The IT M@chine Controller
FA-M3R

FA-M3™
REVOLUTION

The IT M@chine Controller

www.yokogawa.com/itc/

YOKOGAWA

Bulletin 34M6A08-01E

The IT M@chine Controller

Fast

20,000 steps within **1ms**

FA-M3R features a minimum scan time of 200μs, and is faster than microcomputer boards.

Compact

Post Card Size

Truly compact and light, FA-M3R takes up a space of only 147(W) X 100(H) X 88(D) mm, yet allows up to 192 points.

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Truly compact and light, FA-M3R takes up a space of only 147(W)X100(H)X88(D)mm, yet allows up to 192 points.
FA-M3R is the result of a quest for high performance and advanced functions. It offers high cost performance, too.

Contents

Smart

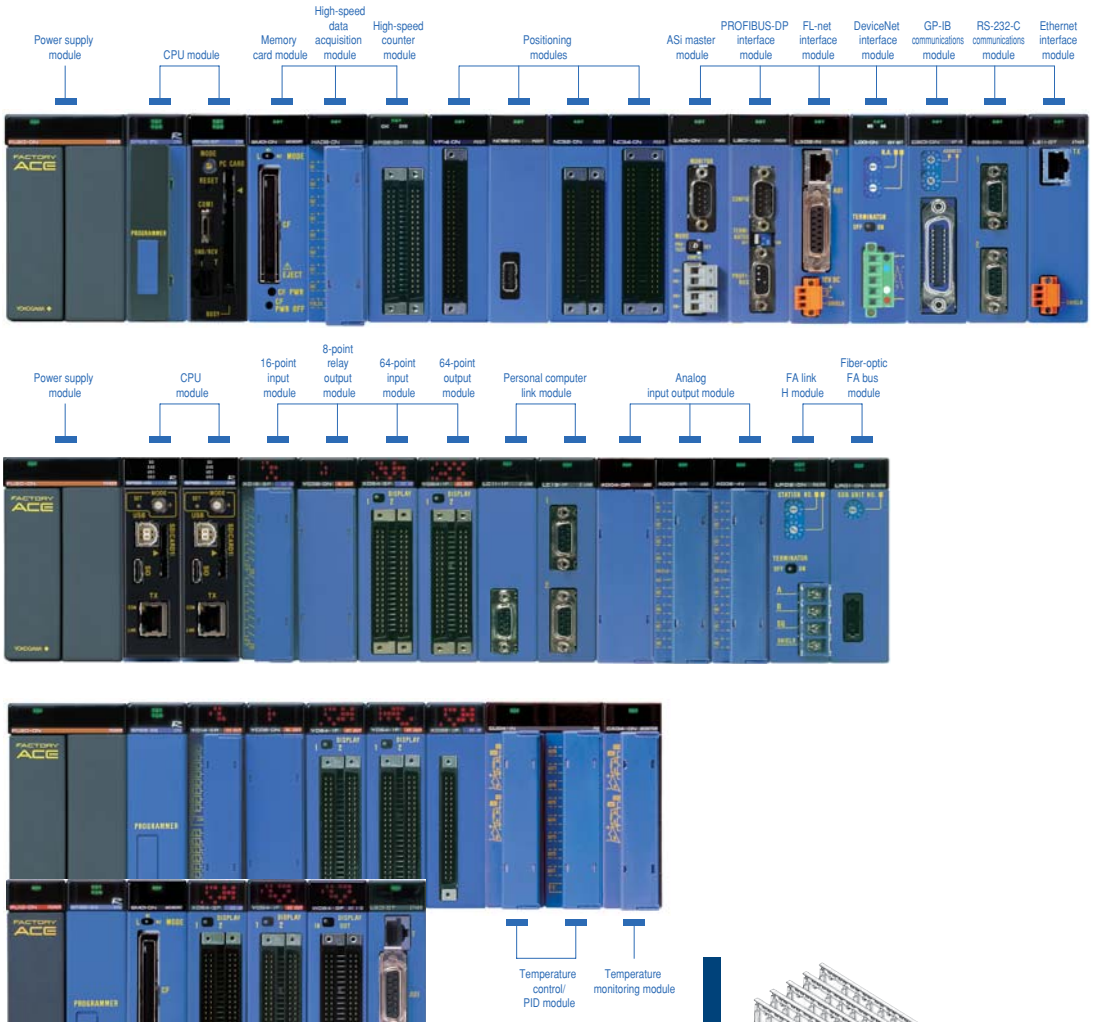
Max. 8192 Points, 344K Words
FA-M3R is the result of a quest for high performance and advanced functions. It offers high cost performance, too.

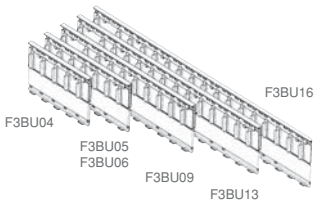
Range Free

Simply Combine Modules to Suit Your Applications!

**The FA-M3R range-free controller supports a wide range of system configurations, from the smallest to the largest.
It employs building blocks of modules of the same size, delivering space and cost savings.**

The FA-M3R provides system expandability, unlimited by system size, and also allows the use of common spare parts. To expand the system, simply add desired modules, all of the same size. The installation leaves ample room within the control panel for standardization and efficiency improvement through panel design. With the FA-M3R PLC, a developer can give full rein to his creativity to build systems and realize control that fits his applications.



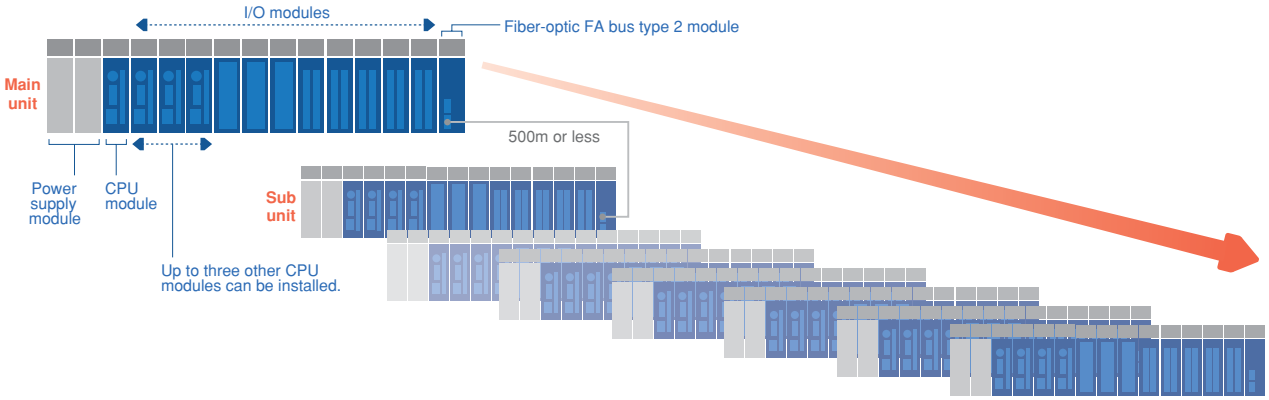


Base Module

The FA-M3R offers six types of base modules, which allows flexible installation: 4- slot, 5- slot, 6- slot, 9-slot, 13-slot and 16-slot types.

