

# FX-Family

## MELSEC PLC

**The world's favorite  
micro PLCs**



**10 Million FX PLCs Worldwide /// Over 30 Years Experience ///**  
**Expanded Micro PLC Control /// Networking Solutions ///**  
**Analog Solutions /// Positioning Solutions ///**

# Global Leader



The MELSEC FX3U/FX3UC series are the third generation on programmable controllers of the Mitsubishi Electric FX family. They offer improved network capability and solutions for positioning tasks.



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



## 10 Million FX

The FX Family of PLCs is the PLC of choice across the world, industries and applications.

Mitsubishi Electric has always worked closely with its customers to design the PLC that they want for their applications. The manufacturing and use of 10 million FX CPUs is a demonstration that this close working relationship has delivered quality, reliability and the product that customers want.

## Over 30 Years

The FX Family of PLCs has been an important part of control engineering for over 30 years. Throughout its history, the product has evolved from the original F Series into today's current FX3G series.

The FX Family has proven to be highly reliable and it consistently improves its compatibility with previous PLC generations.

## Number 1 in the world

Mitsubishi Electric was shown to be the largest volume producer of PLCs in the world following the 2004 Worldwide PLC survey by the respected American automation research company ARC.

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# What makes a world leading PLC range?



## Global use

Wide range power supply means your FX solution will work all over the world.



## International acceptance

Shipping approvals such as Lloyds, German Lloyds, ABS, RINA, Det Norse Vetaritas, for example plus CE and E1 compliance for Low Voltage and EMC directives as well as manufacturing to Automotive industry quality levels, make the FX Family PLCs products to trust.



## Flexible design

The FX Family is designed so that the main PLC CPU acts as a platform to which you can add and customize the special functions you need – making every FX your personal PLC.

Adapter or "ADP" units are used on the left hand side of the main PLC unit.

Memory cassette port is located under the removable front cover.



Optional communication boards are available in USB, RS232C, RS422 and RS485 formats.

The RUN/STOP switch has become a familiar feature with all FX Family PLCs.

The standard RS422 Mini-DIN programming port can also be used for HMI connection.

Main base unit where CPU, I/O and power supply are contained in a single unit.

All FX PLC units can be mounted on a DIN rail or directly mounted with screw fixings.



Simple ribbon connection links each unit together.

Special function blocks can be added to the right hand communications bus of the PLC.

Bright LED lamps indicate I/O and power status.



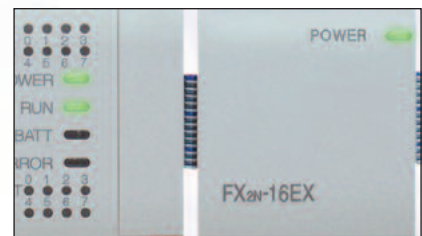
## Easy Programming

The FX Family incorporates an easy programming concept where several complex tasks can be reduced to a single instruction.



## Fast and reliable

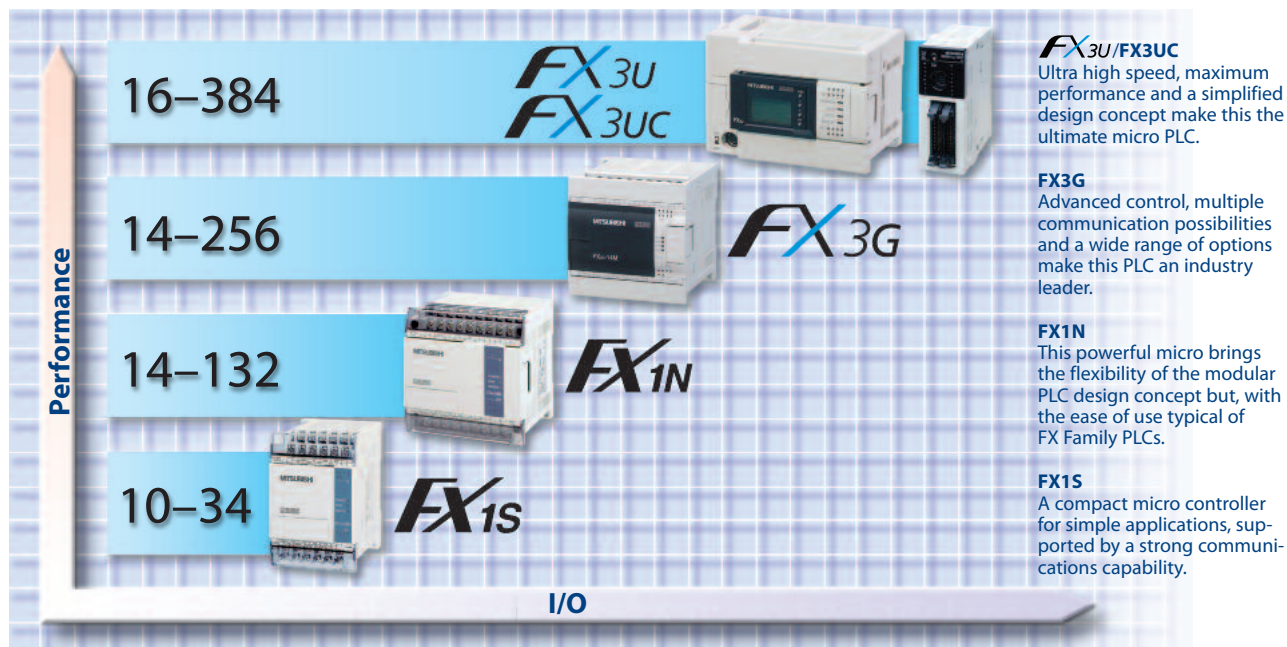
FX PLCs continually push the limits of high speed operation to process your applications more effectively and accurately.



## Compatibility

The FX Family of PLCs continues to raise the level of backward compatibility with many existing FX PLC programs being transferable. And in later models, sharing common peripherals and special function blocks means even greater protection for your investment in both FX and the machine or process being controlled.

# The power to perform



The FX Family of PLCs builds on previous performance and capability, ensuring you have a comprehensive range of control and automation options to choose from.

| Model                              | FX1S                  | FX1N                     | FX3G               | FX3U                  | FX3UC      |
|------------------------------------|-----------------------|--------------------------|--------------------|-----------------------|------------|
| Power supply                       | 100–240 V AC, 24 V DC | 100–240 V AC, 12–24 V DC | 100–240 V AC       | 100–240 V AC, 24 V DC | 24 V DC    |
| Maximum I/O                        | 30 (34 optional)      | 128 (132 optional)       | 256**              | 384*                  | 384*       |
| Digital I/O                        | Relay / Transistor    | Relay / Transistor       | Relay / Transistor | Relay / Transistor    | Transistor |
| Cycle period / logical instruction | 0.55 µs               | 0.55 µs                  | 0.21 µs or 0.42 µs | 0.065 µs              | 0.065 µs   |
| PLC program memory                 | 2 k steps             | 8 k steps                | 32 k steps         | 64 k steps            | 64 k steps |

Summary table of FX PLCs

Note \* : When networked with CC-Link or AS-Interface (Discrete I/O, maximum 256)

Note \*\*: When networked with CC-Link or AS-Interface (Discrete I/O, maximum 128)

## A solution for every application

Micro PLCs have opened up a world of opportunities in Industrial Automation due to their small size and low cost. Now many applications benefit from enhanced performance, easier manufacturing, maintenance and greater reliability.

The FX Family has been a part of this revolution for over 30 years and has developed and redeveloped a range of products to suit most applications. The FX Family consists of four main ranges which are distinct and independent but compatible.

Depending on your application and control needs, you can choose from; the simple FX1S CPU, the modular FX1N range, the powerful FX3U and now the current and dynamic FX3G.

With the FX Family there really is a solution to most applications.



# FX3U a perfect PLC concept

The FX3U CPU brings a combination of greater flexibility and increased performance to the FX Family.

## New high speed bus

The FX3U design has increased the opportunity to configure the PLC directly for your needs.

Following the standard FX Family configuration, the FX3U CPU can be expanded to the right hand side using a wide range of options. These include input and output blocks as well as special function blocks such as analog, pulse train and network communication units.



The FX3U can use new FX3U blocks as well as standard FX2N and FX0N expansion blocks..

The FX3U has an enhanced communications bus that automatically switches into high speed mode for communication with new FX3U expansion modules.

Full compatibility is still available with FX2N and FX0N expansion blocks, and when these are configured the FX3U automatically reduces the bus speed to suit.

This means greater support for existing installed systems as well as delivering high performance and greater response with new installations.

## Adapters add flexibility

A major design enhancement of FX3U is the new adapter expansion bus on the left hand side of the FX3U CPU. Through this bus users can add additional analog and temperature units as well as multiple communications and positioning blocks.

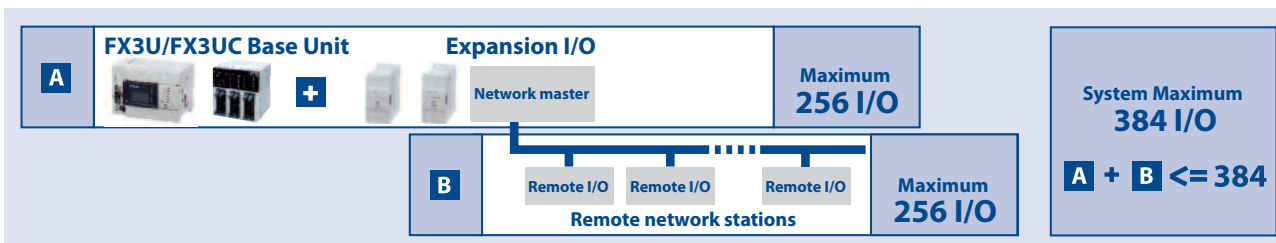


FX3U has a unique new system of directly programmable adapters.

However, the major benefit for the user is that the analog and positioning adapter units no longer require the use of the traditional To/From instruction to configure and operate.

All control is through direct access data registers and setting bits. This means quicker set-up, easier use, and above all much higher processing speeds.

# FX3U/FX3UC. More power. More performance.



FX3U/FX3UC provides additional I/O and networking capacity.

## Increased I/O capacity

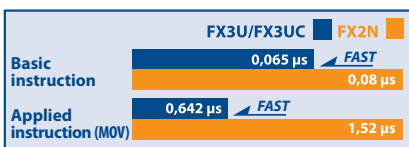
With enhanced networking functions, the FX3U/FX3UC requires an increased input/output (I/O) range. FX3U/FX3UC can support systems with combined local I/O and networked I/O up to a total of 384 I/O points. For users, this means increased system control and added possibilities for advanced networks.

In addition FX3U/FX3UC also fully supports Profibus/DP as well as Ethernet using TCP and UDP protocols.

## 5 times more data storage

With a larger program memory comes the need for more operational devices such as timers, state flags, auxiliary relays and data registers. The FX3U/FX3UC has increased capacity in all of these major areas making program construction easier. Data register capacity has increased by a factor of 5 reflecting the needs of users who have an increased requirement to log operation information against products or batches of products being manufactured.

A typical example of this can be found in the Food and Pharmaceutical industries. Here exact process data such as oven temperatures and cooking times or quantities of ingredients mixed need to be stored against production batches – all this requires increased data handling and data capacity within the PLC.



FX3U/FX3UC provides increased performance in all areas.

Note: 4.5 times increase in speed is measured under the following conditions: program capacity=16 k step, with an I/O usage of 144 points. Program scan time is then; FX3U/FX3UC: 4.6 ms and FX2N: 21.0 ms, an increase in processing speed of 4.56 times.

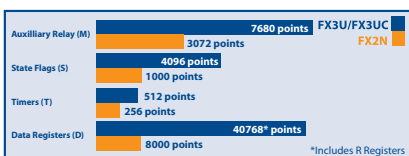
## Up to 4.5 times faster

This means the PC MIX value has been greatly improved with basic instructions now being processed in 0.065 µsec.

For users this means quicker program response and more accurate process performance as inputs, outputs and actions are processed and monitored more times per second.

## 75 new instructions

The FX3U/FX3UC has 75 new instructions in comparison with FX2N. This now makes available 249 instructions for program creation. All of the instructions follow the traditional FX Applied instruction concept designed to make the task of application building and program writing easier and quicker, with less chance for errors.



FX3U/FX3UC offers increased resources as well as increased performance.

## 8 times more memory

FX3U/FX3UC comes with a standard internal memory of 64 k steps, which is 8 times more memory than FX2N.

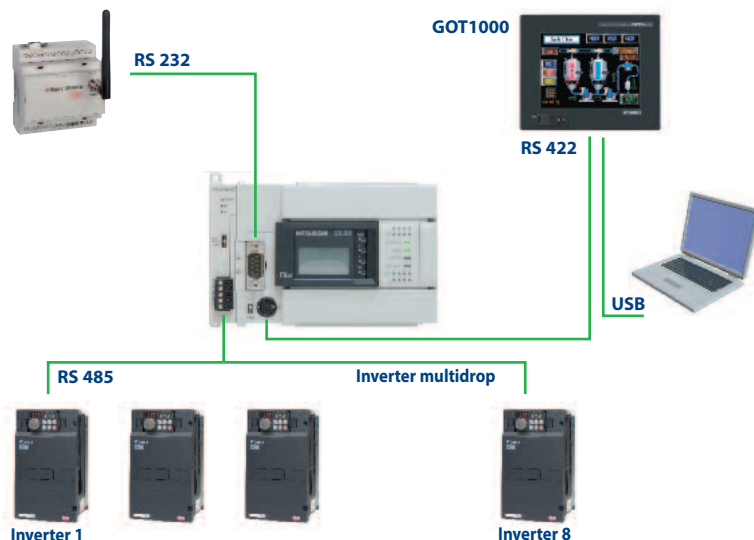
More memory means users can write larger and more complex programs, store more data in file registers, or take greater advantage of using IEC 61131-3 style programming tools.



New instructions include greater control over data processing with a range of new comparison and string manipulation commands.

- LOGE (Nr. 125)**  
Calculates the natural logarithm in floating point
- SORT2 (Nr.149)**  
Sort tabulated data
- TBL (Nr. 152)**  
Batch data positioning mode
- BAND (Nr.257)**  
Defines a band or range of valid numbers
- IVWR (Nr.273)**  
Write parameter to inverter

Some examples of new instructions from the FX3U/FX3UC.



FX3U/FX3UC has a range of flexible communication options.

## Simple high speed positioning

The FX3U/FX3UC has been designed with six high speed counters that can each count up to 100 kHz simultaneously per channel. This, combined with three 100 kHz pulse train outputs, means users can directly configure simple 3-axis positioning systems without the use of additional modules.



Adapter modules increase positioning performance.

However, the new high speed counter ADP and pulse train ADPs can provide the FX3U/FX3UC with maximum positioning performance. Each unit can process signal speeds of up to 200 kHz.

## A great communicator

FX3U/FX3UC has strengthened the communications capability of the FX Family even further.

The new adapters allow up to three RS communication channels to be operated simultaneously allowing multiple HMIs to be connected to a single FX3U/FX3UC CPU or combinations of HMIs, third party devices and programming tools – the choice is yours.

The FX3U/FX3UC also supports a wide range of network options including AS-interface, Profibus-DP, CC-Link, DeviceNet, CANopen as well as Ethernet.

The FX3UC is the ideal choice for applications where there is not much space for the controller hardware. The smallest base unit with 8 digital inputs and 8 transistor outputs takes up just 27 % of the space required for a comparable FX3U unit – and yet the FX3UC incorporates all the features of the FX3U.

The connections for the FX3UC inputs and outputs on the front side can be wired with ribbon cable connectors. For this purpose system cabling sets and remote I/O terminal blocks for easy and fast connections are available.

## FX3U/FX3UC at a glance

- I/O range**  
16–384 (Discrete I/O, maximum 256)
- Program memory**  
64 k steps (standard)
- Basic instruction processing**  
0.065 µsec/logical instruction
- Analog signal processing**  
Up to 80 analog inputs,  
Up to 48 analog outputs
- Analog resolution**  
8, 12 and 16 bits
- Analog options**  
19 analog input, output and temperature blocks available for selection
- Positioning**  
Internal:  
6 high speed counters (100 kHz)  
2 high speed counters (10 kHz)  
3 pulse train outputs (100 kHz), transistor unit only  
External (FX3U only):  
High speed counter block (50 kHz)  
High speed counter ADP module (200 kHz)  
Pulse train ADP (200 kHz)  
Pulse train output block (1 MHz)

# FX3G an industry standard



FX3G PLCs are used in many applications for processing and packaging as well chilled storage and transportation of food items.



Since its launch, the FX3G has been a standard of micro PLC control.

## Customized control

The FX3G is an introductory compact PLC and is the newest addition to the FX3 series, designed for simple yet performance-critical applications that require discrete control of up to 128 local I/O or up to 256 I/O with CC-Link remote I/Os. Incorporating innovative FX3 series technology the customer is presented with a suite of benefits. These include a large program memory to implement sophisticated algorithms plus high speed execution to enhance system productivity.



FX3G has the versatility to handle applications from a wide range of industries.

## Highly flexible

A dual bus architecture provides flexible expansion possibilities and with the ability to handle analog, high speed, positioning, and inverter control, the FX3G is able to successfully adapt to a range of applications in industry areas such agriculture, water processing, material handling, food processing and more.

## The great communicator

With a wide range of network and serial protocols available, such as Ethernet, CC-Link and Modbus, the FX3G enables seamless integration and data communications between both Mitsubishi Electric and third-party devices. Furthermore, a built-in USB port permits convenient connection to any PC or laptop.

## FX3G at a glance

### I/O range

14–256 (Discrete I/O, maximum 128)

### Program memory

32 k steps (internal)

### Basic instruction processing

0.21  $\mu$ s or 0.42  $\mu$ s/logical instruction

### Analog signal processing

Up to 74 analog inputs

Up to 41 analog outputs

### Analog resolution

8, 12 and 16 bit

### Analog options

19 analog input, output and temperature blocks available for selection

### Positioning

Internal:

Up to 4 high speed counters (max. 10 kHz)

up to 2 high speed counters (max. 60 kHz)

up to 3 (2) pulse train outputs (100 kHz)

# FX1N the modular micro



FX1N has six shipping approvals. It has been used in applications from controlling temperature in containers to managing diesel engines.



The FX1N offers comprehensive expansion options.

The FX1N provides a simple introduction to modular micro control offering comprehensive functionality and expansion options.

## Compatibility cuts costs

The FX1N provides many user benefits including excellent compatibility with other FX Family PLCs. The FX1N is upwardly compatible to the FX2N/FX3G using many of the FX2Ns I/O and special function blocks. It also shares the same programming structure as the FX1S. This means that users benefit from learning and using one PLC programming syntax; resulting in faster program development and reduced programming errors.

In addition, users benefit from a reduced stock and spare parts requirement as the FX1N uses the same expansion boards as the FX1S and the same special function and expansion I/O blocks as the FX2N.

## Powerful performance

The FX1N saves space, cost and engineering time with the use of powerful, built in, positioning tools such two 100 kHz pulse train outputs and up to two 60 kHz high speed counters. These can be used to create simple 2-axis positioning systems, linked to servo amplifiers or stepper motor drivers without the need for additional PLC hardware saving space, cost and engineering time.

## FX1N at a glance

### I/O range

14–132

### Program memory

8 k steps (standard)

### Basic instruction processing

0.55 µsec/logical instruction

### Analog signal processing

66 analog inputs

33 analog outputs

### Analog resolution

8, 12 and 16 bits

### Analog options

12 analog input, output and temperature blocks available for selection

### Positioning

Internal:

2 high speed counters 60 kHz,

4 high speed counters 10 kHz

2 pulse train outputs (100 kHz), transistor unit only

# FX1S micro control



FX1S has been used in a wide range of embedded control applications.



FX1S offers communication and real time control from a single unit.

## Fit and forget

Typically FX1S applications are small, embedded control functions that are hidden away or inaccessible under normal maintenance activities. This is why the FX1S has been designed to be a robust low maintenance PLC. Features such as the maintenance free, 2000 step EEPROM memory and real time clock management all help to make the FX1S a self managing system, reducing the impact on the maintenance engineer.



Example of connectivity to 3rd party products

## Remote control

The FX1S has an additional range of BD expansion boards providing RS232, RS485 and RS422 communications options. These can be used to connect and control various third party products such as bar code readers or panel printers.

## Simple programming

The FX Family has a simple programming structure combining Basic and Applied instructions. The Basic instructions are common to all FX Family PLCs. Applied instructions provide the specialist control options such as data comparisons, PID and communications control, all of which are available on FX1S. As each FX PLC range increases in capability (FX1S, FX1N, FX3G, FX3U/FX3UC) so do the number of available Applied instructions.

## FX1S at a glance

### I/O range

10-34

### Program memory

2 k steps (standard)

### Basic instruction processing

0.55 µsec/logical instruction

### Analog signal processing

Up to 2 points

### Analog resolution

12 bits

### Analog options

2 analog input BD board

1 analog output BD board

### Positioning

Internal:

2 high speed counters 60 kHz,

4 high speed counters 10 kHz

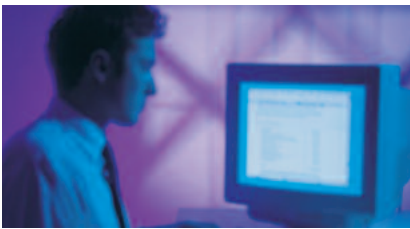
2 pulse train outputs (100 kHz), transistor unit only

# Progressive software concepts

The Mitsubishi FX PLC Family has a worldwide reputation for reliability, performance and ease of use. These key values have also been used to form Mitsubishi's integrated software concept, MELSOFT.

## Productivity tools

Programming software for PLCs is constantly evolving. Users are placing more focus on reusable program code and function block concepts. This helps to reduce errors, reduce programming time and to help manage the whole programming process – increasing overall productivity.

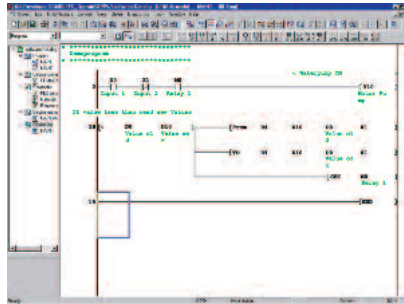


Often the biggest cost on a project is engineering time.



MELSOFT is a wide range of software solutions designed to optimize your plant productivity.

## Simple and intuitive



GX Developer offers ease of use for programmers of all skill levels.

The key to any good software is that it is simple to use. Mitsubishi's GX Developer PLC programming packages have achieved this by using intuitive design.

They also have comprehensive help functions and an advanced communications layer, ensuring safe reliable communication to the target PLC.

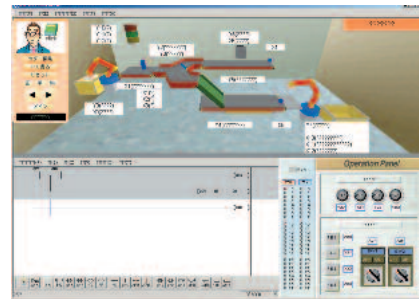
## Choose what you need

GX Developer offers users the chance to program all Mitsubishi MELSEC PLCs from a single package. However, for users who only need support for FX based systems there is GX Developer FX.

Mitsubishi also provide GX IEC Developer packages, providing IEC61131-3 compliant programming in; Instruction List, Ladder, Function Block, Structured Text and SFC formats. Using standard programming languages, like IEC61131-3, on large programming projects can help users save costs by creating reusable PLC code and Function Blocks.

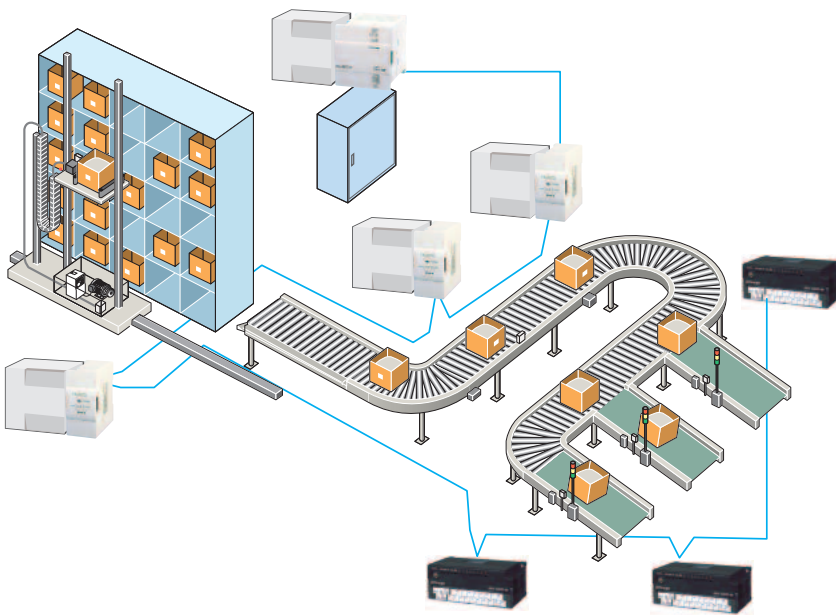
## First time user?

For users who do not have the time to take local training, there is the option of using Mitsubishi's home study software, FX-TRN-BEG, where PLC programs can be created, simulated and debugged in the safety of a PC simulation.



Learning to program can be achieved quickly using interactive software.

# Networking and communication solutions



FX Family PLCs have a wide range of communications options.

Applications are often required to integrate between each other across a factory, to report production or tracking data back for office based processing and in some cases be remotely monitored and maintained when the application is in an inaccessible location. The FX Family of PLCs has evolved to match this demand at all levels.

## Networks make sense

Networked solutions to complex applications often make the overall solution easier to achieve and more cost effective. For example a conveyor system integrated with a warehouse pick and place system may extend over many hundreds of meters, and by using a fieldbus, such as CC-Link, wiring, troubleshooting and maintenance can be dramatically reduced.

## Remote maintenance

With communications technology it is now possible to put PLC control in the most remote locations. Using a PLC with a RS232 interface to a telemetry solution, such as a GSM modem, allows the user the ability to remotely monitor and maintain the system. It can also allow the remote system to send alarm messages, warnings or general status information back to the user's central data processing centre.



Example of remote pumping station.

## Easy communications

Today's FX Family of PLCs share a basic communication concept where additional RS232, RS422 or RS485 communications boards can be added to the main base unit without increasing the required cabinet space. These can then be used for communication to various third party devices like bar code readers, printers and modems.

FX Family PLCs, such as FX1N, FX3G, FX3U and FX3UC, have a wider range of communications modules. These include options for connection to open and bespoke networks such as Ethernet, Profibus-DP, CC-Link, DeviceNet, CANopen, AS-interface or Modbus for example.

# Analog solutions

Analog control is one of the most important areas for any automation system. Critically for users the concern is to match the performance demanded by the application to the available solutions in a cost effective way.

## Where is analog used?

Analog control is widely used. In simple terms it allows a variable signal to be used to control items such as a motor's speed or to sense inputs such as fluid levels.

### ■ Digital to analog (D-A) control

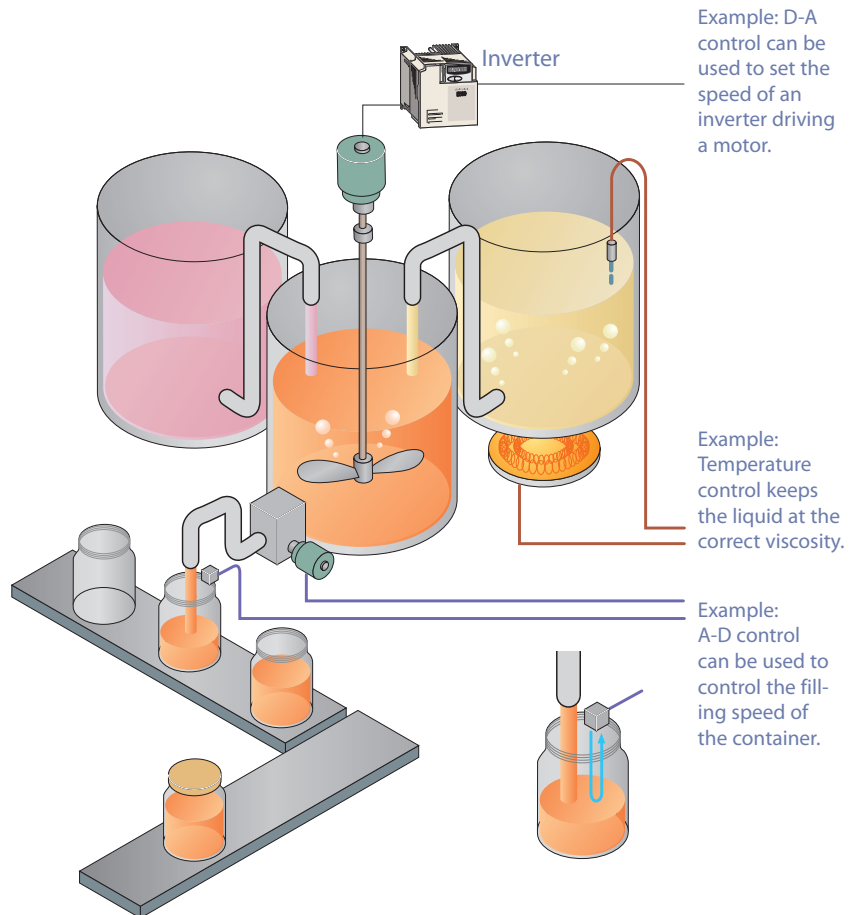
Here a digital PLC value is output as an analog signal. It can be used, for example, to send a speed command to an inverter which in turn causes the motor to increase or decrease speed.

### ■ Analog to digital (A-D) control

In this type of control a variable signal is sent to a PLC where it is converted in to a direct digital value. An example of this could be the measurement of the level of a liquid in a storage tank so that the exact amount of stored liquid can be controlled by the PLC.

### ■ Temperature control

Temperature control is the third type of analog control. An example of use could be where the temperature of a furnace is measured and compared by the PLC against a set range. Additional heating or cooling can then be applied to maintain a constant temperature.



Example: D-A control can be used to set the speed of an inverter driving a motor.

Example: Temperature control keeps the liquid at the correct viscosity.

Example: A-D control can be used to control the filling speed of the container.

Analog solutions are an important part of control engineering and can be used to simplify and accurately control actions happening in the production environment.

## 22 solutions to choose from

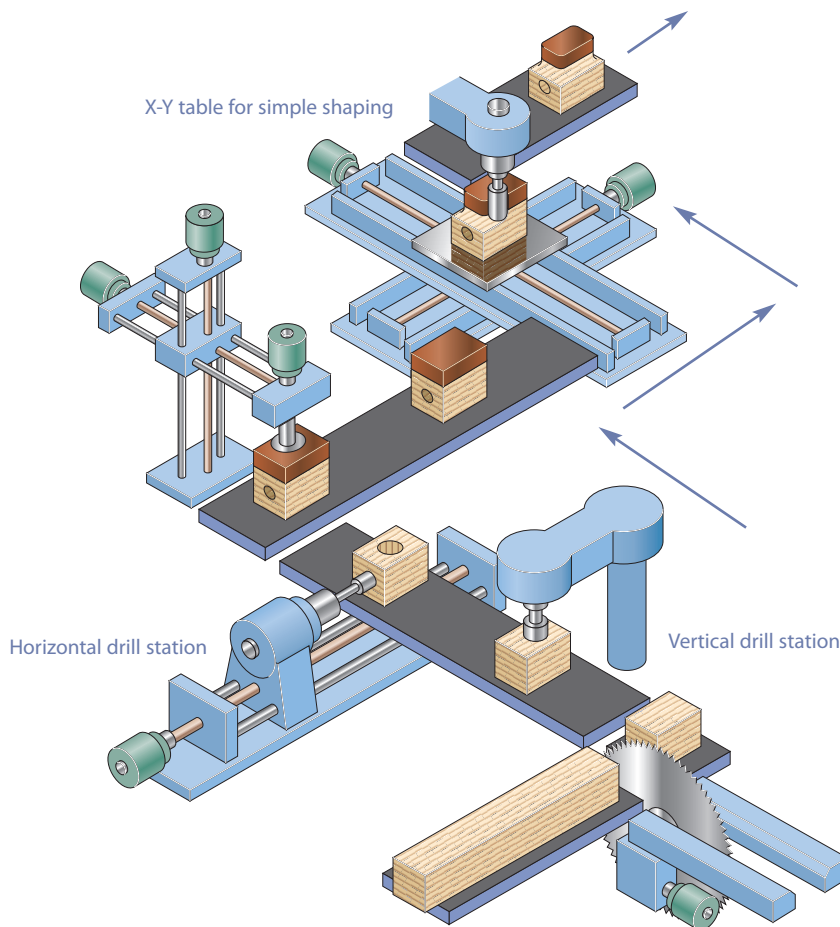
The FX Family offers a wide range of analog solutions from 1 and 2 channel BD boards for FX1S up to 8 channel input blocks like the FX2N-8AD where temperature, voltage and current input can be mixed on the same block. FX analog blocks also come in a range of resolutions from 8 bit up to 16 bit signal processing. Overall there are 22 different analog options available to users of the FX PLC Family.

With this range of choice and flexibility it is sure that there will be a solution here for most applications.



Example of temperature control.

# Positioning solutions



Simple positioning solutions can be effectively managed within a standard FX PLC.

Using simple positioning solutions can help increase the accuracy of the work process, reduce waste and rework as well as provide a higher quality of production.

## Typical applications

Simple positioning applications typically involve independently controlled operational axis and can sometimes have many requirements. In the example of an X-Y table, a relative position is achieved by driving each axis until its target position is achieved, regardless of what happens with the other axis. There are two main elements to achieve this type of positioning control.

### ■ Pulse train outputs

A stream of output pulses can be used as a drive signal to a line driver, stepper motor or servo amplifier, which then causes the connected motor to perform the positioning activity.

The larger the range of output pulse frequencies available means greater speed and/or accuracy is achievable. For example, if a stepper motor with a larger number of steps is used, the travel distance per step can be reduced, resulting in an increased system accuracy.

### ■ High speed counter input

When a motor is being driven, its relative position can be controlled by counting the number of output pulses.

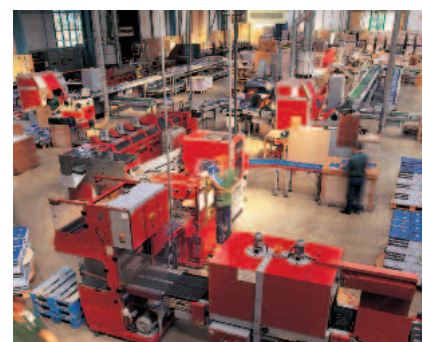
However, for a more accurate process, reading the actual position from an encoder feedback directly into a high speed counter is preferred. This helps to overcome issues of backlash and slippage as the actual position is measured and not assumed.

## Positioning built in as standard

FX PLCs come with high speed counters (in some cases up to 100 kHz) and pulse train outputs (also in some cases up to 100 kHz) as standard. The high speed counters can be configured in single pulse train inputs, The high speed counters can be configured in a single or two phase input.

Pulse train outputs can be configured to provide continuous pulse streams at different frequencies or a set quantity of pulses at a single frequency.

There are also optional modules and adapters that can provide additional high speed counters with performance up to 200 kHz. The same is true for pulse train outputs with 200 kHz and 1 Mpps (1 MHz) output options available.



Example of conveyor belt control.



# Display solutions

An increasingly important area of any automation solution is the reporting and display of operational information. This data enables operators, maintenance teams and business managers to make informed decisions in the best interests of the business.

## The right tool for the right job

For maximum efficiency, each user requires access to information at their work place in a form that highlights the important data for them first. This means a range of different tools are required. As an example, here are three possible scenarios.

### ■ The machine operator

Machines often have a lot of manufacturing debris around or are subject to hygienic cleaning as in the food industry. Any display located in this environment would need to have a high Ingress Protection (IP) rating, indicating a high degree of water-proofness.



In the food industry hygiene is very important.

It may also be a benefit to the operator to have a large and clear display to reduce the chances for error from misreading, due to poor light or small fonts being used. It is also recognized that the use of graphics also reduces the chances for reading errors with complex data.

### ■ The maintenance team

The critical information for a maintenance engineer is the error and diagnostic data within the PLC as this is used to diagnose any process problems. However, additional



The FX3U-7DM can be directly mounted within the PLC (FX3U) or mounted on the front cabinet.

information regarding the operational "hours run" or cycles processed, which could be called soft information as it is calculated on operational parameters, could allow the maintenance engineer to predict possible failure and arrange preventative maintenance.

Access to this data could be through the machine operator's terminal, across a network or through a dedicated display mounted inside or on the control cabinet itself.

### ■ The business manager

In a production controllers office it would be better to display information through a network to their existing desktop PC. In this application a piece of software such as an OPC server/client, a Java applet, an Active X control or a SCADA system would allow lots of data from lots of sources to be displayed in a clear and concise way giving the production controller the overview of the business operation that they need.

## Data the way you want it

Mitsubishi offers a wide range of visualization solutions from simple data displays such as the FX3U-7DM, advanced Graphic Operator Terminals like the GOT1000 Series and E1000 Series, and a wide choice of software solutions from the MELSOFT software suite.

This powerful combination of hardware and software means there is a cost effective solution for most applications.



The GOT1000 is a typical HMI.

# Where have FX PLCs been used?



Sanitation management on Eurostar rollingstock.

Customer applications with FX PLCs have been wide spread from critical applications in pharmaceutical industries to sublime applications in the leisure industry. However, the FX PLC Family still remains the PLC of choice for many machine builders as it is flexible, compact and easy to use, which is why it is so often used.

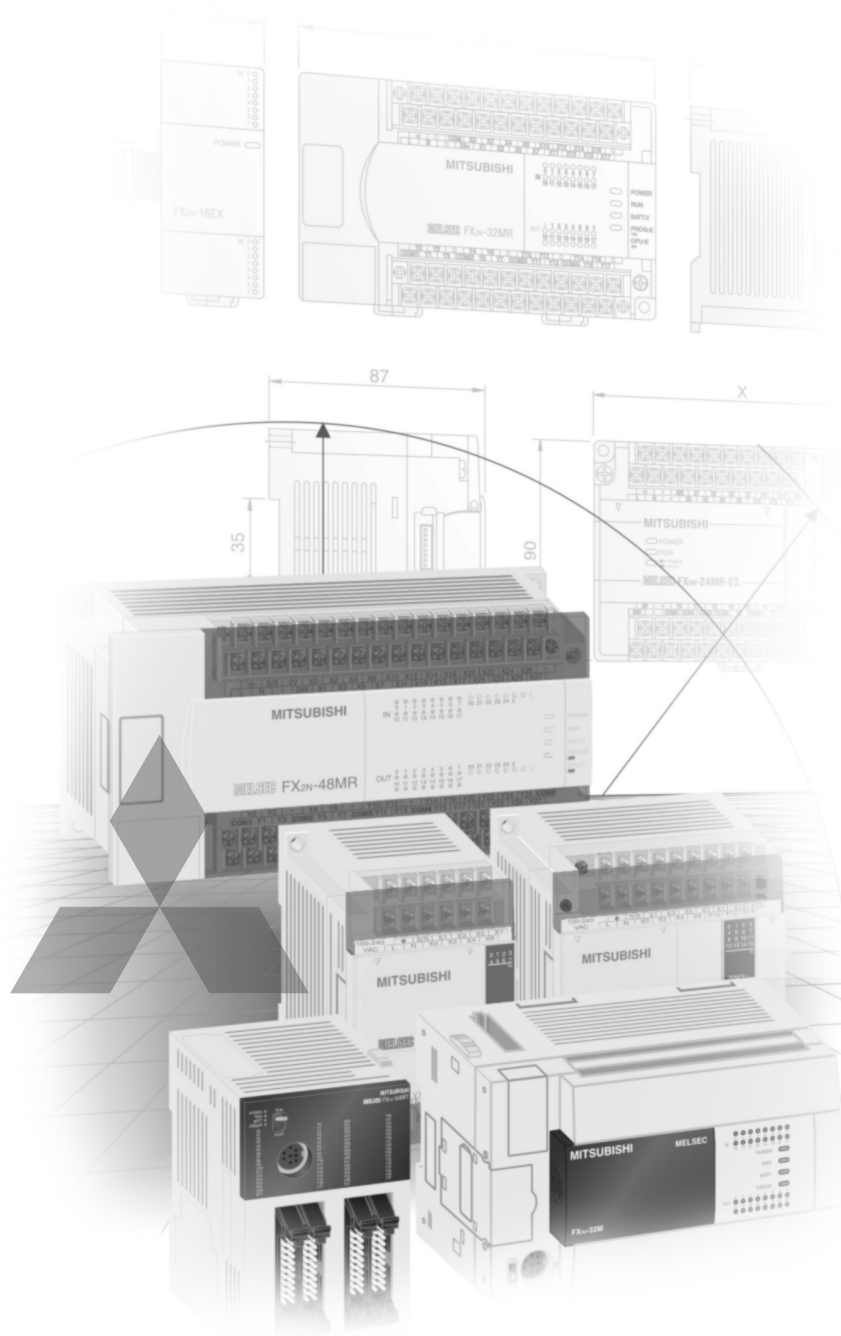
Here are just a few examples of applications that customers have completed in the past

- Agriculture
  - Plant watering systems
  - Plant handling systems
  - Saw mill (wood)
- Building management
  - Smoke detection monitoring
  - Ventilation and temperature control
  - Lift (elevator) control
  - Automated revolving doors
  - Telephone management
  - Energy management
  - Swimming pool management
- Construction
  - Steel bridge manufacturing
  - Tunnel boring systems
- Food and drink
  - Bread manufacture (mixing/baking)
  - Food processing (washing/sorting/slicing/packaging)

- Leisure
  - Multiplex cinema projection
  - Animated mechatronics (museums/theme parks)
- Medical
  - Respiration machine testing
  - Sterilization
- Pharmaceutical/chemical
  - Dosing control
  - Polution measurement systems
  - Cryogenic freezing
  - Gas chromatography
  - Packaging
- Plastics
  - Plastic welding systems
  - Energy management systems for injection molding machines
  - Loading/unloading machines
  - Blow molding test machines
  - Injection molding machines
- Printing
- Textiles
- Transportation
  - Sanitation on passenger ships
  - Sanitation on rail rolling stock
  - Fire tender, pump management
  - Waste disposal truck management
- Utilities
  - Waste water treatment
  - Fresh water pumping



Swimming pools are managed using FX PLCs.



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## Technical Information Section

## Further Publications within the PLC Range

### **Brochures**

#### **System Q Family**

Product catalogues for programmable logic controllers and accessories for the further MELSEC PLC series

#### **HMI Family**

Product catalogue for operator terminals, supervision software and accessories

#### **Inverter Family**

Product catalogue for frequency inverters and accessories

#### **Servo and Motion Systems**

Product catalogue for servo amplifiers and servo motors as well as motion controller and accessories

#### **Robots Family**

Product catalogue for industrial robots and accessories

#### **Low Voltage Switchgears**

Product catalogue for low voltage switchgears, magnetic contactors and circuit breakers

#### **Automation Book**

Overview on all Mitsubishi automation products, like frequency inverters, servo/motion, robots etc.

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### **More information?**

This product catalogue is designed to give an overview of the extensive range of FX Family of MELSEC PLCs. If you cannot find the information you require in this catalogue, there are a number of ways you can get further details on configuration and technical issues, pricing and availability.

For technical issues visit the [www.mitsubishi-automation.com](http://www.mitsubishi-automation.com) website.

Our website provides a simple and fast way of accessing further technical data and up to the minute details on our products and services. Manuals and catalogues are available in several different languages and can be downloaded for free.

For technical, configuration, pricing and availability issues contact our distributors and partners.

Mitsubishi partners and distributors are only too happy to help answer your technical questions or help with configuration building. For a list of Mitsubishi partners please see the back of this catalogue or alternatively take a look at the "contact us" section of our website.