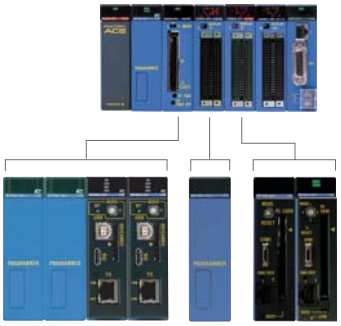
Main Unit and Sub-Unit

The main unit accommodates up to seven sub-units for installing additional I/O modules. This provides up to 8192 range-free I/O points.



Multi-CPU

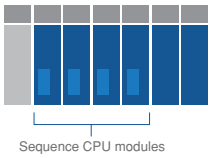
The FA-M3R offers a variety of CPU modules, including sequence and BASIC modules. This capability to intermix different CPU module types in a single unit enhances the existing PLC concept, and realizes versatility and system expandability.



Sequence CPU module

F3SP21 / F3SP28 / F3SP38 / F3SP53 / F3SP58 / F3SP59 / F3SP66 / F3SP67

The FA-M3R accommodates up to four sequence CPU modules. This feature is convenient when improving operating ratios of selected system components, integrating basic program data with data of other programs, dividing processing control, or selecting CPUs according to system scale or program size. What's more, you can freely intermix sequence CPU modules and other types of CPU modules.

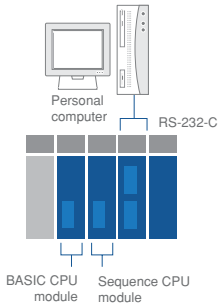


For details, see pages 6 & 7.

BASIC CPU module

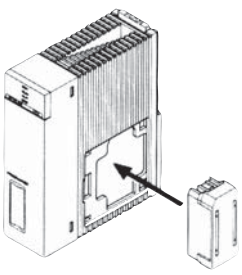
F3BP20 / F3BP30

The BASIC CPU module is just what you need when writing programs in the BASIC language, controlling communications modules that do not support ladder sequences or accessing advanced processing functions. You can also use this module with a sequence CPU module to transfer data and ladder sequences.



Backup using ROM packs

RK10-0N 5,000 ladder steps
RK30-0N 20,000 ladder steps
RK33-0N 56,000 ladder steps
RK53-0N 100,000 ladder steps
RK73-0N 120,000 ladder steps
RK93-0N 360,000 ladder steps



Let's Network! Integrate Control & Communications!

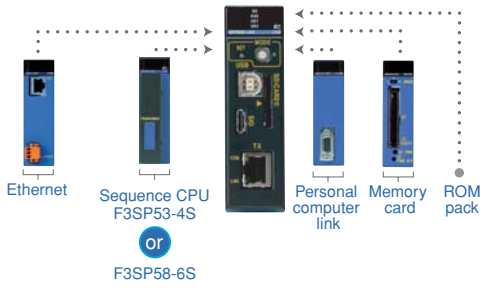
Add information control to high-speed, advanced devices.

Sequence CPU module (with network functions)

F3SP66-4S / F3SP67-6S

The new FA-M3R sequence CPU module comes ready with built-in network functions. Known for leading-edge high-speed control, it now adds fast access and storage of large files. Built-in support of common network protocols addresses diverse network application needs and enables transfer of large files.

All-in-one CPU module



100BASE-TX
(built-in Ethernet)

USB port
(for connecting programming tools)

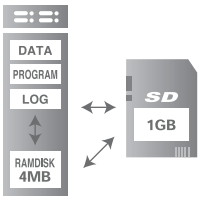
Serial port
(for connecting display or higher-level PC)

SD card slot
(for storing data, programs and log files)

Handling of Large Data

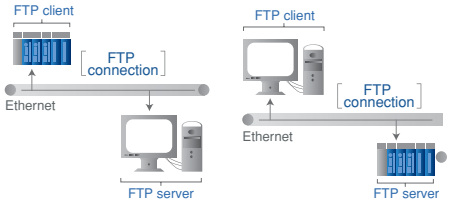
Built-in SD Memory Card Slot and RAM Disk

- **Up to 1 GB** SD memory cards are supported for storing data, programs and log records as files.
- Off-the-shelf SD memory cards can be used.
- Redundancy of the file control area (FAT) reduces risk of file system damage due to power outage or card removal during writing.
- **4 MB** RAM disk included for storing data and log records as files. (volatile memory)



FTP Client and Server Functions

- Data is transferred from CPU to host PC or server autonomously with no need for programming on the host PC or server. (client function)
- Data can be transferred from CPU to higher-level PC by simply specifying parameters using a standard network protocol command interface. Server accesses and responses are logged for convenience of debugging and access management (server function).
- Batch file transfer replaces segmented data transmission.



Easy Network and File Access

Network & File Processing Instructions

Handle large data easily by executing dedicated ladder instructions.

- Socket (TCP/IP, UDP/IP) communications instructions
- FTP client instructions
- File access instructions
- File operation instructions
- Disk operation instructions

Virtual Directory Commands

Get data, programs and log data as files from a higher-level PC or server using FTP, without need for a ladder program.

Simply issue a command from a higher-level PC or server as shown below:

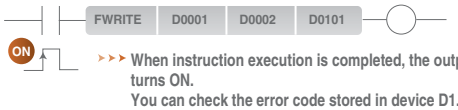
Example

get\virtual\cmd\d2fcsv_D0101_128_0_6_1_0_0_4 data012.csv.
(get 128 words of data starting from device D0101 as a data file in decimal representation and csv format)

Continuous-type Application Instructions

Time-consuming processing does not affect control processing.

Instruction is executed when input condition is TRUE, but actual processing is done in background and thus does not affect control.



When instruction execution is completed, the output turns ON.
You can check the error code stored in device D1.

Data Creation

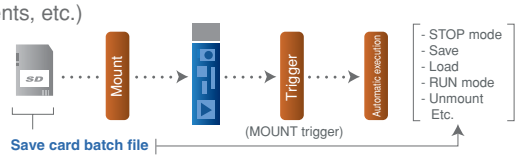
Creation of transmission text and file data is made easy using the **Constant Definition File function (header file)**, which allows constant names to be defined with assigned numeric and string values separately from programs, and then coded in programs, and using the **M3 Escape Sequence function**, which allows binary representation codes to be included in character strings.

"PC-less" Maintenance

Smart Access Function

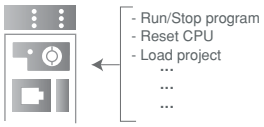
Card Batch File Function

Routine operations such as recipe loading or log acquisition for troubleshooting can be automatically executed simply by inserting an SD memory card. Batch commands coded in auto-execute files stored on a SD memory card can be automatically executed in response to various execution triggers (e.g. card insertion or error events, etc.)



Rotary Switch Function

Maintenance can be performed using the rotary switch and an SD memory card with no need for a PC, by simply turning a rotary switch (MODE switch) and pressing a push button (SET switch) on the front panel of the module.

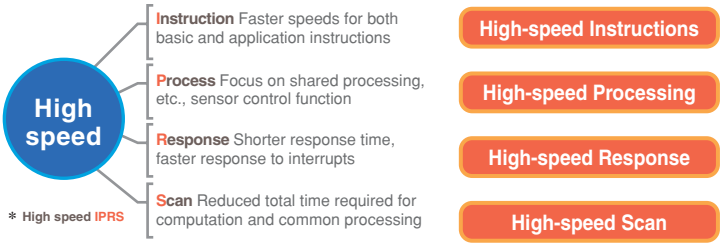


Sequence CPU module

F3SP28-3S / F3SP38-6S / F3SP53-4S / F3SP58-6S / F3SP59-7S

High-speed control, improved product quality, reduced external controllers, shortened tact time and instantaneous response.

FA-M3R is designed based on the "High-speed IPRS"* concept to deliver high-speed performance that surpasses developers' expectations. Careful analysis from every angle creates a controller featuring ultra high-speed, stable control, link functions and improved network performance. The FA-M3R improves system precision and productivity and is the controller of choice for next generation equipment.



High-speed Instructions

High-speed, Advanced Control for Improved Tact Time and Quality

Fast scan time of 20,000 ladder program steps per ms

To increase productivity using faster equipment, support networks, enhance operability, and implement diagnosis and other advanced functions require increased use of application instructions and advanced instructions over and above basic instructions in ladder programs. Besides its ability to improve the scan time of conventional programs (with application instruction ratio of approx. 50%) to 20,000 steps per millisecond, the FA-M3R can also increase speeds of actual advanced application programs by 4 to 11 folds.

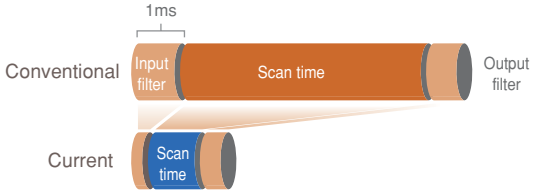
High-speed Scan

Reduced I/O Response Time

Improves productivity and quality by increasing response.

Digital filter from 0 ms

By improving scan time, the FA-M3R reduces processing time. Unfortunately, it also increases the ratio of the I/O time. To solve the problem, we focused on total response time (input ' program execution (processing) ' output) and allow variable time constants to be set to "0", and succeeded in reducing response time (circuit delay: 100 µs min). In addition, using a high-speed contact input module (F3XD16-3H) allows data input with 10 µs response time.

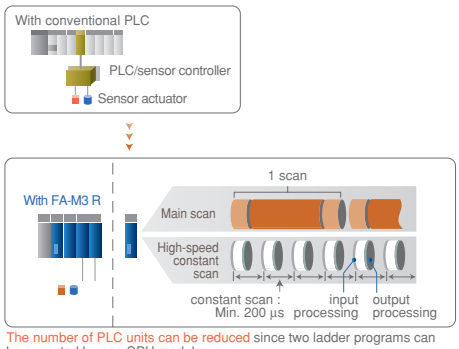


High-speed Processing

No Need of External PLC or Sensor Controller to Deliver Fast Response

Sensor control function allows fast, constant scan of 200 µs

To satisfy response requirements of several hundred microseconds, a common practice is to install a separate small PLC or sensor controller alongside a conventional PLC. FA-M3R's sensor control function eliminates this redundancy by allowing input, computation and output of one block (program) to be executed at constant intervals as short as 200 µs, independently of the main scan and unimpaired by its longer scan time due to advanced functionality, diagnosis function and MMI.



The number of PLC units can be reduced since two ladder programs can be executed by one CPU module.

High-speed Response

Instantaneous Response to Interrupts

Interrupt response time: 100 µs

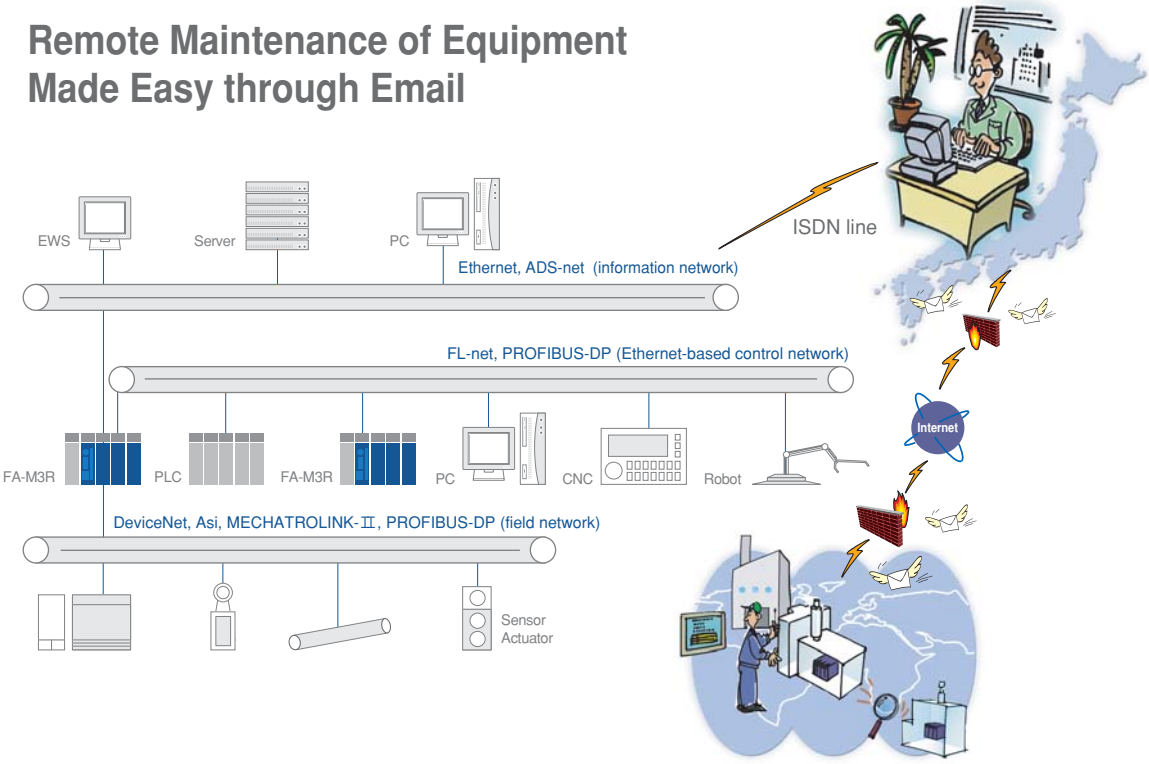
Response time for interrupts from DC input modules is as short as 100 µs. This means that the system can immediately respond to changes in inputs, enabling instantaneous high-speed control.