### **About this product catalogue**

This catalogue is a guide to the range of products available. For detailed configuration rules, system building, installation and configuration the associated product manuals must be read. You must satisfy yourself that any system you design with the products in this catalogue is fit for purpose, meets your requires and conforms to the product configuration rules as defined in the product manuals.

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## ALPHA and MELSEC PLC Systems

### The ALPHA Series

The ALPHA closes the gap between single components and a PLC system. It combines all advantages of a PLC system in a very compact housing and therefore provides a space and cost saving alternative to relays and contactors.

The ALPHA series is suited to applications in industrial machines and in automated building services.

Key enhancements in the ALPHA2 include a program capacity of 200 function blocks, an extra-large display, expansion options and a second communications port. The instruction set, includes math operations, PWM and SMS text messaging functions. All this opens up possibilities for analog and temperature control as well as remote operation.

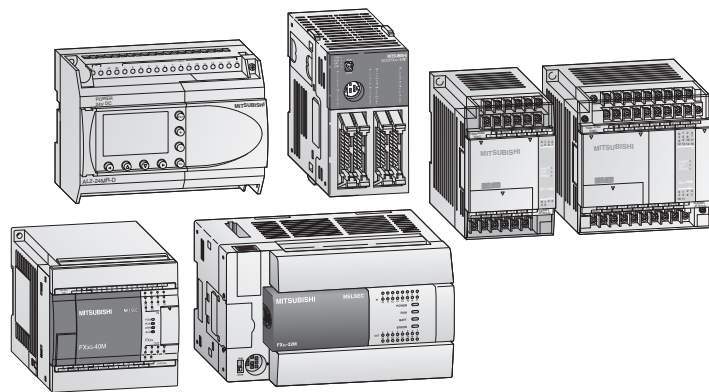
### The MELSEC FX Family

The MELSEC FX family includes a very comprehensive range of base and expansion modules, enabling you to configure a customised system tailored to your precise requirements.

Depending on your application and control needs you can choose from the small, attractively-priced, "stand-alone" FX1S series, the expandable FX1N series or the more powerful FX3G and FX3U series.

With the exception of the FX1S all FX series can be expanded to adapt them to the changing needs of your installations and applications.

Network integration is also supported, making it possible for your FX controllers to communicate with other PLCs, controllers and HMIs. The PLC systems can be configured as local stations in MITSUBISHI networks. In addition these flexible units can also be used as master or slave units on fieldbus's like Profibus/DP and CC-Link. The MELSEC FX Family controllers also support CANopen, DeviceNet, AS-Interface and Ethernet. Special versions with E-Mark label (ECE request) are available upon request for vehicle application.



### Expandability and Power

The MELSEC FX family is highly flexible, enabling fast and efficient configuration and programming for the application at hand.

It is the ideal choice, no matter whether you need to install a simple control application requiring 30 I/Os (FX1S) or a demanding, complex system with up to 384 I/O points (FX3U).

The use of memory cassettes can expand the available programming space on some FX Family PLCs while generally providing a long term program storage option for all FX PLC users. In addition, memory cassettes can also allow programs to be switched at very short notice simply by replacing the cassette.

There are five series in the MELSEC FX family, each of which is designed for a different application profile:

#### ● The FX1S Series

The MELSEC FX1S series is the inexpensive entry to the MELSEC FX family. With its small dimensions it is also an excellent alternative to relay/contactors control configurations.

#### ● The FX1N Series

The CPUs of the FX1N series offer more power than the FX1S series, plus modular

expansion capabilities. You can choose from I/O expansion modules and special function modules for a wide variety of applications.

#### ● The FX3G Series

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

#### ● The FX3U Series

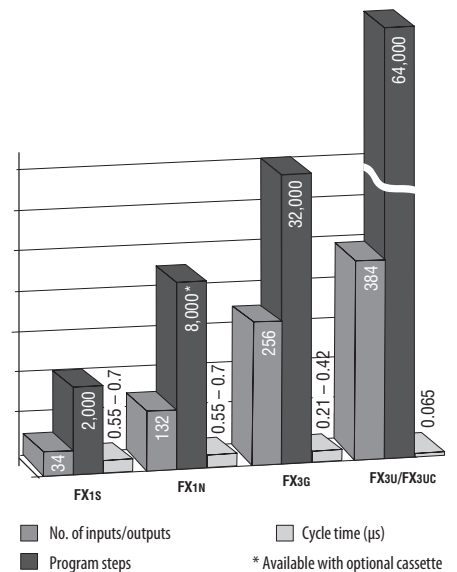
The FX3U series gives you the freedom of modular expandability, with a wide selection of expansion modules and special function modules.

The FX3U is the fastest PLC systems available, with a cycle time of just 0.065  $\mu$ s per logical instruction. This gives users a powerful CPU delivering modular PLC performance in a compact PLC design.

#### ● The FX3UC Series

The performance of the FX3UC is the same as that of the FX3U series, but it has more compact dimensions. It is the ideal choice for applications where little space is available for the controller.

Thus the FX3U and FX3UC series give you the most powerful CPU for your application and combines all benefits of a compact PLC system with the performance of a modular PLC system.



## Features

The modular design of the FX family makes it extremely flexible, enabling it to be used for a very broad range of applications.

You can configure tailor-made systems by combining modules from a variety of different categories (see figure).

All modules are electrically isolated from their environment with optocouplers for maximum reliability.

### Communications modules

Interface modules with RS232/RS422/RS485 interfaces for the connection of peripherals and PLC-PLC links.

Network modules for Ethernet, Profibus/DP, CC-Link, AS-Interface, DeviceNet, CANopen and for the configuration of proprietary Mitsubishi networks

### Positioning modules

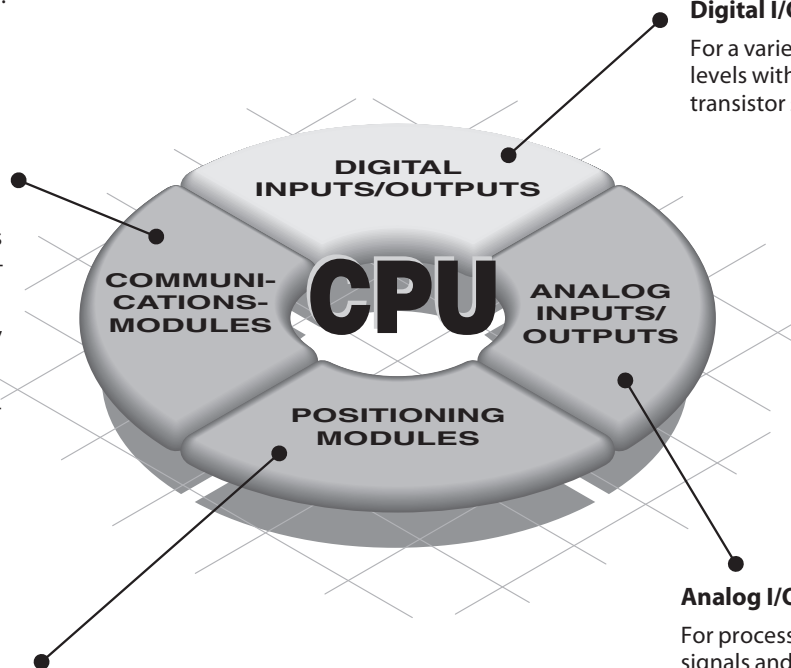
High-speed counter modules with support for the connection of incremental rotary transducers and positioning modules for servo and stepping motor drives

### Digital I/O modules

For a variety of signal levels with relay or transistor switches

### Analog I/O modules

For processing current/voltage signals and temperature registration with a direct connection option for PT100 resistance thermometers and thermocouples



## Digital and special function modules – configuration

The options for using digital and special function modules are dictated by the CPU used in the system.

When calculating the number of special function modules you can use in a system you must take both the number of digital modules and the maximum number of special function modules that can be used into account.

The table on the right provides a simplified guide to the number of modules you can use in each system type. More detailed information and the basic principles of system configuration can be found in the corresponding manuals.

| CPU type | System restrictions  |
|----------|--|
| FX1S     | Stand-alone PLC with 10 / 14 / 20 or 30 I/Os; no special function modules but 1 I/O adapter board can be installed   |
| FX1N     | PLC with max. 132 I/Os<br>A maximum of 2 special function modules or digital expansion modules with up to 32 inputs and outputs (4x8 I/Os or 2x16 I/Os) or one special function module and one digital extension module with up to 16 inputs and outputs (2x8 I/Os or 1x16 I/Os) can be connected. |
| FX3G     | PLC with max. 256 I/Os<br>A maximum of 8 special function modules and digital extension modules with up to 128 I/Os can be connected to the right side of the main unit. In addition, a maximum of 4 special adapters from the FX3U series can be connected to the left side.                      |
| FX3U     | PLC with max. 384 I/Os<br>To the left side of the main unit, a maximum of 10 special adapters from the FX3U series can be connected. To the right side of the main unit, up to 8 special function modules and digital extension modules with up to 256 I/Os can be connected.                      |
| FX3UC    | PLC with max. 384 I/Os<br>To the left side of the main unit, a maximum of 6 special adapters from the FX3U series can be connected. To the right side of the main unit, up to 4 special function modules and digital extension modules with up to 256 I/Os can be connected.                       |

## The Components for an FX PLC System

A basic FX PLC system can consist of a stand alone base unit, with the functionality and I/O range increased by adding extension I/O and special function modules. The following section provides an overview of options available.

### Base Units

The entire FX PLC range can be AC or DC powered with a mix of input and output styles. The PLCs can be programmed with the user friendly GX or GX IEC Developer programming software, allowing programs to be transferred between different FX PLCs. All PLC base units include an integrated real time clock.

Base units are available with different I/O configurations from 10 to 128 points but can be expanded to 384 points depending upon the FX range selected.

### Extension Boards

Extension adapter boards can be installed directly into the base unit and therefore do not require any additional installation space. For a small number of I/O (2 to 4) an extension adapter boards can be installed directly into the (left-hand side) FX1S, FX1N, FX3G or FX3U controller. Interface adapter boards can also provide the FX PLC with additional RS232, RS422, RS485 or USB interfaces. To connect special function modules (e.g. Ethernet module) a communication adapter has to be installed (except FX3UC).

### Extension I/O Modules

Unpowered and powered extension I/O modules can be added to the FX1N/FX3U and FX3UC PLCs.

For expansion modules powered by the base unit, the power consumption has to

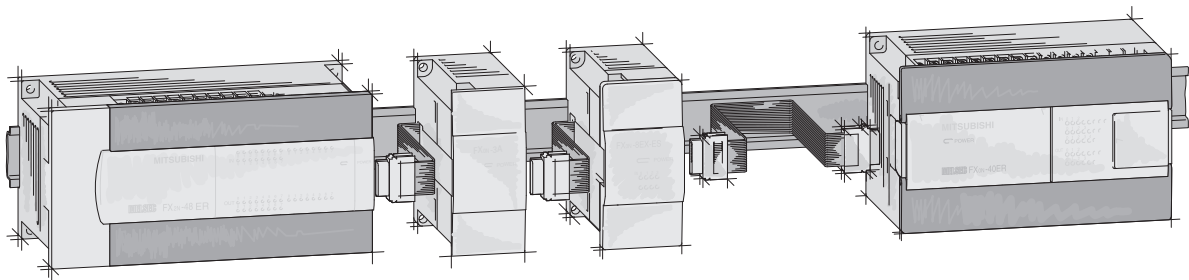
be calculated as the 5 V DC bus can only support a limited number of expansion I/O (for further details please refer to next page – calculation of the power consumption).

### Special Function Modules

A wide variety of special function modules are available for the FX1N, FX3G, FX3U and FX3UC PLCs. They cover networking functionality, analog control, pulse train outputs, data logging function and temperature inputs.

### Memory extension and operator terminals

Each FX family base unit can be equipped with a memory cassette. The programming unit interface enables the connection of programming tools like PC and hand held programming units as well as graphical operator terminals.



| Expansion possibilities                          |                    | ALPHA2 | FX1S | FX1N | FX3G | FX3U | FX3UC  | Reference page |
|--|--------------------|--------|------|------|------|------|--------|----------------|
| Extensions for inside PLC installation           | Digital            | ●      | ●    | ●    | ●    | ●    | ●      | 11, 45         |
|  | Analog             | ●      | ●    | ●    | ●    | ●    | ●      | 11, 46         |
| Extension modules (installation outside the PLC) | Digital            | —      | —    | ●    | ●    | ●    | ●      | 29             |
|  | Analog             | —      | —    | ●    | ●    | ●    | ●      | 33             |
|  | Temperature        | ●      | —    | ●    | ●    | ●    | ●      | 11, 34         |
| Network modules                                  | AS-Interface       | ●      | —    | ●    | —    | ●    | ●      | 12, 39         |
|  | CC-Link            | —      | —    | ●    | ●    | ●    | ●      | 38             |
|  | CAN open           | —      | —    | ●    | ●    | ●    | ●      | 43             |
|  | Ethernet           | —      | ●    | ●    | ●    | ●    | ●      | 40             |
|  | Profibus/DP        | —      | —    | ●    | ●    | ●    | ●      | 41             |
|  | DeviceNet          | —      | —    | —    | —    | ●    | ●      | 43             |
|  | Modbus RTU/ASCII   | —      | —    | —    | ①    | ●    | ●      | 44             |
|  | SSCNET             | —      | —    | —    | —    | ●    | ●      | 37             |
| Communications boards                            | RS232              | ●      | ●    | ●    | ●    | ●    | —      | 48             |
|  | RS422              | —      | ●    | ●    | ●    | ●    | —      | 48             |
|  | RS485              | —      | ●    | ●    | ●    | ●    | —      | 48             |
|  | USB                | —      | —    | —    | —    | ●    | —      | 47             |
| Communications modules                           | RS232              | —      | ●    | ●    | ●    | ●    | ●      | 44             |
|  | RS485              | —      | ●    | ●    | ●    | ●    | ●      | 44             |
| Dedicated function modules                       | High speed counter | —      | —    | —    | —    | ●    | ●      | 36             |
|  | Positioning        | —      | —    | —    | —    | ●    | ●      | 37             |
| Memory cassettes                                 | ●                  | ●      | ●    | ●    | ●    | ●    | 12, 49 |                |
| External Display                                 | —                  | ●      | ●    | ●    | ●    | —    | 54     |                |

① only via IEC function blocks



### Calculation of the Power Consumption

The power consumption figures on the 5 V DC bus for the special function modules are shown in the specifications tables on the following pages.

The maximum permissible currents on the 5 V DC and 24 V DC bus are shown in the table below.

| Modules               | Max. current |          |
|-----------------------|--------------|----------|
|                       | 5 V bus      | 24 V bus |
| FX3G-14/24M□-ES(ESS)  | —            | 400 mA   |
| FX3G-40/60M□-ES(ESS)  | —            | 400 mA   |
| FX3U-16/32M□-ES(ESS)  | 500 mA       | 400 mA   |
| FX3U-48-128M□-ES(ESS) | 500 mA       | 600 mA   |
| FX3UC-16MT/D(DSS)     | 600 mA       | —        |
| FX3UC-32MT/D(DSS)     | 560 mA       | —        |
| FX3UC-64MT/D(DSS)     | 480 mA       | —        |
| FX3UC-96MT/D(DSS)     | 400 mA       | —        |

The residual currents for the 24 V DC service voltage at different input/output configurations are shown in the tables on the right.

A maximum of 256 I/Os are possible for FX3U/FX3UC (128 I/Os for FX3G).

Max. residual current values (in mA) for FX3U-16M□-E□□ through FX3U-32M□-E□□ for the permissible configuration

|                              |    |                             |     |     |     |     |     |     |    |    |  |
|------------------------------|----|-----------------------------|-----|-----|-----|-----|-----|-----|----|----|--|
| Number of additional outputs | 40 | 25                          |     |     |     |     |     |     |    |    |  |
|                              | 32 | 100                         | 50  | 0   |     |     |     |     |    |    |  |
|                              | 24 | 175                         | 125 | 75  | 25  |     |     |     |    |    |  |
|                              | 16 | 250                         | 200 | 150 | 100 | 50  | 0   |     |    |    |  |
|                              | 8  | 325                         | 275 | 225 | 175 | 125 | 75  | 25  |    |    |  |
|                              | 0  | 400                         | 350 | 300 | 250 | 200 | 150 | 100 | 50 | 0  |  |
|                              |    | 0                           | 8   | 16  | 24  | 32  | 40  | 48  | 56 | 64 |  |
|                              |    | Number of additional inputs |     |     |     |     |     |     |    |    |  |

Max. residual current values (in mA) for FX3U-48M□-E□□ through FX3U-128M□-E□□ for the permissible configuration

|                              |    |                             |     |     |     |     |     |     |     |     |     |     |    |    |  |  |  |  |  |
|------------------------------|----|-----------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|--|--|--|--|--|
| Number of additional outputs | 64 | 0                           |     |     |     |     |     |     |     |     |     |     |    |    |  |  |  |  |  |
|                              | 56 | 75                          | 25  |     |     |     |     |     |     |     |     |     |    |    |  |  |  |  |  |
|                              | 48 | 150                         | 100 | 50  | 0   |     |     |     |     |     |     |     |    |    |  |  |  |  |  |
|                              | 40 | 225                         | 175 | 125 | 75  | 25  |     |     |     |     |     |     |    |    |  |  |  |  |  |
|                              | 32 | 300                         | 250 | 200 | 150 | 100 | 50  | 0   |     |     |     |     |    |    |  |  |  |  |  |
|                              | 24 | 375                         | 325 | 275 | 225 | 175 | 125 | 75  | 25  |     |     |     |    |    |  |  |  |  |  |
|                              | 16 | 450                         | 400 | 350 | 300 | 250 | 200 | 150 | 100 | 50  | 0   |     |    |    |  |  |  |  |  |
|                              | 8  | 525                         | 475 | 425 | 375 | 325 | 275 | 225 | 175 | 125 | 75  | 25  |    |    |  |  |  |  |  |
|                              | 0  | 600                         | 550 | 500 | 450 | 400 | 350 | 300 | 250 | 200 | 150 | 100 | 50 | 0  |  |  |  |  |  |
|                              |    | 0                           | 8   | 16  | 24  | 32  | 40  | 48  | 56  | 64  | 72  | 80  | 88 | 96 |  |  |  |  |  |
|                              |    | Number of additional inputs |     |     |     |     |     |     |     |     |     |     |    |    |  |  |  |  |  |

An external power supply is necessary, if the residual current for the 24 V supply of the special function modules is not sufficient.

### Sample Calculations

The tables below and on the right show different examples for sample power calculation for a PLC system.

The current values for the special function modules can be found in the specifications on the following pages.

Comparison with the current value tables show that the calculated figures for the 5 V bus lie within the allowable ranges.

In the example below all units can be supplied sufficiently with the internal 24 V power supply.

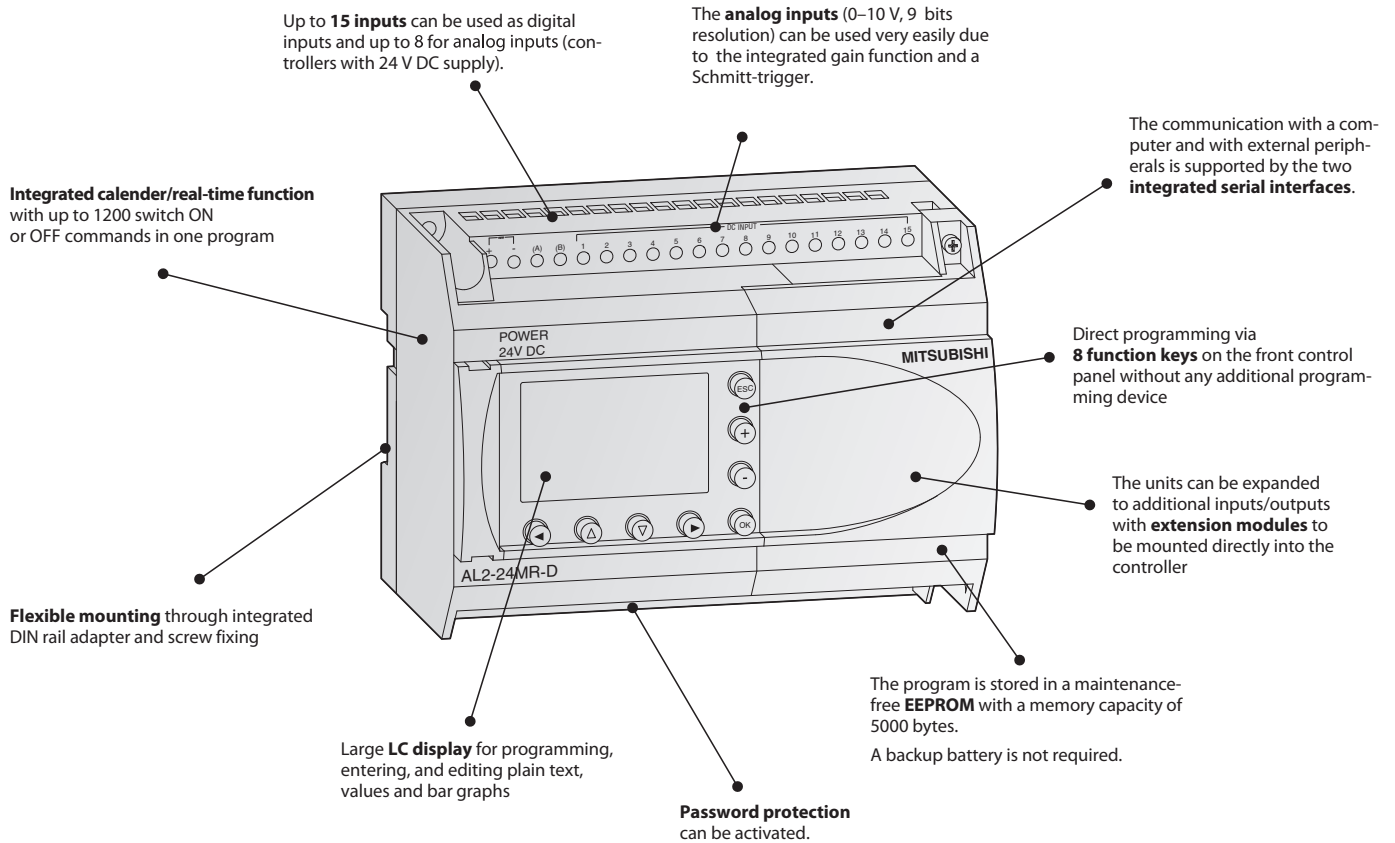
| Module       | No. | 24 V DC calculation |             | 5 V DC calculation |               |
|--------------|-----|---------------------|-------------|--------------------|---------------|
|              |     | Current / module    | Calculation | Current / module   | Total current |
| FX3U-80MR/ES | 1   | 600 mA              | +600 mA     | +500 mA            | +500 mA       |
| FX3U-4AD     | 3   | 90 mA               | -180 mA     | 110 mA             | -220 mA       |
| FX3U-4DA     | 2   | 160 mA              | -320 mA     | 120 mA             | -240 mA       |
| FX3U-ENET    | 1   | 240 mA              | -240 mA     | —                  | —             |
|              |     |                     |             | -140 mA !!!        |               |
|              |     |                     |             | Result:            | 40 mA (OK!)   |

An external 24 V power supply has to be added in the example above.

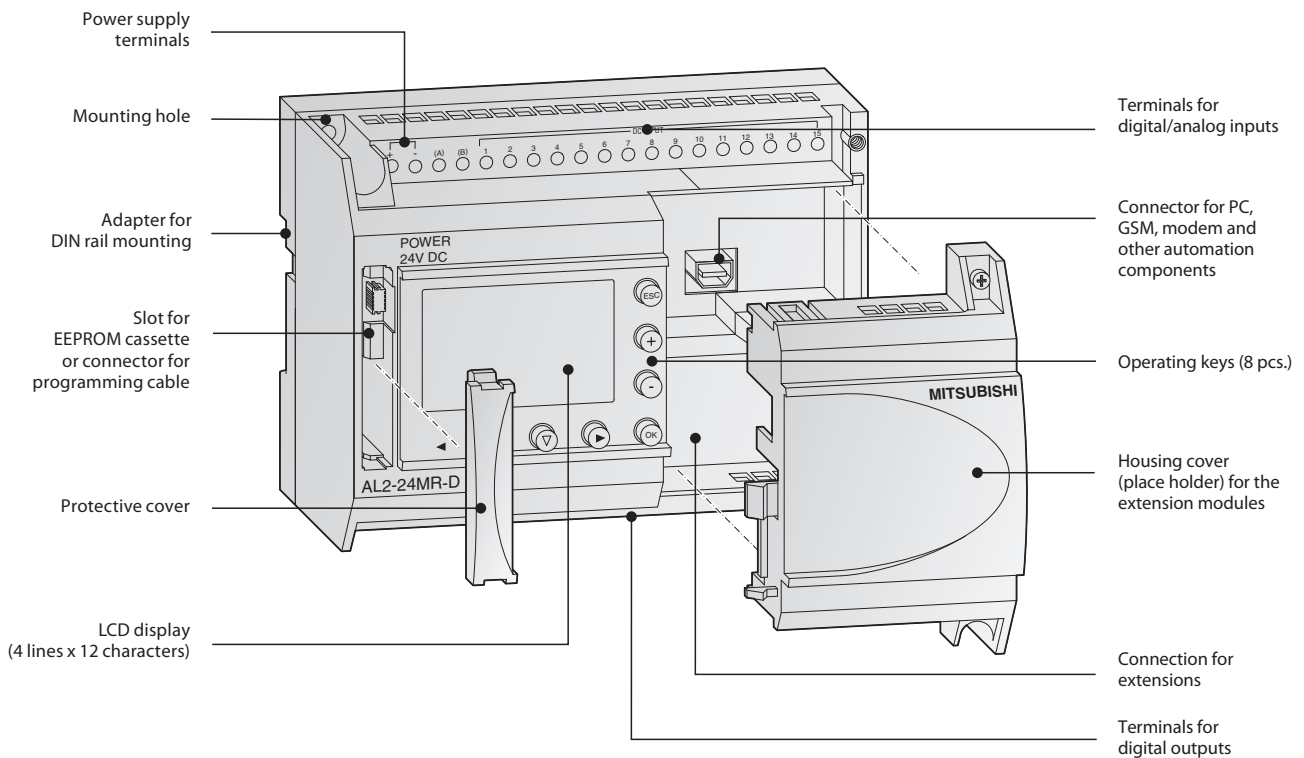
| Module           | No. | Number of I/Os                  |    |     | 24 V DC calculation  |   | 5 V DC calculation |               |         |
|------------------|-----|---------------------------------|----|-----|----------------------|---|--------------------|---------------|---------|
|                  |     | X                               | Y  | X/Y | Total ①              | Total current ②   | Current / module   | Total current |         |
| FX3U-48MR/ES     | 1   | 24                              | 24 | —   | X = 8<br>Y = 24<br>→ | +325 mA   | 500 mA             | +500 mA       |         |
| FX2N-16EYR-ES/UL | 1   | —                               | 16 | —   |                      |   | —                  | 0 mA          |         |
| FX2N-8EX-ES/UL   | 1   | 8                               | —  | —   |                      |   | —                  | 0 mA          |         |
| FX2N-8EYR-ES/UL  | 1   | —                               | 8  | —   |                      |   | —                  | 0 mA          |         |
| FX3U-4AD-PT-ADP  | 1   | —                               | —  | —   |                      | -50 mA  | 30 mA              | -15 mA        |         |
|                  |     |                                 |    |     |                      | +275 mA (OK!)   |                    | +485 mA (OK!) |         |
| FX2N-32ER-ES/UL  | 1   | 16                              | 16 | —   | X = 16<br>Y = 0<br>→ | +150 mA residual current for extension unit FX2N-32ER-ES/UL | 690 mA             | +690 mA       |         |
| FX2N-16EX-ES/UL  | 1   | 16                              | —  | —   |                      |   | —                  | 0 mA          |         |
| FX2N-10PG        | 1   | —                               | —  | 8   |                      |   | 0 mA               | 120 mA        | -120 mA |
| FX2N-32CCL       | 1   | —                               | —  | 8   |                      |   | -50 mA             | 130 mA        | -130 mA |
| Result:          |     | 64 + 64 + 16 = 144! (< 256) OK! |    |     |                      |   | +100 mA (OK!)      | +440 mA (OK!) |         |

① Total no. of I/Os which are connected to a base unit to calculate the max. residual current values (see tables) ② see tables above (max. residual current values)

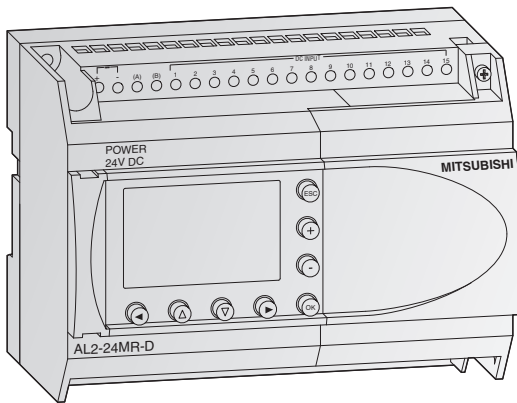
**The ALPHA 2 Series**



**Description of the Unit Components**



## Specifications ALPHA 2



e.g. AL2-24M□-□

### ALPHA 2 Base Units

The ALPHA 2 controllers offer simple reliable control for a range of automation applications including lighting, air conditioning, security systems, and temperature and water control.

#### Special features:

- Transistor and relay output options
- Analog input/output
- High Speed counters up to 1 kHz
- GSM function for communication with mobile phones
- Language support for 8 different languages
- Display unit for messages and function block data

### Base Units with 10–24 I/Os

| Specifications                   |                 | AL2-10MR-A   | AL2-10MR-D | AL2-14MR-A                           | AL2-14MR-D  | AL2-24MR-A                           | AL2-24MR-D  |
|----------------------------------|-----------------|--|------------|--------------------------------------|-------------|--------------------------------------|-------------|
| <b>Electrical specifications</b> |                 |  |            |                                      |             |                                      |             |
| Integrated inputs/outputs        |                 | 10   | 10         | 14                                   | 14          | 24                                   | 24          |
| Power supply                     |                 | 100–240 V AC   | 24 V DC    | 100–240 V AC                         | 24 V DC     | 100–240 V AC                         | 24 V DC     |
| Digital inputs                   |                 | 6  | 6          | 8                                    | 8           | 15                                   | 15          |
| Analog inputs                    |                 | —  | 6          | —                                    | 8           | —                                    | 8           |
| Channels                         |                 | —  | 6          | —                                    | 8           | —                                    | 8           |
| Integrated outputs               |                 | 4  | 4          | 6                                    | 6           | 9                                    | 9           |
| Max. power consumption           | W               | 4.9  | 4.0        | 5.5                                  | 7.5         | 7.0                                  | 9.0         |
| Typ. power consumption           | All I/Os ON/OFF | 3.5/1.85 240 V AC<br>3.0/1.55 120 V AC   | 2.5/0.75   | 4.5/2.0 240 V AC<br>3.5/1.5 120 V AC | 4.0/1.0     | 5.5/2.5 240 V AC<br>4.5/2.0 120 V AC | 5.0/1.0     |
| Weight                           | kg              | 0.2  | 0.2        | 0.3                                  | 0.3         | 0.35                                 | 0.3         |
| Dimensions (WxHxD)               | mm              | 71.2x90x55   | 71.2x90x55 | 124.6x90x52                          | 124.6x90x52 | 124.6x90x52                          | 124.6x90x52 |
| <b>Order information</b>         | Art. no.        | 215070   | 215071     | 215072                               | 215073      | 215074                               | 215075      |
| <b>Accessories</b>               |                 | Power supplies with DIN-rail or wall mounting possibilities for powering the 24 V DC modules (refer to the power supply chapter in this catalogue) |            |                                      |             |                                      |             |

## Environmental Specifications

| General specifications       |  | Alpha 2 series   |
|------------------------------|--|--|
| Ambient temperature          | Display: -10–55 °C, Hardware: -25–55 °C (storage temperature: -30–+70 °C)    |  |
| Protection rating            | IP20   |  |
| Noise immunity               | 1000 Vpp with noise generator; 1 μs at 30–100 Hz, tested by noise simulator  |  |
| Dielectric withstand voltage | 3750 V AC, >1 min. according to EN60730                                      |  |
| Allowable relative humidity  | 35–85 % (no condensation)  |  |
| Shock resistance             | Acc. to IEC 68-2-27: 147 m/s <sup>2</sup> acceleration, 11 ms 3x3 directions |  |
| Vibration resistance         | direct mounting  | Acc. to IEC-2-6: 19.6 m/s <sup>2</sup> acceleration, 80 min. in each direction |
|                              | DIN rail mounting  | Acc. to IEC-2-6: 9.8 m/s <sup>2</sup> acceleration, 80 min. in each direction  |
| Insulation resistance        | 500 V DC, 7 MΩ acc. to EN60730-1   |  |
| Ambient conditions           | No corrosive gases, no dust  |  |
| Certifications               | Please refer to pages 66–67 in this catalogue                                |  |

## Electrical Specifications

| Power supply specifications            | DC powered modules (AL2-□MR-D) | AC powered modules (AL2-□MR-A) |
|--|--------------------------------|--------------------------------|
| Power supply                           | 24 V DC                        | 100–240 V AC (50/60 Hz)        |
| Inrush current at ON                   | ≤7.0 A (at 24 V DC)            | ≤6.5 A (at 240 V AC)           |
| Allowable momentary power failure time | 5 ms                           | 10 ms                          |

### Digital Inputs

|               |  |                                      |
|---------------|--|--------------------------------------|
| Input voltage | 24 V DC (+20 %/-15 %)  | 100–240 V AC (+10 %/-15 %), 50/60 Hz |
| Input current | The input current changes depending on Source or Sink.<br>For Sink: (AL2-10/14/24MR-D) = 5.5 mA, 24 V DC<br>For Source: (AL2-10/14MR-D) = 6.0 mA, 24VDC (AL2-24MR-D) = 5.5 mA, 24 V DC |                                      |
| Response time | OFF→ON   | ms 10–20                             |
|               | ON→OFF   | ms 10–20                             |

### Analog Inputs

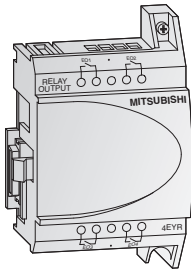
|                    |                   |   |
|--------------------|-------------------|---|
| Analog input range | 0–500             | — |
| Resolution         | 9 bit, (10 V/500) | — |
| Conversion speed   | ms 8              | — |
| Voltage            | 0–10 V DC         | — |
| Impedance          | kΩ 142 ±5 %       | — |
| Accuracy           | ±5 % (0.5 V DC)   | — |

\* Current leakage from the sensors connected to the inputs might provide enough current to turn the controller On. Do not use two wire sensors

| Output specifications    | All modules   |
|--------------------------|---|
| Type                     | Relay   |
| Switching voltage (max.) | V 250 V AC, 30 V DC   |
| Rated current            | 10M, 14M: 8 A/point<br>24M (001-004): 8 A/point<br>24M (005-009): 2 A/point                             |
| Max. switching load      | - inductive load<br>14M, 24M: 249 VA, 250 V AC/373 VA, 250 V AC<br>24M: 93 VA, 125 V AC/93 VA, 250 V AC |
| Minimum load             | 10 mA, 5 V DC   |
| Response time            | ms ≤10  |

## Programming Specifications

| System specifications            | Alpha 2 series   |
|----------------------------------|--|
| Programming method               | Function block   |
| Program capacity                 | 200 function blocks or 5000 bytes  |
| Program processing               | Cyclic processing of the stored program  |
| Number of available instructions | 38 different function blocks   |
| Program storage                  | Integrated EEPROM and optional additional EEPROM cassette  |
| Data storage                     | At voltage loss the current status of values, running time meters, and real-time data are stored for up to 20 days (at temperatures of 0 to 25 °C) through integrated capacitors |
| Processing time                  | 1 ms + 20 μs/log. instruction (complex commands 500 μs/instruction)  |
| Real-time clock                  | Seconds, minutes, hours, day of week, month, year (4-digit); accuracy: 5 s/day; automatic summer and winter time toggling  |
| Program protection               | Program and keys (3 levels)  |



### Digital Extension Modules

There are 4 different extension modules available for the ALPHA 2, which allow the controller to be extended through additional inputs or outputs. The modules are inserted directly into the ALPHA 2 and therefore do not take up any additional space.

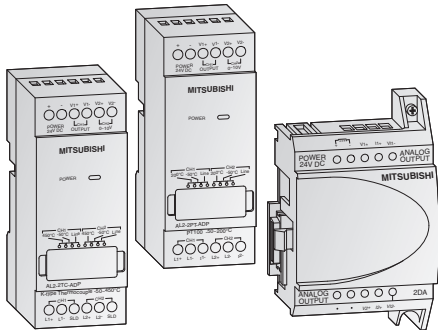
The AL2-4EX has the additional feature that 2 inputs may be used as high-speed counters with a counting frequency of 1 kHz.

All modules feature photocoupler insulation for all I/Os.

*Note: The digital extension modules cannot be used with the AL2-10MR series.*

| Digital extension modules specifications | AL2-4EX-A2  | AL2-4EX                  | AL2-4EYR          | AL2-4EYT       |
|--|---|--------------------------|-------------------|----------------|
| <b>Inputs</b>                            |   |                          |                   |                |
| Integrated inputs                        | 4   | 4                        | —                 | —              |
| Input voltage                            | 220–240 V AC  | 24 V DC (+20 %, -15 %)   | —                 | —              |
| Input current                            | 7.5 mA at 240 V AC (50 Hz),<br>9.0 mA at 240 V AC (60 Hz) | 5.4 mA ± 1 mA at 24 V DC | —                 | —              |
| <b>Outputs</b>                           |   |                          |                   |                |
| Integrated outputs                       | —   | —                        | 4                 | 4              |
| Output type                              | —   | —                        | Relay             | Transistor     |
| Switched voltage (max.)                  | V   | —                        | 250 V AC, 30 V DC | 5–24 V DC      |
| Rated current                            | A   | —                        | 2 A per output    | 1 A per output |
| <b>Electrical specifications</b>         |   |                          |                   |                |
| Power Supply AC range (+10 %, -15 %)     | 220–240 V AC  | 24 V DC                  | 100–240 V AC      | 24 V DC        |
| <b>Mechanical specifications</b>         |   |                          |                   |                |
| Weight                                   | kg  | 0.05                     | 0.05              | 0.05           |
| Dimensions (WxHxD)                       | mm  | 53.1x90x24.5             | 53.1x90x24.5      | 53.1x90x24.5   |
| <b>Order information</b>                 |   |                          |                   |                |
| Art. no.                                 | 142522  | 142521                   | 142523            | 142524         |

*Note: EI1 and EI2 of the AL2-4EX can be used as high-speed counter inputs. In each case the response time for the high-speed counter inputs will be 0.5 ms or less. The AL2-4EX-A2, AL2-4EX, AL2-4EYR and AL2-4EYT modules can not be used with the AL2-10MR series.*



### Analog Extension Modules

The analog extension modules significantly increase the range of applications for the ALPHA 2. With these modules it is possible to output voltage or current signals or to measure temperatures.

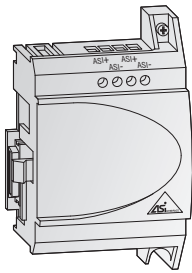
Three different analog extension modules are available:

- The AL2-2DA offers two additional analog outputs for the ALPHA 2 and converts a digital input value into a voltage or a current. This module is inserted directly into the ALPHA 2.

*Note: the AL2-2DA cannot be used with the AL2-10MR series.*

- The AL2-2PT-ADP connects an external PT100 sensor to convert temperature readings into analog signals (0–10 V).
- The AL2-2TC-ADP connects thermocouple sensors (K type) to convert temperature readings into analog signals (0–10 V).

| Analog extension modules specifications | AL2-2DA                    | AL2-2PT-ADP  | AL2-2TC-ADP  |
|---|----------------------------|--|--|
| <b>Analog inputs</b>                    |                            |  |  |
| Integrated inputs                       | —                          | 2  | 2  |
| Connectable temperature sensors         | —                          | PT100 sensor<br>Temp. coefficient 3.850 ppm/°C (IEC 751) | Thermocouple (K type), isolated type<br>(IEC 584-1 1977, IEC 584-2 1982) |
| Compensated range                       | —                          | -50–+200 °C  | -50–+450 °C  |
| <b>Analog outputs</b>                   |                            |  |  |
| Integrated outputs                      | 2                          | —  | —  |
| Analog output voltage range             | 0–10 V DC (5 kΩ 1 MΩ)      | —  | —  |
| Analog output current range             | 4–20 mA (max. 500 Ω)       | —  | —  |
| <b>Electrical specifications</b>        |                            |  |  |
| Number of channels                      | 2                          | 2  | 2  |
| Power Supply                            | 24 V DC (-15–+10 %), 70 mA | 24 V DC (-15–+20 %), 1 W                                 | 24 V DC (-15–+20 %), 1 W   |
| <b>Mechanical specifications</b>        |                            |  |  |
| Weight                                  | kg                         | 0.05   | 0.07   |
| Dimensions (WxHxD)                      | mm                         | 53.1x90x24.5   | 35.5x90x32.5   |
| <b>Order information</b>                |                            |  |  |
| Art. no.                                | 151235                     | 151238   | 151239   |



**AS-Interface Module AL2-ASI-BD**

The Actuator Sensor Interface module AL2-ASI-BD in combination with an ALPHA 2 controller facilitates the data communications via an AS-Interface system. The AL2-ASI-BD is attached to an ALPHA 2 series module and forms a slave unit. Up to 4 inputs and 4 outputs can be exchanged with the AS-Interface master.

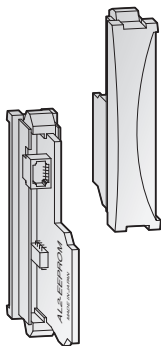
The addresses of the slave devices in the AS-Interface are assigned either automatically via the master in the network or via a programming device (software).

The maximum communication distance is 100 m without a repeater. If 2 repeaters are used, the distance is extended to up to 300 m.

For the AS-Interface a separate power supply is required. The communication signal is superimposed on the power supply of the AS-Interface bus.

*Note: The AL2-ASI-BD cannot be used with the AL2-10MR series.*

| Specifications               | AL2-ASI-BD                            |
|------------------------------|---------------------------------------|
| Module type                  | Slave module                          |
| Number of I/O points         | 4 inputs, 4 outputs                   |
| External power supply        | 30.5 V DC (AS-Interface power supply) |
| External current consumption | mA Max. 40                            |
| Communications protocol      | AS-Interface standard                 |
| Weight                       | kg 0.05                               |
| Dimensions (WxHxD)           | mm 53.1x90x24.5                       |
| <b>Order information</b>     | Art. no. 142525                       |



**Memory Cassette AL2-EEPROM-2 Memory Media**

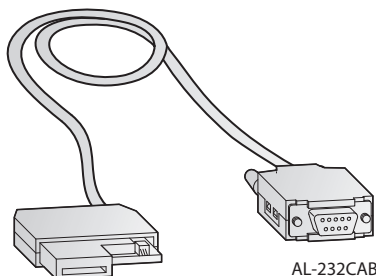
With the AL2-EEPROM-2 memory cassettes, a new program can be transferred to the ALPHA 2 controller's internal system memory from the cassette, or the program of the internal system memory can be saved to the cassette.

If the memory cassette is used, a certain program can be run temporarily by simply plugging the external memory module onto the ALPHA 2.

After removing the memory cassette, the former program in the internal memory becomes active again.