Remote OME on Internet

Global Remote Maintenance Over the Internet

Reading/writing of devices and alarm notification through Emails over 100Mbps networks

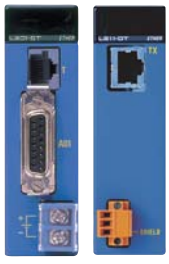
Remote Maintenance of Equipment Made Easy through Email



Ethernet Interface Module

F3LE01-5T / F3LE11-0T / F3LE12-0T

Automatic response to request Emails (F3LE11-0T)



With the Ethernet interface module, remote maintenance and engineering (OME) is only an Email away. When equipment failure occurs, an Email is automatically transmitted to the user. From a higher-level computer, the user sends request Emails to read or write various statuses, read user logs and system logs, or uses the trace function to obtain up-to-date information on the system status. This significantly shortens the time required to resolve field problems. By combining FA-M3 Programming Tool WideField2 with other software, building an OME environment becomes a simple task. This module not only supports 10Mbps communications, but also high speed communications at 100Mbps, compliant to the 100BASE-TX standard.

Item	Specifications		
	F3LE01-5T	F3LE11-0T	F3LE12-0T
Communications protocol	TCP/IP, UDP/IP,ICMP, ARP	TCP/IP, UDP/IP, ICMP, ARP, SMTP/POP3,HTTP1.0	TCP/IP, UDP/IP, ICMP, ARP
Access control method	CSMA/CD		
Transmission rate	10Mbps	100Mbps, 10Mbps	
Transmission mode	Baseband		
Max. segment length	10BASE5/500m* 10BASE-T/100m*	100m*	
Functions	Event transmission	Email response, automatic transmission of alarm emails, password function	Messaging (UDP/IP) function

* The length between the HUB and the module

Ethernet-based Remote OME

The remote OME (Remote Operation, Maintenance & Engineering) function utilizes communications via the Ethernet, the de-facto standard for open networks, to deliver a wealth of solutions. Information such as images and audio can be captured and transmitted using a camera and telephone to allow efficient verification of the system status. This relieves developers of headaches such as excessive man-hours required for minor problems, frequent business trips and delayed system failure information.

* Remote OME (Remote Operation, Maintenance & Engineering) refers to a mechanism that enables remote maintenance of equipment at distant sites. It is a concept proposed by Yokogawa and is a registered trademark of Yokogawa Electric Corporation.

Open Networks

FL-net Interface Module

F3LX02-1N

Build a multi-vendor system with ease

The FL-net interface module is compliant with FL-net (OPCN2) version 2.00, an open FA network standard defined by Japan Electrical Manufacturers' Association (JEMA). It allows a user to easily build a multi-vendor system, and communicate using cyclic transmission and/or message transmission. Moreover, by connecting a PC running the WideField2 software, a user can perform maintenance and debugging, using WideField2 functions to monitor ladder programs, read/write devices, read log files and trace program execution.

Item	Specifications
No. of systems	2*
Transmission rate/medium	10Mbps/IEEE 802.3 compliant
Transmission protocol	UDP/IP
No. of nodes	254 max.
Connectors	AUI,10BASE-T
Communications method	Token without master
Cyclic transmission	512 words for area 1 8192 words for area 2
Messaging	1024 bytes max.

* Applicable when used with F3SP38, F3SP53, F3SP59, F3SP66 and F3SP67.
This module is compatible with F3SP28, F3SP38, F3SP53, F3SP58, F3SP59, F3SP66 and F3SP67 CPU modules.

DeviceNet Interface Module

F3LD01-0N

Improve productivity using multi-vendor network

This interface module conforms to "DeviceNet", which is the global standard in open field networks. It is also adopted by SEMI (Semiconductor Equipment and Materials Institute) as the standardized sensor bus. The module transfers ON/OFF data, analog data, tens of bytes of data or setup/maintenance information, and allows connection of up to 63 compatible devices of worldwide manufacturers with a maximum transfer rate of 500 Kbps and a maximum transmission distance of 500 meters (at 125 Kbps).
It supports a wide range of applications with flexibility and brings dramatic improvements in productivity and maintainability.

The ODVA (Open DeviceNet Vendor Association, Inc.) is a non-profit organization established by equipment vendors with the primary objective of maintaining and promoting the DeviceNet specifications. It has more than 240 members, including Yokogawa Electric Corporation.

Item	Specifications
Interface	DeviceNet compliant
Transmission rate	125/250/500Kbps (selectable by switch)
Transmission medium	5-wire cable (2 for signals, 1 for SHIELD and 2 for power)
Transmission distance	Maximum cable length for main line: 500m (Transmission rate: 125 Kbps when using only thick cables)
Connection method	Multi-drop, T-junction
Number of nodes	64 (including master)

ASi Master Module

F3LA01-0N

Friendly open reduced-wiring system

The ASi master module is compliant with AS-interface V2.1, and is capable of controlling up to 62 ASi slaves at transmission rate of 167kbps with maximum transmission distance of 100m. With enclosed cable terminals, connection and disconnection of a slave is extremely easy, without any need for cable cutting and stripping. AS-interface is an open, reduced-wiring system compliant with the EN50295 standard designed to provide reduced wiring to proximity sensors, optical sensors, limit switches, indicators, and other bit devices.

Item		Specifications
Communications specifications	Transmission protocol	AS-interface V2.1 compliant
	Number of nodes	1 ASi master / 1 ASi power supply 62 ASi slaves max.
	Number of I/O points	434 I/O points (248 inputs and 186 outputs)
	Transmission path topology	Multi-drop
	Transmission rate	167kbps
	Transmission distance	Total 100 m max.

PROFIBUS-DP Interface Module

F3LB01-0N

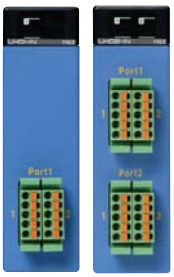
World's most popular fieldbus

The PROFIBUS-DP interface module acts as a master module in a PROFIBUS-DP network, an open network standard (EN50170), which finds wide applications in factory automation. It supports transmission rates up to 12Mbps for as many as 125 slaves over a maximum transmission distance of 1200m to deliver high-speed control of various sensors, actuators, and other remote I/O field devices. You can also use the module in a multi-master configuration for distributed control and added flexibility.

Item	Specifications								
Interface	PROFIBUS-DP DPM1 (Class 1) compliant								
Transmission medium	Special cable (containing two signal lines)								
Transmission rate / Transmission distance	Baud Rate	9.6kbps	19.2kbps	93.75kbps	187.5kbps	500kbps	1500kbps	3Mbps	6Mbps	12Mbps
	Distance	1200m			1000m	400m	200m	100m		
Electrical standard	EIA RS-485								
Number of nodes	125 (including this module itself)								
Number of I/O points	8192 I/O points (4096 inputs and 4096 outputs)								
Network configuration	Configurable from a PC using proprietary PROFIBUS Configurator software								

YHLS Master Module

F3LH01-1N, F3LH02-1N



High-speed remote I/O providing flexibility for development, production and maintenance

Features YHLS' high speed, simple & reduced wiring, easy maintenance and open architecture

YHLS (Yokogawa Hi-speed Link system) is a high-speed 1:N remote I/O communication system. It supports up to 63 connected slaves for processing data of up to 2016 I/O points (1008 inputs and 1008 outputs) at high-speed scan of 243 µs per 256 I/O points. Moreover, complex communication protocols are transparent to the programmer, simplifying system implementation.

Fast
- Up to **12 Mbps**. Scans **63 slave units** in just **0.96 ms** in full-duplex mode.
- High-speed scan of 243 µs per 256 I/O points

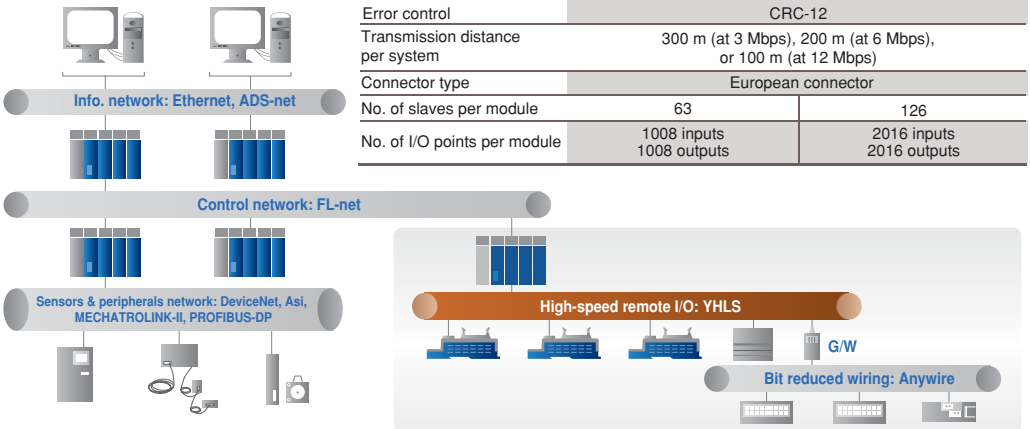
Compact
- Slave unit size is **halved** (32-point slave has the same size as competitors' 16-point slave.)

Reliable
- Guaranteed constant scan time (not affected by noise and online connection/disconnection of slave units)
- Protected against short-circuit of I/O power supply of slave unit. (Error is reported to master module.)
- Protected against short-circuit of output terminals of slave unit.

Maintainable
- Both power and communication connectors of slave unit support insertion/removal of live wires.
- Allows online replacement of slave units.
- Supports maintenance of individual sensors (I/O is equipped with individual power and ground signals and supports e-CON like wiring.)
- Both master module and slave units are equipped with communications quality indicators.

Open
- Allows connection of third-party HLS devices.
- Adopts the "HLS" open protocol, allowing user development of proprietary slave units.

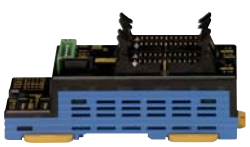
Item	Specification	
	F3LH01-1N	F3LH02-1N
Number of systems	1	2
Transmission mode	4-wire full duplex or 2-wire half duplex	
Transmission format	HLS compliant	
Transmission rate	3 Mbps, 6 Mbps or 12 Mbps	
Synchronization mode	Bit synchronization	
Error control	CRC-12	
Transmission distance per system	300 m (at 3 Mbps), 200 m (at 6 Mbps), or 100 m (at 12 Mbps)	
Connector type	European connector	
No. of slaves per module	63	126
No. of I/O points per module	1008 inputs 1008 outputs	2016 inputs 2016 outputs



YHLS (YOKOGAWA Hi-speed Link System) adopts a HLS-compliant open protocol, enhanced to allow easy monitoring of transmission line quality during development and operation using RDY, ALM and LNK LED indicators.

YHLS Slave Units

TAH Series



Model	Suffix Code	Description
TAHWD32	-3PAM	16 DC inputs (positive common), 24 V DC, MIL 16 TR outputs (sink-type, with short-circuit protection), 24 V DC 0.1 A, MIL
	-3NBM	16 DC inputs (negative common), 24 V DC, MIL 16 TR outputs (source-type, with short-circuit protection), 24 V DC 0.1 A, MIL
TAHXD16	-3PEM	16 DC inputs (positive common), 24 V DC, MIL
	-3NEM	16 DC inputs (negative common), 24 V DC, MIL
TAHYD16	-3EAM	16 TR outputs (sink-type, with short-circuit protection), 24 V DC 0.1 A, MIL
	-3EBM	16 TR outputs (source-type, with short-circuit protection), 24 V DC 0.1 A, MIL

Personal Computer Link Module

F3LC11-1F / F3LC12-1F / F3LC11-2F

Ideal for connecting to PCs or displays

This communications module implements PC link functions to a display or an upper-level computer, such as a personal computer or a FA computer via an RS-232-C or RS-422-A/485 interface. It allows reading from and writing to all FA-M3R devices, even when no ladder program is executing. You may also read various program-related information and error logs. With the F3LC11-2F, up to 32 FA-M3R units may be connected to an upper-level computer.

Item	Specification		
	F3LC11-1F	F3LC12-1F	F3LC11-2F
Interface	EIA RS-232-C compliant		EIA RS-422-A /EIA RS-485 compliant
Transmission mode	Half-duplex		Half-duplex, 4-wire/2-wire
Transmission distance	Total distance: 15 m		Total distance: 1200m
Transmission rate	300 / 600 / 1200 / 2400 / 4800 / 9600 / 14400 /19200 / 28800 / 38400 / 57.6k / 76.8k / 115.2k bps		
No. of units	—		32 max.
Number of ports	1 (non-isolated)	2 (non-isolated)	1 (isolated)

Ladder Communications Module

F3RZ81-0F / F3RZ82-0F / F3RZ91-0F

High-speed serial communications up to 115.2 kbps

This module enables control of remote devices by ladder programs of a sequence CPU module using RS-232C, RS-422-A or RS-485 communications. The F3RZ81-0F/ F3RZ82-0F module uses a D-sub 9-pin connector and allows transmission up to 15 m, while the F3RZ91-0F module uses a terminal block and allows transmission up to 1200 m.