The memory cassette AL2-EEPROM-2 is not a memory expansion device, but a medium for data exchange.

| Specifications           | AL2-EEPROM-2    |
|--------------------------|-----------------|
| Memory type              | EEPROM          |
| Application              | ALPHA 2         |
| Memory capacity          | 5,000 bytes     |
| Function blocks          | Max. 200        |
| Dimensions (WxHxD)       | mm 10x45x25     |
| <b>Order information</b> | Art. no. 142526 |

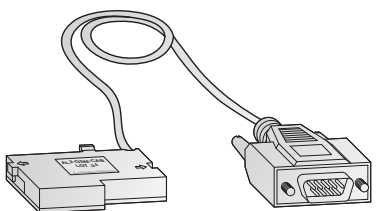


AL-232CAB

**Interface Cable AL-232CAB**

The AL-232CAB is an RS232C interface cable. It connects the ALPHA 2 controller to a personal computer running the programming software for the ALPHA 2 controller.

The cable ensures a galvanic isolation between the ALPHA 2 controller and the personal computer. The cable AL-232CAB can not be used for any other connection.



AL2-GSM-CAB

**GSM Cable AL2-GSM-CAB**

The GSM AL2-GSM-CAB is an RS232C interface cable and it is used to connect the ALPHA 2 controller to a normal or GSM modem, a personal computer or other serial devices. It can transfer SMS data to a GSM modem for onward transmission to mobile telephones or e-mail addresses. It also permits remote monitoring and remote maintenance.

*Note: The above cables cannot be used with the AL2-10MR series.*

| Specifications           | AL-232CAB                    | AL2-GSM-CAB                |
|--------------------------|------------------------------|----------------------------|
| Connector                | 9-pin D-SUB female connector | 9-pin D-SUB male connector |
| Application              | ALPHA 2 <-> PC               | ALPHA 2 <-> PC, modem      |
| Length                   | m 2.5                        | 1.5                        |
| <b>Order information</b> | Art. no. 87674               | 142528                     |

The MELSEC FX1s Series

**High-speed inputs** for fast counting tasks with counting frequencies of up to 60 kHz and **interrupt processing capabilities**

The **internal service power supply unit** for 24 V DC has a capacity of 400 mA.  
Note: service power supply is only available for AC Power Supply types.

All units feature two **analog potentiometers** for setpoint value entry and an **integrated RUN/STOP switch**.

**Square pulse output** (this applies only to transistor units.)  
Two integrated **high speed pulse outputs** for frequencies up to 100 kHz for outputting pulse signals and controlling stepping motors

Integration of **interface, extension, and functions adapters** for direct installation in the base unit

**Integrated real-time clock** with year, month, day and time

**Integrated serial RS422 interface** for direct communication with computers

Your PLC programs are stored in a maintenance-free **EEPROM user memory** with a capacity of 2,000 program steps, so there is no need for a backup battery to protect against power failures.

**Flexible installation** with the integrated DIN rail adapter and screw fastening holes for mounting on flat surfaces

**Password access protection** facility for effective protection of your intellectual property.

Description of the Unit Components

Protective cover

Terminal cover

Fixing hole

Connection of the power supply

Adapter interface

Slot for adapter

2 analog potentiometers

Connection for programming units

Service voltage source

Terminals for digital outputs

Terminals for digital inputs

LEDs for indicating the input status

RUN/STOP switch

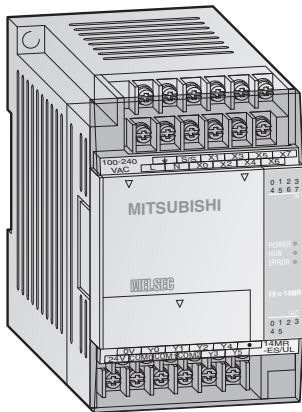
LEDs for indicating the operating status

LEDs for indicating the output status

Housing cover

■ Base Units

FX1S  FX1N  FX3G  FX3U  FX3UC



**Base Units FX1S**

The FX1S series base units are available with 10 to 30 input/output points.

It is possible to choose between relay and transistor output type.

*Note: Versions with UL certification are available on request.*

**Special Features:**

- Integrated power supply (AC or DC powered)
- Maintenance-free EEPROM memory
- Ample memory capacity (2000 steps) and device ranges
- High-speed operations
- Incorporated positioning control
- Integrated real-time clock
- System upgrades by exchangeable interface and I/O adapter boards for direct fitting into the base unit
- LEDs for indicating the input and output status
- Standard programming unit interface
- User-friendly programming systems, including IEC 61131.3 (EN 61131.3)-compatible programming software, HMI's and hand-held programming units

**Base Units with 10–14 I/Os**

| Specifications             | FX1S-10 MR-DS | FX1S-10 MR-ES/UL | FX1S-10 MT-DSS      | FX1S-14 MR-DS | FX1S-14 MR-ES/UL | FX1S-14 MT-DSS      |
|----------------------------|---------------|------------------|---------------------|---------------|------------------|---------------------|
| Max. number inputs/outputs | 10            | 10               | 10                  | 14            | 14               | 14                  |
| Power supply               | 24 V DC       | 100–240 V AC     | 24 V DC             | 24 V DC       | 100–240 V AC     | 24 V DC             |
| Integrated inputs          | 6             | 6                | 6                   | 8             | 8                | 8                   |
| Integrated outputs         | 4             | 4                | 4                   | 6             | 6                | 6                   |
| Output type                | Relay         | Relay            | Transistor (source) | Relay         | Relay            | Transistor (source) |
| Power consumption          | W             | 6                | 19                  | 6             | 19               | 6.5                 |
| Weight                     | kg            | 0.22             | 0.3                 | 0.22          | 0.3              | 0.22                |
| Dimensions (WxHxD)         | mm            | 60x90x49         | 60x90x75            | 60x90x49      | 60x90x75         | 60x90x49            |
| <b>Order information</b>   | Art. no.      | 141240           | 141243              | 141246        | 141247           | 141248              |

**Base Units with 20–30 I/Os**

| Specifications             | FX1S-20 MR-DS | FX1S-20 MR-ES/UL | FX1S-20 MT-DSS      | FX1S-30 MR-DS | FX1S-30 MR-ES/UL | FX1S-30 MT-DSS      |
|----------------------------|---------------|------------------|---------------------|---------------|------------------|---------------------|
| Max. number inputs/outputs | 20            | 20               | 20                  | 30            | 30               | 30                  |
| Power supply               | 24 V DC       | 100–240 V AC     | 24 V DC             | 24 V DC       | 100–240 V AC     | 24 V DC             |
| Integrated inputs          | 12            | 12               | 12                  | 16            | 16               | 16                  |
| Integrated outputs         | 8             | 8                | 8                   | 14            | 14               | 14                  |
| Output type                | Relay         | Relay            | Transistor (source) | Relay         | Relay            | Transistor (source) |
| Power consumption          | W             | 7                | 20                  | 8             | 21               | 8                   |
| Weight                     | kg            | 0.3              | 0.4                 | 0.35          | 0.45             | 0.35                |
| Dimensions (WxHxD)         | mm            | 75x90x49         | 75x90x75            | 100x90x49     | 100x90x75        | 100x90x49           |
| <b>Order information</b>   | Art. no.      | 141251           | 141252              | 141254        | 141255           | 141257              |



■ Base Units  FX1S  FX1N  FX3G  FX3U  FX3UC

**Environmental Specifications**

| General specifications       | Data  |
|------------------------------|---|
| Ambient temperature          | 0–55 °C (storage temperature: -20–+70 °C)   |
| Protection                   | IP10  |
| Noise durability             | 1000 Vpp with noise generator; 1 μs at 30–100 Hz  |
| Dielectric withstand voltage | 1,500 V AC, 1 min. (500 V AC for direct voltage modules)  |
| Ambient relative humidity    | 35–85 % (non-condensing)  |
| Shock resistance             | Acc. to IEC/EN 68-2-27: 15G (3 times each in 3 directions for 11 ms)  |
| Vibration resistance         | Acc. to IEC/EN 68-2-6: 1G (resistance to vibrations from 57–150 Hz for 80 minutes along all 3 axes); 0.5G for DIN rail mounting |
| Insulation resistance        | 500 V DC, 5 MΩ  |
| Ground                       | Class D: Grounding resistance 100 Ω or less   |
| Fuse rating                  | AC models: 250 V 1.0 A; DC models: 0.8 A  |
| Environment                  | Avoid environments containing corrosive gases, install in a dust-free location.   |
| Certifications               | Please refer to pages 66–67 in this catalogue   |

**Electrical Specifications**

| Power supply specifications            | DC powered modules (FX1S-□M□-DS/-DSS) | AC powered modules (FX1S-□M□-ES/UL)              |
|--|---------------------------------------|--|
| Power supply                           | 24 V DC (+10 %/-15 %)                 | 100–240 V AC (+10 %/-15 %), 50/60 Hz (±10 %)     |
| Inrush current at ON                   | 10 A/0.1 ms (at 24 V DC)              | 15 A/5 ms (at 100 V AC); 25 A/5 ms (at 200 V AC) |
| Allowable momentary power failure time | 5 ms                                  | 10 ms  |
| Primary power supply                   | 24 V DC, 400 mA                       |  |
| External power supply (24 V DC)        | —                                     | 400 mA   |

| Output specifications                | Relay modules  | Transistor modules |
|--------------------------------------|--|--------------------|
| Switching voltage (max.)             | V <250 V AC, <30 V DC                                    | 5–30 V DC          |
| Max. output current                  | - per output   | 0.5                |
|                                      | - per group*   | 0.8                |
| Max. switching current               | - inductive load   | 12 W               |
|                                      | - lamp load  | 1.2                |
| Response time                        | ms 10  | 0.2                |
| Life of contacts (switching times)** | 3,000,000 at 20 VA; 1,000,000 at 35 VA; 200,000 at 80 VA |                    |

\* The limitation applies only per reference terminal for each group, 1 and 4 outputs for relays and transistors. Please observe the terminal assignments for the group identification.

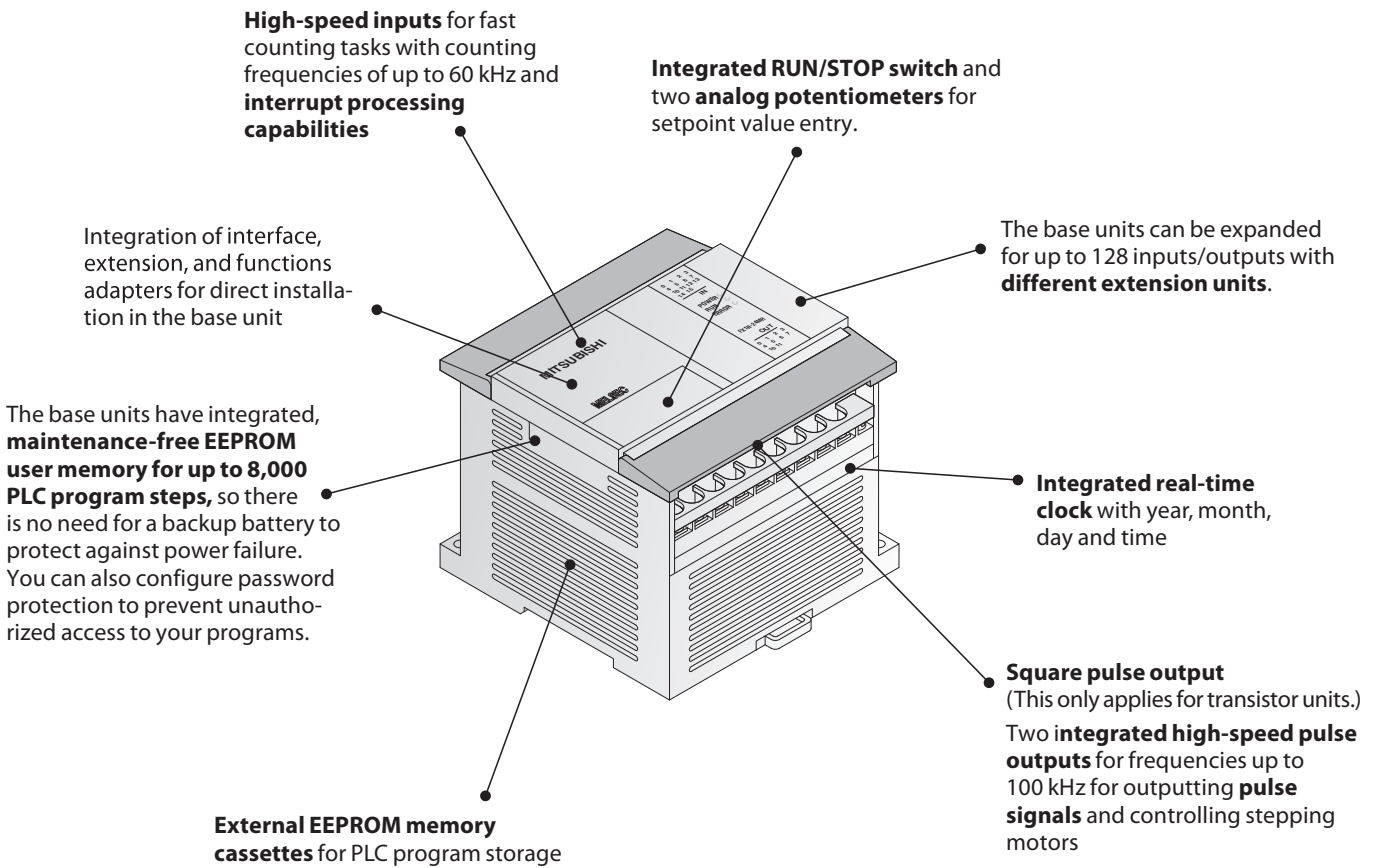
\*\* Not guaranteed by Mitsubishi Electric.

**Programming Specifications**

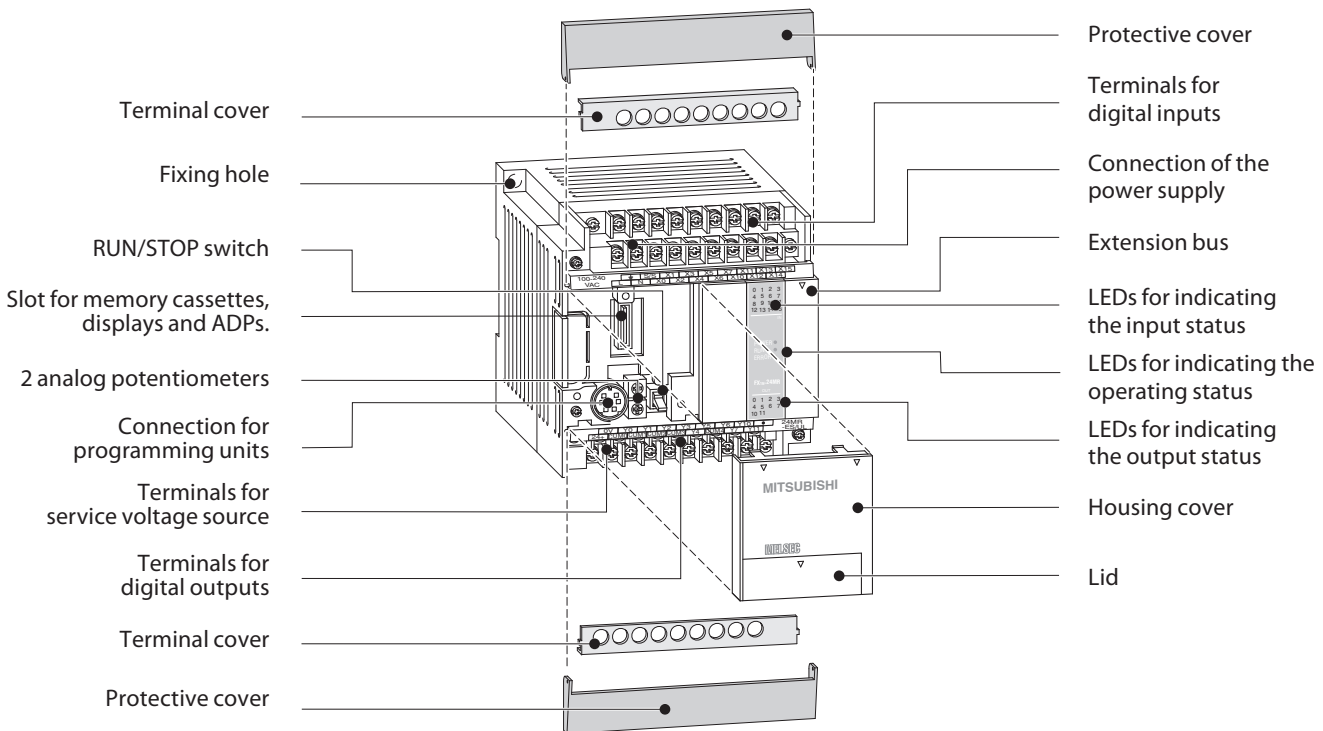
| System specifications                     | FX1S   |
|---|--|
| <b>Program data</b>                       |  |
| Program memory                            | 2,000 steps EEPROM (internal)  |
| Program execution                         | Periodical execution of the stored program   |
| Program protection                        | Password protection with 3 protection levels. Note: Protection levels may only be changed with FX-10P/FX-20P/FX-30P. |
| Number of instructions                    | 27 sequence instructions, 2 step ladder instructions, 85 applied instructions  |
| Cycle period                              | 0.55–0.7 μs/logical instruction  |
| <b>Operands</b>                           |  |
| Internal relays                           | 512 total, with 384 general (M0–M383) and 128 latched (M384–M511)  |
| Special relays                            | 256 (M8000–M8255)  |
| State relays                              | 128  |
| Timers                                    | 64 (max. 63 timers, partially switchable to 100 ms and 10 ms)  |
| External setpoint entry via potentiometer | 2 potentiometers   |
| Counter                                   | 32 (16 bit), C0–C31  |
| High-speed counter inputs                 | 1 phase, 6 points max: 60kHz/2 points, 10kHz/4 points ; 2 phase, 2 points max: 30kHz/1 point, 5kHz/1 point           |
| Data register                             | 256 subtotal (128 general (D0–D127) and 128 latched (D128–D255))   |
| Index register                            | 16   |
| Special register                          | 256 (16 bit), D8000–D8255  |
| Pointer                                   | 64, P0–P63   |
| Nesting operands                          | 8, N0–N7   |
| Interrupt inputs                          | 6  |
| Constants                                 | 16 bits: K: -32768 to +32767, hex: 0–FFFF<br>32 bits: K: -2147483648 to +2147483647, hex: 0–FFFF FFFF                |

The MELSEC FX1N Series

2  
FX BASE UNITS

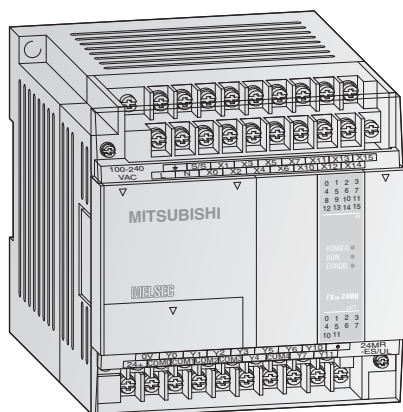


Description of the Unit Components



■ Base Units

FX1S  FX1N  FX3G  FX3U  FX3UC



**Base Units FX1N**

The FX1N series base units are available with 14 to 60 input/output points.

It is possible to choose between relay and transistor output type.

*Note: Versions with UL certification are available on request.*

**Special Features:**

- Integrated serial interface for communication between Personal computers and HMI
- Standard programming unit interface
- LEDs for indicating the input and output status
- Detachable terminal blocks for units with 14, 24, 40, and 60 I/Os.
- Slot for memory cassettes
- All DC models with variable voltage from 12 up to 24 V
- Integrated real-time clock
- Exchangeable interface and I/O adapter boards for direct fitting into the base unit

2  
FX BASE UNITS

**Base Units with 14–24 I/Os**

| Specifications            | FX1N-14 MR-DS   | FX1N-14 MR-ES/UL | FX1N-14 MT-DSS      | FX1N-24 MR-DS | FX1N-24 MR-ES/UL | FX1N-24 MT-DSS      |
|---------------------------|-----------------|------------------|---------------------|---------------|------------------|---------------------|
| Integrated inputs/outputs | 14              | 14               | 14                  | 24            | 24               | 24                  |
| Power supply              | 12–24 V DC      | 100–240 V AC     | 12–24 V DC          | 12–24 V DC    | 100–240 V DC     | 12–24 V DC          |
| Integrated inputs         | 8               | 8                | 8                   | 14            | 14               | 14                  |
| Integrated outputs        | 6               | 6                | 6                   | 10            | 10               | 10                  |
| Output type               | Relay           | Relay            | Transistor (source) | Relay         | Relay            | Transistor (source) |
| Power consumption         | W 13            | 29               | 13                  | 15            | 30               | 15                  |
| Weight                    | kg 0.45         | 0.45             | 0.45                | 0.45          | 0.45             | 0.45                |
| Dimensions (WxHxD)        | mm 90x90x75     | 90x90x75         | 90x90x75            | 90x90x75      | 90x90x75         | 90x90x75            |
| <b>Order information</b>  | Art. no. 141258 | 141259           | 141260              | 141261        | 141262           | 141263              |

**Base Units with 40–60 I/Os**

| Specifications            | FX1N-40 MR-DS   | FX1N-40 MR-ES/UL | FX1N-40 MT-DSS      | FX1N-60 MR-DS | FX1N-60 MR-ES/UL | FX1N-60 MT-DSS      |
|---------------------------|-----------------|------------------|---------------------|---------------|------------------|---------------------|
| Integrated inputs/outputs | 40              | 40               | 40                  | 60            | 60               | 60                  |
| Power supply              | 12–24 V DC      | 100–240 V AC     | 12–24 V DC          | 12–24 V DC    | 100–240 V AC     | 12–24 V DC          |
| Integrated inputs         | 24              | 24               | 24                  | 36            | 36               | 36                  |
| Integrated outputs        | 16              | 16               | 16                  | 24            | 24               | 24                  |
| Output type               | Relay           | Relay            | Transistor (source) | Relay         | Relay            | Transistor (source) |
| Power consumption         | W 18            | 32               | 18                  | 20            | 35               | 20                  |
| Weight                    | kg 0.65         | 0.65             | 0.65                | 0.8           | 0.8              | 0.8                 |
| Dimensions (WxHxD)        | mm 130x90x75    | 130x90x75        | 130x90x75           | 175x90x75     | 175x90x75        | 175x90x75           |
| <b>Order information</b>  | Art. no. 141264 | 141265           | 141266              | 141267        | 141268           | 141269              |

■ Base Units  FX1S  FX1N  FX3G  FX3U  FX3UC

### Environmental Specifications

| General specifications       | Data  |
|------------------------------|---|
| Ambient temperature          | 0–55 °C (storage temperature: –20–+70 °C)   |
| Protection                   | IP10  |
| Noise durability             | 1000 Vpp with noise generator; 1 µs at 30–100 Hz  |
| Dielectric withstand voltage | 1,500 V AC, 1 min. (500 V AC for direct voltage modules)  |
| Ambient relative humidity    | 35–85 % (non-condensing)  |
| Shock resistance             | Acc. to IEC 68-2-27: 15G (3 times each in 3 directions for 11 ms)   |
| Vibration resistance         | Acc. to IEC 68-2-6: 1G (resistance to vibrations from 57–150 Hz for 80 minutes along all 3 axes); 0.5G for DIN rail mounting  |
| Insulation resistance        | 500 V DC, 5 MΩ  |
| Ground                       | Class D: Grounding resistance 100 Ω or less   |
| Fuse rating                  | AC units: From FX1N-14M□ to FX1N-24M□: 250 V AC 1.0 A; From FX1N-40M□ to FX1N-60M□: 250 V AC 3.15 A/DC units: 125 V DC 3.15 A |
| Environment                  | Avoid environments containing corrosive gases, install in a dust-free location.   |
| Certifications               | Please refer to pages 66–67 in this catalogue   |

### Electrical Specifications

| Power supply specifications            | DC powered modules (FX1N-□M□-DS/-DSS)            | AC powered modules (FX1N-□M□-ES/UL)              |
|--|--|--|
| Power supply                           | 12–24 V DC (+20 %/-15 %)                         | 100–240 V AC (+10 %/-15 %), 50/60 Hz (±10 %)     |
| Inrush current at ON                   | 25 A/1 ms (at 24 V DC); 22 A/0.3 ms (at 12 V DC) | 30 A/5 ms (at 100 V AC); 50 A/5 ms (at 200 V AC) |
| Allowable momentary power failure time | 5 ms   | 10 ms  |
| Primary power supply                   | 24 V DC, 400 mA                                  |  |
| External power supply (24 V DC)        | —  | 400 mA   |

| Output specifications                   | Relay modules  | Transistor modules  |
|---|--|---------------------|
| Switching voltage (max.)                | V <240 V AC, <30 V DC                                    | 5–30 V DC           |
| Max. output current                     | - per output   | 0.5                 |
|   | - per group  | 0.8                 |
| Max. switching current - inductive load | 80 VA  | 12 W                |
| Response time                           | ms 10  | <0.2 (Y0, Y1 <5 µs) |
| Life of contacts (switching times)*     | 3,000,000 at 20 VA; 1,000,000 at 35 VA; 200,000 at 80 VA |                     |

\* Not guaranteed by Mitsubishi Electric.

### Programming Specifications

| System specifications  | FX1N  |
|------------------------|---|
| <b>Program data</b>    |   |
| I/O points (addresses) | 128 (+4 optional)   |
| Address range          | Max. 128 inputs X0–X177, max. 128 outputs Y0–Y177                             |
| Program memory         | 8,000 steps EEPROM (internal), exchangeable EEPROM for easy program exchange  |
| Cycle period           | 0.55–0.7 µs /logical instruction  |
| Number of instructions | 27 sequence instructions, 2 step ladder instructions, 89 applied instructions |
| Programming language   | Step ladder, instruction list, SFC  |
| Program execution      | Cyclical execution, refresh mode processing                                   |
| Program protection     | Password protection with 3 protection levels*                                 |

\* Protection levels may only be changed with FX-10P/FX-20P/FX-30P.

| System specifications               | FX1N  |
|-------------------------------------|---|
| <b>Operands</b>                     |   |
| Internal relays                     | 1,536   |
| Special relays                      | 256   |
| Step ladder                         | 1,000   |
| Timer                               | 256   |
| Ext. preset value via potentiometer | 2   |
| Counter                             | 235   |
| High-speed counter                  | 1 phase, 6 points max: 60kHz/2 points, 10kHz/4 points; 2 phase, 2 points max: 30kHz/1 point, 5kHz/1 point |
| Real-time clock                     | Year, month, day, hour, minute, second, weekday   |
| Data register                       | 8,000   |
| File register                       | Max. 7,000 (parameter editable), Total registers = 8,000  |
| Index register                      | 16  |
| Special register                    | 256   |
| Pointer                             | 128   |
| Nestings                            | 8   |
| Interrupt inputs                    | 6   |
| Constants                           | 16 bits: K: –32768 to +32767, hex: 0–FFFF; 32 bits: K: 2147483648 to +2147483647, hex: 0–FFFF FFFF        |

**The MELSEC FX3G Series**

**Integrated high-speed counter inputs** for processing fast input signals. For example, you can configure two 60 kHz counters and four 10 kHz counters.

**Interrupt processing** is also handled via the inputs.

RAM/EEPROM memory for up to **32,000 PLC program steps** gives you plenty of reserve, even for big, complex applications.

Add-in function boards can be installed in the PLC to provide a **second RS485/RS422/RS232 communications interface** for programming or network configurations.

Analog function boards for input and output and a function board with 8 analog potentiometers are also available as add-in.

An **integrated RUN/STOP switch** is available.

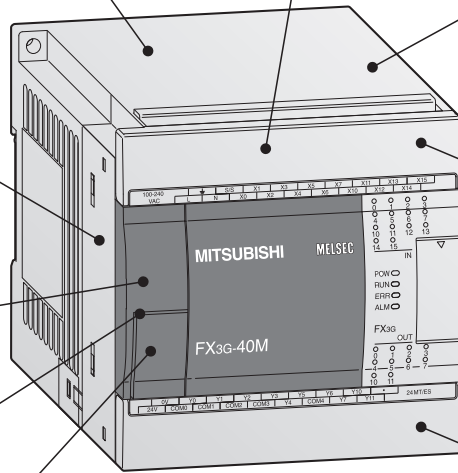
Connection possibility for special function adaptermodules

**Two integrated serial interfaces** for direct communication with computers.

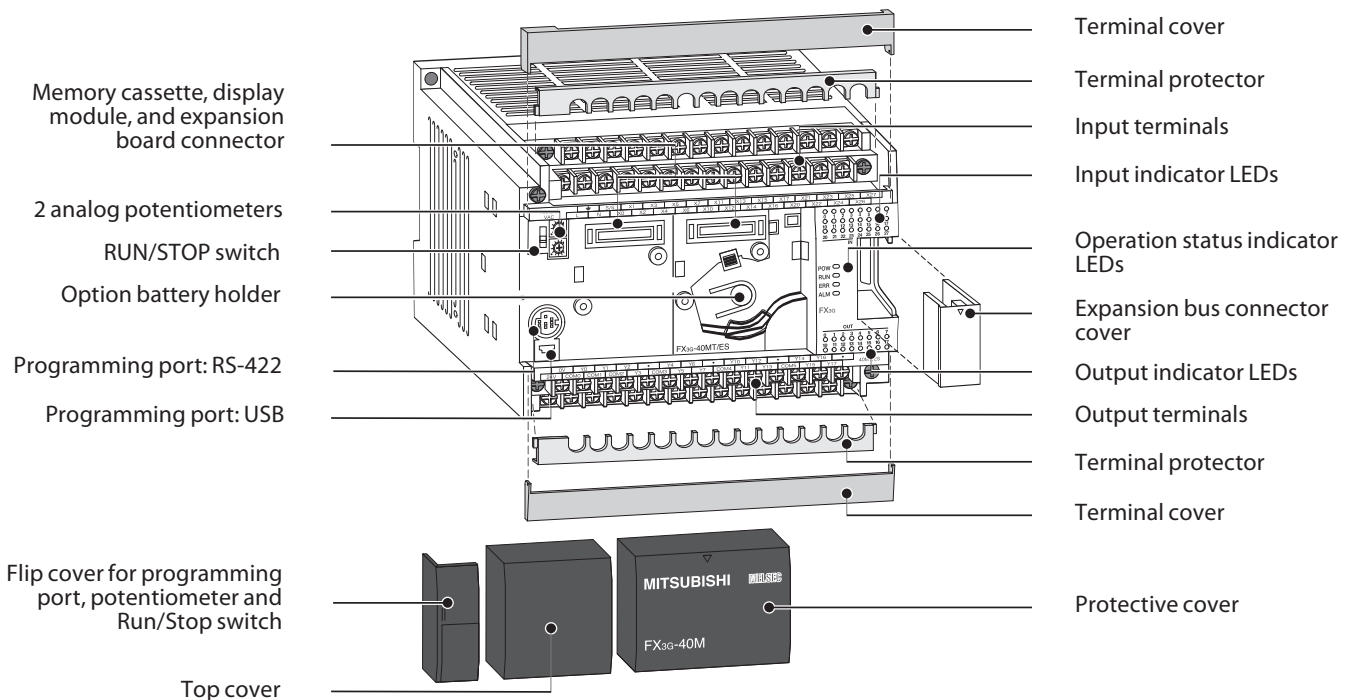
The base units can be expanded to provide configurations with up to 256 inputs and outputs with **modular and compact extension units**.

**Integrated real-time clock** with year, month, day and time

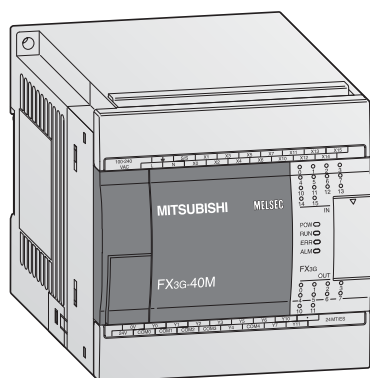
Two **integrated pulse outputs** for frequencies from 2 to 100,000 Hz for controlling stepping motors and outputting **pulse-width modulated signals**.



**Description of the Unit Components**



■ Base Units  FX1S  FX1N  FX3G  FX3U  FX3UC



**Base Units FX3G**

The FX3G series base units are available with 14 to 60 input/output points .  
It is possible to choose between relay and transistor output types.

**Special features:**

- Integrated USB interface for communication between PLCs and PC
- Integrated serial interface for communication between PCs and HMI
- LEDs for indicating the input and output status
- Detachable terminal blocks for all units
- Slot for memory cassettes
- Integrated real-time clock
- Integrated positioning control
- Exchangeable interface and extension adapters for direct mounting into a base unit
- Expandable with digital I/O modules, special function modules and ADP modules
- User-friendly programming systems, including IEC 1131.3 (EN 61131.3) compatible programming software, HMIs and hand-held programming units

**Base Units with 14–24 I/Os**

| Specifications            | FX3G-14 MR/ES | FX3G-14 MT/ESS       | FX3G-14 MR/DS | FX3G-14 MT/DSS       | FX3G-24 MR/ES | FX3G-24 MT/ESS       | FX3G-24 MR/DS | FX3G-24 MT/DSS       |        |
|---------------------------|---------------|----------------------|---------------|----------------------|---------------|----------------------|---------------|----------------------|--------|
| Integrated inputs/outputs | 14            | 14                   | 14            | 14                   | 24            | 24                   | 24            | 24                   |        |
| Power supply              | 100–240 V AC  | 100–240 V AC         | 24 V DC       | 24 V DC              | 100–240 V AC  | 100–240 V AC         | 24 V DC       | 24 V DC              |        |
| Integrated inputs         | 8             | 8                    | 8             | 8                    | 14            | 14                   | 14            | 14                   |        |
| Integrated outputs        | 6             | 6                    | 6             | 6                    | 10            | 10                   | 10            | 10                   |        |
| Output type               | Relay         | Transistor (source)* | Relay         | Transistor (source)* | Relay         | Transistor (source)* | Relay         | Transistor (source)* |        |
| Power consumption         | W             | 31                   | 19            | 19                   | 32            | 32                   | 21            | 21                   |        |
| Weight                    | kg            | 0.50                 | 0.50          | 0,50                 | 0.55          | 0.55                 | 0,55          | 0,55                 |        |
| Dimensions (WxHxD)        | mm            | 90x90x86             | 90x90x86      | 90x90x86             | 90x90x86      | 90x90x86             | 90x90x86      | 90x90x86             |        |
| <b>Order information</b>  | Art. no.      | 231466               | 231470        | 231474               | 231478        | 231467               | 231471        | 231475               | 231479 |

\* Sink type transistor output units on request.

**Base Units with 40–60 I/Os**

| Specifications            | FX3G-40 MR/ES | FX3G-40 MT/ESS       | FX3G-40 MR/DS | FX3G-40 MT/DSS       | FX3G-60 MR/ES | FX3G-60 MT/ESS       | FX3G-60 MR/DS | FX3G-60 MT/DSS       |        |
|---------------------------|---------------|----------------------|---------------|----------------------|---------------|----------------------|---------------|----------------------|--------|
| Integrated inputs/outputs | 40            | 40                   | 40            | 40                   | 60            | 60                   | 60            | 60                   |        |
| Power supply              | 100–240 V AC  | 100–240 V AC         | 24 V DC       | 24 V DC              | 100–240 V AC  | 100–240 V AC         | 24 V DC       | 24 V DC              |        |
| Integrated inputs         | 24            | 24                   | 24            | 24                   | 36            | 36                   | 36            | 36                   |        |
| Integrated outputs        | 16            | 16                   | 16            | 16                   | 24            | 24                   | 24            | 24                   |        |
| Output type               | Relay         | Transistor (source)* | Relay         | Transistor (source)* | Relay         | Transistor (source)* | Relay         | Transistor (source)* |        |
| Power consumption         | W             | 37                   | 25            | 25                   | 40            | 40                   | 29            | 29                   |        |
| Weight                    | kg            | 0.70                 | 0.70          | 0,70                 | 0.85          | 0.85                 | 0,85          | 0,85                 |        |
| Dimensions (WxHxD)        | mm            | 130x90x86            | 130x90x86     | 130x90x86            | 175x90x86     | 175x90x86            | 175x90x86     | 175x90x86            |        |
| <b>Order information</b>  | Art. no.      | 231468               | 231472        | 231476               | 231480        | 231469               | 231473        | 231477               | 231481 |

\* Sink type transistor output units on request.

■ Base Units □ FX1S □ FX1N  FX3G □ FX3U □ FX3UC

### Environmental Specifications

| General specifications       | Data   |
|------------------------------|--|
| Ambient temperature          | 0–55 °C (storage temperature: -25–+75 °C)  |
| Protection                   | IP10   |
| Noise durability             | 1000 Vpp with noise generator; 1 μs at 30–100 Hz   |
| Dielectric withstand voltage | 1500 V AC, 1 min.  |
| Ambient relative humidity    | 5–95 % (non-condensing)  |
| Shock resistance             | 147m/s <sup>2</sup> Acceleration, Action time: 11ms, 3 times by half-sine pulse in each direction X, Y, and Z                  |
| Vibration resistance         | Acc. to IEC 68-2-6: 1 g (resistance to vibrations from 57–150 Hz for 80 minutes along all 3 axes); 0.5 g for DIN rail mounting |
| Insulation resistance        | 500 V DC, 5 MΩ   |
| Ground                       | Class D: Grounding resistance 100 Ω or less  |
| Fuse                         | For FX3G-14M□ and FX3G-24M□: 250 V 1 A; For FX3G-40M□ and FX3G-60M□: 250 V 3.15 A  |
| Environment                  | Avoid environments containing corrosive gases, install in a dust-free location.  |
| Certifications               | Please refer to pages 66–67 in this catalogue  |

### Electrical Specifications

| Power supply specifications            | AC powered modules (FX-3G-□M□/ES/ESS)                 |
|--|---|
| Power supply                           | 100–240 V AC (+10 %/-15 %), 50/60 Hz                  |
| Inrush current at ON                   | 30 A/<5 ms (at 100 V AC);<br>50 A/<5 ms (at 200 V AC) |
| Allowable momentary power failure time | 10 ms   |
| Primary power supply                   | —   |
| External power supply (24 V DC)        | 400 mA  |

| Output specifications                | Relay modules    | Transistor modules                                       |
|--------------------------------------|------------------|--|
| Switching voltage (max.)             | V                | <240 V AC, <30 V DC                                      |
| Max. output current                  | - per output     | A  |
|                                      | - per group*     | A  |
| Max. switching current               | - inductive load | 80 VA  |
| Response time                        | ms               | 10   |
| Life of contacts (switching times) ② |                  | <0.2 (<5 μs for Y0, Y1) ①                                |
|                                      |                  | 3,000,000 at 20 VA; 1,000,000 at 35 VA; 200,000 at 80 VA |

① The 40 and 60 I/O points main units supports 5 μs for Y2. ② Not guaranteed by Mitsubishi Electric.  
\* This limitation applies only per reference terminal for each group, 4 and 8 outputs for relays and 2 and 4 outputs for transistors. Please observe the terminal assignments for the group identification.

### Programming Specifications

| System specifications  | FX3G   |
|------------------------|--|
| <b>Program data</b>    |  |
| I/O points (addresses) | 256 total (combined local and CC-Link remote I/O)                                    |
| Address range          | Max. 128 direct addressing and max. 128 remote I/O                                   |
| Program memory         | 32,000 steps EEPROM (internal),<br>exchangeable EEPROM memory cassette               |
| Cycle period           | 0.21 μs or 0.42 μs/contact instruction   |
| Number of instructions | 29 sequence instructions,<br>2 step ladder instructions,<br>123 applied instructions |
| Programming language   | Step ladder, instruction list, SFC   |
| Program execution      | Cyclical execution, refresh mode processing  |
| Program protection     | 2 different keywords,<br>maximum password length 16 characters                       |

| System specifications               | FX3G  |
|-------------------------------------|---|
| <b>Operands</b>                     |   |
| Internal relays                     | 7680  |
| Special relays                      | 512   |
| Step ladder                         | 4096  |
| Timer                               | 320   |
| Ext. preset value via potentiometer | 2   |
| Counter                             | 235   |
| High-speed counter                  | 6 single phase inputs (max. 60 kHz),<br>3 double phase inputs (max. 30 kHz)                                     |
| Real-time clock                     | Year, month, day, hour, minute, second, weekday   |
| Data register                       | 8,000   |
| File register                       | 24,000 (E0~R23999) internal/optional memory   |
| Index register                      | 16  |
| Special register                    | 512 (D8000-D8511)   |
| Pointer                             | 2,048   |
| Nestings                            | 8   |
| Interrupt inputs                    | 6   |
| Constants                           | 16 bits: K: -32,768 to +32,767; hex: 0–FFFF<br>32 bits: K: 2,147,483,648 to +2,147,483,647;<br>hex: 0–FFFF FFFF |

The MELSEC FX3U Series

2  
FX BASE UNITS

RAM/EEPROM memory for up to **64,000 PLC program steps** gives you plenty of reserve, even for big, complex applications.

**Integrated high-speed counter** inputs for processing fast input signals. For example, you can configure six 100 kHz counters and two 10 kHz counters.

**Interrupt processing** is also handled via the inputs.

Add-in function boards can be installed in the PLC to provide a **second RS485 / RS422 / RS232/USB communications interface** for programming or network configurations.

The base units can be expanded to provide configurations with up to 384 inputs and outputs with **compact extension units** (total of 384 only by using main unit I/Os, extension unit I/Os and remote I/Os).

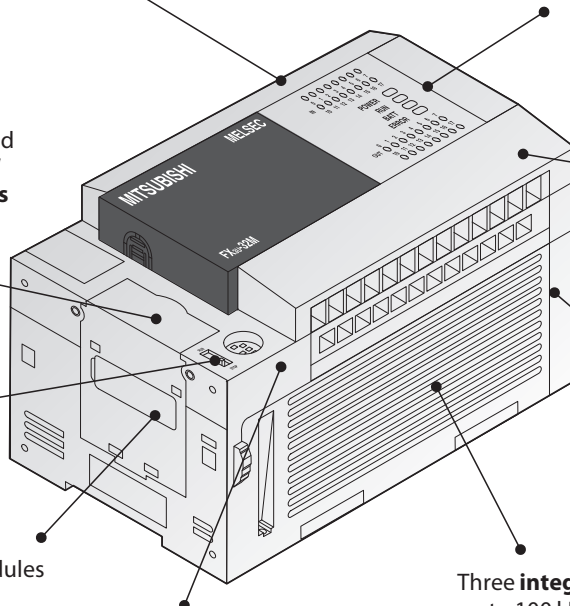
An **integrated RUN/STOP switch** is available.