Item	Specification		
	F3RZ81-0F	F3RZ82-0F	F3RZ91-0F
Interface	EIA RS-232C compliant		EIA RS-422-A /EIA RS-485 compliant
Connection	Point-to-point		Point-to-point (also supports multi-point connection)
Transmission mode	Full/half duplex		Full/half duplex, 4-wire/2-wire
Synchronization mode	Start-stop synchronization		
Communications protocol	None		
Transmission rate	300 / 600 / 1200 / 2400 / 4800 / 9600 /14400 / 19200 / 28800 / 38400 / 57.6k / 76.8k / 115.2k bps		
Transmission distance	15 m max.		1200 m max
Number of ports	1 (non-isolated)	2 (non-isolated)	1 (isolated)

RS-232-C Communications Module

F3RS22-0N

RS-422 Communications Module

F3RS41-0N

This module enables control of remote devices by BASIC programs of a BASIC CPU module (F3BP20-0N, F3BP30-0N) using RS-232C, RS-422-A or RS-485 communications. The RS-232-C communications module has two ports using D-sub 9-pin connectors and allows transmission speeds up to 15 m, while the RS-422 communications module has one port using a terminal block and allows transmission speeds up to 1200 m. BASIC statements are provided for sending and receiving data via the communications line.

Item	Specification	
	F3RS22-0N	F3RS41-0N
Interface	EIA RS-232C compliant	EIA RS-422-A /EIA RS-485 compliant
Connection	Point-to-point	Point-to-point (also supports multi-point connection)
Transmission mode	Full/half duplex	Full/half duplex, 4-wire/2-wire
Synchronization mode	Asynchronous	
Communications protocol	None	
Transmission rate	75/150/300/600/1200/2400/4800/9600/19200 bps	
Transmission distance	Total distance: 15 m	Total distance: 1200m
Number of ports	2 (non-isolated)	1 (isolated)

* These modules are intended for use with F3BP20 and F3BP30 only.

GP-IB Communications Module

F3GB01-0N

Optimal solution for automation of inspection system.

- Performs both measurement and control within a compact body.
- Delivers a high-speed inspection system.
- Enables simple, high-speed communications with GP-IB devices.
- Enables system configuration using only the BASIC language.
- Enables communications with GP-IB devices using only ladder sequences.

Item		Specification
Interface		ANSI/IEEE Standard 488
Transmission mode		8-bit parallel, half-duplex
Connection type		Star, multidrop
Number of devices		15 Max.
Handshaking system		3-wire handshaking
Transmission distance	Total cable length	20m max.
	Between devices	4m max.
	Total distance by devices	2m max. (x number of devices)
Interface		24-pin receptacle connector (IEEE-488)
Setting	Device address	0 to 30
	Delimiter code	CR+LF, CR, EOI or Others
	Controller	Yes or No
Current consumption		250mA

Program Reuse

Total Design Efficiency — from Development to Maintenance

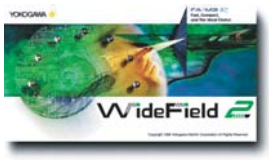
Custom design, reusability, maintainability, team development, improved software quality, shorter development cycle

FA-M3R Programming Tool WideField2

SF620-MCW

Email function included

User interface language selection



Speeds Up All Kinds of Programming

Improving program development efficiency is a universal concern of all PLCs. In particular, program reuse reaps benefits of high quality programs, short development cycles and low development outlay. In a relentless quest for improved total design efficiency from development through maintenance and maximum program reuse, the FA-M3R takes a step beyond structured programming to introduce the concept of "object ladder." WideField2 is created with the vision and analogy to a baseball ground where flying baseballs in all directions must be caught. It thus aims to be a tool to developers, easy-to-use in all scenarios during the program development process. WideField2 introduces new functions like program modularization, local devices, component macros and "structures" for defining structures of devices, to realize further modularization of programs and device structures. The end result? Improved program reusability and reduced total cost.

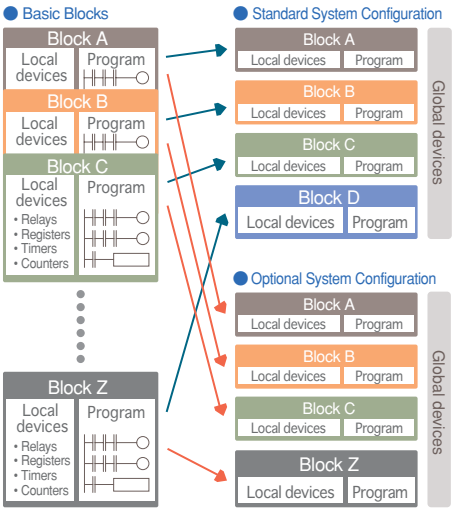
*: The object ladder program development concept integrates both programs and devices into blocks by function to improve efficiency of application customization.
*: When using F3SP66 or F3SP67 sequence CPU module, use WideField2 R4.01 or a later version.
*: WideField2 R5.01 and later versions are multi-lingual versions supporting English and Japanese.

Object Ladder Increases Reusability

Structure

Increases reusability through independent blocks and macros

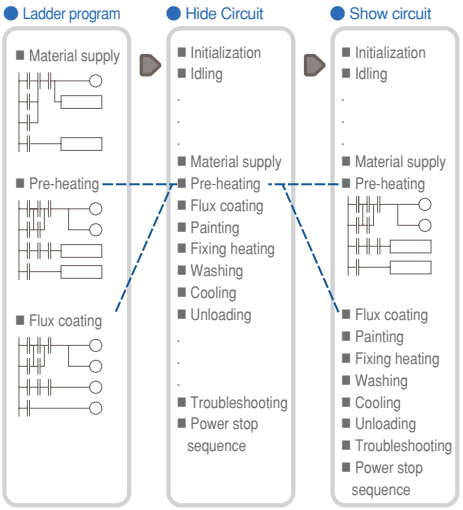
Local devices are key elements in the implementation of object ladder. Even if given identical names in different blocks, local devices are assigned to physically distinct devices, eliminating the risk of interference during program execution. Handling a ladder program and its local devices as a single object increases block independence, allows flexible reuse and customized design, as well as facilitates program development in a team. Similarly, by encapsulating local devices in component macros, a program can be divided into reusable components.



Easy Debugging with Index View

Efficient program reuse through better readability and visibility

Job optimization is fundamental to improving efficiency. Debugging is inevitable in program development and reuse. By using an index view during debugging, however, a user experiences improved efficiency in reusing existing programs.
The index view displays circuit comments of a ladder program and hides the detailed program code underneath, to present a contents page of a program. It improves readability so that a user may have an overall view of the program flow prior to debugging specific program segments.



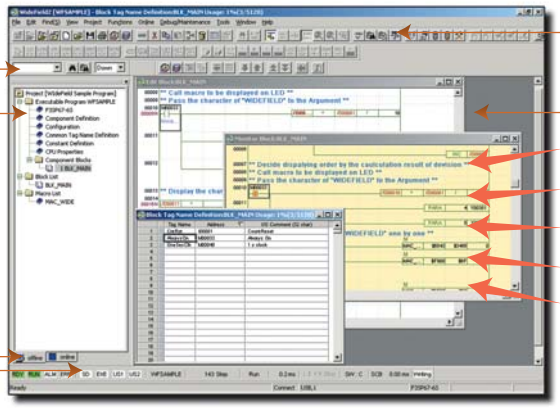
• Overview

Execute often used commands directly from the Find/Comparison toolbar

Refer to file/data structure during operation

Switches view between offline and online mode

Allows constant monitoring of CPU status.