**Integrated real-time clock** with year, month, days and time

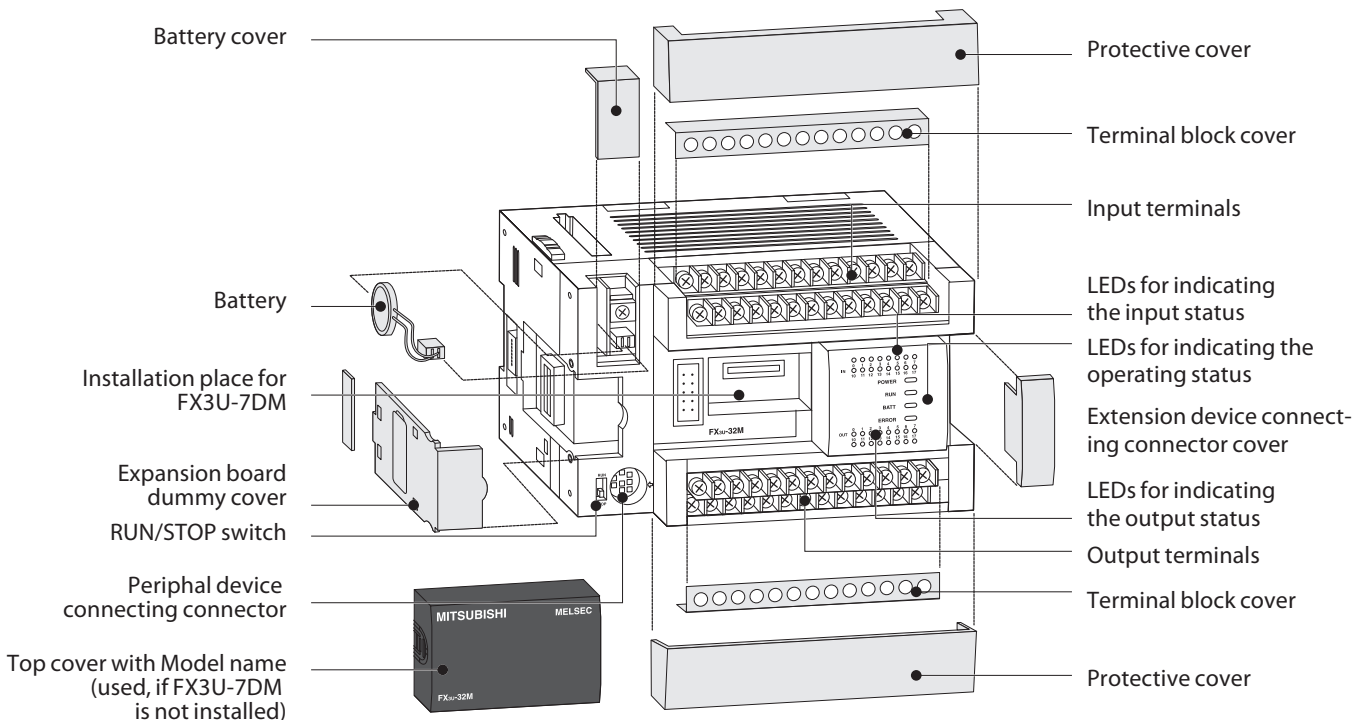
Connection possibility for special function adapter modules

Three **integrated pulse outputs** for frequencies up to 100 kHz with **deceleration and acceleration ramps** for controlling stepping motors and outputting **pulse-width modulated signals**.

**Integrated serial interface** for direct communication with computers



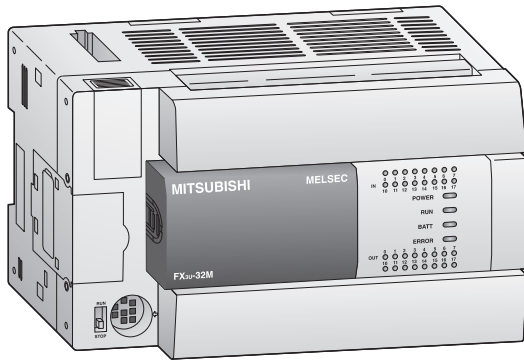
Description of the Unit Components





■ Base Units

FX1S  FX1N  FX3G  FX3U  FX3UC



**Base Units FX3u**

The FX3U series base units are available with 16, 32, 48, 64, 80 or 128 input/output points expandable to 384 points.

It is possible to choose between relay and transistor output type.

*Note: Additional special versions are available on request.*

**Special Features:**

- Integrated serial interface for communication between PCs and HMI
- Integrated positioning control
- Exchangeable interface modules for direct mounting into a base unit
- LEDs for indicating the input and output status
- Slot for memory cassettes
- Integrated real-time clock
- Expandable with digital I/O modules, special function modules and ADP modules
- User-friendly programming systems, including IEC 1131.3 (EN 61131.3) compatible programming software, HMIs and hand-held programming units

2

FXBASE UNITS

**Base Units with 16 I/Os**

| Specifications            | FX3U-16 MR/DS   | FX3U-16 MR/ES | FX3U-16 MT/DSS           | FX3U-16 MT/ESS           |
|---------------------------|-----------------|---------------|--------------------------|--------------------------|
| Integrated inputs/outputs | 16              | 16            | 16                       | 16                       |
| Power supply              | 24 V DC         | 100–240 V AC  | 24 V DC                  | 100–240 V AC             |
| Integrated inputs         | 8               | 8             | 8                        | 8                        |
| Integrated outputs        | 8               | 8             | 8                        | 8                        |
| Output type               | Relay           | Relay         | Transistor (source type) | Transistor (source type) |
| Power consumption         | 25 W            | 30 VA         | 25 W                     | 30 VA                    |
| Weight                    | kg 0.6          | 0.6           | 0.6                      | 0.6                      |
| Dimensions (WxHxD)        | mm 130x90x86    | 130x90x86     | 130x90x86                | 130x90x86                |
| <b>Order information</b>  | Art. no. 231498 | 231486        | 231503                   | 231492                   |

**Base Units with 32 I/Os**

| Specifications            | FX3U-32 MR/DS   | FX3U-32 MR/ES | FX3U-32 MT/DSS           | FX3U-32 MT/ESS           |
|---------------------------|-----------------|---------------|--------------------------|--------------------------|
| Integrated inputs/outputs | 32              | 32            | 32                       | 32                       |
| Power supply              | 24 V DC         | 100–240 V AC  | 24 V DC                  | 100–240 V AC             |
| Integrated inputs         | 16              | 16            | 16                       | 16                       |
| Integrated outputs        | 16              | 16            | 16                       | 16                       |
| Output type               | Relay           | Relay         | Transistor (source type) | Transistor (source type) |
| Power consumption         | 30 W            | 35 VA         | 30 W                     | 35 VA                    |
| Weight                    | kg 0.65         | 0.65          | 0.65                     | 0.65                     |
| Dimensions (WxHxD)        | mm 150x90x86    | 150x90x86     | 150x90x86                | 150x90x86                |
| <b>Order information</b>  | Art. no. 231499 | 231487        | 231504                   | 231493                   |

## Base Units with 48 I/Os

| Specifications            | FX3U-48<br>MR/DS | FX3U-48<br>MR/ES | FX3U-48<br>MT/ESS           | FX3U-48<br>MT/DSS           |
|---------------------------|------------------|------------------|-----------------------------|-----------------------------|
| Integrated inputs/outputs | 48               | 48               | 48                          | 48                          |
| Power supply              | 24 V DC          | 100–240 V AC     | 100–240 V AC                | 24 V DC                     |
| Integrated inputs         | 24               | 24               | 24                          | 24                          |
| Integrated outputs        | 24               | 24               | 24                          | 24                          |
| Output type               | Relay            | Relay            | Transistor<br>(source type) | Transistor<br>(source type) |
| Power consumption         | 35 W             | 40 VA            | 40 VA                       | 35 W                        |
| Weight                    | kg 0.85          | 0.85             | 0.85                        | 0.85                        |
| Dimensions (WxHxD)        | mm 182x90x86     | 182x90x86        | 182x90x86                   | 182x90x86                   |
| <b>Order information</b>  | Art. no. 231500  | 231488           | 231494                      | 231505                      |

## Base Units with 64 I/Os

| Specifications            | FX3U-64<br>MR/DS | FX3U-64<br>MR/ES | FX3U-64<br>MT/ESS           | FX3U-64<br>MT/DSS           |
|---------------------------|------------------|------------------|-----------------------------|-----------------------------|
| Integrated inputs/outputs | 64               | 64               | 64                          | 64                          |
| Power supply              | 24 V DC          | 100–240 V AC     | 100–240 V AC                | 24 V DC                     |
| Integrated inputs         | 32               | 32               | 32                          | 32                          |
| Integrated outputs        | 32               | 32               | 32                          | 32                          |
| Output type               | Relay            | Relay            | Transistor<br>(source type) | Transistor<br>(source type) |
| Power consumption         | 40 W             | 45 VA            | 45 VA                       | 40 W                        |
| Weight                    | kg 1.0           | 1.0              | 1.0                         | 1.0                         |
| Dimensions (WxHxD)        | mm 220x90x86     | 220x90x86        | 220x90x86                   | 220x90x86                   |
| <b>Order information</b>  | Art. no. 231501  | 231489           | 231495                      | 231506                      |

## Base Units with 80–128 I/Os

| Specifications            | FX3U-80<br>MR/DS | FX3U-80<br>MR/ES | FX3U-80<br>MT/DSS           | FX3U-80<br>MT/ESS           | FX3U-128<br>MR/ES | FX3U-128<br>MT/ESS          |
|---------------------------|------------------|------------------|-----------------------------|-----------------------------|-------------------|-----------------------------|
| Integrated inputs/outputs | 80               | 80               | 80                          | 80                          | 128               | 128                         |
| Power supply              | 24 V DC          | 100–240 V AC     | 24 V DC                     | 100–240 V AC                | 100–240 V AC      | 100–240 V AC                |
| Integrated inputs         | 40               | 40               | 40                          | 40                          | 64                | 64                          |
| Integrated outputs        | 40               | 40               | 40                          | 40                          | 64                | 64                          |
| Output type               | Relay            | Relay            | Transistor<br>(source type) | Transistor<br>(source type) | Relay             | Transistor<br>(source type) |
| Power consumption         | 45 W             | 50 VA            | 45 W                        | 50 VA                       | 65 VA             | 65 VA                       |
| Weight                    | kg 1.20          | 1.20             | 1.20                        | 1.20                        | 1.80              | 1.80                        |
| Dimensions (WxHxD)        | mm 285x90x86     | 285x90x86        | 285x90x86                   | 285x90x86                   | 350x90x86         | 350x90x86                   |
| <b>Order information</b>  | Art. no. 231502  | 231490           | 231507                      | 231496                      | 231491            | 231497                      |

■ Base Units □ FX1S □ FX1N □ FX3G  FX3U □ FX3UC

### Environmental Specifications

| General specifications       | Data   |
|------------------------------|--|
| Ambient temperature          | 0–55 °C (storage temperature: -25–+75 °C)  |
| Protection                   | IP10   |
| Noise durability             | 1000 Vpp with noise generator; 1 μs at 30–100 Hz   |
| Dielectric withstand voltage | AC PSU: 1500 V AC, 1 min./DC PSU: 500 V AC, 1 min.   |
| Ambient relative humidity    | 5–95 % (non-condensing)  |
| Shock resistance             | Acc. to IEC 68-2-27: 15G (3 times each in 3 directions for 11 ms)  |
| Vibration resistance         | Acc. to IEC 68-2-6: 1G (resistance to vibrations from 57–150 Hz for 80 minutes along all 3 axes); 0.5G for DIN rail mounting |
| Insulation resistance        | 500 V DC, 5 MΩ   |
| Ground                       | Class D: Grounding resistance 100 Ω or less  |
| Fuse                         | From FX3U-16M□ to FX3U-32M□: 3.15 A; From FX3U-48M□ to FX3U-128M□: 5 A   |
| Environment                  | Avoid environments containing corrosive gases, install in a dust-free location.  |
| Certifications               | Please refer to pages 66–67 in this catalogue  |

### Electrical Specifications

| Power supply specifications            | DC powered modules (FX3U-□M□/DS/DSS) | AC powered modules (FX3U-□MR/ES)                       |
|--|--------------------------------------|--|
| Power supply                           | 24 V DC (+20 %/-30 %)                | 100–240 V AC (+10 %/-15 %), 50/60 Hz                   |
| Inrush current at ON                   | —                                    | 30 A / <5 ms (at 100 V AC); 65 A / <5 ms (at 200 V AC) |
| Allowable momentary power failure time | 5 ms                                 | 10 ms  |
| Primary power supply                   | 24 V DC                              | —  |
| External power supply (24 V DC)        | —                                    | FX3U-16/32MR/ES: 400 mA / FX3U-48–128MR/ES: 600 mA     |

| Output specifications                           | Relay modules  | Transistor modules                             |
|---|--|--|
| Switching voltage (max.)                        | V <240 V AC, <30 V DC                                    | 5–30 V DC                                      |
| Max. output current                             | - per output: A 2<br>- per group*: A 8                   | 0.5 / 0.3 <sup>①</sup><br>0.8/1.6 <sup>②</sup> |
| Max. switching current                          | - inductive load: 80 VA                                  | 12 W/7.2 W                                     |
| Response time                                   | ms 10  | <0.2(Y0,Y1<30 μs)                              |
| Life of contacts (switching times) <sup>③</sup> | 3,000,000 at 20 VA; 1,000,000 at 35 VA; 200,000 at 80 VA |  |

① for Y0 and Y1 = 0.3 A; all others 0.5 A    ② 0.8 for 4 per group and 1.6 for 8 per group  
 ③ Not guaranteed by Mitsubishi Electric.  
 \* This limitation applies only per reference terminal for each group, 4 and 8 outputs for relays and 2 and 4 outputs for transistors. Please observe the terminal assignments for the group identification.

### Programming Specifications

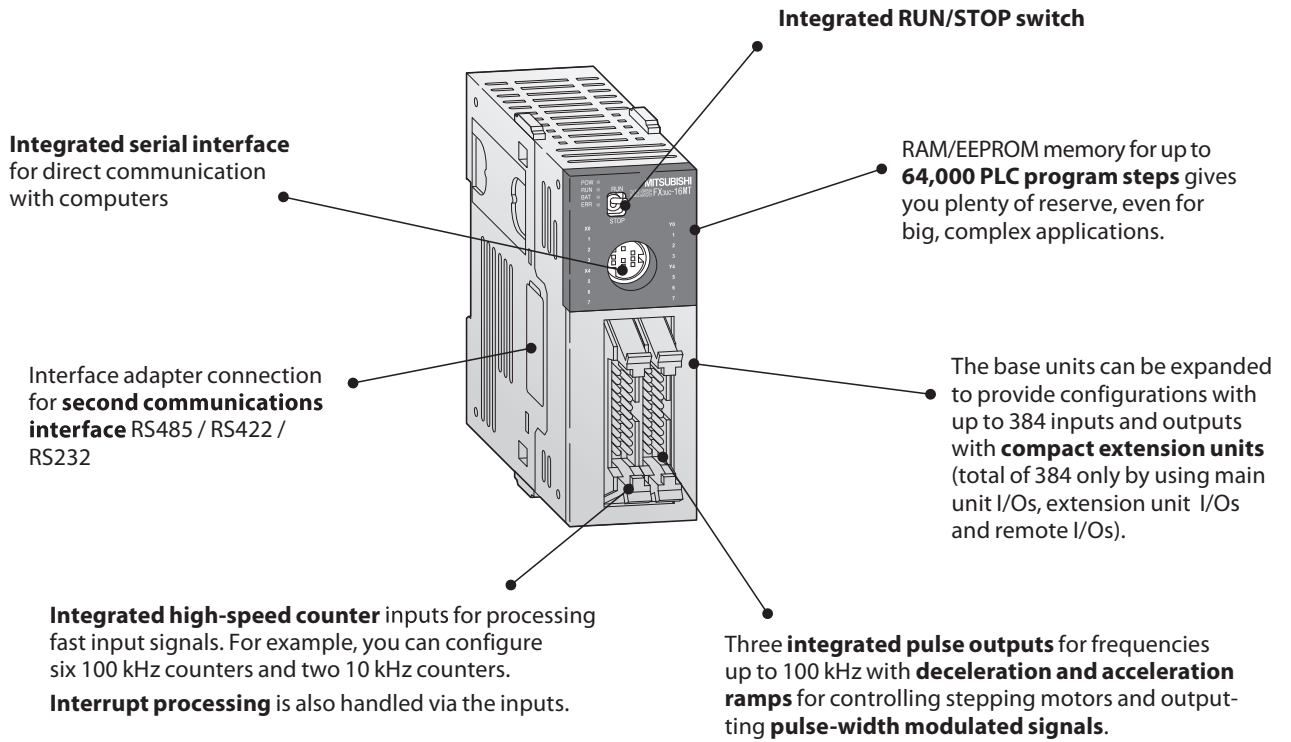
| System specifications  | FX3U   |
|------------------------|--|
| <b>Program data</b>    |  |
| I/O points (addresses) | Max. total 384 (with remote I/O)   |
| Address range          | Max. 256 direct addressing and max. 256 network I/Os                           |
| Program memory         | 64,000 steps RAM (internal), exchangeable FLROM for easy program exchange      |
| Cycle period           | 0.065 μs /basic instruction  |
| Number of instructions | 27 sequence instructions, 2 step ladder instructions, 209 applied instructions |
| Programming language   | Step ladder, instruction list, SFC   |
| Program execution      | Cyclical execution, refresh mode processing                                    |
| Program protection     | Password protection with 3 protection levels*                                  |

\* Protection levels may only be changed with FX-10P/FX-20P/FX-30P.

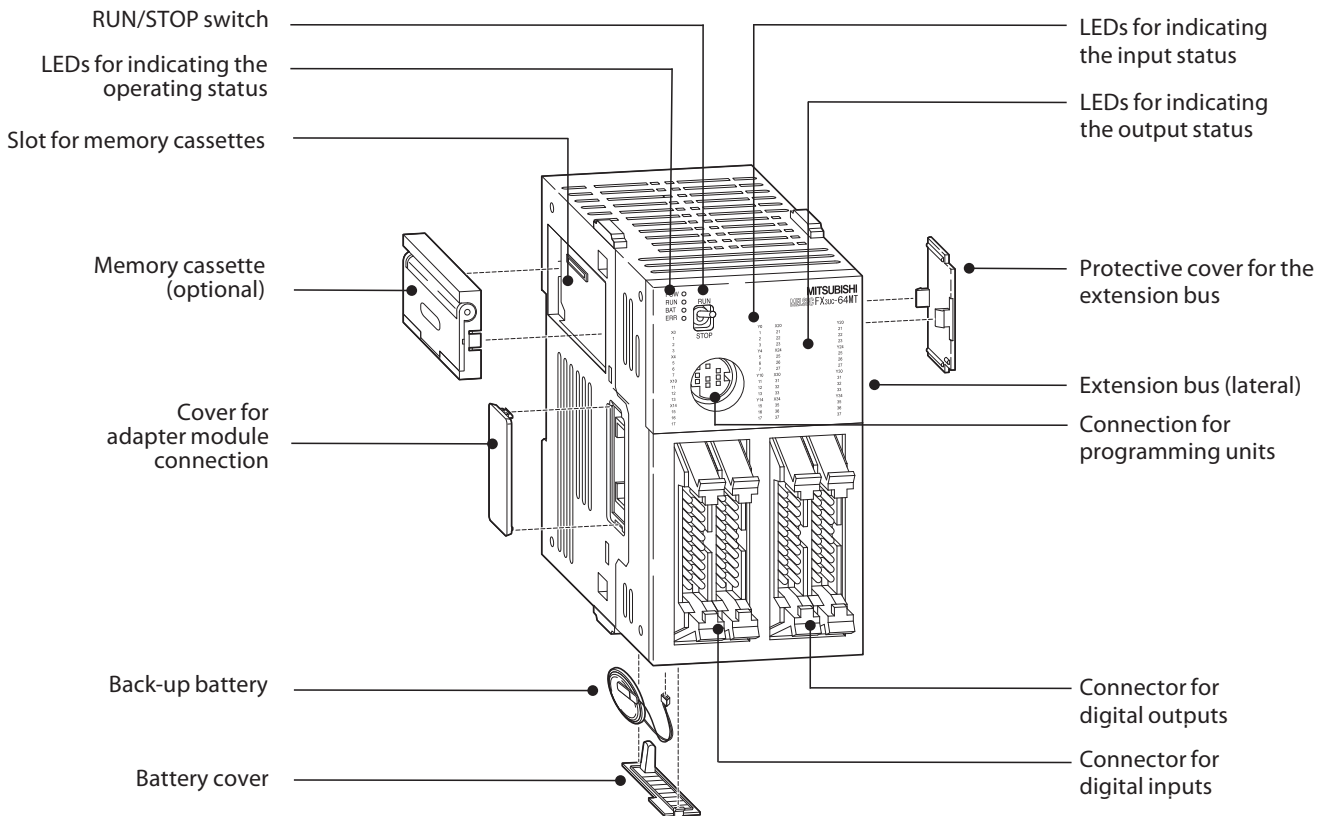
| System specifications    | FX3U  |
|--------------------------|---|
| <b>Operands</b>          |   |
| Internal relays          | 7,680   |
| Special relays           | 512   |
| State relays             | 4,096   |
| Timer                    | 512   |
| Counter                  | 235   |
| High-speed counter       | 16  |
| High-speed counter speed | 1 phase, 8 points max: 100kHz/6 points 10kHz/2 points<br>2 phase, 2 points max: 50kHz/2 points            |
| Real-time clock          | Year, month, day, hour, minute, second, weekday   |
| Data register            | 8,000   |
| Extension file register  | 32768   |
| Index register           | 16  |
| Special register         | 512   |
| Pointer                  | 4,096   |
| Nestings                 | 8   |
| Interrupt inputs         | 6   |
| Constants                | 16 bits: K: -32768 to +32768, hex: 0–FFFF;<br>32 bits: K: -2147483648 to +2147483647;<br>hex: 0–FFFF FFFF |

The MELSEC FX3UC Series

2  
FX BASE UNITS

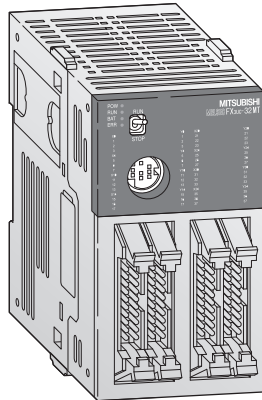


Description of the Unit Components



■ Base Units

□ FX1S □ FX1N □ FX3G □ FX3U  FX3UC



**Base Units FX3uc**

The FX3U series base units are available with 16, 32, 64 or 128 input/output points (expandable to 384 I/Os). It is possible to choose between relay and transistor output type.

**Special Features:**

- Integrated serial interface for communication between PCs and HMI
- Same instruction set as FX3U
- Integrated positioning control
- Very compact dimensions
- LEDs for indicating the input and output status
- Slot for memory cassette
- Adapter modules and system cabling sets available for units with ribbon cable connectors
- Expandable with digital I/O modules, special function modules and ADP modules
- User-friendly programming systems, including IEC 1131.3 (EN 61131.3) compatible programming software, HMIs and hand-held programming units

2

FXBASE UNITS

**Base Units with 16–96 I/Os**

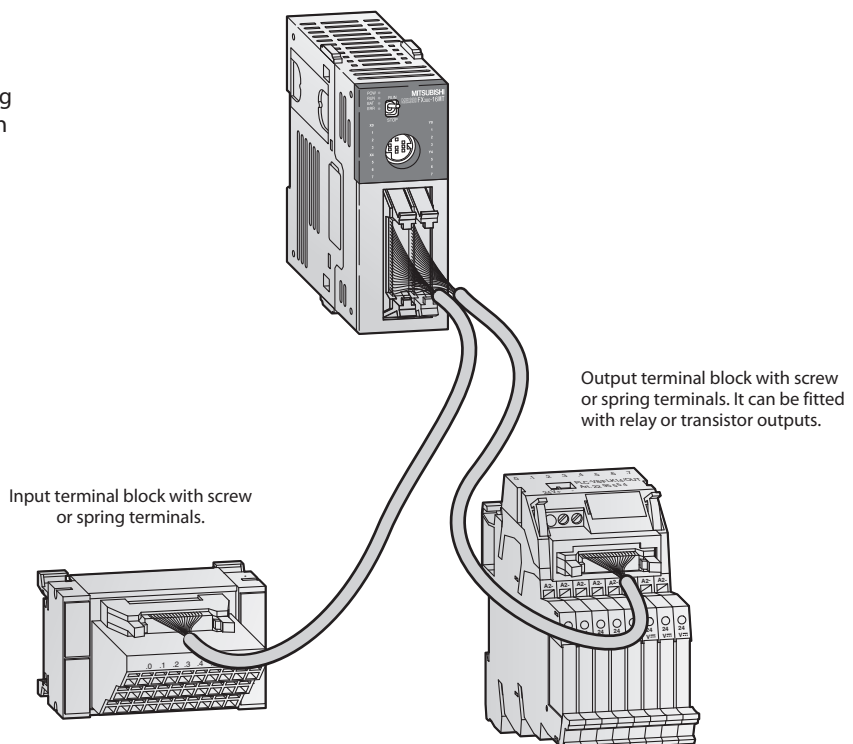
| Specifications            | FX3UC-16<br>MT/DSS        | FX3UC-32<br>MT/DSS        | FX3UC-64<br>MT/DSS        | FX3UC-96<br>MT/DSS        |
|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| Integrated inputs/outputs | 16                        | 32                        | 64                        | 96                        |
| Power supply              | 24 V DC (+20 %, -15 %)    | 24 V DC (+20 %, -15 %)    | 24 V DC (+20 %, -15 %)    | 24 V DC (+20 %, -15 %)    |
| Integrated inputs         | 8                         | 16                        | 32                        | 48                        |
| Integrated outputs        | 8                         | 16                        | 32                        | 48                        |
| Output type               | Transistor (source type)* | Transistor (source type)* | Transistor (source type)* | Transistor (source type)* |
| Power consumption         | W 6                       | 8                         | 11                        | 14                        |
| Weight                    | kg 0.2                    | 0.2                       | 0.3                       | 0.35                      |
| Dimensions (WxHxD)        | mm 34x90x74               | 34x90x74                  | 59.7x90x74                | 85.4x90x74                |
| <b>Order information</b>  | Art. no. 231508           | 231509                    | 231510                    | 231511                    |

\* Sink type transistor output units on request.

**System Cabling**

A choice of terminal blocks with screw or spring terminals are available for easy wiring of the FX3UC modules with standard ribbon cable connectors.

For more details please refer to the "Accessories" section in this catalogue.



■ Base Units □ FX1S □ FX1N □ FX3G □ FX3U ☑ FX3UC

## Environmental Specifications

| General specifications       | Data   |
|------------------------------|--|
| Ambient temperature          | 0–55 °C (storage temperature: –25–+75 °C)  |
| Protection                   | IP10   |
| Noise durability             | 1000 Vpp with noise generator; 1 μs at 30–100 Hz   |
| Dielectric withstand voltage | AC PSU: 1500 V AC, 1 min./DC PSU: 500 V AC, 1 min.   |
| Ambient relative humidity    | 5–95 % (non-condensing)  |
| Shock resistance             | Acc. to IEC 68-2-27: 15G (3 times each in 3 directions for 11 ms)  |
| Vibration resistance         | Acc. to IEC 68-2-6: 1G (resistance to vibrations from 57–150 Hz for 80 minutes along all 3 axes); 0.5G for DIN rail mounting |
| Insulation resistance        | 500 V DC, 5 MW   |
| Ground                       | Class D: Grounding resistance 100 W or less  |
| Environment                  | Avoid environments containing corrosive gases, install in a dust-free location.  |
| Certifications               | Please refer to pages 66–67 in this catalogue  |

## Electrical Specifications

| Power supply specifications            | All modules           |
|--|-----------------------|
| Power supply                           | 24 V DC (+20 %/–30 %) |
| Inrush current at ON                   | —                     |
| Allowable momentary power failure time | 5 ms                  |
| Primary power supply                   | 24 V DC               |
| External power supply (24 V DC)        | —                     |

| Output specifications                             | All modules  |
|---|--|
| Switching voltage (max.)                          | V 5–30 V DC  |
| Max. output current                               | - per output A 0.1/0.3 <sup>①</sup>                      |
|   | - per group* A 0.8/1.6                                   |
| Max. switching current                            | - inductive load 2.4 W/7.2 W <sup>②</sup>                |
| Response time                                     | ms <0.2 (Y0, Y1 <30 μs)                                  |
| Life of contacts (switching times) <sup>③ ③</sup> | 3,000,000 at 20 VA; 1,000,000 at 35 VA; 200,000 at 80 VA |

① for Y0 and Y1 = 0.3 A; all others 0.1 A    ② 7.2 W for Y0 to Y3, all other outputs 2.4 W  
 ③ Not guaranteed by Mitsubishi Electric.  
 \* This limitation applies only per reference terminal for each group, 4 and 8 outputs for relays and 2 and 4 outputs for transistors. Please observe the terminal assignments for the group identification.

## Programming Specifications

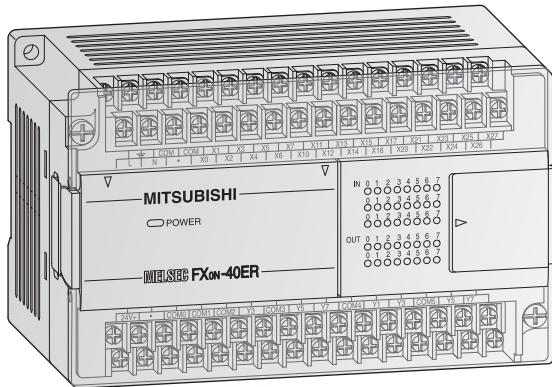
| System specifications  | FX3UC  |
|------------------------|--|
| <b>Program data</b>    |  |
| I/O points (addresses) | Max. total 384 (with remote I/O)   |
| Address range          | Max. 256 direct addressing and max. 256 network I/Os                           |
| Program memory         | 64,000 steps RAM (internal), exchangeable FLROM for easy program exchange      |
| Cycle period           | 0.065 μs/basic instruction   |
| Number of instructions | 27 sequence instructions, 2 step ladder instructions, 209 applied instructions |
| Programming language   | Step ladder, instruction list, SFC   |
| Program execution      | Cyclical execution, refresh mode processing                                    |
| Program protection     | Password protection with 3 protection levels*                                  |

\* Protection levels may only be changed with FX-30P.

| System specifications    | FX3UC   |
|--------------------------|---|
| <b>Operands</b>          |   |
| Internal relays          | 7,680   |
| Special relays           | 512   |
| State relays             | 4,096   |
| Timer                    | 512   |
| Counter                  | 235   |
| High-speed counter       | 16  |
| High-speed counter speed | 1 phase, 8 points max: 100 kHz/6 points<br>10 kHz/2 points<br>2 phase, 2 points max: 50 kHz/2 points      |
| Real-time clock          | Year, month, day, hour, minute, second, weekday   |
| Data register            | 8,000   |
| Extension file register  | 32768   |
| Index register           | 16  |
| Special register         | 512   |
| Pointer                  | 4,096   |
| Nestings                 | 8   |
| Interrupt inputs         | 6   |
| Constants                | 16 bits: K: –32768 to +32768, hex: 0–FFFF;<br>32 bits: K: –2147483648 to +2147483647;<br>hex: 0–FFFF FFFF |

■ Powered Compact Extension Units

FX1S  FX1N  FX3G  FX3U  FX3UC



**Extension Units FX0N**

The FX0N series extension units are available with 40 input/output points.

It is possible to choose between relay and transistor output type.

**Special Features:**

- LEDs for indicating the input and output status
- MELSEC FX1N series compatible
- Integrated service power supply with up to 200 mA capacity

| Specifications                                  | FX0N-40<br>ER-ES/UL   | FX0N-40<br>ER-DS | FX0N-40<br>ET-DSS |
|---|---|------------------|-------------------|
| <b>Electrical data</b>                          |   |                  |                   |
| Integrated inputs/outputs                       | 40  | 40               | 40                |
| Power supply                                    | AC range (+10 %, -15 %)   | 100–240 V        | —                 |
|   | Frequency at AC   | Hz 50/60         | —                 |
|   | DC range (+20 %, -15 %)   | —                | 24 V              |
| Max. input apparent power                       | 40 VA   | 20 W             | 30 W              |
| Inrush current at ON                            | 100 V AC  | 30 A/5 ms        | —                 |
|   | 200 V AC  | 50 A/5 ms        | —                 |
|   | 24 V DC   | —                | 60 A/50 μs        |
| Allowable momentary power failure time          | ms 10   | 5                | 5                 |
| External service power supply (24 V DC)         | mA 200  | —                | —                 |
| <b>Inputs</b>                                   |   |                  |                   |
| Integrated inputs                               | 24  | 24               | 24                |
| 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                                   | For all extension units of the MELSEC FX0N series: 10 ms (at time of shipment)  |                  |                   |
| <b>Outputs</b>                                  |   |                  |                   |
| Integrated outputs                              | 16  | 16               | 16                |
| Output type                                     | Relay   | Relay            | Transistor        |
| Max. switching voltage                          | Generally for relay version: <240 V AC, <30 V DC; for transistor version: 5–30 V DC   |                  |                   |
| Max. output current                             | - per output  | A 2              | 0.5               |
|   | - per group*  | A 5              | 0.8 <sup>①</sup>  |
| Max. switching power - inductive load           | VA 80   | 80               | 12                |
| Response time                                   | ms 10   | 10               | <0.2              |
| Life of contacts (switching times) <sup>②</sup> | For all extension units of the MELSEC FX0N series: 3,000,000 at 20 VA; 1,000,000 at 35 VA; 200,000 at 80 VA (only for relay output) |                  |                   |
| <b>Mechanical data</b>                          |   |                  |                   |
| Weight  | kg 0.75   | 0.75             | 0.75              |
| Dimensions (WxHxD)                              | mm 150x90x87  | 150x90x87        | 150x90x87         |
| <b>Order information</b>                        | Art. no. 60012  | 55955            | 55954             |

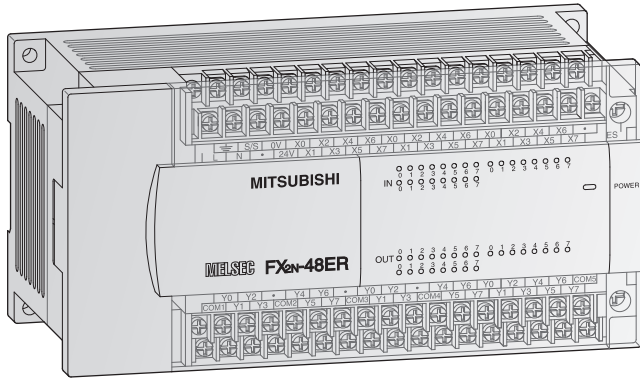
<sup>①</sup> 0.8 for 4 per group

<sup>②</sup> Not guaranteed by Mitsubishi Electric.

\* This limitation applies only per reference terminal for each group. Please observe the terminal assignments for the group identification.

## ■ Powered Compact Extension Units

□ FX1S  FX1N  FX3G  FX3U  FX3UC



### Extension Units FX2N

The FX2N series extension units are available with 32 or 48 input/output points.

It is possible to choose between relay and transistor output type.

### Special Features:

- LEDs for indicating the input and output status
- MELSEC FX1N/FX3G and FX3U series compatible
- Detachable terminal blocks
- Integrated service power supply with 250 mA or 460 mA

| Specifications                                  | FX2N-32<br>ER-ES/UL   | FX2N-32<br>ET-ESS/UL | FX2N-48<br>ER-DS | FX2N-48<br>ER-ES/UL | FX2N-48<br>ET-DSS    | FX2N-48<br>ET-ESS/UL |
|---|---|----------------------|------------------|---------------------|----------------------|----------------------|
| <b>Electrical data</b>                          |   |                      |                  |                     |                      |                      |
| Integrated inputs/outputs                       | 32  | 32                   | 48               | 48                  | 48                   | 48                   |
| Power supply                                    | AC range (+10%, -15%)   | 100–240 V            | —                | 100–240 V           | —                    | 100–240 V            |
|   | frequency at AC   | 50/60                | —                | 50/60               | —                    | 50/60                |
|   | DC range (+20%, -30%)   | —                    | 24 V             | —                   | 24 V                 | —                    |
| Max. input apparent power                       | 35 VA   | 35 VA                | 30 W             | 45 VA               | 30 W                 | 45 VA                |
| Inrush current at ON                            | 100 V AC  | 40 A <5 ms           | —                | 40 A <5 ms          | 40 A <5 ms           | 40 A <5 ms           |
|   | 200 V AC  | 60 A <5 ms           | —                | 60 A <5 ms          | 60 A <5 ms           | 60 A <5 ms           |
| Allowable momentary power failure time          | ms  | 10                   | 5                | 10                  | 5                    | 10                   |
| External service power supply (24 V DC)         | mA  | 250                  | —                | 460                 | —                    | 460                  |
| Power supply int. bus (5 V DC)                  | mA  | 690                  | 690              | 690                 | 690                  | 690                  |
| <b>Inputs</b>                                   |   |                      |                  |                     |                      |                      |
| Integrated inputs                               | 16  | 16                   | 24               | 24                  | 24                   | 24                   |
| Min. current for logical 1                      | mA  | 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                  |
| Response time                                   | For all extension units of the MELSEC FX2N series: 10 ms (at time of shipment)  |                      |                  |                     |                      |                      |
| <b>Outputs</b>                                  |   |                      |                  |                     |                      |                      |
| Integrated outputs                              | 16  | 16                   | 24               | 24                  | 24                   | 24                   |
| Output type                                     | Relay   | Transistor (source)  | Relay            | Relay               | Transistor (source)  | Transistor (source)  |
| Switching voltage (max.)                        | Generally for relay version: <264 V AC, <30 V DC; for transistor version: 5–30 V DC   |                      |                  |                     |                      |                      |
| Max. output current                             | - per output  | A                    | 2                | 2                   | 0.5                  | 0.5                  |
|   | - per group*  | A                    | 8                | 8                   | 0.8/1.6 <sup>②</sup> | 0.8/1.6 <sup>②</sup> |
| Max. switching power - inductive load           | W   | 80                   | 12               | 80                  | 12                   | 12                   |
| Response time                                   | ms  | 10                   | <0.2             | 10                  | <0.2                 | <0.2                 |
| Life of contacts (switching times) <sup>①</sup> | For all extension units of the MELSEC FX2N series: 3,000,000 at 20 VA; 1,000,000 at 35 VA; 200,000 at 80 VA (for relay output only) |                      |                  |                     |                      |                      |
| <b>Mechanical data</b>                          |   |                      |                  |                     |                      |                      |
| Weight  | kg  | 0.65                 | 0.65             | 0.85                | 0.85                 | 0.85                 |
| Dimensions (WxHxD)                              | mm  | 150x90x87            | 150x90x87        | 182x90x87           | 182x90x87            | 182x90x87            |
| <b>Order information</b>                        | Art. no.  | 65568                | 65569            | 66633               | 65571                | 66634                |
|   |   | 65572                |                  |                     |                      |                      |

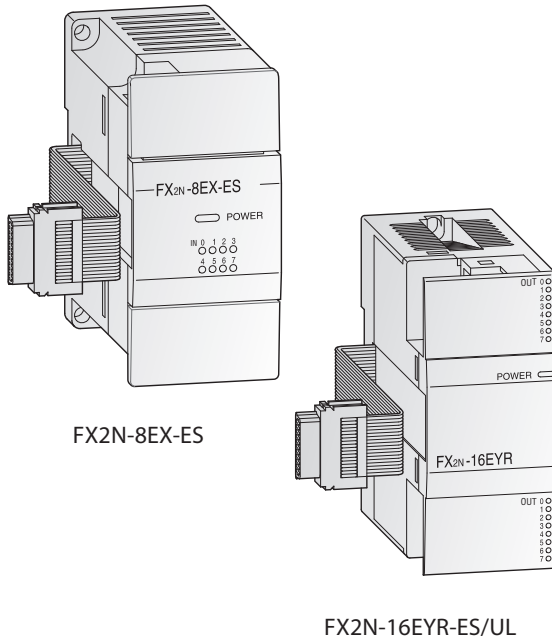
<sup>①</sup> Not guaranteed by Mitsubishi Electric    <sup>②</sup> 0.8 for 4 per group and 1.6 for 8 per group

\* This limitation applies only per reference terminal for each group. Please observe the terminal assignments for the group identification.



■ Unpowered Modular Extension Blocks

□ FX1S  FX1N  FX3G  FX3U  FX3UC



**Extension Blocks FX2N**

The FX2N series modular extension blocks are available with 8 or 16 input/output points. It is possible to choose between relay and transistor output type.

**Special Features:**

- LEDs for indicating the input and output status
- MELSEC FX1N/FX3G and FX3U series compatible
- Very compact dimensions
- Vertically terminal blocks with a cable guide to the upper or lower side

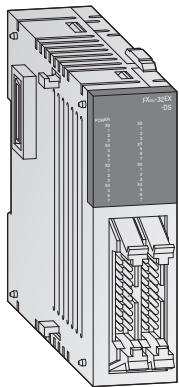
| Specifications                                  | FX2N-8<br>ER-ES/UL  | FX2N-8<br>EX-ES/UL | FX2N-8<br>EYR-ES/UL | FX2N-8<br>EYT-ESS/UL | FX2N-16<br>EX-ES/UL | FX2N-16<br>EYR-ES/UL | FX2N-16<br>EYT-ESS/UL |
|---|---|--------------------|---------------------|----------------------|---------------------|----------------------|-----------------------|
| <b>Electrical data</b>                          |   |                    |                     |                      |                     |                      |                       |
| Integrated inputs/outputs                       | 8   | 8                  | 8                   | 8                    | 16                  | 16                   | 16                    |
| Nbr. of occupied I/O points in the PLC          | 16  | 8                  | 8                   | 8                    | 16                  | 16                   | 16                    |
| Power supply                                    | All modular extension blocks are supplied by the base unit.   |                    |                     |                      |                     |                      |                       |
| <b>Inputs</b>                                   |   |                    |                     |                      |                     |                      |                       |
| Integrated inputs                               | 4   | 8                  | —                   | —                    | 16                  | —                    | —                     |
| Min. current for logical 1                      | mA  | 3.5                | —                   | —                    | 3.5                 | —                    | —                     |
| Max. current for logical 0                      | mA  | 1.5                | —                   | —                    | 1.5                 | —                    | —                     |
| Response time                                   | For all extension blocks of the MELSEC FX2N series: 10 ms (at time of shipment)   |                    |                     |                      |                     |                      |                       |
| <b>Outputs</b>                                  |   |                    |                     |                      |                     |                      |                       |
| Integrated outputs                              | 4   | —                  | 8                   | 8                    | —                   | 16                   | 16                    |
| Output type                                     | Relay   | —                  | Relay               | Transistor           | —                   | Relay                | Transistor (source)   |
| Max. switching voltage                          | Generally for relay version: <240 V AC, <30 V DC; for transistor version: 5–30 V DC   |                    |                     |                      |                     |                      |                       |
| Max. output current                             | A   | 2                  | —                   | 2                    | 0.5                 | —                    | 2                     |
| - per output                                    | A   | 8                  | —                   | 8                    | 0.8                 | —                    | 8                     |
| - per group <sup>①</sup>                        | VA  | 80                 | —                   | 80                   | 12                  | —                    | 80                    |
| Max. switching power                            | ms  | 10                 | 10                  | 10                   | <0.2                | —                    | 10                    |
| Response time                                   | For all extension units of the MELSEC FX2N series: 3,000,000 at 20 VA; 1,000,000 at 35 VA; 200,000 at 80 VA (for relay output only) |                    |                     |                      |                     |                      |                       |
| Life of contacts (switching times) <sup>②</sup> |   |                    |                     |                      |                     |                      |                       |
| <b>Mechanical data</b>                          |   |                    |                     |                      |                     |                      |                       |
| Weight  | kg  | 0.2                | 0.2                 | 0.2                  | 0.2                 | 0.3                  | 0.3                   |
| Dimensions (WxHxD)                              | mm  | 43x90x87           | 43x90x87            | 43x90x87             | 43x90x87            | 40x90x87             | 40x90x87              |
| <b>Order information</b>                        |   |                    |                     |                      |                     |                      |                       |
| Art. no.  | 166285  | 166284             | 166286              | 166287               | 65776               | 65580                | 65581                 |

① This limitation applies only per reference terminal for each group. Please observe the terminal assignments for the group identification.

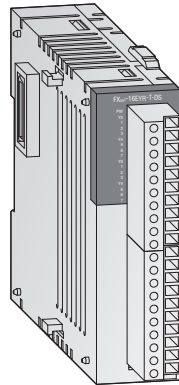
② Not guaranteed by Mitsubishi Electric

## Modular Extension Units

FX1S  FX1N  FX3G  FX3U  FX3UC



FX2NC-32EX-DS



FX2NC-16EYR-DS

### Extension Units FX2NC

The modular extension units of the FX2NC series can be used in combination with FX3UC series base units only. They are available with 16 or 32 input/output points. For modules with 16 outputs it is possible to choose between relay and transistor output type.