Intuitive operation using visual icons

Efficient development with multi-window support

- File comparison
- Sampling trace
- Device management
- Log/alarm display
- Online debugging

Various functions provided for easier reuse, debugging and maintenance

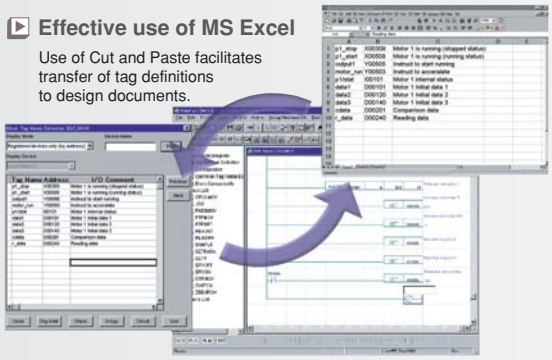
▸ Standard Windows Environment

Easy data exchange with Windows applications

WideField2 provides OLE support and other functions that allow you to tap the convenience of the Windows environment. For instance, device and comment data can be copied from MS Excel and pasted into WideField2. Similarly, circuits can be copied from WideField2 into Microsoft word for preparation of design documents. Moreover, comment data can be imported from or exported to standard CSV-format files, allowing efficient organization of translation and design data.

Effective use of MS Excel

Use of Cut and Paste facilitates transfer of tag definitions to design documents.

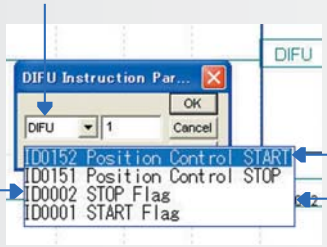


▸ Input Completion Function

When a user is entering devices, this function speeds up the process and prevents misspelling by displaying a list of candidates for selection. This is especially useful for entering long tag names and structure members. Requiring only keyboard input, it can also be used in the field when a mouse is not available.

Can be operated using only keyboard input if no mouse is available.

Facilitates candidate selection by displaying device comments.



Sorts tag names/addresses in alphabetical/numeric order; sorts structures in definition order.

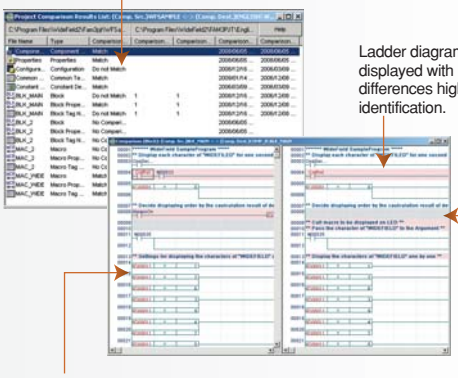
Generates input candidates automatically from input history and tag name definitions.

▸ File Comparison

Better use of design assets

The file comparison function enables offline comparison of data between two projects. It is useful for reuse management by comparing against past design assets, as well as for maintenance by comparing against field programs. Program comparison results are displayed on ladder diagrams with circuits containing differences highlighted for easy identification.

Comparison can be made for all data between two projects.



Ladder diagrams of programs are displayed with lines containing differences highlighted for easy identification.

The ladder program in the comparison source pane can be edited and re-compared for easy synchronization with past assets.

The comparison result is adjusted by insertion of missing lines so that matching contents are displayed side-by-side for easy comparison.

▸ Powerful Find Function

The Find function, which is often used during programming and debugging, is now even more powerful. A user can search within a block or within an entire project using a convenient Find toolbar by specifying search conditions in a dialog, or by simply clicking a button to search for the next candidate. A user can even search for hidden devices not displayed on the screen, or search for a tag name by specifying its assigned address.

Superior, Easy Temperature Control

Superior Temperature Control with Easy Setup

Temperature Control/PID Modules

Sampling 0.1s | Accuracy ±0.1% | Resolution 0.1°C

F3CU04-0S / F3CU04-1S

Versatile control at high speed, accuracy and resolution

Up to 144 Loops Supported

This module enables fine control at high speed, accuracy and resolution. Its built-in "SUPER" function suppresses overshooting using fuzzy theory to deliver improved manufacturing quality. Its superior functions and performance can be easily harnessed using its "dynamic auto-tuning" function or setup tool.

High-speed, High-Accuracy, High-Resolution

- Input sampling cycle: 100 ms/2 CH, 200 ms/4 CH
- Input accuracy: ±0.1% of F.S.
- Input resolution: 0.1°C (5-digit display)

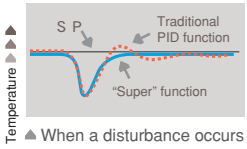
Universal Input

A single module can be used to support a variety of inputs (thermocouple, RTD, DC mV and DC V), selectable for each channel. By configuring individual channels to separate inputs, it delivers high efficiency at low cost.

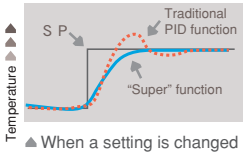
Dynamic Auto-tuning Function

- With a user setting the minimum number of parameters (such as input/output range and control set point), this module automatically calculates the optimal PID parameters to simplify startup preparation, saving tuning effort and cost.
- It even recalculates the PID parameters automatically when there is a major change in the control condition (i.e. change in control set point) during operation.

■ Overshoot Suppression Function SUPER



▲ When a disturbance occurs



▲ When a setting is changed

Temperature Monitoring Module

F3CX04-0N

Easy temperature monitoring with superior cost-performance

Up to 144 Channels Supported

- Input sampling cycle: 100 ms/2 CH, 200 ms/4 CH
- Input accuracy: ±0.1% of F.S.
- Input resolution: 0.1°C (5-digit display)
- Universal input
- Up to 144 channels (4 channels x 36 modules)

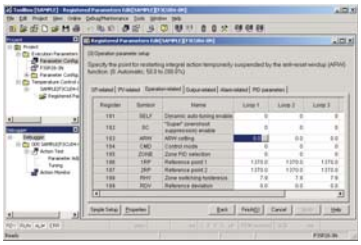
Item		Specification		
		F3CU04-0S	F3CU04-1S	F3CX04-0N
Number of loops/channels		4 loops		4 channels
Isolation method		Between input terminals and internal circuit: Isolation by photocouplers and transformers Between input terminals: Independent circuits for different channels		
Input type		Universal input (individual inputs configurable separately by software or collectively by hardware): 15 thermocouples, 9 RTDs, 2 DC mV ranges, and 4 DC V ranges		
Input sampling cycle		100 ms for 2 channels or 200 ms for 4 channels		
Input impedance		1MΩ or more		
Allowable signal impedance		250 Ω max. for thermocouple and DC mV, 100 Ω max. for RTD (with same wire resistance), and 2 k Ω max. for DC V		
Burnout detection function		Yes		
Output type	Time proportioning PID (Open collector output)	Yes (ON/OFF control, forward/reverse)		—
	Continuous PID (4-20 mA output)	No	Yes	—
Control section	Control function	ON/OFF, PID, heating/cooling, setting output, dynamic auto-tuning, and "Super"		—
	Control cycle	Same as input sampling cycle		—