*Note: These modules can be used in combination with a FX3UC PLC only!*

#### Special Features:

- Very compact dimensions
- LEDs for indicating the input and output status
- Removable terminal blocks for FX2NC-16EYR-T-DS and FX2NC-16EX-T-DS (interchangeable against optional spring terminal blocks)
- Adapter modules and system cabling sets are optionally available for units with ribbon cable connectors (transistor output types)

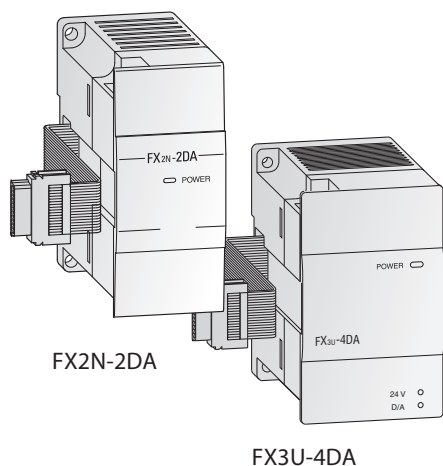
| Specifications                           | FX2NC-16 EX-T-DS  | FX2NC-16 EYR-T-DS | FX2NC-16 EX-DS         | FX2NC-16 EYT-DSS       | FX2NC-32 EX-DS         | FX2NC-32 EYT-DSS       |                      |
|--|---|-------------------|------------------------|------------------------|------------------------|------------------------|----------------------|
| <b>Electrical data</b>                   |   |                   |                        |                        |                        |                        |                      |
| Integrated inputs/outputs                | 16  | 16                | 16                     | 16                     | 32                     | 32                     |                      |
| Power supply                             | All modular extension blocks are supplied by the base unit.   |                   |                        |                        |                        |                        |                      |
| <b>Inputs</b>                            |   |                   |                        |                        |                        |                        |                      |
| Integrated inputs                        | 16  | —                 | 16                     | —                      | 32                     | —                      |                      |
| Input current X0→X7 / X10→∞              | 7/5   | —                 | 7/5                    | —                      | 7/5                    | —                      |                      |
| Min. current for logical 1 X0→X7 / X10→∞ | mA 4.5/3.5  | —                 | 4.5/3.5                | —                      | 4.5/3.5                | —                      |                      |
| Max. current for logical 0               | mA 1.5  | —                 | 1.5                    | —                      | 1.5                    | —                      |                      |
| Isolation                                | Photocoupler isolation between input terminals and PC power for all base units  |                   |                        |                        |                        |                        |                      |
| Response time                            | For all extension units of the MELSEC FX2NC series: 10 ms (at time of shipment), partly adjustable between 0 and 60 ms in 1 ms steps (REF, FNCS1 = 0–60 ms) |                   |                        |                        |                        |                        |                      |
| <b>Outputs</b>                           |   |                   |                        |                        |                        |                        |                      |
| Integrated outputs                       | —   | 16                | —                      | 16                     | —                      | 32                     |                      |
| Output type                              | —   | Relay             | —                      | Transistor             | —                      | Transistor             |                      |
| Max. switching voltage                   | V Generally for relay version: <240 V AC, <30 V DC; for transistor version: 5–30 V DC   |                   |                        |                        |                        |                        |                      |
| Max. output current                      | - per output  | A —               | 2                      | —                      | 0.1/0.3 <sup>①</sup>   | —                      | 0.1/0.3 <sup>①</sup> |
|  | - per group*  | A —               | 4/8                    | —                      | 0.8                    | —                      | 0.8                  |
| Max. switching power                     | - inductive load  | VA —              | 80                     | —                      | 2.4/7.2 <sup>②</sup>   | —                      | 2.4/7.2 <sup>②</sup> |
|  | - lamp load   | W —               | 100                    | —                      | 0.3/0.9 <sup>③</sup>   | —                      | 0.3/0.9 <sup>③</sup> |
| Response time                            | ms —  | 10                | —                      | <0.2                   | —                      | <0.2                   |                      |
| Life of contacts (switching times)       | —   | like base unit    | —                      | —                      | —                      | —                      |                      |
| <b>Mechanical data</b>                   |   |                   |                        |                        |                        |                        |                      |
| Connection type                          | Removable screw terminal blocks   |                   | Ribbon cable connector | Ribbon cable connector | Ribbon cable connector | Ribbon cable connector |                      |
| Weight                                   | kg 0.2  | 0.2               | 0.15                   | 0.2                    | 0.2                    | 0.2                    |                      |
| Dimensions (WxHxD)                       | mm 20.2x90x89   | 24.2x90x89        | 14.6x90x87             | 14.6x90x87             | 26.2x90x87             | 26.2x90x87             |                      |
| <b>Order information</b>                 | Art. no.  | 128152            | 128153                 | 104503                 | 104504                 | 104505                 | 104506               |

<sup>①</sup> 0.3A for Y0 to Y1; 0.1 A all others    <sup>②</sup> 7.2 W for Y0 to Y3; 2.4 W all others    <sup>③</sup> 0.9 W for Y0 to Y3; 0.3 W all others

\* This limitation applies only per reference terminal for each group. Please observe the terminal assignments for the group identification.

■ Analog Output Modules

□ FX1S  FX1N  FX3G  FX3U  FX3UC



**FX2N-2DA, FX2N-4DA, FX3U-4DA**

The analog output modules provide the user with 2 to 4 analog outputs. The modules convert digital values from the FX1N/FX3G/FX3U controller to the analog signals required by the process. The module can output both current and voltage signals.

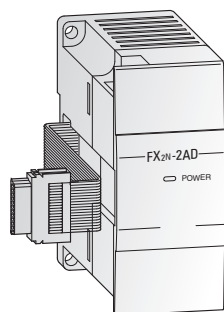
Note: The FX3U-4DA can only be used in combination with a FX3G/FX3U series base unit.

| Specifications             |   | FX2N-2DA                                    | FX2N-4DA                                     | FX3U-4DA                                     |
|----------------------------|---|---|--|--|
| Analog channels            | inputs                                      | —   | —  | —  |
|                            | outputs                                     | 2   | 4  | 4  |
| Analog output range        | 0 → +10 V DC/<br>0 → +5 V DC/<br>4 → +20 mA | 0 → +10 V DC/<br>0 → +5 V DC/<br>4 → +20 mA | -10 → +10 V DC/<br>0 → +20 mA/<br>4 → +20 mA | -10 → +10 V DC/<br>0 → +20 mA/<br>4 → +20 mA |
|                            | Resolution                                  | 2.5 mV (12 bits)                            | 5 mV (10 bits)                               | 0.32 mV (16 bits + sign)                     |
|                            | current                                     | 4 μA (12 bits)                              | 20 μA (11 bits + sign)                       | 0.63 μA (15 bits)                            |
| Fullscale overall accuracy | ±1 %  | ±1 %  | ±0.3–0.5 %*                                  |  |
| Power supply               | 5 V DC                                      | 30 mA (from base unit)                      | 30 mA (from base unit)                       | 100 mA (from base unit)                      |
|                            | 24 V DC                                     | 85 mA                                       | 200 mA                                       | 160 mA                                       |
| Related I/O points         |   | 8   | 8  | 8  |
| Weight                     | kg  | 0.3   | 0.3  | 0.2  |
| Dimensions (WxHxD)         | mm  | 43x90x87                                    | 55x90x87                                     | 55x90x87                                     |
| <b>Order information</b>   | Art. no.                                    | 102868                                      | 65586  | 169509                                       |

\* Dependent on the ambient temperature

■ Analog Input Modules

□ FX1S  FX1N  FX3G  FX3U  FX3UC

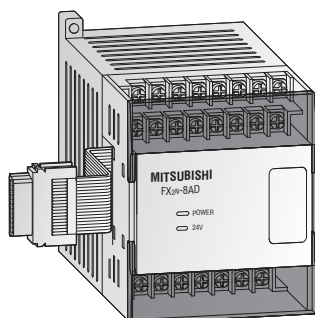


**FX2N-2AD, FX2N-4AD, FX3U-4AD, FX2N-8AD**

The analog input modules provide the user with 2 to 8 analog inputs. The module converts analog process signals into digital values which are further processed by the MELSEC FX1N/FX3G/FX3U controller.

The actual values or mean values over several measurements may be output.

Note: The FX3U-4AD can only be used in combination with a FX3G/FX3U series base unit.



| Specifications             |  | FX2N-2AD                                       | FX2N-4AD                                       | FX3U-4AD                                       | FX3UC-4AD                                      | FX2N-8AD                                       |
|----------------------------|--|--|--|--|--|--|
| Analog channels            | inputs   | 2  | 4  | 4  | 4  | 8  |
|                            | outputs  | —  | —  | —  | —  | —  |
| Analog input range         | 0 → +10 V DC/<br>0 → +5 V DC/<br>0/ 4 → +20 mA | 0 → +10 V DC/<br>0 → +5 V DC/<br>0/ 4 → +20 mA | -10 → +10 V DC/<br>-20 → +20 mA/<br>4 → +20 mA | -10 → +10 V DC/<br>-20 → +20 mA/<br>4 → +20 mA | -10 → +10 V DC/<br>-20 → +20 mA/<br>4 → +20 mA | -10 → +10 V DC/<br>-20 → +20 mA/<br>4 → +20 mA |
|                            | Resolution                                     | 2.5mV, 1.25mV/<br>4 μA (12 bits)               | 5 mV<br>(11 bits + sign)                       | 0.32 mV<br>(16 bits + sign)                    | 0.32 mV<br>(16 bits + sign)                    | 0.63 mV<br>(14 bits + sign)                    |
|                            | current  | 4 μA (12 bits)                                 | 20 μA<br>(10 bits + sign)                      | 1.25 μA<br>(15 bits + sign)                    | 1.25 μA<br>(15 bits + sign)                    | 2.5 μA<br>(13 bits + sign)                     |
| Fullscale overall accuracy | ±1 %   | ±1 %   | ±0.3–1 %*                                      | ±0.3–1 %*                                      | ±0.3–0.5 %*                                    |  |
| Power supply               | 5 V DC   | 20 mA<br>(from base unit)                      | 30 mA<br>(from base unit)                      | 110 mA<br>(from base unit)                     | 100 mA<br>(from base unit)                     | 50 mA<br>(from base unit)                      |
|                            | 24 V DC  | 50 mA<br>(from base unit)                      | 55 mA  | 90 mA  | 80 mA  | 80 mA  |
| Related I/O points         |  | 8  | 8  | 8  | 8  | 8  |
| Weight                     | kg   | 0.3  | 0.3  | 0.2  | 0.13   | 0.4  |
| Dimensions (WxHxD)         | mm   | 43x90x87                                       | 55x90x87                                       | 55x90x87                                       | 20.2x90x79                                     | 75x105x75                                      |
| <b>Order information</b>   | Art. no.                                       | 102869   | 65585  | 169508   | 210090   | 129195   |

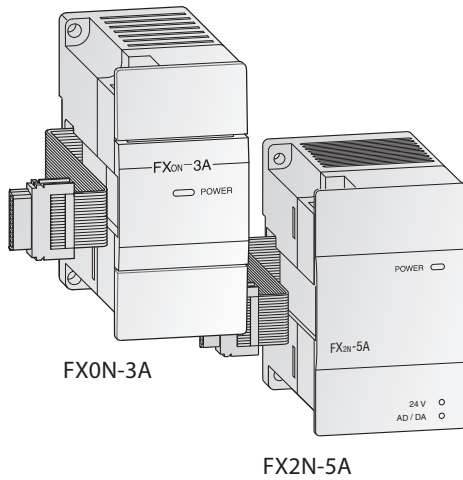
\* Dependent on the ambient temperature

Note: The FX2N-8AD can be configured to accept standard analog inputs as well as selected temperature inputs such as K, T or J type thermocouples.

4  
SPECIAL FUNCTION MODULES

■ Combined Analog I/O Modules

□ FX1S □ FX1N □ FX3G □ FX3U □ FX3UC



**FX0N-3A, FX2N-5A, FX3U-3A-ADP**

The analog input/output modules are available in two different models. They provide the user with 2 or 4 analog inputs and 1 analog output. They serve for conversion of analog process signals into digital values, and vice versa.

As of the FX2N-5A module the analog inputs can be selected between current or voltage input signals.

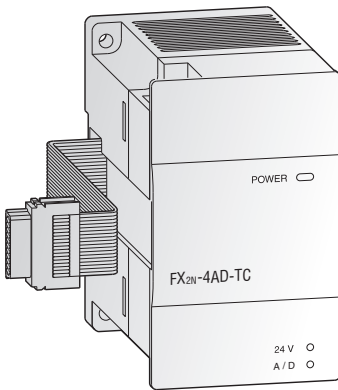
*Note: The FX2N-5A may not be used in combination with a FX1N series base unit.*

| Specifications           |         | FX0N-3A                            | FX2N-5A  | FX3U-3A-ADP             |
|--------------------------|---------|------------------------------------|--|-------------------------|
| Number of analog points  | inputs  | 2                                  | 4  | 2                       |
|                          | outputs | 1                                  | 1  | 1                       |
| Input (resolution)       | voltage | 0—+10 V (8 bit),<br>0—+5 V (8 bit) | -10—+10 V (15 bit + sign),<br>-100—+100 mV (11 bit + sign) | 0—+10 V (2.5 mV/12 bit) |
|                          | current | 0/4—+20 mA (8 bit)                 | -20—+20 mA (14 bit + sign),<br>0/4—+20 mA (14 bit)         | 4—+20 mA (5 µA/12 bit)  |
| Output (resolution)      | voltage | 0—+10 V (8 bit),<br>0—+5 V (8 bit) | -10—+10 V (12 bit)   | 0—+10 V (2.5 mV/12 bit) |
|                          | current | 4—+20 mA (8 bit)                   | 0/4—+20 mA (10 bit)  | 4—+20 mA (4 µA/12 bit)  |
| Total accuracy           |         | ±1 %                               | ±0.3–1 %*  | ±0.5–1 %*               |
| Power supply             | 5 V DC  | 30 mA (from base unit)             | 70 mA (from base unit)                                     | 20 mA (from base unit)  |
|                          | 24 V DC | 90 mA (from base unit)             | 90 mA  | 90 mA                   |
| Related I/O points       |         | 8                                  | 8  | 0                       |
| Weight                   | kg      | 0.2                                | 0.3  | 0.1                     |
| Dimensions (WxHxD)       | mm      | 43x90x87                           | 55x90x87   | 17.6x90x89.5            |
| <b>Order information</b> |         | Art. no. 41790                     | 153740   | 221549                  |

\*Dependent on the ambient temperature

■ Analog Temperature Input Modules

□ FX1S □ FX1N □ FX3G □ FX3U □ FX3UC



**FX2N-4AD-TC, FX2N-4AD-PT, FX2N-2LC**

The analog input module for thermocouples FX2N-4AD-TC is used for processing temperatures. It has 4 independent inputs for detecting signals from thermocouples of types J and K. The type of thermocouple can be chosen independently for each point.

The analog input module for Pt100 inputs FX2N-4AD-PT permits the connection of four Pt100 sensors to the FX2N/FX3U series controller.

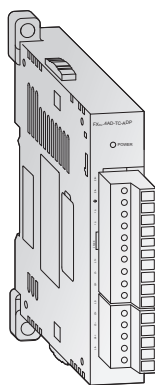
The temperature control module FX2N-2LC is equipped with two temperature input points and two transistor (open collector) output points. It is used to read temperature signals from thermocouples and Pt100 sensors, and performs PID output control

*Note: The FX2N-2LC may not be used in combination with a FX1N series base unit.*

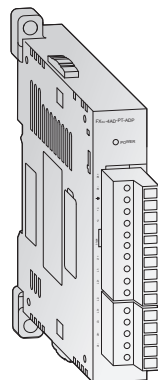
| Specifications                   |         | FX2N-4AD-TC                                    | FX2N-4AD-PT                         | FX2N-2LC   |
|----------------------------------|---------|--|-------------------------------------|--|
| Analog inputs                    |         | 4 (J or K type)                                | 4 (Pt100 sensors)                   | 2 points   |
| Compensated temperature range °C |         | -100—+600 (J type)/<br>-100—+1200 (K type)     | -100—+600                           | Thermocouple and Pt100 sensor  |
| Digital outputs                  |         | -1000—+6000 (J type)/<br>-1000—+12000 (K type) | -1,000—6,000<br>(12 bit conversion) | 2 transistor output points   |
| Resolution                       |         | 0.3 (J type) / 0.4 (K type)                    | 0.2–0.3 °C                          | 0.1 °C or 1 °C   |
| Total accuracy                   |         | ±0.5 % fullscale +1 °C                         | ±1.0 % fullscale                    | ±0.7 % fullscale<br>(±0.3 % when ambient temperature is 23 °C ±5 °C) |
| Power supply                     | 5 V DC  | 40 mA (from base unit)                         | 30 mA (from base unit)              | 70 mA (from base unit)   |
|                                  | 24 V DC | 60 mA  | 50 mA                               | 55 mA  |
| Related I/O points               |         | 8  | 8                                   | 8  |
| Weight                           | kg      | 0.3  | 0.3                                 | 0.3  |
| Dimensions (WxHxD)               | mm      | 55x90x87                                       | 55x90x87                            | 55x90x87   |
| <b>Order information</b>         |         | Art. no. 65588                                 | 65587                               | 129196   |

■ Analog Temperature Input Adapters

FX1S  FX1N  FX3G  FX3U  FX3UC



FX3U-4AD-TC-ADP



FX3U-4AD-PT-ADP

**FX3U-4AD-TC-ADP, FX3U-4AD-PT-ADP, FX3U-4AD-PTW-ADP, FX3U-4AD-PNK-ADP**

The analog input adapter for thermocouples FX3U-4AD-TC-ADP is used for processing temperatures. It has 4 independent inputs for detecting signals from thermocouples of types J and K.

The FX3U-4AD-PNK-ADP analog input adapter enables the connection of up to four Pt1000/Ni1000 thermocouples.

The FX3U-4AD-PT-ADP and FX3U-4AD-PTW-ADP analog input adapters enable the connection of up to four Pt100 thermocouples to the PLC system.

All analog adapters can be used in combination with the base units of the FX3G/FX3U/FX3UC series only.

*Note: When connecting the analog adapters to a FX3U base unit, a communications adapter is required. A direct connection without adapter is possible if these modules are connected to a FX3UC base unit. When connecting an adapter to a FX3G PLC the communications adapter FX3G-CNV-ADP is required.*

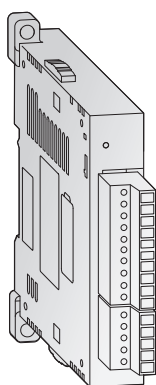
| Specifications                | FX3U-4AD-TC-ADP                                | FX3U-4AD-PT-ADP        | FX3U-4AD-PTW-ADP          | FX3U-4AD-PNK-ADP                            |
|-------------------------------|--|------------------------|---------------------------|---|
| Analog inputs                 | 4 (J or K type)                                | 4 (Pt100 sensors)      | 4 (Pt100 sensors, 3-wire) | (Pt1000/Ni1000 sensors, 2/3 wire)           |
| Compensated temperature range | -100—+600 (J type)/<br>-100—+1000 (K type)     | -50—+250               | -100—+600                 | -50—+250 (Pt1000)/<br>-40—+110 (Ni1000)     |
| Digital outputs               | -1000—+6000 (J type)/<br>-1000—+10000 (K type) | -500—+2500             | -1000—+6000               | -500—+2500 (Pt1000)/<br>-400—+1100 (Ni1000) |
| Resolution                    | 0.3 (J type)/<br>0.4 (K type)                  | 0.1                    | 0.2—0.3                   | 0.1   |
| Total accuracy                | ±0.5 % fullscale                               | ±0.5—1.0 % fullscale*  |                           |   |
| Power supply                  | 5 V DC   | 15 mA (from base unit) | 15 mA (from base unit)    | 15 mA (from base unit)                      |
|                               | 24 V DC  | 45 mA                  | 50 mA                     | 50 mA                                       |
| Related I/O points            | 0  | 0                      | 0                         | 0   |
| Weight                        | kg   | 0.1                    | 0.1                       | 0.1   |
| Dimensions (WxHxD)            | mm   | 17.6x90 (106)x89.5     |                           |   |
| <b>Order information</b>      | Art. no.                                       | 165273                 | 165272                    | 214173                                      |

\*Dependent on the ambient temperature

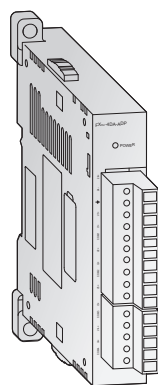
4  
SPECIAL FUNCTION MODULES

■ Analog I/O Adapters

FX1S  FX1N  FX3G  FX3U  FX3UC



FX3U-4AD-ADP



FX3U-4DA-ADP

**FX3U-4AD-ADP, FX3U-4DA-ADP**

The FX3U-4AD-ADP adapter module for analog input is a special function adapter to add four analog input points to the FX3G/FX3U/FX3UC PLC system.

The FX3U-4DA-ADP adapter module for analog output is a special function adapter to add four analog output points to the FX3G/FX3U/FX3UC PLC system.

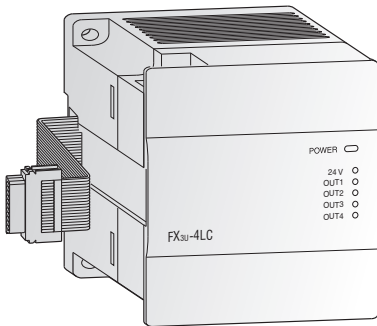
*Note: When connecting the analog adapters to a FX3U base unit, a communications adapter is required. A direct connection without adapter is possible if these modules are connected to a FX3UC base unit. When connecting an adapter to a FX3G PLC the communications adapter FX3G-CNV-ADP is required.*

| Specifications           | FX3U-4AD-ADP                 | FX3U-4DA-ADP           |        |
|--------------------------|------------------------------|------------------------|--------|
| Analog channels          | inputs                       | 4                      |        |
|                          | outputs                      | —                      |        |
| Analog range             | 0—+10 V DC, 4—+20 mA         | 0—+10 V DC, 4—+20 mA   |        |
| Resolution               | 2.5 mV/10 μA (12 bit/11 bit) | 2.5 mV/4 μA (12 bit)   |        |
| Overall accuracy         | ±0.5 %*/±1 %                 | ±0.5 %*/±1 %           |        |
| Power supply             | 5 V DC                       | 15 mA (from base unit) |        |
|                          | 24 V DC                      | 40 mA                  |        |
| Related I/O points       | 0                            | 150 mA                 |        |
| Weight                   | kg                           | 0.1                    |        |
| Dimensions (WxHxD)       | mm                           | 17.6x90 (106)x89.5     |        |
| <b>Order information</b> | Art. no.                     | 165241                 | 165271 |

\*Dependent on the ambient temperature and signal quality

■ Temperature Control Module

FX1S  FX1N  FX3G  FX3U  FX3UC



**Temperature control module**

The temperature control module FX3U-4LC is equipped with four temperature input points and four transistor (open collector) output points. It is used to read temperature signals from thermocouples and Pt100 sensors, and performs PID output control.

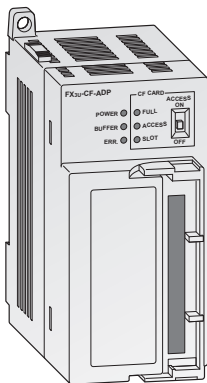
The proportional band, the integral time and the derivative time can be easily set by auto tuning.

The channels are isolated against each other.

| Specifications                | FX3U-4LC  |                         |
|-------------------------------|---|-------------------------|
| Analog inputs                 | 4 (Thermocouple and Pt100 sensors)                              |                         |
| Compensated temperature range | °C  | -200 to +2300           |
| Digital outputs               | 4 NPN transistor open collector output points                   |                         |
| Resolution                    | °C  | 0.1 or 1                |
| Total accuracy                | ±0.3 to 0.7 % (fullscale, dependent on the ambient temperature) |                         |
| Power supply                  | 5 V DC  | 160 mA (from base unit) |
|                               | 24 V DC   | 50 mA                   |
| Related I/O points            | 8   |                         |
| Dimensions (WxHxD)            | mm  | 90x90x86                |
| <b>Order information</b>      | Art. no.  | 232806                  |

■ Data Logger Module

FX1S  FX1N  FX3G  FX3U  FX3UC



**Data logger module**

The FX3U-CF-ADP is a general purpose data logging adapter. The difference to other available logging units is that the PLC main unit controls the data logging based on user requirements, e.g. periodical or even based. For tracing a timestamp is automatically added to all data storages, that eases alarm and other time critical log-

ging. Another usage is the storage of bigger recipe data. A CompactFlash® memory card up to 2GB can be used. Six applied instructions allow all kinds of data writing, manipulation or reading, making this adapter the optimum solution towards customer requirements.

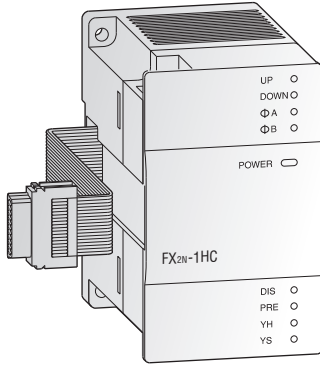
| Specifications            | FX3U-CF-ADP   |            |
|---------------------------|---|------------|
| Data access method        | Controlled by the main unit, no polling from the logging unit possible. |            |
| Connectable units         | A maximum of one FX3U-CF-ADP can be connected per PLC.                  |            |
| Time stamp function       | The real time clock data of the base unit is used.                      |            |
| Recommended storage media | CompactFlash® memory card (GT05-MEM-256MC, -512MC, -1GC, -2GC)          |            |
| Max. file size            | 512 MB  |            |
| File format               | CSV   |            |
| Max. numbers of files     | 63 (Plus one FIFO file.)  |            |
| FIFO function             | One pattern (The file name gets automatically generated.)               |            |
| Power supply              | 24 V DC   | 130 mA     |
| Related I/O points        | 0   |            |
| Dimensions (WxHxD)        | mm  | 45x90x89.5 |
| <b>Order information</b>  | Art. no.  | 230104     |

High-Speed Counter Modules

FX1S  FX1N  FX3G  FX3U  FX3UC

FX2N-1HC, FX2NC-1HC

In addition to the internal high-speed MELSEC FX counters, the high-speed counter modules FX2N-1HC and FX2NC-1HC provide the user with an external counter. It counts 1- or 2-phase pulses up to a frequency of 50 kHz. The counting range covers either 16 or 32 bit. The two integrated transistor outputs can be switched independently of one another by means of internal comparison functions. Hence, simple positioning tasks can also be realized economically. In addition, the FX2N-1HC and FX2NC-1HC can be used as a ring counter.



| Specifications          | FX2N-1HC                          | FX2NC-1HC                         |
|-------------------------|-----------------------------------|-----------------------------------|
| Signal level            | 5, 12, 24 V DC/7 mA               | 5, 12, 24 V DC/7 mA               |
| Counter inputs          | 2 (1 phase) or 1 (2 phase)        | 2 (1 phase) or 1 (2 phase)        |
| Max. counting frequency | kHz 50                            | 50                                |
| Input format            | bit 16, 32                        | 16, 32                            |
| Type of counter         | Up/down counter, ring counter     | Up/down counter, ring counter     |
| Counting range          | 16 bit 0–65535                    | 0–65535                           |
|                         | 32 bit -2147483648—+2147483647    | -2147483648—+2147483647           |
| Output type             | 2 x transistor (5–24 V DC; 0.5 A) | 2 x transistor (5–24 V DC; 0.5 A) |
| Power supply            | 5 V DC 90 mA (from base unit)     | 90 mA (from base unit)            |
|                         | 24 V DC —                         | —                                 |
| Related I/O points      | 8                                 | 8                                 |
| Weight                  | kg 0.3                            | 0.13                              |
| Dimensions (WxHxD)      | mm 55x90x87                       | 20.2x90x89                        |
| Order information       | Art. no. 65584                    | 217916                            |

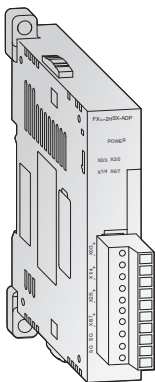
High-Speed Counter Adapters

FX1S  FX1N  FX3G  FX3U  FX3UC

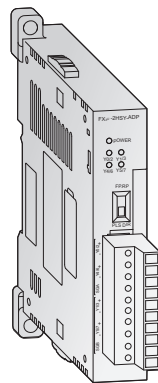
FX3U-4HSX-ADP, FX3U-2HSY-ADP, FX3U-2HC

These adapter modules allow direct processing of positioning application data. The FX3U-4HSX-ADP and the FX3U-2HC provide high speed counter inputs up to 200 kHz while the FX3U-2HSY-ADP delivers 2 channels of pulse train outputs up to 200 kHz.

*Note: The adapters FX3U-□-ADP can only be used with the FX3U and they require a function extension board.*



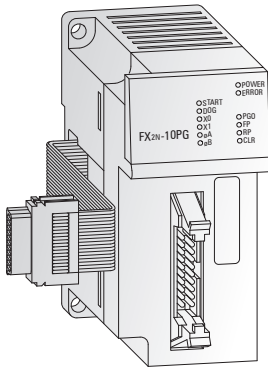
FX3U-4HSX-ADP



FX3U-2HSY-ADP

| Specifications          | FX3U-4HSX-ADP                                    | FX3U-2HSY-ADP   | FX3U-2HC   |
|-------------------------|--|---|--|
| Counter                 | inputs 4   | —   | 2  |
|                         | outputs —  | 2   | —  |
| Max. counting frequency | inputs kHz 1 ch 1 input or 1 ch 2 inputs: 200    | —   | 1 phase input: 200   |
|                         | outputs kHz 2 ch 2 inputs: 100                   | 200   | 2 phase input: 200/100/50  |
| Input format            | Differential line receiver (AM26C32 is suitable) | —   | Differential line receiver (AM26C32 is suitable)   |
|                         | Photocoupler isolation on inputs                 | —   | Photocoupler isolation on inputs   |
| Output format           | —  | Differential line driver (AM26C31 is suitable)                        | Transistor output, 5–24 V DC   |
|                         | —  | Normal rotation pulse train, reverse pulse train or pulse train + one | When the counter value coincides with an output compare value, the appropriate output is set ON. |
| Maximum cable length    | m 10   | 10  | 10   |
| Input potential         | 5 V DC   | —   | 5/12/24 V DC   |
| Output load             | —  | less than 25 mA   | 0.5 A  |
| Maximum connectivity    | 2  | 2   | 8  |
| Power supply            | 5 V DC 30 mA (from base unit)                    | 30 mA (from base unit)  | 245 mA (from base unit)  |
|                         | 24 V DC 30 mA (from base unit)                   | 60 mA (from base unit)  | —  |
| Related I/O points      | 0  | 0   | 8  |
| Weight                  | kg 0.08  | 0.08  | 0.08   |
| Dimensions (WxHxD)      | mm 17.6x90 (106)x89.5                            | 17.6x90 (106)x89.5  | 55x90x87   |
| Order information       | Art. no. 165274                                  | 165275  | 232805   |

■ Positioning Modules  FX1S  FX1N  FX3G  FX3U  FX3UC

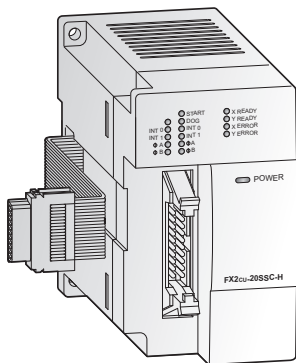


**FX2N-1PG-E, FX2N-10PG**

The positioning modules FX2N-1PG-E and FX2N-10PG are extremely efficient single-axis positioning modules for controlling either step drives or servo drives (by external regulator) with a pulse chain. They are very suitable for achieving accurate positioning in combination with the MELSEC FX series. The configuration and allocation of the position data are carried out directly via the PLC program. A very wide range of manual and automatic functions are available to the user.

| Specifications                  | FX2N-1PG-E         | FX2N-10PG   |
|---------------------------------|--------------------|---|
| Accessible axes                 | 1                  | 1   |
| Output frequency                | pulse/s 10–100 000 | 1–1 000 000                                       |
| Signal level for digital inputs | 24 V DC/40 mA      | 5 V DC/100 mA; 24 V DC/70 mA                      |
| Power supply                    | 5 V DC<br>24 V DC  | 55 mA (from base unit)<br>120 mA (from base unit) |
| Related I/O points              | 8                  | 8   |
| Weight                          | kg 0.3             | 0.2   |
| Dimensions (WxHxD)              | mm 43x90x87        | 43x90x87  |
| <b>Order information</b>        | Art. no. 65583     | 140113  |

■ Positioning Module for SSCNET  FX1S  FX1N  FX3G  FX3U  FX3UC



**SSCNET III Module FX3U-20SSC-H**

The SSCNET module FX3U-20SSC-H can be used in combination with a FX3U programmable controller to achieve a cost effective solution for high precision, high speed positioning. The plug-and-play fiber optic SSCNET cabling reduces setup time and increases control distance for positioning operations in a wide range of applications.

Servo parameters and positioning information for the FX3U-20SSC-H are easily set up with an FX3U base unit and a personal computer. For parameter setting, monitoring and testing the easy programming software FX Configurator-FP is available.

*Note: the FX3U-20SSC-H can be used in combination with a FX3U- or FX3UC base unit only. Please refer to the Mitsubishi Electric MELSERVO catalog for suitable servo motors and amplifiers.*

| Specifications                  | FX3U-20SSC-H                             |
|---------------------------------|--|
| Accessible axes                 | 2 (independent or interpolation)         |
| Output frequency                | 1 Hz to 50 MHz                           |
| Pulse output format             | SSCNET III (servo bus)                   |
| Communications speed            | 50 Mbps                                  |
| Starting time                   | ms 1.6 (+1.7 SSCNET cycle time)          |
| Max. to PLC connectable modules | Up to 8 can be connected to the FX3U PLC |
| Status displays                 | Power, module status, axis status, error |
| Power supply                    | 5 V DC<br>24 V DC                        |
| Related I/O points              | 8  |
| Weight                          | kg 0.3                                   |
| Dimensions (WxHxD)              | mm 55x90x87                              |
| <b>Order information</b>        | Art. no. 168914                          |



■ Network Modules for CC-Link

□ FX1S  FX1N  FX3G  FX3U  FX3UC

**CC-Link Master Module FX2N-16CCL-M**

The CC-Link network enables the controlling and monitoring of decentralized I/O modules at the machine.

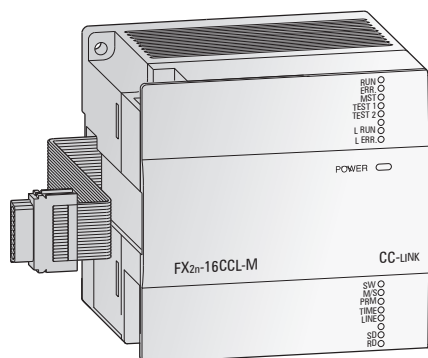
The CC-Link master module FX2N-16CCL-M is a special extension block which assigns an FX series PLC as the master station of the CC-Link system.

The setting of all modules within the network is handled directly via the master module.

Up to 15 remote stations and remote device stations can be connected to the master station as decentralized I/O stations. These remote stations can be up to 7 I/O modules and up to 8 remote device stations. 2 master modules can be connected to one FX1N, FX3G or FX3U/FX3UC base unit.

The maximum communications distance is 1200 m without repeater.

*Note: When connecting this module to a FX3UC base unit, the communications adapter FX2N-CNV-IF resp. a power supply unit FX3UC-1PS-5V is required. For more informations about CC-Link please refer to the "Automation Book".*



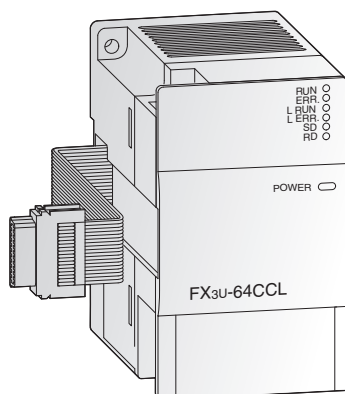
| Specifications                |            | FX2N-16CCL-M  |
|-------------------------------|------------|---|
| Module type                   |            | Master station  |
| Link points per station       | I/O points | 32  |
|                               | register   | 8   |
| Max. number of I/O points     |            | 128 (with FX1N PLC), 256 (with FX3G PLC)*, 384 (with FX3U PLC)* |
| Number of connectable modules |            | Max. 15   |
| Power supply                  | 5 V DC     | —   |
|                               | 24 V DC    | 150 mA  |
| Related I/O points            |            | 8   |
| Weight                        |            | 0.4   |
| Dimensions (WxHxD)            |            | 85x90x87  |
| <b>Order information</b>      |            | Art. no. 133596   |

\*Including I/O points in PLC and network.

**FX3U-64CCL Interface Block**

The FX3U-64CCL CC-Link interface block is available for FX3 series main units and enables CC-Link V2 functionality, for example expanded cyclic transmission which facilitates handling of multiple data processes.

*Note: When attaching the FX3U-64CCL to an FX3UC main unit, the FX2NC-CNV-IF interface converter or the FX3UC-1PS-5V power supply unit is required. For more informations about CC-Link please refer to the "Automation Book".*



| Specifications           |            | FX3U-64CCL   |
|--------------------------|------------|--|
| Module type              |            | Intelligent device station                                     |
| Link points per station  | I/O points | 128 (Occupying 1 station with Octuple expanded cyclic setting) |
|                          | register   | 32 (Occupying 1 station with Octuple expanded cyclic setting)  |
| Max. transmission speed  |            | 10 Mbps  |
| Related I/O points       |            | 8  |
| Power supply             |            | 24 V DC/220 mA   |
| Weight                   |            | 0.3  |
| Dimensions (WxHxD)       |            | 55x90x87   |
| <b>Order information</b> |            | Art. no. 217915  |

■ Network Modules for CC-Link

FX1S  FX1N  FX3G  FX3U  FX3UC

**CC-Link Communication Module FX2N-32CCL**

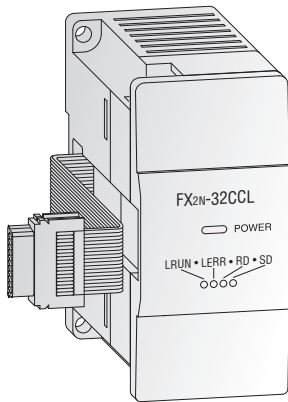
The communication module FX2N-32CCL enables the user to connect to the CC-Link network with a superior PLC system as master CPU. This gives him access to the network of all MELSEC PLC systems and frequency inverters and to additional products from other suppliers.

Thus the network is expandable via the digital inputs/outputs of the FX modules to a maximum of 256 I/Os.

The buffer memory of the FX2N-32CCL is read and written by FROM/TO instructions.

The connection is to the extension bus on the right side of the controller.

*Note: For more informations about CC-Link please refer to the "Automation Book".*



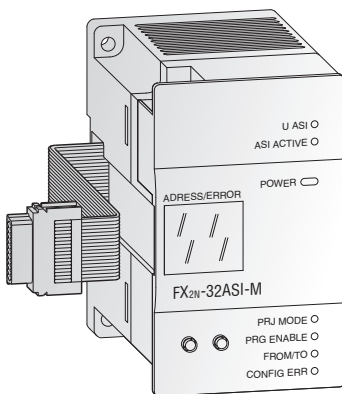
| Specifications                |            | FX2N-32CCL                   |
|-------------------------------|------------|------------------------------|
| Module type                   |            | Remote station               |
| Link points per station       | I/O points | 32                           |
|                               | register   | 8                            |
| Max. number of I/O points     |            | —                            |
| Number of connectable modules |            | —                            |
| Power supply                  | 5 V DC     | max. 130 mA (from base unit) |
|                               | 24 V DC    | 50 mA                        |
| Related I/O points            |            | 8                            |
| Weight                        |            | 0.3                          |
| Dimensions (WxHxD)            |            | 43x90x87                     |
| <b>Order information</b>      |            | Art. no. 102961              |

■ Network Module for AS-Interface

FX1S  FX1N  FX3G  FX3U  FX3UC

**AS-Interface Module FX2N-32ASI-M**

The FX2N-32ASI-M serves as master module for the connection of the FX1N, FX3G, FX3U and FX3UC PLC to the AS-Interface system. Up to 31 slave units with up to 4 inputs and 4 outputs can be controlled.



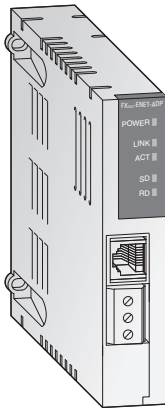
| Specifications                    |         | FX2N-32ASI-M   |
|-----------------------------------|---------|--|
| Module type                       |         | Master module  |
| Max. number of I/O points         |         | 128 (with FX1N PLC); 256 (with FX3G PLC); 384 (with FX3U/FX3UC PLC)*   |
| Communication protocol            |         | AS-Interface standard  |
| Communication speed               | kbps    | 167  |
| Method                            |         | APM method (Alternating Pulse Modulation)  |
| Communication cable               |         | AS-Interface standard cable  |
| Total extension distance          | m       | 100 (up to 2 repeaters can be used on the system. The total extension distance may be extended by 100m for each repeater.) |
| Max. number of controllable units |         | Up to 31 slave modules (up to 4 inputs / 4 outputs per slave)  |
| I/O refresh time                  |         | Max. 5 ms  |
| Network setup                     |         | 2 key network setup  |
| Display                           |         | 7-segment display for status and diagnosis messages  |
| Power supply                      | 5 V DC  | 150 mA (from base unit)  |
|                                   | 24 V DC | 70 mA external   |
| Related I/O points                |         | 8  |
| Weight                            | kg      | 0.2  |
| Dimensions (WxHxD)                | mm      | 55x90x87   |
| <b>Order information</b>          |         | Art. no. 103314  |

\*Including I/O points in PLC and network.

4 SPECIAL FUNCTION MODULES

■ Network Module for Ethernet  FX1S  FX1N  FX3G  FX3U  FX3UC

**Ethernet Communications Adapter FX2NC-ENET-ADP**



The FX2NC-ENET-ADP communications adapter is an Ethernet interface with 10BASE-T specifications for the FX1S and FX1N series.

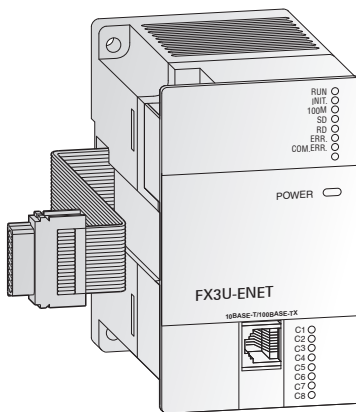
The FX2NC-ENET-ADP enables upload, download, monitor and test sequence of programs via Ethernet from a personal computer (GX Developer or MX Component and the virtual COM port driver installed).

*Note: When connecting this adapter module to a FX1S or FX1N PLC the communications adapter FX1N-CNV-BD is required.*

| Specifications                       | FX2NC-ENET-ADP                                    |                         |
|--------------------------------------|---|-------------------------|
| Protocol                             | TCP/IP  |                         |
| No. of simultaneous open connections | 1   |                         |
| Interface                            | IEEE802.3u (100BaseTX), IEEE802.3 (10BaseT)       |                         |
| Connector                            | RJ45 (to Ethernet), 3 screw terminals (to ground) |                         |
| Max. transfer rate                   | 10 Mbit/s   |                         |
| Cable                                | CAT5 STP or 3 STP                                 |                         |
| Related I/O points                   | 0   |                         |
| Power supply                         | 5 V DC  | 135 mA (from base unit) |
|                                      | 24 V DC   | —                       |
| Weight                               | kg  | 0.1                     |
| Dimensions (WxHxD)                   | mm  | 19.1x90x78              |
| <b>Order information</b>             | Art. no.  | 157447                  |

■ Network Module for Ethernet  FX1S  FX1N  FX3G  FX3U  FX3UC

**Ethernet Communications Module FX3U-ENET**



The FX3U-ENET communications module provides the FX3G, FX3U or FX3UC with a direct connection on to an Ethernet network.

With the FX3U-ENET installed an FX3G/FX3U/FX3UC PLC can exchange data quickly and easily with process visualization systems in addition to supporting full program UP/DOWN load as well as comprehensive monitoring support. The module also supports Peer to Peer connection and MC Protocol. It is easily set-up with the FX Configurator-EN software.

*Note: The FX3U-ENET can be used in combination with a FX3G, FX3U- or FX3UC base unit only.*

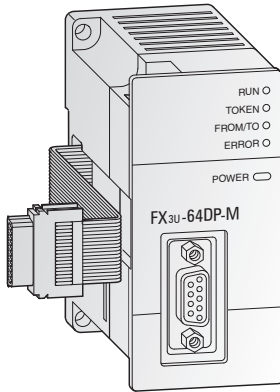
| Specifications                       | FX3U-ENET                                   |                         |
|--------------------------------------|---|-------------------------|
| Protocol                             | TCP/IP, UDP                                 |                         |
| Communication mode                   | Full-duplex / half-duplex                   |                         |
| No. of simultaneous open connections | 8   |                         |
| Fixed buffer communication           | 1023 word x 8                               |                         |
| Communication with mail server       | SMTP, POP3                                  |                         |
| Interface                            | IEEE802.3u (100BaseTX), IEEE802.3 (10BaseT) |                         |
| Connector                            | RJ45  |                         |
| Max. transfer rate                   | 100 Mbits/s, 10 Mbit/s                      |                         |
| Max. segment length                  | m   | 100                     |
| Cable                                | CAT5 STP or 3 STP                           |                         |
| Power supply                         | 5 V DC                                      | —                       |
|                                      | 24 V DC                                     | 240 mA (from base unit) |
| Related I/O points                   | 8   |                         |
| Weight                               | kg  | 0.3                     |
| Dimensions (WxHxD)                   | mm  | 55x90x87                |
| <b>Order information</b>             | Art. no.                                    | 166086                  |

■ Network Module for Profibus/DP □ FX1S □ FX1N □ FX3G  FX3U  FX3UC

**Master module FX3U-64DP-M**

The FX3U-64DP-M PROFIBUS/DP master module enables you to integrate a MELSEC FX3U or FX3UC PLC system as a class 1 master of a PROFIBUS/DP network. This interface module provides your FX3U/FX3UC base unit with an intelligent Profibus/DP link for the implementation of decentralised control tasks. The FX3U Profibus/DP master provides comprehensive data and alarm processing to the Profibus/DP V1 standard. It is easily set up with the GX Configurator-DP software.

*Note: The FX3U-64DP-M can be used in combination with a FX3U- or FX3UC base unit only.*

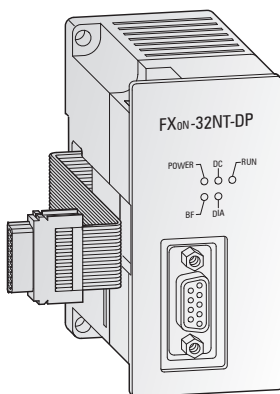


| Specifications                          | FX3U-64DP-M  |
|---|--|
| Module type                             | Master   |
| Transmission type                       | Bus network  |
| Transmission data                       | 32 byte/slave (normal service mode)<br>244 byte/slave (extended service mode)                          |
| Interface                               | PROFIBUS/DP (with 9 pole D-SUB connector)  |
| Max. number of master per configuration | 1  |
| Repeaters                               | 3  |
| Max. number of slaves                   | 64   |
| Communications speed                    | PROFIBUS standard  |
| Communications distance                 | m Max. 1,200 (depends on communication speed)  |
| Communication cable                     | PROFIBUS cable with 9-pin D-SUB connector  |
| Power supply                            | 5 V DC<br>24 V DC  |
| Related I/O points                      | 8  |
| Weight                                  | kg 0.2   |
| Dimensions (WxHxD)                      | mm 43x90x87  |
| <b>Order information</b>                | Art. no. 166085  |
| <b>Accessories</b>                      | PROFIBUS connector up to 12 Mbaud: PROFICON-PLUS, art. no. 140008 or PROFICON-PLUS-PG, art. no. 140009 |

■ Network Module for Profibus/DP □ FX1S  FX1N □ FX3G □ FX3U □ FX3UC

**Slave Module FX0N-32NT-DP**

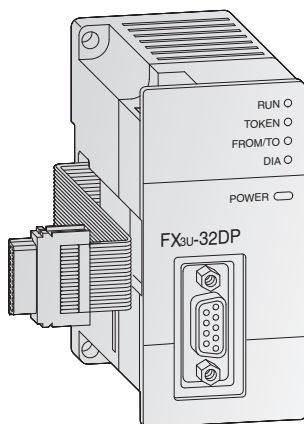
The FX0N-32NT-DP PROFIBUS/DP slave module enables you to integrate a MELSEC FX1N in an existing PROFIBUS/DP network. This interface module provides your FX1N CPU with an intelligent PROFIBUS/DP link for the implementation of decentralised control tasks. It links the system to the master PLC in the PROFIBUS/DP network for efficient and trouble-free data exchange.



| Specifications           | FX0N-32NT-DP   |
|--------------------------|--|
| Module type              | Slave  |
| Interface                | PROFIBUS/DP (with 9 pole D-SUB connector)  |
| Communications speed     | PROFIBUS standard  |
| Profibus specifications  | PROFIBUS standard  |
| Communications distance  | m Max. 1,200 (depends on communication speed)  |
| Communication cable      | PROFIBUS cable with 9-pin D-SUB connector  |
| Power supply             | 5 V DC<br>24 V DC  |
| Related I/O points       | 8  |
| Weight                   | kg 0.3   |
| Dimensions (WxHxD)       | mm 43x90x87  |
| <b>Order information</b> | Art. no. 62125   |
| <b>Accessories</b>       | PROFIBUS connector up to 12 Mbaud: PROFICON-PLUS, art. no. 140008 or PROFICON-PLUS-PG, art. no. 140009 |

■ Network Module for Profibus/DP □ FX1S □ FX1N  FX3G  FX3U  FX3UC

**FX3U-32DP PROFIBUS DP Slave Module**



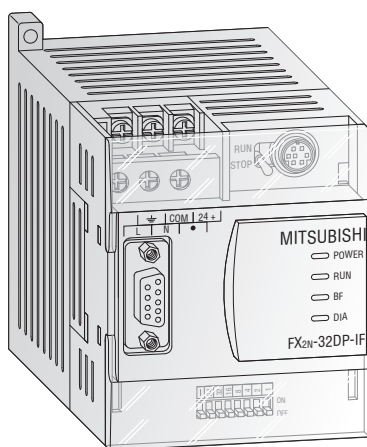
The FX3U-32DP PROFIBUS DP slave module is available for FX3 series main units and allows the attached FX main unit to function as a slave station on a PROFIBUS DP-V1 network. PROFIBUS DP-V1 functionality supports extensive alarm processing and messaging on top of standard cyclic data exchange.

*Note: When attaching the FX3U-32DP to an FX3UC main unit, the FX2NC-CNV-IF interface converter or the FX3UC-1PS-5V power supply unit is required.*

| Specifications                                  | FX3U-32DP                                    |
|---|--|
| Module type                                     | Slave station                                |
| Transmission type                               | Bus network                                  |
| Transmission data                               | Max. 144 bytes                               |
| Interface                                       | PROFIBUS DP connector                        |
| Max. number of slave stations per configuration | 8  |
| Communication speed                             | Max. 12 Mbps                                 |
| Communication distance                          | Max. 1,200m (depends on communication speed) |
| Communication cable                             | PROFIBUS cable with PROFIBUS DP connector    |
| Related I/O points                              | 8  |
| Power supply                                    | Internal 24 V DC/145 mA                      |
| Weight  | kg 0.2                                       |
| Dimensions (WxHxD)                              | mm 43x90x89                                  |
| <b>Order information</b>                        | Art. no. 194214                              |

■ Remote I/O Station for PROFIBUS/DP

**Remote I/O Station FX2N-32DP-IF**



The remote I/O station FX2N-32DP-IF forms an extremely compact communication unit and provides a connection of I/O modules with up to 256 I/O points and/or up to 8 special function modules as an alternative.

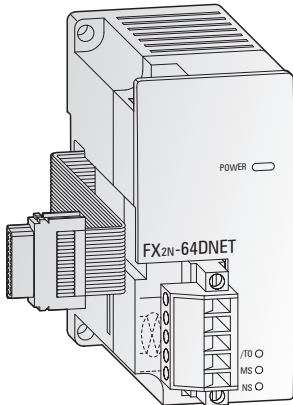
It features an entire electrical isolation of the PROFIBUS/DP connector and of the sensor/actuator circuits.

The FX2N-32DP-IF includes a 240 V power supply unit and a 24 V service voltage terminal, e.g. for analog modules. The FX2N-32DP-IF-D is supplied with 24 V DC.

PROFIBUS data such as the baud rate or I/O data can be monitored directly with the programming software or on the hand-held programming units FX-10P/FX-20P/ FX-30P. This facilitates an easy error diagnosis directly on the remote I/O station.

| Specifications                         | FX2N-32DP-IF  | FX2N-32DP-IF-D                             |
|--|---|--|
| Power supply                           | 100–240 V AC (+10 %/-15 %) 50/60 Hz   | 24 V DC (+20 %/-30 %)                      |
| Power consumption                      | 30 VA   | 14 W                                       |
| Internal current consumption           | 5 V DC/max. 220 mA (from base unit), 24 V DC/500 mA   | 5 V DC/max. 220 mA (from base unit)        |
| Interface (connectors)                 | 9-pin D-SUB for PROFIBUS/DP, 8-pin Mini-DIN for PC or programming unit FX-10P/FX-20P/FX-30P |  |
| Communication speed                    | distance  |  |
|  | 1200 m  | kbps 9.6/19.2/45.45/93.75                  |
|  | 1000 m  | kbps 187.5                                 |
|  | 400 m   | kbps 500                                   |
|  | 200 m   | kbps 1500                                  |
| 100 m                                  | kbps 3000/6000/12000  |  |
| Communication distance                 | m   | Max. 1200 (depends on communication speed) |
| Communication cable                    | PROFIBUS cable with 9-pin D-SUB connector   |  |
| Max. number of controllable I/O points | 256   |  |
| Related I/O points                     | 0   |  |
| Weight                                 | kg  | 0.4  |
| Dimensions (WxHxD)                     | mm  | 75x98x87                                   |
| <b>Order information</b>               | Art. no. 145401   | 142763                                     |

■ Network Module for DeviceNet  FX1S  FX1N  FX3G  FX3U  FX3UC



**DeviceNet Slave Module FX2N-64DNET**

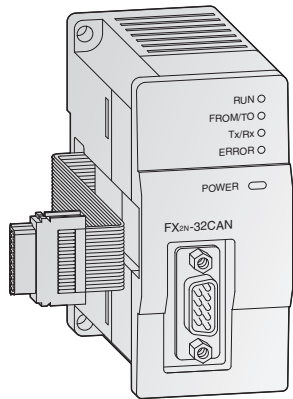
The DeviceNet slave module FX2N-64DNET can be used to connect FX3G and FX3U programmable controllers to a DeviceNet network.

The FX2N-64DNET can communicate to the master by the master/slave communication (using the master/slave I/O connection), and to other nodes supporting the UCMM connection by client/server communication (using the UCMM connection).

The communication between the programmable controller and the internal buffer memory of the FX2N-64DNET is handled by FROM/ TO instructions.

| Specifications                       |              | FX2N-64DNET                          |   |
|--------------------------------------|--------------|--------------------------------------|---|
| Module type                          |              | Slave (group 2)                      |   |
| Node type                            |              | G2 Server                            |   |
| Station numbers                      |              | 0–63 points                          |   |
| Supported communication speeds       |              | kbps                                 | 125/250/500                               |
| Communication data (open connection) | Master/slave | no. of connections                   | 1 connection (group 2)                    |
|                                      |              | transfer time-out                    | 2,000 ms (ACK time-out)                   |
| UCMM client/server                   |              | no. of connections                   | 63/63 (group 1, 3)                        |
|                                      |              | data length                          | Max. 64 bytes per connection              |
| Communication data (I/O connection)  |              | type                                 | Polling, cyclic, change of state          |
|                                      |              | data length                          | Max. 64 bytes (fragmentation is possible) |
| Module ID code                       |              | K 7090                               |   |
| Status displays                      |              | Power, module status, network status |   |
| Related I/O points                   |              | 8                                    |   |
| Power supply                         | 5 V DC       | 120 mA                               |   |
|                                      | 24 V DC      | mA                                   | 50 mA                                     |
| Weight                               |              | kg                                   | 0.2                                       |
| Dimensions (WxHxD)                   |              | mm                                   | 43x90x87                                  |
| <b>Order information</b>             |              | Art. no.                             | 131708                                    |

■ Network Module for CANopen  FX1S  FX1N  FX3G  FX3U  FX3UC



**CANopen Master-Modul FX2N-32CAN**

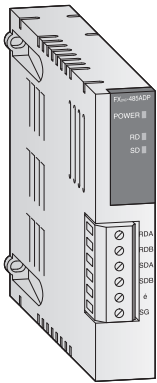
The FX2N-32CAN communications module makes it possible to connect an FX1N, FX3G or FX3U/FX3UC PLC to an existing CANopen network.

In addition to real-time capabilities and high-speed data transfer at rates of up to 1 Mbit/s the CANopen module also shines with high transfer reliability and simple network configuration. Up to 120 data words can be sent and received as process data objects (30 PDOs). The number of words that can be transmitted in each direction can be set between 1 and 120.

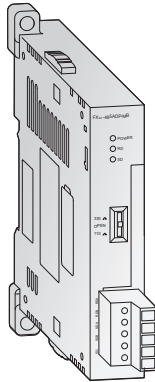
Communication with the module's memory buffer is performed with simple FROM/TO instructions.

| Specifications  |         | FX2N-32CAN   |                                      |
|---|---------|--|--------------------------------------|
| Module type   |         | CANopen master   |                                      |
| Power supply  |         | 5 V DC (via base unit)   |                                      |
| CAN standard  |         | ISO 11898/1993   |                                      |
| CANopen standard by CIA                                   |         | DS-301 version 3.0   |                                      |
| Additional CANopen features                               |         | NMT, Guarding, and Guarding request based on DS-302 V2.0. network variables based on DS-405 V1.0 |                                      |
| Max. nbr. of modules that can be connected to the network |         | 30 without repeater; 127 with repeater   |                                      |
| Station numbers   |         | 1–127  |                                      |
| Supported baud rate                                       |         | kBaud  | 10, 20, 50, 125, 250, 500, 800, 1000 |
| Status displays   |         | RUN, Error, Power, Network status  |                                      |
| Related I/O points  |         | 8  |                                      |
| Power supply  | 5 V DC  | 290 mA   |                                      |
|   | 24 V DC | —  |                                      |
| Weight  |         | kg   | 0.2                                  |
| Dimensions (WxHxD)  |         | mm   | 43x90x88.7                           |
| <b>Order information</b>                                  |         | Art. no.   | 141179                               |

**Modbus & Serial Communication Special Adapters**     FX1S    FX1N    FX3G    FX3U    FX3UC



FX2NC-485ADP



FX3U-485ADP

**Active data modules (RS485)**

The addition of active data interface modules permit active communication between the PLC and surrounding devices. With RS485 communication can be configured as either 1:N multidrop, parallel link or peer to peer operation.

FX3U-485ADP-MB also supports Modbus RTU and Modbus ASCII.

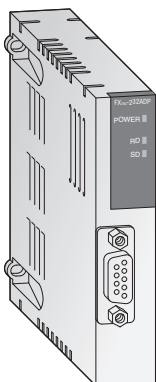
| Specifications              | FX2NC-485ADP <sup>①</sup> | FX3U-485ADP-MB <sup>②</sup>  |
|-----------------------------|---------------------------|------------------------------|
| Interface                   | RS485                     | RS485; Modbus RS485          |
| Communication speed*        | kbps 0.3–19.2             | 0.3–19.2                     |
| Max. communication distance | m 500                     | 500                          |
| Power supply                | 5 V DC                    | Max. 150 mA (from base unit) |
|                             | 24 V DC                   | 20 mA (from base unit)       |
| Related I/O points          | 0                         | 0                            |
| Weight                      | kg 0.1                    | 0.08                         |
| Dimensions (WxHxD)          | mm 19.1x90x78             | 17.6x90(106)x74              |
| <b>Order information</b>    | Art. no. 149111           | 206191                       |

<sup>①</sup> Application for FX1S/FX1N base unit    <sup>②</sup> Application for FX3G/FX3U/FX3UC base units

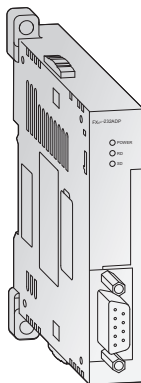
\* Speed depends on communication method (Parallel link, N:N Network, No protocol, Dedicated protocol etc.)

Note: When connecting these adapter modules to a FX3U, a communications adapter FX3U-□□□-BD is required. When connecting the FX2NC adapters to a FX1S or FX1N PLC the communications adapter FX1N-CNV-BD is required. When connecting an FX3U adapter to a FX3G PLC the communications adapter FX3G-CNV-ADP is required.

**Interface Modules**     FX1S    FX1N    FX3G    FX3U    FX3UC



FX2NC-232ADP



FX3U-232ADP

**Active Data Interface Modules FX2NC-232ADP, FX3U-232ADP**

The additional active data interface modules permit active communication between the PLC and surrounding RS232C peripherals. All device information can be sent or received via these interfaces.

The module is suitable for the connection of printers, bar code readers, PCs and other PLC systems. The communication is handled by the PLC program using the RS instruction.

The connection is to the communications bus on the left side of the controller.

The internal serial RS422 interface is also fully available.

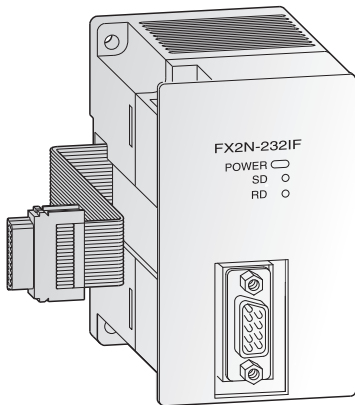
Note: The FX2NC-232ADP requires a FX2N-CNV-BD interface adapter when connecting to a FX1S or FX1N base unit.

The FX3U-232ADP can be used in combination with a FX3G, FX3U or FX3UC base unit only. When connecting the interface modules to a FX3U base unit, an interface or communications adapter FX3U-□□□-B is required. A direct connection without adapter is possible if these modules are connected to a FX3UC base unit.

| Specifications           | FX2NC-232ADP   | FX3U-232ADP   |
|--------------------------|--|---|
| Interface                | RS232C with 9 pin D-SUB compact plug (photocoupler isolation)                                |   |
| Communication speed*     | kbps 0.3–19.2  | 0.3–115.2   |
| Communication distance   | m Max. 15  | Max. 15   |
| Communication cable      | Shielded cable   | Shielded cable  |
| Communication mode       | Half duplex /Full Duplex   | Half duplex /Full Duplex                              |
| Protocols                | Computer link (dedicated protocol: format1, format4), no protocol, optional programming port |   |
| Format                   | 7 or 8 bits, parity: none/even/odd, stop bits: 1 or 2  | 7 or 8 bits, parity: none/even/odd, stop bits: 1 or 2 |
| Power supply             | 5 V DC   | 100 mA (from base unit)                               |
|                          | 24 V DC  | 30 mA (from base unit)                                |
| Related I/O points       | 0  | 0   |
| Weight                   | kg 0.1   | 0.08  |
| Dimensions (WxHxD)       | mm 19.1x90x83  | 17.6x90(106)x81.5                                     |
| <b>Order information</b> | Art. no. 149110  | 165276  |

\* Speed depends on communication method (No protocol, Dedicated protocol, Protocol for programming tool)

■ Interface Modules □ FX1S □ FX1N □ FX3G  FX3U  FX3UC



**Interface Module FX2N-232IF**

The interface module FX2N-232IF provides an RS232C interface for serial data communications with the MELSEC FX3U and FX3UC.

Communication with PCs, printers, modems, barcode readers etc. is handled by the PLC program.

The send and receive data are stored in the FX2N-232IF's own buffer memory.

Changes at the user program are not possible via this interface module.

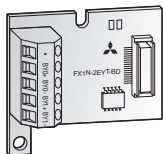
| Specifications           |         | FX2N-232IF  |
|--------------------------|---------|---|
| Interface                |         | RS232C with 9 pole D-SUB connector (photocoupler isolation) |
| Communication speed      | kbps    | 0.3–19.2  |
| Communication distance   | m       | Max. 15   |
| Communication cable      |         | Shielded cable  |
| Communication mode       |         | Full duplex   |
| Protocols                |         | Non protocol mode/start stop synchronisation                |
| Send and receive buffer  |         | 512 byte each   |
| Format                   |         | 7 or 8 bits, parity none/even/odd, stop bits: 1 or 2        |
| Power supply             | 5 V DC  | 40 mA (from base unit)                                      |
|                          | 24 V DC | 80 mA   |
| Related I/O points       |         | 8   |
| Weight                   | kg      | 0.3   |
| Dimensions (WxHxD)       | mm      | 55x90x87  |
| <b>Order information</b> |         | Art. no. 66640  |

■ Digital Extension Adapter Boards  FX1S  FX1N □ FX3G □ FX3U □ FX3UC

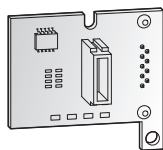
**Extension Adapters FX1N-4EX-BD, FX1N-2EYT-BD**

The extension adapters for the FX1N series are available with 4 inputs or 2 outputs. They are installed directly in the controller of the FX1S or FX1N series and therefore do not require any additional installation space.

These adapters are especially advantageous when only few additional I/Os are required and there is not enough room for an adjacent module to be installed.



FX1N-2EYT-BD



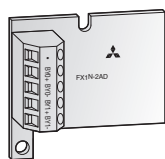
Connector side

| Specifications            |         | FX1N-4EX-BD           | FX1N-2EYT-BD         |
|---------------------------|---------|-----------------------|----------------------|
| Applicable for            |         | Base units FX1S/FX1N  | Base units FX1S/FX1N |
| Integrated inputs/outputs |         | 4                     | 2                    |
| Power supply              |         | From base unit        | From base unit       |
| Integrated inputs         |         | 4                     | —                    |
| Input level               | voltage | 24 V DC (+20 %/-15 %) | —                    |
|                           | current | 5 mA (24 V DC)        | —                    |
| Integrated outputs        |         | —                     | 2                    |
| Output type               |         | —                     | Transistor           |
| Max. switching voltage    | V       | —                     | 5–30 V DC            |
| Weight                    | kg      | 0.02                  | 0.02                 |
| Dimensions (WxHxD)        | mm      | 43x38.5x22            | 43x38.5x22           |
| <b>Order information</b>  |         | Art. no. 139418       | 139420               |

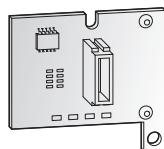


■ Analog Adapter Boards

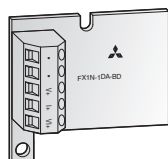
☑ FX1S ☑ FX1N ☑ FX3G ☐ FX3U ☐ FX3UC



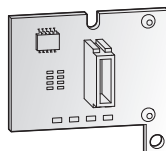
FX1N-2AD-BD



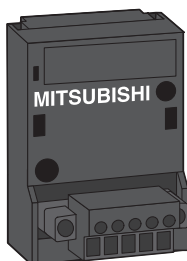
Connector side



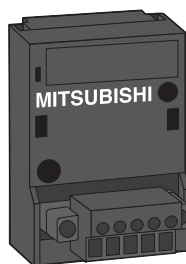
FX1N-1DA-BD



Connector side



FX3G-2AD-BD



FX3G-1DA-BD

**Analog Adapter Boards FX1N-2AD-BD, FX1N-1DA-BD, FX3G-1DA-BD and FX3G-2AD-BD**

The analog input adapter boards FX1N-2AD-BD and FX3G-2AD-BD provide the user with 2 analog inputs.

The boards convert analog process signals into digital values which are further processed by the MELSEC controller.

The analog adapters FX1N-1DA-BD and FX3G-1DA-BD provide the user with 1 analog output. The modules convert digital values from the FX1S/FX1N/FX3G controller to the analog signals required by the process.

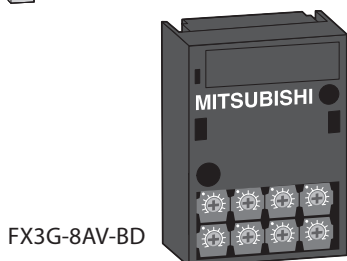
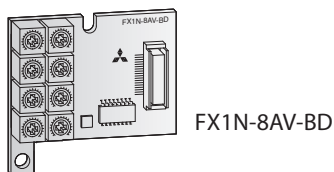
| Specifications           | FX1N-2AD-BD   | FX1N-1DA-BD                     |
|--------------------------|---|---------------------------------|
| Applicable for           | Base units FX1S/FX1N  | Base units FX1S/FX1N            |
| Power supply             | From base unit  | From base unit                  |
| Analog channels          | inputs: 2<br>outputs: —                                     | —<br>1                          |
| Analog input range       | 0 – +10 V DC/4 – +20 mA                                     | 0 – +10 V DC/4 – +20 mA         |
| Input resistance         | voltage input: kΩ 300<br>current input: Ω 250               | —<br>—                          |
| External load            | voltage output: kΩ —<br>current output: Ω —                 | 2 – 1,000<br>< 500              |
| Resolution               | 2.5 mV (12 bits)/8 μA (11 bits)                             | 2.5 mV (12 bits)/8 μA (11 bits) |
| Overall accuracy         | ±1 %  | ±1 %                            |
| Conversion speed         | analog → digital: 1 program cycle<br>digital → analog: ms — | —<br>1 program cycle            |
| Related I/O points       | 0   | 0                               |
| Weight                   | kg 0.02   | 0.02                            |
| Dimensions (WxHxD)       | mm 43x38.5x22   | 43x38.5x22                      |
| <b>Order information</b> | Art. no. 139421   | 139422                          |

| Specifications           | FX3G-2AD-BD  | FX3G-1DA-BD                     |
|--------------------------|--|---------------------------------|
| Applicable for           | Base units FX3G  | Base units FX3G                 |
| Power supply             | From base unit   | From base unit                  |
| Analog channels          | inputs: 2<br>outputs: —  | —<br>1                          |
| Analog input range       | 0 – +10 V DC/4 – +20 mA  | 0 – +10 V DC/4 – +20 mA         |
| Input resistance         | voltage input: kΩ 198.7<br>current input: Ω 250                      | —<br>—                          |
| External load            | voltage output: kΩ —<br>current output: Ω —                          | 2 – 1,000<br>< 500              |
| Resolution               | 2.5 mV (12 bits)/8 μA (11 bits)                                      | 2.5 mV (12 bits)/8 μA (11 bits) |
| Overall accuracy         | ±1 %   | ±1 %                            |
| Conversion speed         | analog → digital: 180 μs (1 program cycle)<br>digital → analog: ms — | —<br>60 μs (1 program cycle)    |
| Related I/O points       | 0  | 0                               |
| Weight                   | kg 0.02  | 0.02                            |
| Dimensions (WxHxD)       | mm 35x51.2x29.2  | 35x51.2x29.2                    |
| <b>Order information</b> | Art. no. 221265  | 221266                          |

4  
SPECIAL FUNCTION MODULES

■ Setpoint Adapter Boards

FX1S  FX1N  FX3G  FX3U  FX3UC



**Analog Setpoint Adapters FX1N-8AV-BD and FX3G-8AV-BD**

The FX□□-8AV-BD analog setpoint adapters enable the user to set 8 analog setpoint values. The analog values of the potentiometers are read into the controller and used as default setpoint values for timers, counters and data registers by the user's PLC programs.

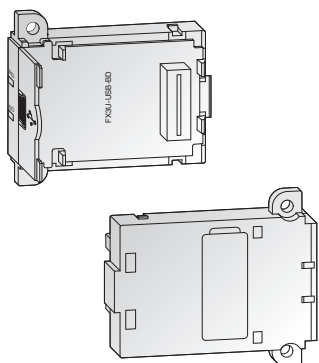
Setpoint value polling and the definition of the potentiometer scales are performed in the PLC program using the dedicated instructions VRRD/VRSC (FNC85/86).

The FX□□-8AV-BD analog setpoint adapters are installed in the expansion slot of the FX1S/FX1N/ FX3G CPU. No additional power supply is required for operation.

| Specifications           | FX1N-8AV-BD  | FX3G-8AV-BD     |
|--------------------------|--|-----------------|
| Applicable for           | Base units FX1S/FX1N                                     | Base units FX3G |
| Power supply             | From base unit   | From base unit  |
| Adjusting range          | 8 bit  | 8 bit           |
| Related I/O points       | 0  | 0               |
| Potentiometer evaluation | Via application instruction from the PLC CPU (FNC 85/86) |                 |
| Weight                   | kg 0.02  | 0.02            |
| Dimensions (WxHxD)       | mm 43x38.5x22  | 35x51.2x12      |
| <b>Order information</b> | Art. no. 130744  | 221267          |

■ Communications Adapter Boards

FX1S  FX1N  FX3G  FX3U  FX3UC



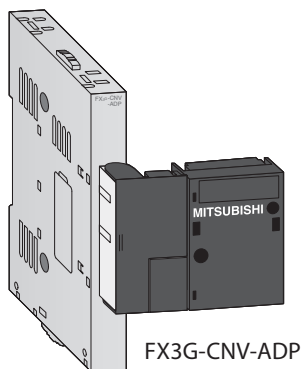
**Adapter Board FX3U-USB-BD**

This adapter board allows direct USB 2.0 connection to the front of the FX3U PLC for program maintenance.

| Specifications           | FX3U-USB-BD             |
|--------------------------|-------------------------|
| Applicable for           | Base units FX3U         |
| Power supply             | 5 V DC (from base unit) |
| Weight                   | kg 0.02                 |
| Dimensions (WxHxD)       | mm 19.6x46.1x53.5       |
| <b>Order information</b> | Art. no. 165284         |

■ Expansion Adapters

FX1S  FX1N  FX3G  FX3U  FX3UC



**Expansion Adapters FX1N-CNV-BD, FX3G-CNV-ADP, FX3U-CNV-BD**

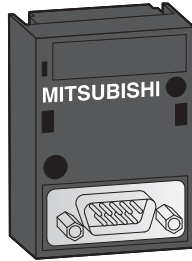
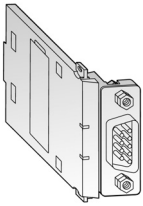
The below listed expansion adapters enable the connection of the adapter modules FX□□-□□□ADP on the left hand side of the FX1N, FX3G and FX3U base units.

| Specifications           | FX1N-CNV-BD          | FX3G-CNV-ADP    | FX3U-CNV-BD       |
|--------------------------|----------------------|-----------------|-------------------|
| Applicable for           | Base units FX1S/FX1N | Base units FX3G | Base units FX3U   |
| Weight                   | kg 0.01              | 0.1             | 0.01              |
| Dimensions (WxH)         | mm 43x38x(D)14       | 90x14.6x(D)86   | 19.6x46.1x(D)53.5 |
| <b>Order information</b> | Art. no. 130745      | 221268          | 165285            |

**Interface Adapters**

FX1S  FX1N  FX3G  FX3U  FX3UC

FX3U-232-BD



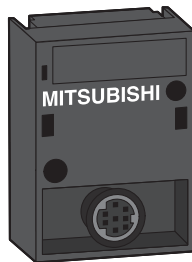
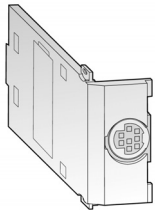
FX3G-232-BD

**Interface Adapters FX1N-232-BD, FX3G-232-BD, FX3U-232-BD**

The FX□□-232-BD interface adapters provide an RS232C interface for serial data communications with the MELSEC FX1S/FX1N/FX3G/FX3U.

| Specifications           | FX1N-232-BD                        | FX3G-232-BD     | FX3U-232-BD                   |
|--------------------------|------------------------------------|-----------------|-------------------------------|
| Applicable for           | Base units FX1S/FX1N               | Base units FX3G | Base units FX3U               |
| Interface                | RS232C with 9 pole D-SUB connector |                 |                               |
| Power supply             | 5 V DC/20 mA (from base unit)      |                 | 5 V DC/20 mA (from base unit) |
| Related I/O points       | —                                  |                 |                               |
| Weight                   | kg 0.02                            | 0.02            | 0.02                          |
| Dimensions (WxHxD)       | mm 43x38.5x22                      | 35x51.2x17.2    | 19.3x46.1x62.7                |
| <b>Order information</b> | Art. no. 130743                    | 221254          | 165281                        |

FX3U-422-BD



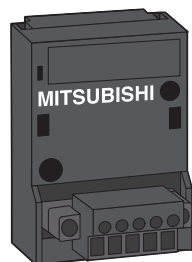
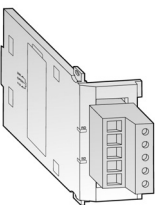
FX3G-422-BD

**Interface Adapters FX1N-422-BD, FX3G-422-BD, FX3U-422-BD**

The FX□□-422-BD interface adapters provide a second RS422 interface for connection of an additional device to the controller (programming unit or operator terminal).

| Specifications           | FX1N-422-BD                          | FX3G-422-BD                   | FX3U-422-BD     |
|--------------------------|--------------------------------------|-------------------------------|-----------------|
| Applicable for           | Base units FX1S/FX1N                 | Base units FX3G               | Base units FX3U |
| Interface                | RS422 with 8 pole mini DIN connector |                               |                 |
| Power supply             | 5 V DC/60 mA (from base unit)        | 5 V DC/20 mA (from base unit) |                 |
| Related I/O points       | —                                    |                               |                 |
| Weight                   | kg 0.01                              | 0.02                          | 0.02            |
| Dimensions (WxHxD)       | mm 43x38.5x20                        | 35x51.2x14.9                  | 19.6x46.1x53.5  |
| <b>Order information</b> | Art. no. 130741                      | 221252                        | 165282          |

FX3U-485-BD



FX3G-485-BD

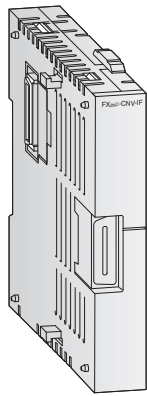
**Interface Adapters FX1N-485-BD, FX3G-485-BD, FX3U-485-BD**

The interface adapters FX□□-485-BD provide the controller with an additional RS485 interface. The adapter, which is simply inserted into the base unit's expansion slot, enables the configuration of RS485 1:n multidrop, parallel link or peer-to-peer networks with FX1S/FX1N/FX3G/FX3U systems.

| Specifications           | FX1N-485-BD                   | FX3G-485-BD                   | FX3U-485-BD                   |
|--------------------------|-------------------------------|-------------------------------|-------------------------------|
| Applicable for           | Base units FX1S/FX1N          | Base units FX3G               | Base units FX3U               |
| Interface                | RS485/RS422                   |                               |                               |
| Power supply             | 5 V DC/60 mA (from base unit) | 5 V DC/20 mA (from base unit) | 5 V DC/40 mA (from base unit) |
| Related I/O points       | —                             |                               |                               |
| Weight                   | kg 0.02                       | 0.02                          | 0.02                          |
| Dimensions (WxHxD)       | mm 43x38.5x22                 | 35x51.2x29.2                  | 19.6x46.1x69                  |
| <b>Order information</b> | Art. no. 130742               | 221253                        | 165283                        |

**Expansion Adapter**

FX1S  FX1N  FX3G  FX3U  FX3UC



FX2NC-CNV-IF

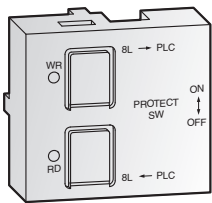
**FX2NC-CNV-IF**

The FX2NC-CNV-IF expansion adapter connects FX3UC main units with the standard FX0N/FX2N/FX3U right side expansion bus.

| Specifications           | FX2NC-CNV-IF                    |            |
|--------------------------|---------------------------------|------------|
| Bus connection           | FX3UC bus to FX0N/FX2N/FX3U bus |            |
| Weight                   | kg                              | 0.3        |
| Dimensions (WxHxD)       | mm                              | 90x 4.6x74 |
| <b>Order information</b> | Art. no.                        | 104508     |

**Memory Media**

FX1S  FX1N  FX3G  FX3U  FX3UC



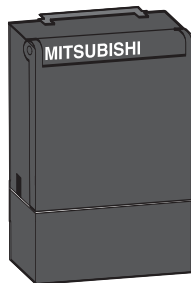
FX1N-EEPROM-8L

**Memory cassettes for FX1S, FX1N and FX3G**

All FX1S, FX1N and FX3G base units are equipped with a slot for the optional, robust FX memory cassettes. By connection of these memory cassettes, the internal memory of the controller is switched off and only the program specified in the respective memory cassette is run.

The memory cassettes can upload/download programs to and from the FX PLC internal memory with the help of 2 buttons.

The memory cassette FX3G-EEPROM-32L can also be placed on top of the standard BD expansion boards.

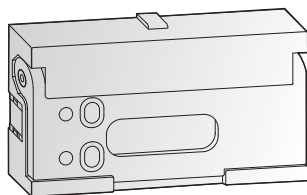


FX3G-EEPROM-32L

| Specifications           | FX1N-EEPROM-8L       | FX3G-EEPROM-32L |
|--------------------------|----------------------|-----------------|
| Applicable for           | Base units FX1S/FX1N | Base units FX3G |
| Memory type              | EEPROM               | EEPROM          |
| Size                     | 2000/8000 steps      | 32000 steps     |
| Protect switch           | Provided             | Provided        |
| Data transfer buttons    | Provided             | Provided        |
| <b>Order information</b> | Art. no. 130746      | 221269          |

**Memory Media**

FX1S  FX1N  FX3G  FX3U  FX3UC



FX3U-FLROM-64L

**Memory Cassettes for FX3U/FX3UC**

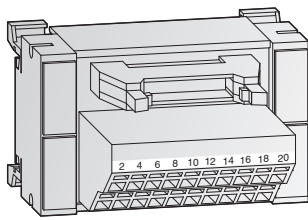
The memory cassette can be installed at the main unit, and when installed, the memory cassette's internal program is used in place of the internal RAM memory.

The FX3U-FLROM-64L features additional data transfer buttons.

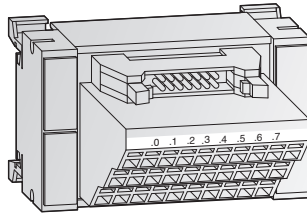
| Specifications           | FX3U-FLROM-16         | FX3U-FLROM-64         | FX3U-FLROM-64L        |
|--------------------------|-----------------------|-----------------------|-----------------------|
| Applicable for           | Base units FX3U/FX3UC | Base units FX3U/FX3UC | Base units FX3U/FX3UC |
| Number of steps          | 16,000                | 64,000                | 64,000                |
| Memory type              | Flash memory          | Flash memory          | Flash memory          |
| Protect switch           | Provided              | Provided              | Provided              |
| Data transfer buttons    | Not provided          | Not provided          | Provided              |
| Dimensions (WxHxD)       | mm 37x20x6.1          | 37x20x6.1             | 37x20x6.1             |
| <b>Order information</b> | Art. no. 165278       | 165279                | 165280                |

Terminal Blocks

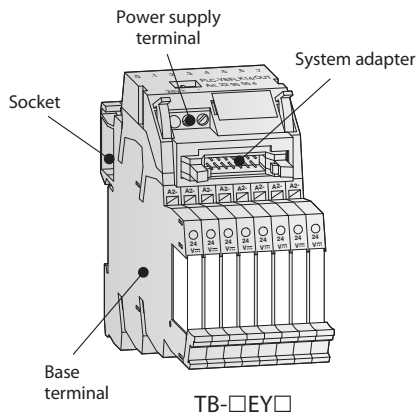
FX1S  FX1N  FX3G  FX3U  FX3UC



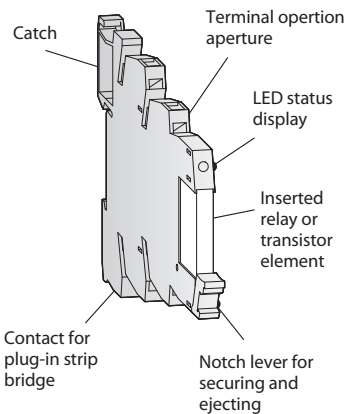
TB-20C



TB-□EX□



TB-□EY□



These terminal blocks are adapter modules that simplify the wiring of the inputs and outputs of the FX3UC main units with ribbon cable connectors. This practical, time-saving wiring system also improves the performance of the outputs. Special terminal blocks are also available for the FX3U/FX3UC positioning modules with ribbon cable connectors. Input blocks, output blocks and combined I/O blocks are available, with a choice of different terminal types.

The TB-□EX□ input blocks are fitted with rows of bridged connectors for 24V/0V terminals, which make wiring quick and easy.

The TB-8EY-S and TB-8EY-C output blocks consist of 8 standard terminals and a system adapter. The standard terminals can be populated with relay or transistor elements, which makes it possible to configure the system for much higher output currents.

Preconfigured system cabling is available for all the terminal blocks (see next page).

| Specifications           | TB-8EY-S  | TB-8EY-C         | TB-16EX-S       | TB-16EX-C        |
|--------------------------|---|------------------|-----------------|------------------|
| Type                     | Input block   | Input block      | Input block     | Input block      |
| Integrated inputs        | 8   | 8                | 16              | 16               |
| Design                   | Initiator module with potential terminals               |                  |                 |                  |
| Connection type          | Screw terminals   | Spring terminals | Screw terminals | Spring terminals |
| Application              | FX2NC series base and extension modules with connectors |                  |                 |                  |
| Dimensions (WxHxD) mm    | 75x45x54  | 75x45x63         | 116x45x54       | 116x45x63        |
| <b>Order information</b> | Art. no. 149144   | 149145           | 149021          | 149022           |
| <b>Accessories</b>       | Connection Cable (see following page)                   |                  |                 |                  |

| Specifications           | TB-8EY-S   | TB-8EY-C         | TB-20-S                               | TB-20C             |
|--------------------------|--|------------------|---------------------------------------|--------------------|
| Type                     | Output block   | Output block     | Input/output block                    | Input/output block |
| Channels                 | 8  | 8                | 8/16                                  | 8/16               |
| Design                   | Socket for relay or transistor elements  |                  | 20 pin terminal module                |                    |
| Connection type          | Screw terminals  | Spring terminals | Screw terminals                       | Spring terminals   |
| Application              | FX2NC series base and extension modules with connectors                        |                  | FX2N series positioning module        |                    |
| Dimensions (WxHxD) mm    | 49.6x100x94  | 49.6x100x94      | 75x45x52                              | 75x45x52           |
| <b>Order information</b> | Art. no. 149044  | 149045           | 149148                                | 149023             |
| <b>Accessories</b>       | Pluggable function elements (see below), Connection cable (see following page) |                  | Connection cable (see following page) |                    |

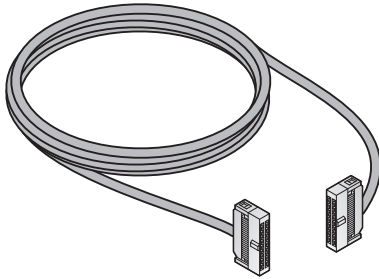
The transistor and relay elements are plugged directly into the standard terminals in the TB-8EY-S or TB-8EY-C modules. All the elements feature a status LED, protection against reverse polarity connection and a freewheeling diode.

Neighbouring terminals with identical voltages can be connected with plug-in strip bridge connectors, which can be cut to length as required.

| Specifications                | TB-8RELAY-6A   | TB-8TRANSISTOR-2A              |
|-------------------------------|--|--------------------------------|
| Output type                   | Relay with 1 switch-over contact   | Transistor (with optocoupler)  |
| Number of elements            | 8  | 8                              |
| Rated input voltage           | 24 V DC  | 24 V DC                        |
| Switching voltage (min./max.) | 12 V AC/DC; 250 V AC/DC  | 3 V DC; 33 V DC                |
| Limit permanent current       | 6 A  | 3 A (at 20 °C), 2 A (at 60 °C) |
| Max. breaking capacity        | 140 W (24 V DC), 1500 VA (250 V AC)  | —                              |
| Ambient temperature           | -20—+60 °C   | -20—+60 °C                     |
| <b>Order information</b>      | Art. no. 149034 (set with 8 elements)  | 149035 (set with 8 elements)   |
| <b>Accessories</b>            | Insulated infinite pin bridge for potential isolation, TB-PIB-RD, color red, art.-no.: 149146; Insulated infinite pin bridge for potential isolation, TB-PIB-BL, color blue art.-no.: 149147; Isolation plate TB-5P for lateral base terminal connection, art.-no.: 149158 |                                |

■ Terminal Connection Cable

FX1S  FX1N  FX3G  FX3U  FX3UC



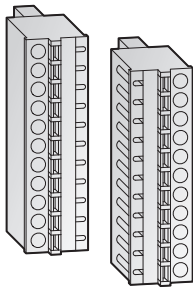
These preconfigured cables enable quick, error-free wiring of the terminal blocks of the positioning modules for the FX3U and FX3UC series fitted with ribbon cable connectors. The cables are available in a choice of lengths between 1 and 5 m. Other lengths are also possible by special order.

| Specifications           | TB-EX-CAB-1M            | TB-EX-CAB-3M | TB-EX-CAB-5M |
|--------------------------|-------------------------|--------------|--------------|
| Application              | For TB-20-□ (1:1 cable) |              |              |
| Length                   | m 1                     | 3            | 5            |
| <b>Order information</b> | Art. no. 149038         | 149039       | 149040       |

| Specifications           | TB-EY-CAB-1M   | TB-EY-CAB-3M | TB-EY-CAB-5M |
|--------------------------|--|--------------|--------------|
| Application              | For 2 x terminal blocks TB-8EY-S or TB-8EY-C (Y cable) |              |              |
| Length                   | m 1  | 3            | 5            |
| <b>Order information</b> | Art. no. 149041  | 149042       | 149043       |

■ Connection terminals

FX1S  FX1N  FX3G  FX3U  FX3UC

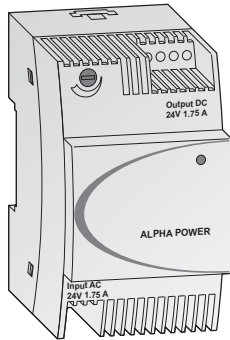


The base unit FX2NC-16MR-T-DS and the extension units FX2NC-16EX-T-DS and FX2NC-16EYR-T-DS are fitted with screw terminals as standard equipment. These plug-in terminals can easily be replaced with spring terminals if required. Two replacement terminal units are required for each module with 16 I/Os.

| Specifications            | TB-CON-5-C       | TB-CON10-C   |
|---------------------------|------------------|--|
| Number of terminal points | 5                | 10   |
| Connection type           | Spring terminals | Spring terminals   |
| Application               | Adapter modules  | Adapter modules and FX2NC-16EX-T-DS / FX2NC-16EYR-T-DS extension modules |
| Dimensions (WxHxD)        | mm 12.5x20x21    | 12.5x20x21   |
| <b>Order information</b>  | Art. no. 221539  | 149036   |

■ 24 V Power Supply Unit

☑ ALPHA ☑ FX1s ☑ FX1N ☑ FX3G ☑ FX3U ☑ FX3UC



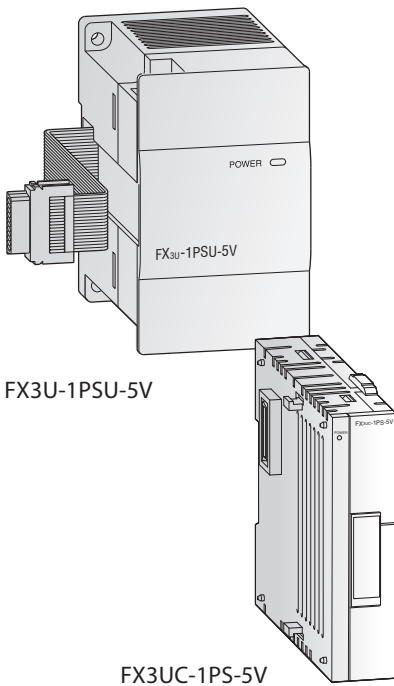
The ALPHA-POWER units are a convenient power supply for 24 V units and other external devices. They come with mounting system for wall or DIN rail mounting and their dimensions are matched to those of the ALPHA family.

Up to 5 power supply units can be installed together for redundant mode operation or connected in parallel for more power. The units have an integrated thermal overload protection circuit and a POWER LED. The output voltage is adjustable.

| Specifications         | ALPHA POWER 24-0.75                          | ALPHA POWER 24-1.75 | ALPHA POWER 24-2.5 |
|------------------------|--|---------------------|--------------------|
| Application            | Power supply for 24 V DC Alpha base units    |                     |                    |
| General specifications | Conforms to FX family and ALPHA base units   |                     |                    |
| Nominal input voltage  | 100–240 V (45–65 Hz)                         |                     |                    |
| Output voltage         | 24 V DC (+/-1 %)                             |                     |                    |
| Nominal output current | 0.75 A (at T=55 °C)                          | 1.75 A (at T=55 °C) | 2.5 A (at T=55 °C) |
| Max. output current    | 1.4 A  | 3.75 A              | 4.4 A              |
| Ambient temperature    | -25–+55 °C (operation), -40–+85 °C (storage) |                     |                    |
| Ambient humidity       | Max. 95 % (no condensation)                  |                     |                    |
| Weight                 | kg   | 0.1                 | 0.2                |
| Dimensions (WxHxD)     | mm   | 36x90x61            | 54x90x61           |
| Order information      | Art. no.                                     | 209029              | 209030             |
|                        |  | 209031              |                    |

■ 5 V Power Supply Unit

☐ FX1s ☐ FX1N ☐ FX3G ☑ FX3U ☑ FX3UC



The power supply modules FX3U-1PSU-5V and FX3UC-1PS-5V are used to reinforce the build-in 5 V DC and 24 V DC power supply of a FX3G/FX3U/FX3UC main unit. They do not occupy any I/O points and deliver up to 1 A more current for the 5 V system bus (for special function modules).

Up to two FX3U-1PSU-5V or FX3UC-1PS-5V modules can be used. Both modules have an integrated overload protection available.

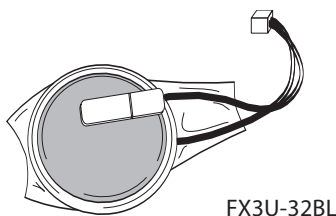
*Note: The FX3U-1PSU-5V can't be used with a 24 V base unit!*

*When connecting an input extension module (incl. FX2N-8ER-ES/UL, FX2N-8ER) to the FX3U-1PSU-5V, supply the power for it from the 24 V DC service power supply of the connected main unit or powered extension unit on the upstream side.*

| Specifications         | FX3U-1PSU-5V                                 | FX3UC-1PS-5V                          |
|------------------------|--|---------------------------------------|
| Application            | Power supply for the FX3G/FX3U system bus    | Power supply for the FX3UC system bus |
| General specifications | Conforms to FX family base units             |                                       |
| Nominal input voltage  | 100–240 V (50/60 Hz)                         |                                       |
| Output voltage         | 5 V DC/24 V DC                               | 5 V DC                                |
| Max. output current    | 5 V DC<br>24 V DC                            | 5 V DC                                |
|                        | 1 A at 40 °C; 0.8 A at 55 °C                 | 1 A                                   |
|                        | 0.3 A at 40 °C; 0.2 A at 55 °C               | —                                     |
| Ambient temperature    | -25–+55 °C (operation), -40–+85 °C (storage) |                                       |
| Ambient humidity       | Max. 95 % (no condensation)                  |                                       |
| Weight                 | kg   | 0.3                                   |
| Dimensions (WxHxD)     | mm   | 55x90x87                              |
| Order information      | Art. no.                                     | 169507                                |
|                        |  | 210086                                |

■ Backup Batteries

☐ FX1s ☐ FX1N ☑ FX3G ☑ FX3U ☑ FX3UC



**Batteries**

The battery buffers the internal RAM of the MELSEC PLC in the event of a voltage failure.

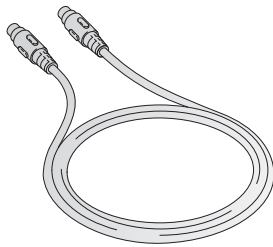
The battery FX2NC-32BL is suitable for the positioning modules FX2N-20GM.

The battery FX3U-32BL can be used for all base units of the MELSEC FX3G/FX3U/FX3UC series.

| Specifications    | FX2NC-32BL       | FX3U-32BL      |
|-------------------|------------------|----------------|
| Applicable for    | FX2N-20GM module | Base unit FX3U |
| Order information | Art. no.         | 128725         |
|                   |                  | 165286         |

**Cables**

☑ FX1S ☑ FX1N ☑ FX3G ☑ FX3U ☑ FX3UC



FX-20P-CAB0

**FX Series connection cables**

The cable listed in the following tables are used for FX Series PLC programming, positioning applications, block connections and interface conversion.

**Connection cable for RS232C peripherals**

| Specifications           | F2-RS-5CAB           | F2-232CAB-1       | FX-232CAB-1 |
|--------------------------|----------------------|-------------------|-------------|
| Application              | FX2N-1RM to resolver | PC to FX-232AWC-H | PC to GOT   |
| Length                   | m 5.0                | 3.0               | 3.0         |
| <b>Order information</b> | Art. no. 76160       | 76163             | 124972      |

**Connection cable for RS-422 peripherals**

| Specifications           | FX-422CAB0             | FX-422CAB             | FX-422CAB-150         |
|--------------------------|------------------------|-----------------------|-----------------------|
| Application              | FX-232AWC-H to FX□ PLC | FX-232AWC-H to FX PLC | FX-232AWC-H to FX PLC |
| Length                   | m 1.5                  | 0.3                   | 1.5                   |
| <b>Order information</b> | Art. no. 76094         | 25949                 | —                     |

**Connection cable for programming unit**

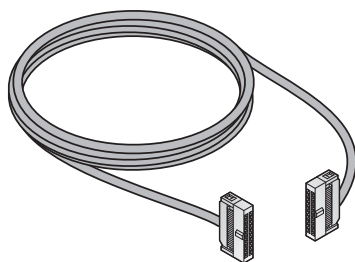
| Specifications           | FX-20P-CAB0                | FX-20P-CAB         | FX-20P-CADP           |
|--------------------------|----------------------------|--------------------|-----------------------|
| Application              | FX-20P-G/FX-30P to FX□ PLC | FX-20P-E to FX PLC | FX-20P-CAB to FX□ PLC |
| Length                   | m 1.5                      | 1.5                | 0.3                   |
| <b>Order information</b> | Art. no. 55917             | 30815              | 31870                 |

**Connection cable for extension bus**

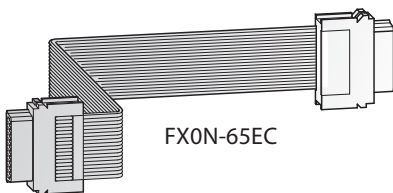
| Specifications           | FX0N-65EC   |
|--------------------------|---|
| Application              | PLC bus cable for two-stage-configuration with extension units FX□□-□□□ES |
| Length                   | m 0.65  |
| <b>Order information</b> | Art. no. 45348  |

**Interface converter**

| Specifications           | FX-USB-AW              | FX-232AWC-H               |
|--------------------------|------------------------|---------------------------|
| Application              | USB to RS422 converter | RS422 to RS232C converter |
| Dimensions               | m 0.063+3.0            | 0.25x0.8x0.6              |
| <b>Order information</b> | Art. no. 165288        | 159642                    |

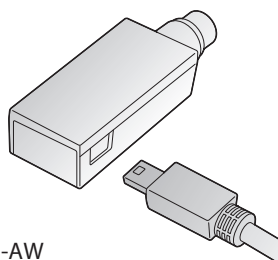


FX-16E-500CAB



FX0N-65EC

**Programming Cables**



FX-USB-AW

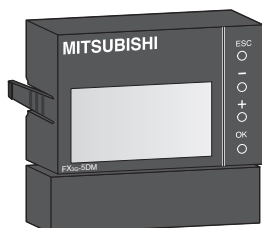
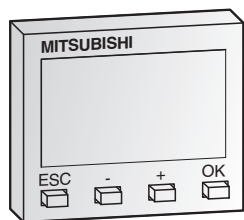
The USB to RS-422 converter FX-USB-AW is used for the connection between the PLC and a serial interface of a personal computer. The converter is divided into 2 parts and thus universally applicable for all FX-series PLCs.

The SC-09 programming cable is used for the connection between the PLC and a serial interface of a personal computer. The cable is divided into 2 parts and thus universally applicable for all Mitsubishi PLCs.

|                          | FX-USB-AW       | SC-09       |
|--------------------------|-----------------|-------------|
| Connection on PC side    | USB             | 9-pin D-SUB |
| <b>Order information</b> | Art. no. 165288 | 43393       |



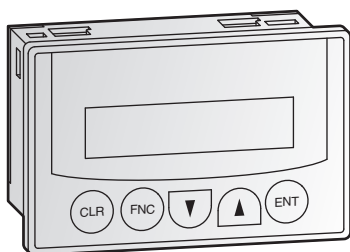
■ Display Modules



**Display Module FX1N-5DM and FX3G-5DM**

The display modules FX1N-5DM and FX3G-5DM are inserted directly with space-saving into the controller and enable monitoring and editing of the data stored in the PLC. The display module e.g. can be used instead of digital switches and external 7-segment displays in very confined areas.

| Specifications           | FX1N-5DM                     | FX3G-5DM                      |
|--------------------------|------------------------------|-------------------------------|
| Applicable for           | Base units FX1S/FX1N         | Base units FX3G series        |
| Display                  | LCD (with backlight)         | LCD (with backlight)          |
| Power supply             | 5 V DC ±5 % (from base unit) | 5 V DC ± 5 % (from base unit) |
| Current consumption      | mA 110                       | n/a                           |
| Weight                   | kg 0.02                      | 0.02                          |
| Dimensions (WxHxD)       | mm 40x32x17                  | 49x34x12                      |
| <b>Order information</b> | Art. no. 129197              | 221270                        |

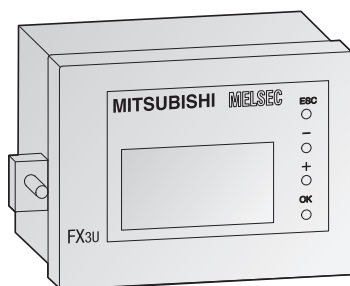


**Control and Display Panel FX-10DM-E**

The control and display panel FX-10-DM-E provides a key-oriented user-interface and enables you to monitor and edit process data in the PLC.

The display is arranged in 2 rows of 16 characters each. Functions can be invoked and values can be edited using the panel keys.

| Specifications           | FX-10DM-E                          |
|--------------------------|------------------------------------|
| Applicable for           | All base units FX1S/FX1N/FX2N/FX3U |
| Display                  | LCD (with backlight)               |
| Resolution               | 2x16 signs (80x16 pixles)          |
| Power supply             | 5 V DC ±5 % (from base unit)       |
| Current consumption      | mA 220                             |
| Weight                   | kg 0.02                            |
| Dimensions (WxHxD)       | mm 96x62x32                        |
| <b>Order information</b> | Art. no. 132600                    |



Panel FX3U-7DM with built-in holder FX3U-7DM-HLD

**Control and Display Panel FX3U-7DM, Holder FX3U-7DM-HLD**

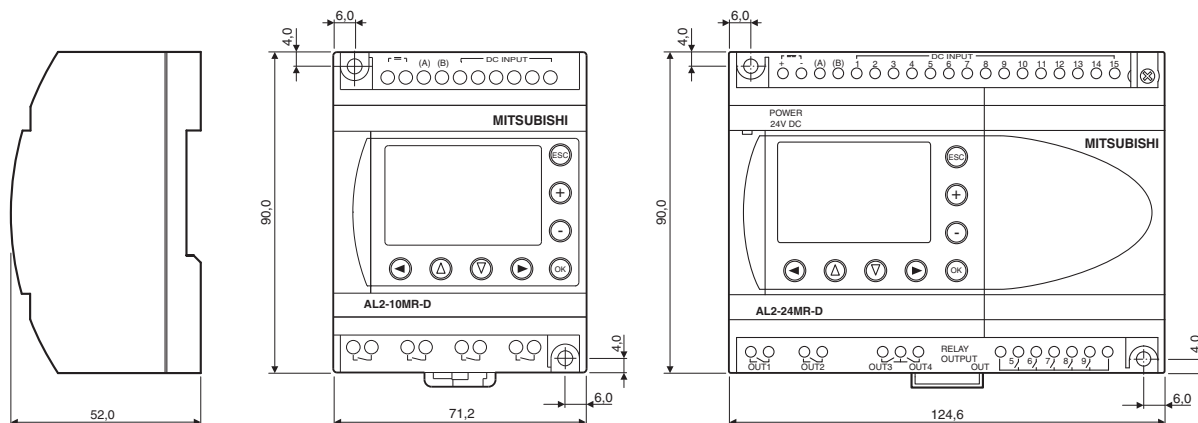
The FX3U-7DM display module can be incorporated in the main unit, or can be installed in the enclosure using the FX3U-7DM-HLD display module holder.

| Specifications           | FX3U-7DM                | FX3U-7DM-HLD    |
|--------------------------|-------------------------|-----------------|
| Applicable for           | Base units FX3U         | Base units FX3U |
| Display                  | 16 letters x 4 lines    | —               |
| Resolution               | —                       | —               |
| Power supply             | 5 V DC (from base unit) | —               |
| Current consumption      | mA 20                   | —               |
| Extension cable          | —                       | Included        |
| Weight                   | kg 0.02                 | 0.01            |
| Dimensions (WxHxD)       | mm 48x35x11.5           | 66.3x41.8x13    |
| <b>Order information</b> | Art. no. 165268         | 165287          |

For further control and operator terminals please refer to the technical catalogue HMI.

### Dimensions of the ALPHA series

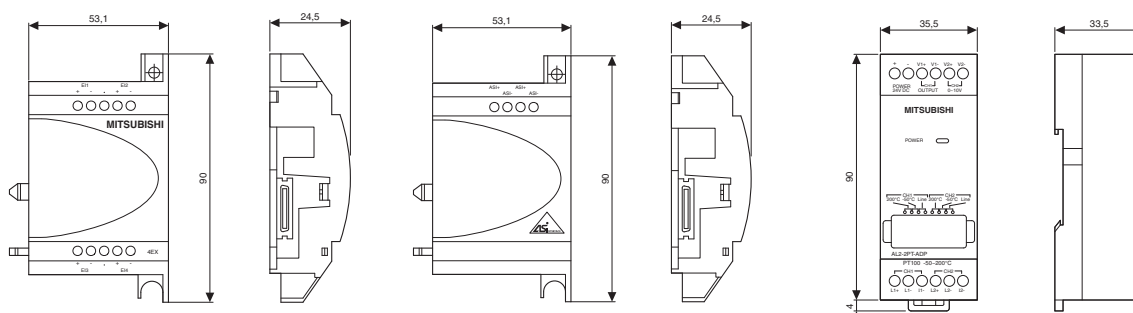
AL2-14M□-□, AL2-24M□-□



AL2-4EY□, AL2-2DA

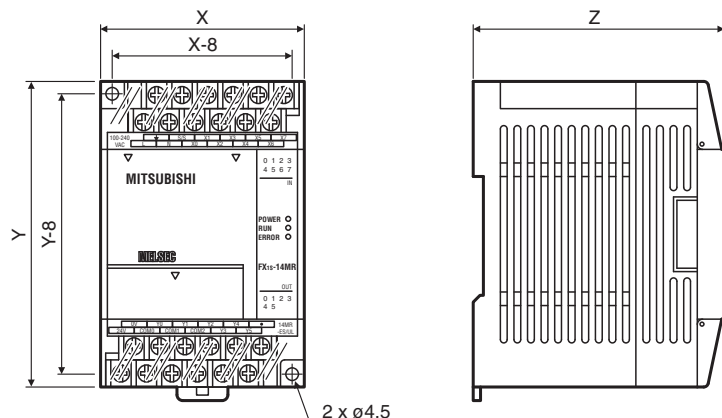
AL2-ASI-BD

AL2-2PT-ADP, AL2-2TC-ADP



All dimensions in mm

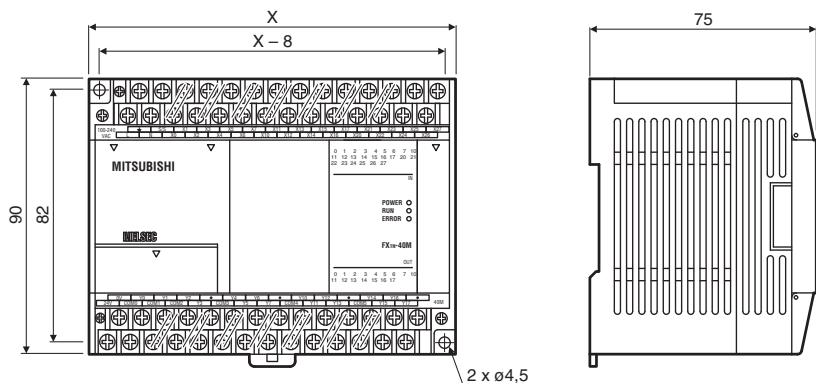
Dimensions of Base Units FX1S



| Base unit       | X   | Y  | Z  |
|-----------------|-----|----|----|
| FX1S-10MR-DS    | 60  | 90 | 49 |
| FX1S-10MR-ES/UL | 60  | 90 | 75 |
| FX1S-10MT-DSS   | 60  | 90 | 49 |
| FX1S-14MR-DS    | 60  | 90 | 49 |
| FX1S-14MR-ES/UL | 60  | 90 | 75 |
| FX1S-14MT-DSS   | 60  | 90 | 49 |
| FX1S-20MR-DS    | 75  | 90 | 49 |
| FX1S-20MR-ES/UL | 75  | 90 | 75 |
| FX1S-20MT-DSS   | 75  | 90 | 49 |
| FX1S-30MR-DS    | 100 | 90 | 49 |
| FX1S-30MR-ES/UL | 100 | 90 | 75 |
| FX1S-30MT-DSS   | 100 | 90 | 49 |

All dimensions in mm

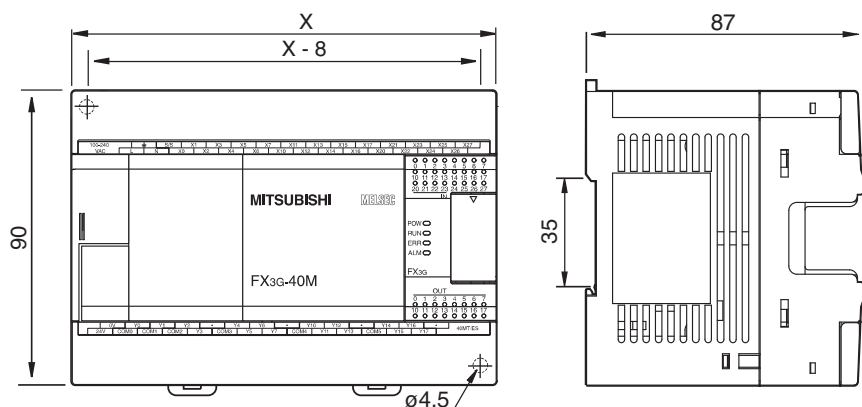
Dimensions of Base Units FX1N



| Base unit    | X   |
|--------------|-----|
| FX1N-14MR□□□ | 90  |
| FX1N-14MT□□□ | 90  |
| FX1N-24MR□□□ | 90  |
| FX1N-24MT□□□ | 90  |
| FX1N-40MR□□□ | 130 |
| FX1N-40MT□□□ | 130 |
| FX1N-60MR□□□ | 175 |
| FX1N-60MT□□□ | 175 |

All dimensions in mm

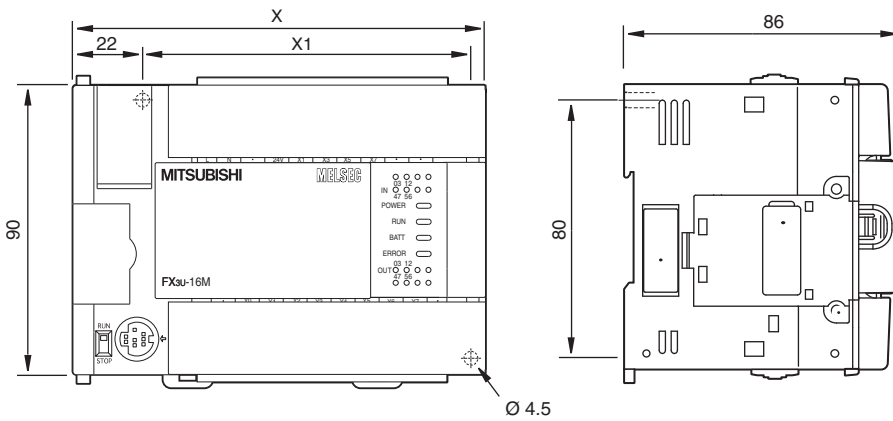
Dimensions of Base Units MELSEC FX3G



| Base unit | X   |
|-----------|-----|
| FX3G-14   | 90  |
| FX3G-24   | 90  |
| FX3G-40   | 130 |
| FX3G-60   | 175 |

All dimensions in mm

**Dimensions of Base Units FX3U**

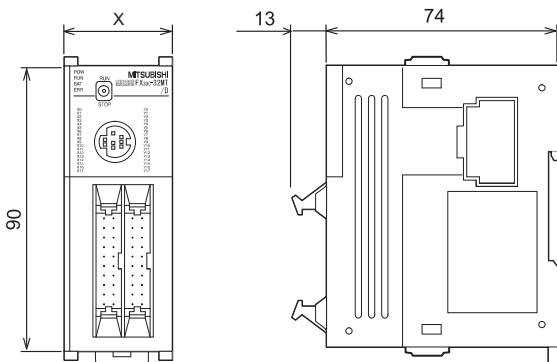


**Base Units**

| Type         | X   | X1  |
|--------------|-----|-----|
| FX3U-16M□□□  | 130 | 103 |
| FX3U-32M□□□  | 150 | 123 |
| FX3U-48M□□□  | 182 | 155 |
| FX3U-64M□□□  | 220 | 193 |
| FX3U-80M□□□  | 285 | 258 |
| FX3U-128M□□□ | 350 | 323 |

All dimensions in mm

**Dimensions of Base Units FX3UC**

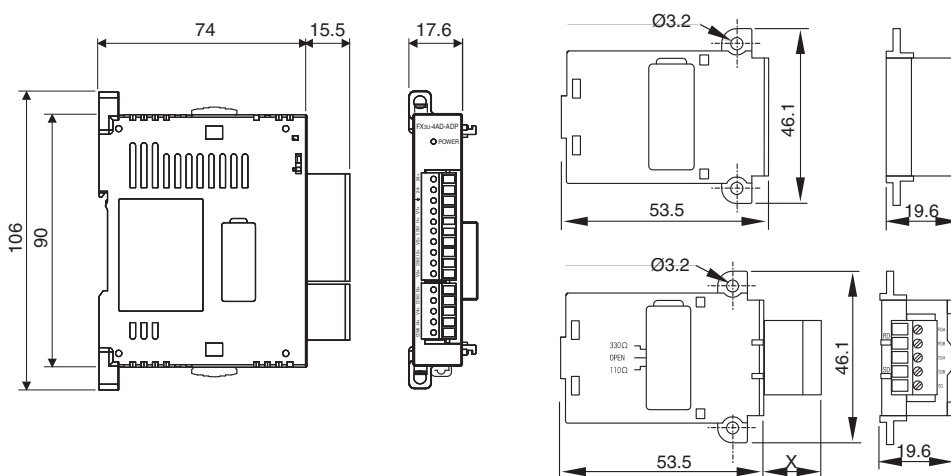


**Base Units**

| Type           | X    |
|----------------|------|
| FX3UC-16MT/DSS | 34   |
| FX3UC-32MT/DSS | 34   |
| FX3UC-64MT/DSS | 59.7 |
| FX3UC-96MT/DSS | 85.4 |

All dimensions in mm

**Dimensions of Adapter Modules FX3U and Extension Adapters**

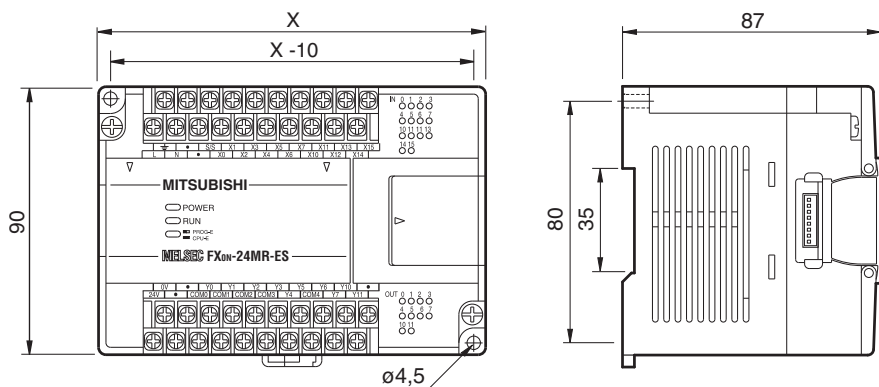


**Extension Adapters**

| Type     | X    |
|----------|------|
| FX3U-CNV | —    |
| FX3U-USB | —    |
| FX3U-485 | 15,5 |
| FX3U-422 | —    |
| FX3U-232 | 9,2  |

All dimensions in mm

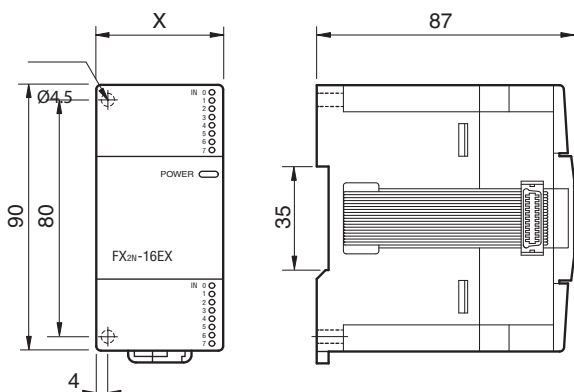
### Dimensions of Compact Extension Units FX0N



| Type            | X   |
|-----------------|-----|
| FX0N-40ER-DS    | 150 |
| FX0N-40ER-ES/UL | 150 |
| FX0N-40ET-DSS   | 150 |

All dimensions in mm

### Dimensions of Compact Extension Units and Modular Extension Blocks MELSEC FX2N



#### Compact Extension Units

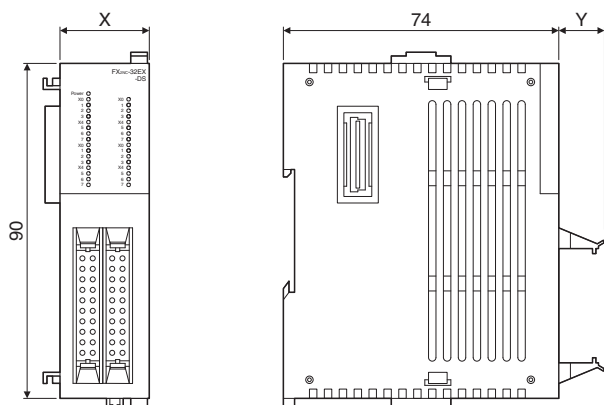
| Type             | X   |
|------------------|-----|
| FX2N-32E□□□      | 150 |
| FX2N-48E□□□      | 182 |
| FX2N-48ER-UA1/UL | 220 |

#### Modular Extension Blocks

| Type        | X  |
|-------------|----|
| FX2N-8E□□□  | 43 |
| FX2N-16E□□□ | 40 |

All dimensions in mm

### Dimensions of Modular Extension Blocks FX2NC

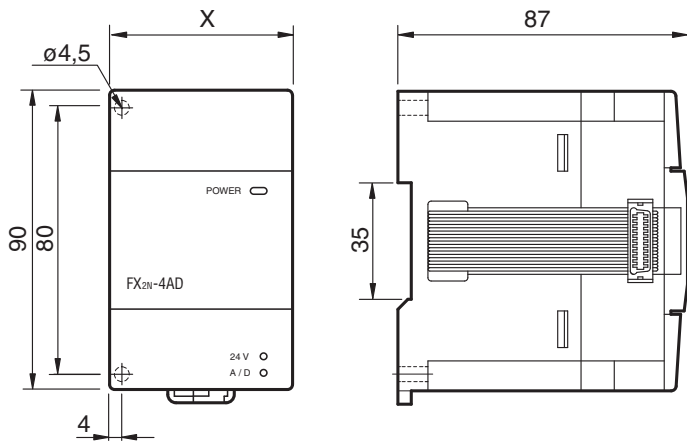


#### Extension Blocks

| Type              | X    | Y  |
|-------------------|------|----|
| FX2NC-16EX-DS     | 14.6 | 13 |
| FX2NC-16EYT-DSS   | 14.6 | 13 |
| FX2NC-16EX-T-DS   | 20.2 | 15 |
| FX2NC-16EYR-T-DSS | 24.2 | 15 |
| FX2NC-32EX-DS     | 26.2 | 13 |
| FX2NC-32EYT-DSS   | 26.2 | 13 |

All dimensions in mm

Dimensions of Special Function Modules MELSEC FX2N



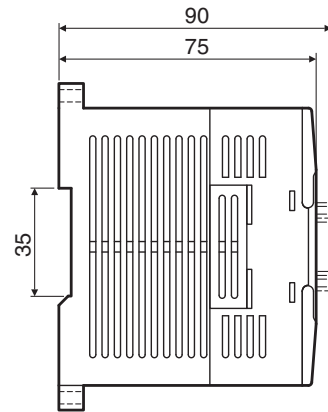
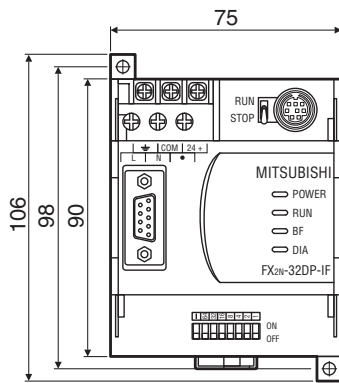
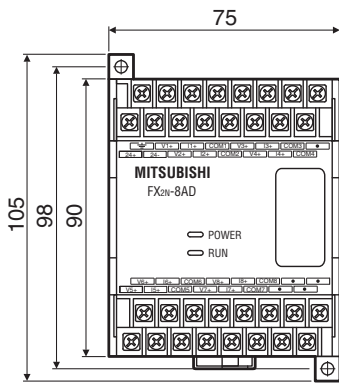
Special Function Modules FX0N/FX2N

| Type         | X  |
|--------------|----|
| FX0N-3A      | 43 |
| FX2N-2DA     | 43 |
| FX2N-2AD     | 43 |
| FX2N-4DA     | 55 |
| FX2N-4AD     | 55 |
| FX2N-4AD-TC  | 55 |
| FX2N-4AD-PT  | 55 |
| FX2N-1HC     | 55 |
| FX2N-1PG-E   | 43 |
| FX2N-10PG    | 43 |
| FX2N-2LC     | 55 |
| FX2N-5A      | 55 |
| FX2N-232-IF  | 55 |
| FX2N-32ASI-M | 55 |
| FX2N-32CCL   | 43 |
| FX2N-32CAN   | 43 |
| FX2N-64DNET  | 43 |

FX2N-8AD

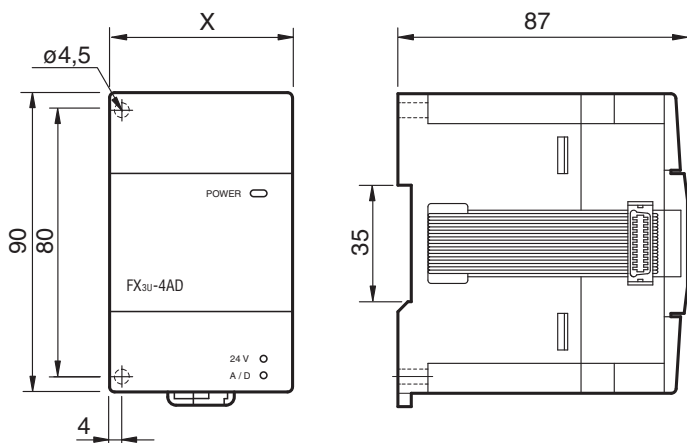
FX2N-32DP-IF

All dimensions in mm



6 DIMENSIONS

Dimensions of Special Function Modules MELSEC FX3U/FX3UC

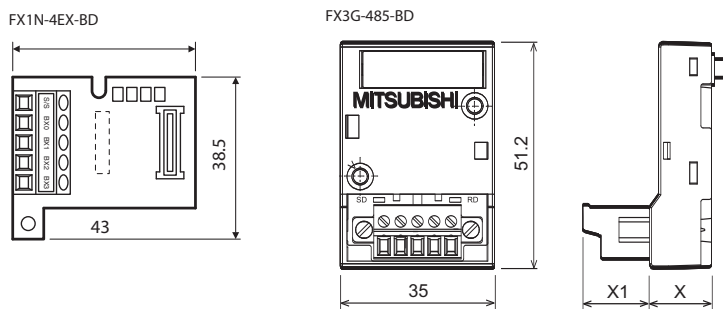


Special Function Modules FX3U/FX3UC

| Type         | X    |
|--------------|------|
| FX3U-2HC     | 55   |
| FX3U-3A-ADP  | 17.6 |
| FX3U-4DA     | 55   |
| FX3U-4AD     | 55   |
| FX3U-4LC     | 90   |
| FX3U-CF-ADP  | 45   |
| FX3U-ENET    | 55   |
| FX3U-20SSC-H | 55   |
| FX3U-64CCL   | 55   |
| FX3U-64DPM   | 43   |
| FX3U-1PSU-5V | 55   |
| FX3UC-4AD    | 20.2 |
| FX3UC-1PS-5V | 24.2 |

All dimensions in mm

### Dimensions of Adapters FX1N and FX3G

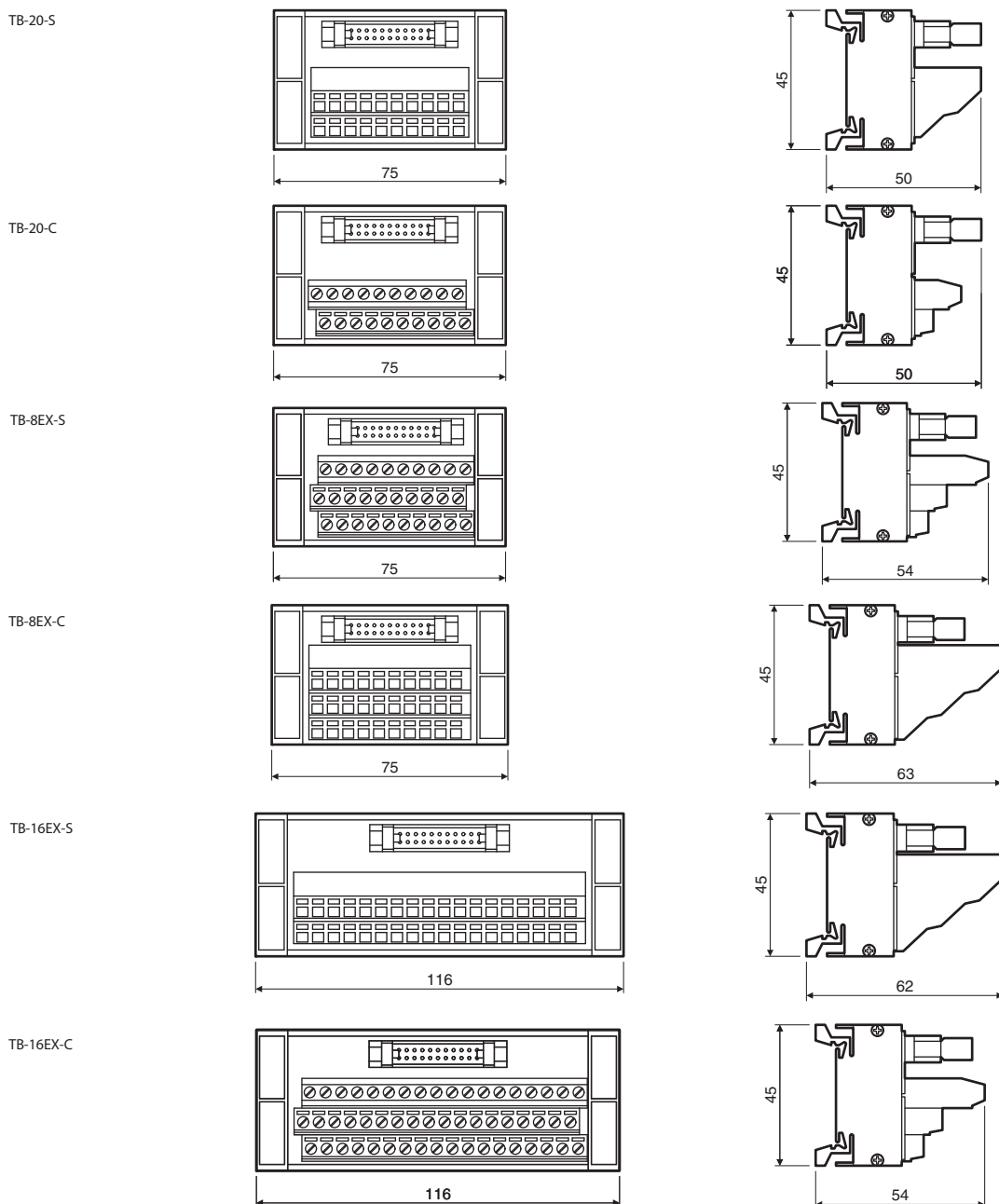


#### FX3G Extension Adapters

| Type        | X    | X1   |
|-------------|------|------|
| FX3G-1DA-BD | 14.1 | 15.1 |
| FX3G-232-BD | 12   | 5.2  |
| FX3G-2AD-BD | 14.1 | 15.1 |
| FX3G-422-BD | 12   | 2.9  |
| FX3G-485-BD | 14.1 | 15.1 |
| FX3G-8AV-BD | 12   | -    |

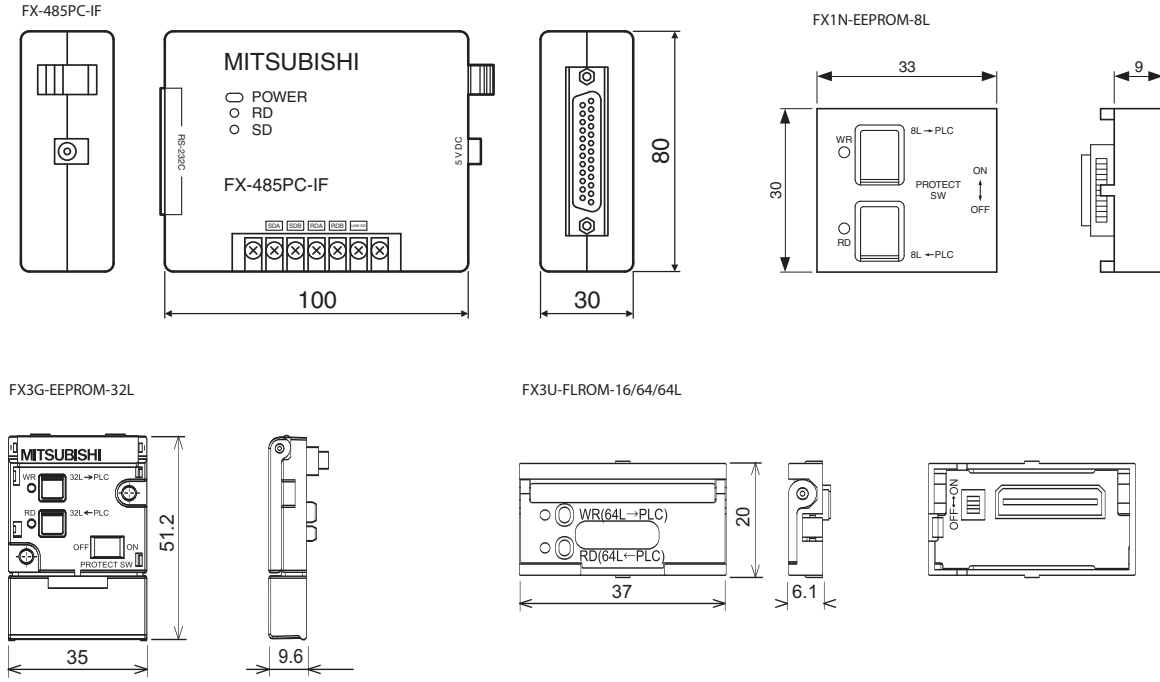
All dimensions in mm

### Dimensions for Terminal Blocks



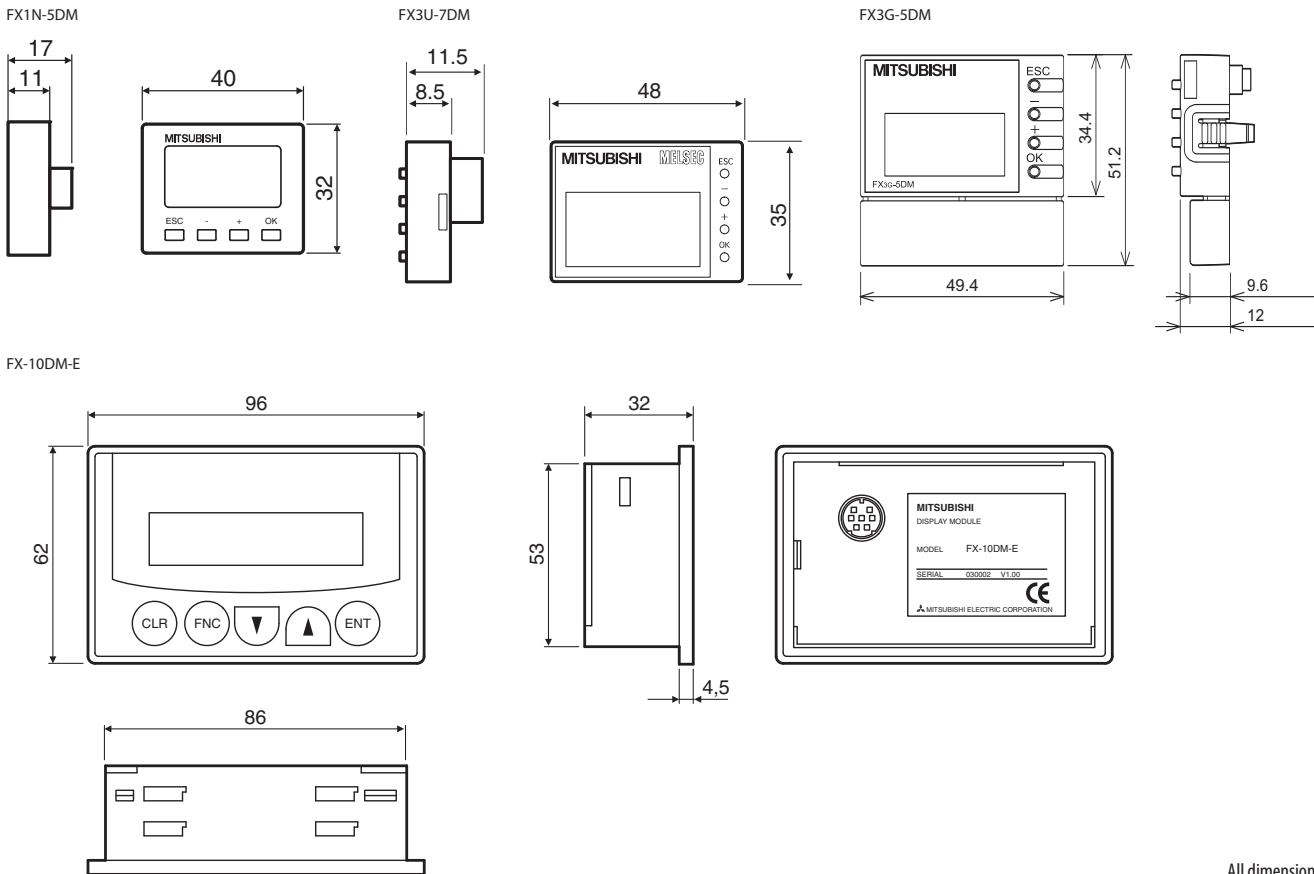
All dimensions in mm

Dimensions for Accessories



All dimensions in mm

Dimensions for Display Panels



All dimensions in mm



**MELSOFT – Programming and Documentation Software for Standard Personal Computers**



With the MELSOFT software family Mitsubishi Electric offers efficient software packages helping to reduce programming and setup times to a high degree. The MELSOFT software family provides instant access, direct communications, compatibility, and open exchange of variables.

The MELSOFT family comprises:

- Programming packages AL-PCS/WIN and GX Developer
- Various development software for operator terminals (please refer to the GOT Technical Catalogue)
- Software for a dynamic data exchange like MX Change

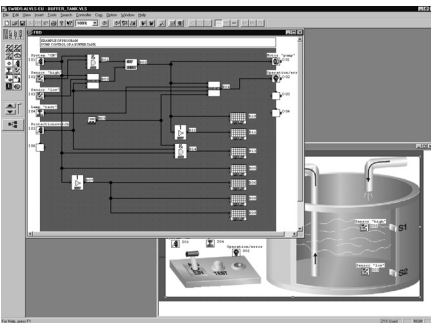
AL-PCS/WIN is recommended as a cost-effective beginners package for the ALPHA series. This package offers a quick and easy introduction to programming.

GX Developer is the right decision for a universal programming package. In addition, GX Developer is fully compatible with all MELSEC PLCs, including A and Q series controllers.

For detailed information please order our separate MELSOFT brochure.

For structured programming the IEC1131.3 (EN 61131-3) conform programming software GX IEC Developer is recommended.

**■ ALPHA Programming Software**

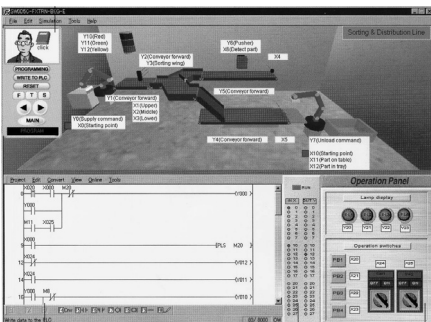


**AL-PCS/WIN Programming Software**

All controllers of the ALPHA series can be programmed with the MS Windows software AL-PCS/WIN. Programming the ALPHA with this software is very easy and is done by placing the different program elements on a graphical programming environment. The connections (wiring) between the inputs, function blocks, and outputs are drawn graphically by mouse click to build the logic. By this, programs with up to 200 function blocks can be created, where each single function in a program can be used as many times as desired. A complete documentation of the program can be created directly from AL-PCS/WIN.

| Software                 | AL-PCS/WIN  |        |
|--------------------------|---|--------|
| Series                   | Alpha series  |        |
| Language                 | 7 languages (English/German/French/Italian/Spanish/Swedish/Russian) |        |
| Applicable for           | Windows 95/98/ME/NT/2000/XP/Vista                                   |        |
| <b>Order information</b> | Art. no.  | 152603 |

**■ PLC Training Software**



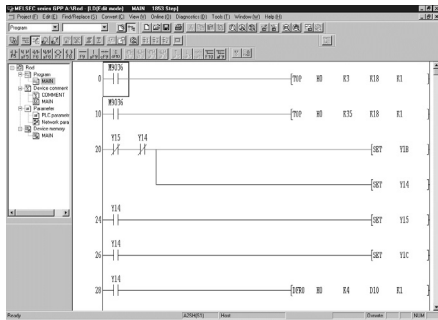
**FX-TRN-BEG-E Training Software**

The FX-TRN-BEG-E training software package is designed to help beginners get started with the programming of PLC systems. It combines a simulated PLC environment with expert tutorials. A real-time module simulates the operation of the PLC program. Simulation speed is adjustable and you can also access system elements and display program status while the process is running.

| Software                 | FX-TRN-BEG-E                      |        |
|--------------------------|-----------------------------------|--------|
| Series                   | Whole FX family                   |        |
| Language                 | English, Russian                  |        |
| Applicable for           | Windows 95/98/ME/NT/2000/XP/Vista |        |
| <b>Order information</b> | Art. no.                          | 149714 |

## PLC Programming Software

### ■ GX Developer



GX Developer is the standard programming software for all MELSEC PLC series and combines all functions of MELSEC MEDOC with the user guidance of Microsoft Windows.

With this software you can comfortably create PLC programs alternatively in the form of Ladder Diagrams or Instruction Lists. Both forms of representation can be toggled easily during operation.

Besides efficient monitoring and diagnostics functions GX Developer features an offline simulation of any PLC type.

With GX Developer all MELSEC PLCs from the FX1s to the Q25PH (Q series) are supported.

The GX Developer FX is limited to the programming of the FX series.

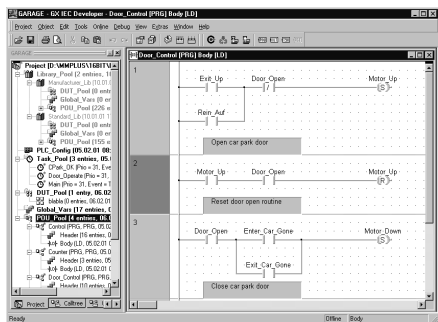
This software provides all the Windows-specific advantages and is especially suited to all MELSEC PLCs.

The software is supplied without an SC-09 programming cable, which can be ordered separately. This cable is needed for the connection between the PLC and a serial interface of a personal computer.

GX Developer can be run under MS Windows® XP and Vista.

| Software                 | GX DEVELOPER FX V0878-1LOC-M             | GX DEVELOPER FX V0878-2LOC-M_2&MORE | GX Developer V0800-1LOC-G | GX Developer V0800-1LOC-E |
|--------------------------|--|-------------------------------------|---------------------------|---------------------------|
| Series                   | FX1S, FX1N, FX3G, FX3U, FX3UC            | FX1S, FX1N, FX3G, FX3U, FX3UC       | All MELSEC PLCs           | All MELSEC PLCs           |
| Language                 | German/English                           | German/English                      | German                    | English                   |
| Disk type                | CD ROM                                   | CD ROM                              | CD ROM                    | CD ROM                    |
| <b>Order information</b> | Art. no. 225141                          | 225155                              | 152816                    | 150420                    |
| <b>Accessory</b>         | Programming cable SC-09, art. no.: 43393 |                                     |                           |                           |

### ■ GX IEC Developer



GX IEC Developer provides all functions of the pre-mentioned programs and in addition meets the programming standard: IEC 1131.3 (EN 61131). This makes the software ready for the programming standard of the future and offers beside the FX version in addition the full version as a basis for the on-leading programming of the MELSEC AnS/QnAS series, the

MELSEC AnU/QnA series and MELSEC System Q.

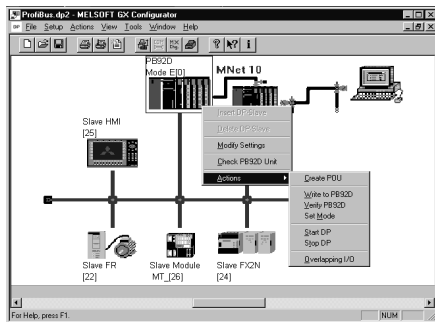
GX IEC Developer can be run under Windows 95/98 and Windows NT/2000/XP.

The software is supplied without an SC-09 programming cable, which can be ordered separately. This cable is needed for the connection between the PLC and a serial interface of a personal computer.

| Software                 | GX IEC Developer FX V0703-1LOC-G         | GX IEC Developer FX V0703-1LOC-E | GX IEC Developer V0703-1LOC-G | GX IEC Developer V0703-1LOC-E |
|--------------------------|--|----------------------------------|-------------------------------|-------------------------------|
| Series                   | FX1S, FX1N, FX3G, FX3U, FX3UC            | FX1S, FX1N, FX3G, FX3U, FX3UC    | All MELSEC PLCs               | All MELSEC PLCs               |
| Language                 | German                                   | English                          | German                        | English                       |
| Disk type                | CD ROM                                   | CD ROM                           | CD ROM                        | CD ROM                        |
| <b>Order information</b> | Art. no. 221425                          | 221430                           | 221413                        | 221419                        |
| <b>Accessory</b>         | Programming cable SC-09, art. no.: 43393 |                                  |                               |                               |

## Configurations Software

### ■ GX Configurator DP



The GX Configurator DP is a user friendly configurations software for the open network PROFIBUS/DP.

The software package is a 32 bit application and runs under all Windows versions. Configuration of all PROFIBUS/DP modules for the MELSEC Ans/QnAS and A/Q series and also the FX family is possible.

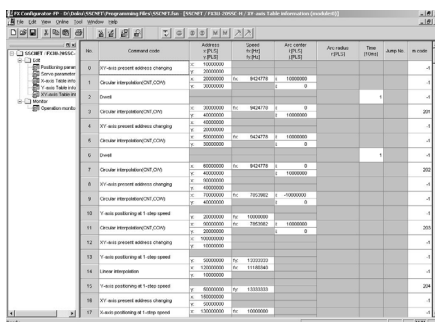
Due to the supported extended user parameters of a GSD file, easy parameter setting of PROFIBUS/DP slave devices is possible even for third-party devices.

The new GX Configurator DP enables the download of all configuration data via an over-riding network.

All PROFIBUS modules are configured via the backside bus.

| Software  | GX Configurator DP V0500-1L0C-E          |        |
|---|--|--------|
| Supported PROFIBUS/DP master modules for the Mitsubishi MELSEC series | A1S1J71PB92D, AJ71PB92D, QJ71PB92D       |        |
| Language  | English/German                           |        |
| Disk type   | CD ROM                                   |        |
| <b>Order information</b>  | Art. no.                                 | 145312 |
| <b>Accessory</b>  | Programming cable SC-09, art. no.: 43393 |        |

### ■ FX Configurator FP



FX Configurator-FP is beneficial for setting up table operation information, servo amplifier parameters and positioning parameters for the FX3U-SSC-H positioning module. Positioning operations and their associated parameters (speeds, addresses, torque limits etc.) can be monitored and tested with the integrated monitor and test functions.

Control patterns from simple to complicated combinations of positioning commands can easily be configured with new methods.

The software runs under all Windows versions.

| Software   | FX Configurator FP V0100-1L0C-E          |        |
|--|--|--------|
| Supported modules for the Mitsubishi MELSEC series | FX3U-20SSC-H                             |        |
| Language   | English                                  |        |
| Disk type  | CD ROM                                   |        |
| <b>Order information</b>                           | Art. no.                                 | 189283 |
| <b>Accessory</b>                                   | Programming cable SC-09, art. no.: 43393 |        |

**Hand-Held Programming Unit**



**FX-30P**

The FX-30P is a small, industrial programming and maintenance tool for the FX Series. This unit can perform program uploads/downloads and store up to 15 programs in its internal memory. Keywords can be registered, deleted or canceled in applicable PLCs. Program monitoring and data device adjustment functionality is also available. To stay up to date the latest firmware can be downloaded on a PC then installed via the USB port. PLC programs on the PC can also be transferred via USB, eliminating the need for peripheral devices.

*Note: FX-30P firmware and program downloads from a PC via the embedded USB port available in firmware versions 1.10 and later.*

| Specifications                             |                  | FX-30P   |
|--|------------------|--|
| Applicable for                             |                  | Base units FX1S, FX1N, FX3G, FX2N, FX3U, FX3UC   |
| Ambient temperature                        |                  | 0–40 °C  |
| Ambient relative humidity (non-condensing) |                  | 5–95 %   |
| Power supply                               |                  | 5V DC ±5%/155 mA (from main unit)  |
| Display                                    |                  | LCD (with backlight)   |
| Character display                          |                  | 21x8   |
| Keyboard                                   |                  | 35   |
| Memory                                     | Program capacity | Built-in RAM: 64K steps for program monitoring and modification RAM retention (for about five years, ambient temperature 25 C(77 F)) by battery.<br>Built-in flash memory ROM: Up to 15 programs can be stored in the built-in flash memory ROM. Allowable number of writes: 100,000 times |
|  | HPP held data    | Display language setting (Japanese, English or Chinese), contrast, buzzer sound volume, brightness adjustment, screen saver and HPP protect key (saved in the built-in flash memory)   |
| Cable                                      |                  | FX-20P-CAB0  |
| Weight                                     | kg               | 0.3  |
| Dimensions (WxHxD)                         | mm               | 87x170x30  |
| <b>Order information</b>                   |                  | Art. no. 221271  |

| Module type                    | CE  |     | uL<br>cUL | Ship approvals |     |    |    |    |      |
|--------------------------------|-----|-----|-----------|----------------|-----|----|----|----|------|
|                                | EMC | LVD |           | ABS            | DNV | LR | GL | BV | RINA |
| <b>ALPHA 2 Base Units</b>      |     |     |           |                |     |    |    |    |      |
| AL2-10MR-A                     | ●   | ●   | ●         | —              | —   | —  | —  | —  | —    |
| AL2-10MR-D                     | ●   | ●   | ●         | —              | —   | —  | —  | —  | —    |
| AL2-14MR-A                     | ●   | ●   | ●         | —              | ●   | —  | —  | —  | —    |
| AL2-14MR-D                     | ●   | ●   | ●         | —              | ●   | —  | —  | —  | —    |
| AL2-24MR-A                     | ●   | ●   | ●         | —              | ●   | —  | —  | —  | —    |
| AL2-24MR-D                     | ●   | ●   | ●         | —              | ●   | —  | —  | —  | —    |
| <b>ALPHA Extension Modules</b> |     |     |           |                |     |    |    |    |      |
| AL2-4EX-A2                     | ●   | ●   | ●         | —              | ●   | —  | —  | —  | —    |
| AL2-4EX                        | ●   | ●   | ●         | —              | ●   | —  | —  | —  | —    |
| AL2-4EYR                       | ●   | ●   | ●         | —              | ●   | —  | —  | —  | —    |
| AL2-4EYT                       | ●   | ●   | ●         | —              | ●   | —  | —  | —  | —    |
| AL2-2DA                        | ●   | ●   | ●         | —              | —   | —  | —  | —  | —    |
| AL2-2PT-ADP                    | ●   | ●   | ●         | —              | —   | —  | —  | —  | —    |
| AL2-2TC-ADP                    | ●   | ●   | ●         | —              | —   | —  | —  | —  | —    |
| AL2-ASI-BD                     | ●   | ●   | ●         | —              | ●   | —  | —  | —  | —    |
| <b>FX1S Base Units</b>         |     |     |           |                |     |    |    |    |      |
| FX1S-10MR-DS                   | ●   | ●   | ●         | ●              | —   | ●  | ●  | —  | ●    |
| FX1S-10MR-ES/UL                | ●   | ●   | ●         | ●              | —   | ●  | ●  | —  | ●    |
| FX1S-10MT-DSS                  | ●   | ○   | ●         | ●              | —   | ●  | ●  | —  | ●    |
| FX1S-14MR-DS                   | ●   | ●   | ●         | ●              | —   | ●  | ●  | —  | ●    |
| FX1S-14MR-ES/UL                | ●   | ●   | ●         | ●              | —   | ●  | ●  | —  | ●    |
| FX1S-14MT-DSS                  | ●   | ○   | ●         | ●              | —   | ●  | ●  | —  | ●    |
| FX1S-20MR-DS                   | ●   | ●   | ●         | ●              | —   | ●  | ●  | —  | ●    |
| FX1S-20MR-ES/UL                | ●   | ●   | ●         | ●              | —   | ●  | ●  | —  | ●    |
| FX1S-20MT-DSS                  | ●   | ○   | ●         | ●              | —   | ●  | ●  | —  | ●    |
| FX1S-30MR-DS                   | ●   | ●   | ●         | ●              | —   | ●  | ●  | —  | ●    |
| FX1S-30MR-ES/UL                | ●   | ●   | ●         | ●              | —   | ●  | ●  | —  | ●    |
| FX1S-30MT-DSS                  | ●   | ○   | ●         | ●              | —   | ●  | ●  | —  | ●    |
| <b>FX1N Base Units</b>         |     |     |           |                |     |    |    |    |      |
| FX1N-14MR-DS                   | ●   | ●   | ●         | ●              | —   | ●  | ●  | —  | ●    |
| FX1N-14MR-ES/UL                | ●   | ●   | ●         | ●              | —   | ●  | ●  | —  | ●    |
| FX1N-14MT-DSS                  | ●   | ○   | ●         | ●              | —   | ●  | ●  | —  | ●    |
| FX1N-24MR-DS                   | ●   | ●   | ●         | ●              | —   | ●  | ●  | —  | ●    |
| FX1N-24MR-ES/UL                | ●   | ●   | ●         | ●              | —   | ●  | ●  | —  | ●    |
| FX1N-24MT-DSS                  | ●   | ○   | ●         | ●              | —   | ●  | ●  | —  | ●    |
| FX1N-40MR-DS                   | ●   | ●   | ●         | ●              | —   | ●  | ●  | —  | ●    |
| FX1N-40MR-ES/UL                | ●   | ●   | ●         | ●              | —   | ●  | ●  | —  | ●    |
| FX1N-40MT-DSS                  | ●   | ○   | ●         | ●              | —   | ●  | ●  | —  | ●    |
| FX1N-60MR-DS                   | ●   | ●   | ●         | ●              | —   | ●  | ●  | —  | ●    |
| FX1N-60MR-ES/UL                | ●   | ●   | ●         | ●              | —   | ●  | ●  | —  | ●    |
| FX1N-60MT-DSS                  | ●   | ○   | ●         | ●              | —   | ●  | ●  | —  | ●    |
| <b>FX3G Base Units</b>         |     |     |           |                |     |    |    |    |      |
| FX3G-14MR/ES                   | ●   | ●   | ●         | —              | —   | —  | —  | —  | —    |
| FX3G-14MT/ESS                  | ●   | ●   | ●         | —              | —   | —  | —  | —  | —    |
| FX3G-14MR/DS                   | ●   | ●   | ●         | —              | —   | —  | —  | —  | —    |
| FX3G-14MT/DSS                  | ●   | ●   | ●         | —              | —   | —  | —  | —  | —    |
| FX3G-24MR/ES                   | ●   | ●   | ●         | —              | —   | —  | —  | —  | —    |
| FX3G-24MT/ESS                  | ●   | ●   | ●         | —              | —   | —  | —  | —  | —    |
| FX3G-24MR/DS                   | ●   | ●   | ●         | —              | —   | —  | —  | —  | —    |
| FX3G-24MT/DSS                  | ●   | ●   | ●         | —              | —   | —  | —  | —  | —    |
| FX3G-40MR/ES                   | ●   | ●   | ●         | —              | —   | —  | —  | —  | —    |
| FX3G-40MT/ESS                  | ●   | ●   | ●         | —              | —   | —  | —  | —  | —    |
| FX3G-40MR/DS                   | ●   | ●   | ●         | —              | —   | —  | —  | —  | —    |
| FX3G-40MT/DSS                  | ●   | ●   | ●         | —              | —   | —  | —  | —  | —    |
| FX3G-60MR/ES                   | ●   | ●   | ●         | —              | —   | —  | —  | —  | —    |
| FX3G-60MT/ESS                  | ●   | ●   | ●         | —              | —   | —  | —  | —  | —    |
| FX3G-60MR/DS                   | ●   | ●   | ●         | —              | —   | —  | —  | —  | —    |
| FX3G-60MT/DSS                  | ●   | ●   | ●         | —              | —   | —  | —  | —  | —    |

| Module type                               | CE  |     | uL<br>cUL | Ship approvals |     |    |    |    |      |
|---|-----|-----|-----------|----------------|-----|----|----|----|------|
|   | EMC | LVD |           | ABS            | DNV | LR | GL | BV | RINA |
| <b>FX3U Base Units</b>                    |     |     |           |                |     |    |    |    |      |
| FX3U-16□                                  | ●   | ●   | ●         | ●              | ●   | ●  | ●  | ●  | ●    |
| FX3U-32□                                  | ●   | ●   | ●         | ●              | ●   | ●  | ●  | ●  | ●    |
| FX3U-48□                                  | ●   | ●   | ●         | ●              | ●   | ●  | ●  | ●  | ●    |
| FX3U-64□                                  | ●   | ●   | ●         | ●              | ●   | ●  | ●  | ●  | ●    |
| FX3U-80□                                  | ●   | ●   | ●         | ●              | ●   | ●  | ●  | ●  | ●    |
| FX3U-128□                                 | ●   | ●   | ●         | ●              | ●   | ●  | ●  | ●  | ●    |
| <b>FX3UC Base Units</b>                   |     |     |           |                |     |    |    |    |      |
| FX3UC-16MT/DSS                            | ●   | ●   | ●         | —              | ●   | —  | —  | —  | —    |
| FX3UC-32MT/DSS                            | ●   | ●   | ●         | —              | ●   | —  | —  | —  | —    |
| FX3UC-64MT/DSS                            | ●   | ●   | ●         | —              | ●   | —  | —  | —  | —    |
| FX3UC-96MT/DSS                            | ●   | ●   | ●         | —              | ●   | —  | —  | —  | —    |
| <b>FX0N/FX2N Extension Units</b>          |     |     |           |                |     |    |    |    |      |
| FX0N-40ER-ES/UL                           | ●   | ●   | ●         | —              | ●   | —  | —  | —  | —    |
| FX0N-40ER-DS                              | ●   | ●   | —         | —              | ●   | —  | —  | —  | —    |
| FX0N-40ET-DSS                             | ●   | ○   | —         | —              | ●   | —  | —  | —  | —    |
| FX2N-32ER-ES/UL                           | ●   | ●   | ●         | ●              | ●   | ●  | ●  | ●  | ●    |
| FX2N-32ET-ESS/UL                          | ●   | ●   | ●         | ●              | ●   | ●  | ●  | ●  | ●    |
| FX2N-48ER-DS                              | ●   | ●   | ●         | ●              | ●   | —  | —  | —  | —    |
| FX2N-48ER-ES/UL                           | ●   | ●   | ●         | ●              | ●   | ●  | ●  | ●  | ●    |
| FX2N-48ET-DSS                             | ●   | ○   | ●         | ●              | ●   | —  | —  | —  | ●    |
| FX2N-48ET-ESS/UL                          | ●   | ●   | ●         | ●              | ●   | ●  | ●  | ●  | ●    |
| <b>FX2N Extension Blocks</b>              |     |     |           |                |     |    |    |    |      |
| FX2N-8ER-ES/UL                            | ●   | ●   | ●         | —              | —   | —  | —  | —  | —    |
| FX2N-8EX-ES/UL                            | ●   | ○   | ●         | —              | —   | —  | —  | —  | —    |
| FX2N-8EYR-ES/UL                           | ●   | ●   | ●         | —              | —   | —  | —  | —  | —    |
| FX2N-8EYT-ESS/UL                          | ●   | ○   | ●         | —              | —   | —  | —  | —  | —    |
| FX2N-16EX-ES/UL                           | ●   | ○   | ●         | ●              | ●   | ●  | ●  | ●  | ●    |
| FX2N-16EYR-ES/UL                          | ●   | ●   | ●         | ●              | ●   | ●  | ●  | ●  | ●    |
| FX2N-16EYT-ESS/UL                         | ●   | ○   | ●         | ●              | ●   | ●  | ●  | ●  | ●    |
| <b>FX1N/FX2N Special Function Modules</b> |     |     |           |                |     |    |    |    |      |
| FX0N-3A                                   | ●   | —   | —         | —              | —   | —  | —  | —  | —    |
| FX0N-32NT-DP                              | ●   | ○   | ●         | —              | —   | —  | —  | —  | —    |
| FX2N-1HC                                  | ●   | ●   | ●         | ●              | ●   | ●  | ●  | ●  | ●    |
| FX2N-1PG-E                                | ●   | ●   | ●         | ●              | ●   | ●  | ●  | ●  | ●    |
| FX2N-2AD                                  | ●   | ○   | ●         | ●              | —   | —  | —  | —  | —    |
| FX2N-2DA                                  | ●   | ○   | ●         | ●              | —   | —  | —  | —  | —    |
| FX2N-2LC                                  | ●   | ○   | ●         | —              | —   | —  | —  | —  | —    |
| FX2N-4AD                                  | ●   | ○   | ●         | ●              | ●   | ●  | ●  | ●  | ●    |
| FX2N-4AD-TC                               | ●   | ○   | ●         | ●              | ●   | ●  | ●  | ●  | ●    |
| FX2N-4AD-PT                               | ●   | ○   | ●         | ●              | ●   | ●  | ●  | ●  | ●    |
| FX2N-4DA                                  | ●   | ○   | ●         | ●              | ●   | ●  | ●  | ●  | ●    |
| FX2N-5A                                   | ●   | ○   | ●         | —              | —   | —  | ●  | —  | ●    |
| FX2N-8AD                                  | ●   | ○   | ●         | —              | —   | —  | ●  | —  | ●    |
| FX2N-10PG                                 | ●   | ○   | ●         | —              | —   | —  | —  | —  | —    |
| FX2N-16CCL-M                              | ●   | ○   | —         | —              | —   | —  | —  | —  | —    |
| FX2N-32ASI-M                              | ●   | ○   | —         | —              | —   | —  | —  | —  | —    |
| FX2N-32CAN                                | ●   | ○   | —         | —              | —   | —  | —  | —  | —    |
| FX2N-32CCL                                | ●   | ○   | —         | —              | —   | —  | —  | —  | —    |
| FX2N-32DP-IF                              | ●   | ●   | ●         | —              | ●   | —  | —  | —  | —    |
| FX2N-64DNET                               | ●   | ○   | ●         | —              | —   | —  | —  | —  | —    |
| FX2N-232IF                                | ●   | ○   | —         | ●              | ●   | ●  | ●  | ●  | ●    |
| <b>FX2NC Extension Blocks</b>             |     |     |           |                |     |    |    |    |      |
| FX2NC-16EX-T-DS                           | ●   | ●   | ●         | —              | ●   | ●  | —  | —  | —    |
| FX2NC-16EYR-T-DS                          | ●   | ●   | ●         | —              | ●   | ●  | —  | —  | —    |
| FX2NC-16EX-DS                             | ●   | ●   | ●         | —              | ●   | ●  | —  | —  | —    |
| FX2NC-16EYT-DSS                           | ●   | ●   | ●         | —              | ●   | ●  | —  | —  | —    |
| FX2NC-32-EX-DS                            | ●   | ●   | ●         | —              | ●   | ●  | —  | —  | —    |
| FX2NC-32-EYT-DSS                          | ●   | ●   | ●         | —              | ●   | ●  | —  | —  | —    |

● = comply, ○ = no need to comply

| Module type                           | CE  |     | uL<br>cUL | Ship approvals |     |    |    |    |      |
|---------------------------------------|-----|-----|-----------|----------------|-----|----|----|----|------|
|                                       | EMC | LVD |           | ABS            | DNV | LR | GL | BV | RINA |
| <b>FX2NC Special Function Modules</b> |     |     |           |                |     |    |    |    |      |
| FX2NC-485ADP                          | ●   | —   | —         | —              | ●   | ●  | —  | —  | —    |
| FX2NC-232ADP                          | ●   | —   | —         | —              | ●   | ●  | —  | —  | —    |
| FX2NC-ENET-ADP                        | ●   | ○   | ●         | —              | —   | —  | —  | —  | —    |
| FX2NC-1HC                             | ●   | ○   | ●         | —              | —   | —  | —  | —  | —    |
| <b>FX3U Special Function Modules</b>  |     |     |           |                |     |    |    |    |      |
| FX3U-2HC                              | ●   | ○   | ●         | —              | —   | —  | —  | —  | —    |
| FX3U-3A-ADP                           | ●   | ○   | ●         | —              | —   | —  | —  | —  | —    |
| FX3U-4AD                              | ●   | ○   | ●         | —              | —   | —  | —  | —  | —    |
| FX3U-4DA                              | ●   | ○   | ●         | —              | —   | —  | —  | —  | —    |
| FX3U-4AD-TC-ADP                       | ●   | ○   | ●         | ●              | ●   | ●  | ●  | ●  | ●    |
| FX3U-4AD-PT-ADP                       | ●   | ○   | ●         | ●              | ●   | ●  | ●  | ●  | ●    |
| FX3U-4AD-PNK-ADP                      | ●   | ○   | ●         | —              | —   | —  | —  | —  | —    |
| FX3U-4AD-Ptw-ADP                      | ●   | ○   | ●         | —              | —   | —  | —  | —  | —    |
| FX3U-4AD-ADP                          | ●   | ○   | ●         | ●              | ●   | ●  | ●  | ●  | ●    |
| FX3U-4DA-ADP                          | ●   | ○   | ●         | ●              | ●   | ●  | ●  | ●  | ●    |
| FX3U-4HSX-ADP                         | ●   | ○   | ●         | ●              | ●   | ●  | ●  | ●  | ●    |
| FX3U-4LC                              | ●   | ○   | ●         | —              | —   | —  | —  | —  | —    |
| FX3U-CF-ADP                           | ●   | ○   | ●         | —              | —   | —  | —  | —  | —    |
| FX3U-2HSY-ADP                         | ●   | ○   | ●         | ●              | ●   | ●  | ●  | ●  | ●    |
| FX3U-20SSC-H                          | ●   | ○   | ●         | —              | —   | —  | —  | —  | —    |
| FX3U-485ADP-MB                        | ●   | ○   | ●         | —              | —   | —  | ●  | ●  | —    |
| FX3U-232ADP-MB                        | ●   | ○   | ●         | —              | —   | —  | ●  | ●  | —    |
| FX3U-ENET                             | ●   | ○   | ●         | —              | —   | —  | —  | —  | —    |
| FX3U-64DP-M                           | ●   | ○   | ●         | —              | —   | —  | —  | —  | —    |
| FX3U-64CCL                            | ●   | —   | ●         | —              | —   | —  | —  | —  | —    |
| <b>Adapter Boards</b>                 |     |     |           |                |     |    |    |    |      |
| FX1N-1DA-BD                           | ●   | ○   | —         | ●              | ●   | ●  | ●  | —  | ●    |
| FX1N-2AD-BD                           | ●   | ○   | —         | ●              | ●   | ●  | ●  | —  | ●    |
| FX1N-2EYT-BD                          | ●   | ○   | —         | ●              | ●   | ●  | ●  | —  | ●    |
| FX1N-4EX-BD                           | ●   | ○   | —         | ●              | ●   | ●  | ●  | —  | ●    |
| FX1N-8AV-BD                           | ●   | ○   | —         | ●              | ●   | ●  | ●  | —  | ●    |
| FX1N-232-BD                           | ●   | ○   | —         | ●              | —   | ●  | ●  | —  | ●    |
| FX1N-422-BD                           | ●   | ○   | —         | ●              | —   | ●  | ●  | —  | ●    |
| FX1N-485-BD                           | ●   | ○   | —         | ●              | —   | ●  | ●  | —  | ●    |
| FX1N-CNV-BD                           | ●   | ○   | —         | ●              | ●   | ●  | —  | —  | —    |
| FX2N-8AV-BD                           | ●   | ○   | —         | ●              | —   | —  | —  | —  | —    |
| FX2N-232-BD                           | ●   | ○   | —         | ●              | —   | —  | —  | —  | —    |
| FX2N-422-BD                           | ●   | ○   | —         | ●              | —   | —  | —  | —  | —    |
| FX2N-485-BD                           | ●   | ○   | —         | ●              | —   | —  | —  | —  | —    |
| FX2N-CNV-BD                           | ●   | ○   | —         | —              | —   | —  | —  | —  | —    |
| FX3G-1DA-BD                           | ●   | ○   | —         | —              | —   | —  | —  | —  | —    |
| FX3G-2AD-BD                           | ●   | ○   | —         | —              | —   | —  | —  | —  | —    |
| FX3G-8AV-BD                           | ●   | ○   | —         | —              | —   | —  | —  | —  | —    |
| FX3G-232-BD                           | ●   | ○   | —         | —              | —   | —  | —  | —  | —    |
| FX3G-422-BD                           | ●   | ○   | —         | —              | —   | —  | —  | —  | —    |
| FX3G-485-BD                           | ●   | ○   | —         | —              | —   | —  | —  | —  | —    |
| FX3U-232-BD                           | ●   | ○   | —         | ●              | ●   | ●  | ●  | ●  | ●    |
| FX3U-422-BD                           | ●   | ○   | —         | ●              | ●   | ●  | ●  | ●  | ●    |
| FX3U-485-BD                           | ●   | ○   | —         | ●              | ●   | ●  | ●  | ●  | ●    |
| FX3U-CNV-BD                           | ●   | ○   | —         | ●              | ●   | ●  | ●  | ●  | ●    |
| FX3U-USB-BD                           | ●   | ○   | —         | ●              | ●   | ●  | ●  | ●  | ●    |

| Module type            | CE  |     | uL<br>cUL | Ship approvals |     |    |    |    |      |
|------------------------|-----|-----|-----------|----------------|-----|----|----|----|------|
|                        | EMC | LVD |           | ABS            | DNV | LR | GL | BV | RINA |
| <b>Terminal Blocks</b> |     |     |           |                |     |    |    |    |      |
| TB-205                 | —   | ○   | ●         | —              | —   | —  | —  | —  | —    |
| TB-20C                 | —   | ○   | ●         | —              | —   | —  | —  | —  | —    |
| <b>Accessories</b>     |     |     |           |                |     |    |    |    |      |
| ALPHA POWER 24         | ●   | ●   | ●         | —              | —   | —  | —  | —  | —    |
| FX1N-5DM               | ●   | ○   | —         | ●              | ●   | ●  | ●  | —  | ●    |
| FX-10DM-E              | ●   | ○   | —         | —              | —   | —  | —  | —  | —    |
| FX-20 P-E-SET0         | ●   | ○   | —         | —              | —   | —  | —  | —  | —    |
| FX-USB-AW              | ●   | ○   | —         | —              | —   | —  | —  | —  | —    |
| FX-232AWC-H            | ●   | ○   | —         | —              | —   | —  | —  | —  | —    |
| FX2N-CNV-IF            | ●   | ○   | —         | ●              | —   | —  | —  | —  | —    |
| FX2N-CNV-BC            | ●   | ○   | —         | —              | —   | —  | —  | —  | —    |
| FX2N-CNV-IF            | ●   | ○   | —         | —              | ●   | ●  | —  | —  | —    |
| FX3U-1PSU-5V           | —   | —   | —         | —              | —   | —  | —  | —  | —    |
| FX3UC-1PS-5V           | —   | —   | —         | —              | ●   | —  | —  | —  | —    |
| FX3U-7DM               | ●   | ○   | —         | ●              | ●   | ●  | ●  | ●  | ●    |
| FX3U-7DM-HLD           | ●   | —   | —         | —              | —   | —  | —  | —  | —    |

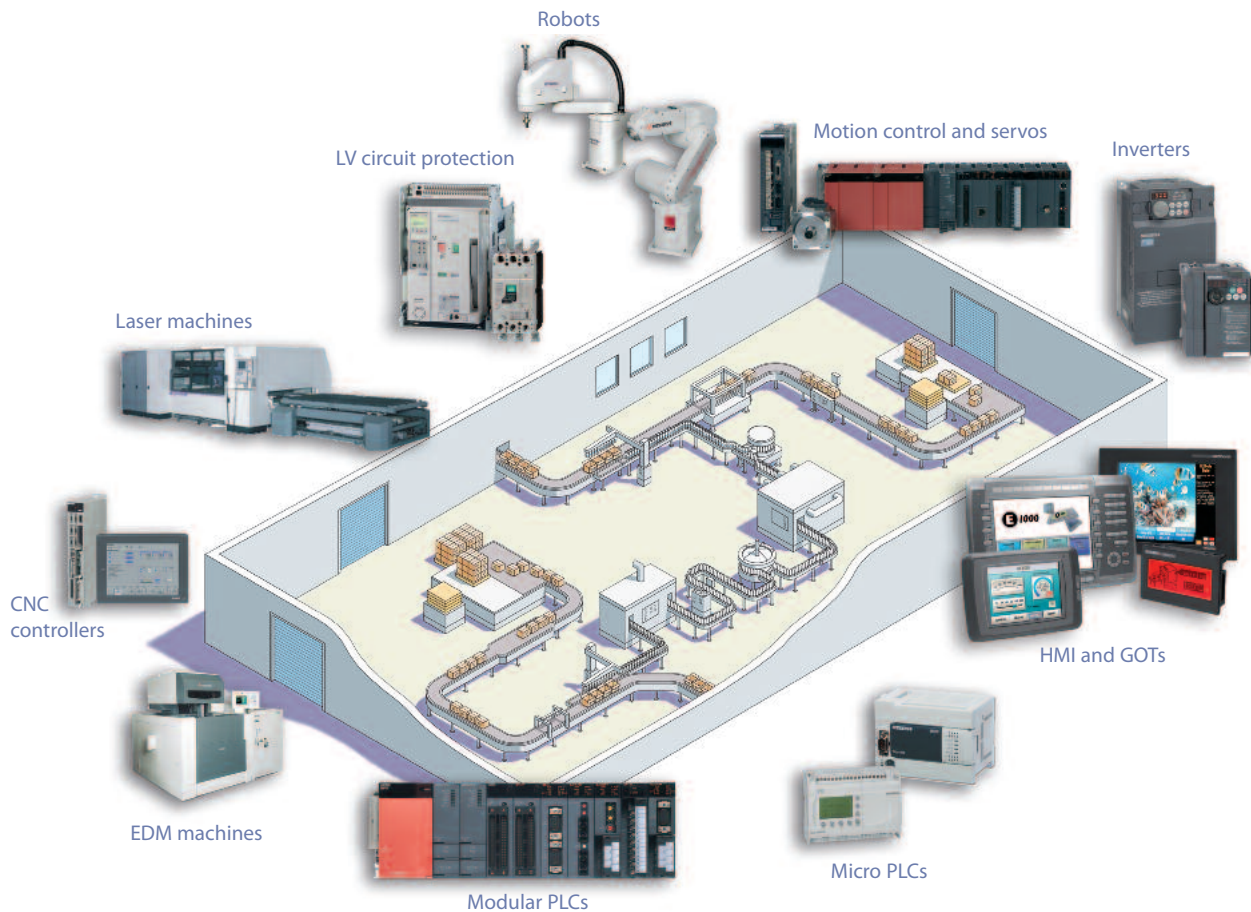
● = comply, ○ = no need to comply

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