Toolbox for Temperature Control and Monitoring Module

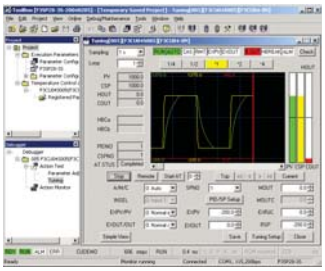
SF661-ECW

Easy Setup of Operation Parameters

This software is a parameter setup tool for use with the FA-M3R Temperature Control and PID Modules and the Temperature Monitoring Module. It supports a range of functions from initial setup to action testing, and simplifies the tedious tuning process by enabling graphical display of monitored values.



Detailed Setup



Tuning

User-friendly setup screens

On-line help information on module parameters simplifies parameter setup. Setup screens can be customized with the required parameters displayed in the appropriate order to match user operation.

Powerful debugging and data logging

Display of preset values, action monitoring and display of error information are available during action testing. Input field data can be logged, and exported (in CSV format) as external data to be used in subsequent reporting, analysis or processing.

Concurrent use of ToolBox and FA-M3 Programming Tool WideField2

The Toolbox software can be executed concurrently with WideField2, and even allows concurrent editing and communications using both programs.

Note: When using F3SP66 or F3SP67 sequence CPU module, use ToolBox R3.01 or a later version.

Drastically Reduced Tact Time

Relentless Pursuit of Higher Speed and Richer Functionality

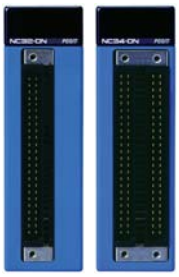
Versatile positioning control can be implemented using efficient setup tool

Positioning Module (model with Pulse Output)

F3NC32-0N / F3NC34-0N

For fast, accurate, high-resolution and versatile position control

This positioning module is amply powered to control high-speed, high-accuracy and high-resolution position-command type servo-motors/drivers, and stepping motors/drivers. Its rich set of positioning control functions enables a much shorter tact time, coupled with higher productivity and product quality. The accompanying efficient setup tool for positioning modules contributes to data reusability and better development efficiency throughout the entire development cycle from initial configuration through maintenance.



Item		Specification	
		F3NC32-0N	F3NC34-0N
Control	No. of axes	2	4
	Control method	Open-loop control using position reference pulse output	
	Output pulse type	RS-422A compliant differential line driver; 5 Mpps for servomotors, 1 Mpps for stepping motors; Pulse type selectable for each axis: CW/CCW pulse, travel/direction pulse, and phase A/phase B pulse	
Counter	No. of channels	2	4
	Input pulse type	Incremental encoder (phase A/B), absolute encoder; 5 Mpps input pulse rate (after 4x multiplication)	
External contact input		6 inputs per axis (origin, forward limit, reverse limit, driver alarm input, external trigger, general-purpose input); emergency stop	
External contact output		3 outputs per axis (one deviation pulse clear signal and two general-purpose outputs), and 1 SEN signal per axis	
Positioning functions	Units of measurement	mm, degrees, and pulses	
	Control modes	Position control, speed control, position-control ⟷ speed-control switchover	
	Interpolation modes	2-axis linear interpolation; 2-axis circular interpolation	2-, 3-, and 4-axis linear interpolation; 2-axis circular and helical interpolation
	Operation modes	Pattern operation and direct operation	
	Pattern operation	PTP movement, CP normal movement, CP pass-by movement, and CP pass-through movement; No. of action pattern records: 2000 max. (500 actions x 4 patterns); No. of position data records: 2000 max per axis	
	Position reference	Absolute/incremental position reference -2,147,483,648 to 2,147,483,647 (pulses)	
	Speed reference	1 to 5,000,000 pps	
	ACC/DCC curve	Automatic trapezoidal acceleration/deceleration; Automatic S-shape acceleration/deceleration	
	ACC/DCC time	0 to 32,767 ms (configurable independently for acceleration and deceleration)	
	Others	Change in target position during movement ; Change in specified speed during movement	
Origin search		Two types of automatic origin search; Manual origin search (any combination of external contact inputs may be used)	
Manual operation		Jog operation and manual pulse generator mode	
Other functions		Electronic gear, teaching, current position setup; M code output, override, software limit switch; Counter coincidence or zone coincidence detection	
Data backup		Flash ROM (100,000 times rewritable)	

ToolBox for Positioning Modules

SF662-ECW

Total development support from configuration through maintenance

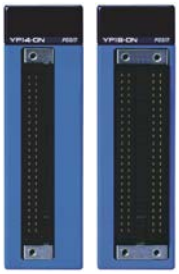
- Provides an integrated development environment.
- Supports action pattern definition for greater program reusability and development efficiency.
- Excellent debugging support.

ToolBox for Positioning Modules is a Window-based software tool for configuring positioning modules (F3NC32-0N and F3NC34-0N). It can be used to set up registered parameters, action pattern data and position data, as well as perform action test and monitoring. With ToolBox, configuration and debugging of positioning modules becomes an easy job!

* Use Toolbox R2.01 or a later version when using sequence CPU modules (F3SP66 and F3SP67).

Positioning Module
(model with multi-channel pulse output)

F3YP14-0N / F3YP18-0N



Uses a single slot to control eight axes

This module implements motor control for 4 or 8 axes from a single slot. It features extremely low cost per axis and allows configuration of multi-axis positioning control systems of up to 288 axes. It is ideal for positioning-type servo and pulse motors. Thanks to the high-speed response of FA-M3R, startup time is merely 0.09 ms, drastically reducing tact time. It also drives DD and linear motors at max speed of 4 Mpps.

Item		Specification F3YP14-0N	F3YP18-0N
Number of axes		4	8
Control	Control method	Open loop control by positioning pulse output	
	Output pulse	RS-422A compliant differential output 3,998,000 pps(when using servomotors) 499,750 pps (when using pulse motors)	
Control mode		Positioning control	
Positioning control	Interpolation method	Axis-by-axis independent operation, Multi-axial linear interpolation (selectable by CPU)	
	Command position	-2,147,483,648 to 2,147,483.647 pulses	
	Command speed	0.1 to 3,998,000 pulse/s (for servomotors); 0.1 to 499,750 pulse/s (for pulse motors)	
	Function	Target position/speed change during operation	
Acceleration/ deceleration	ACC/DCC curve	Trapezoidal, S-shaped	
	ACC/DCC time	0 to 32767ms (configurable independently for acceleration and deceleration)	
Home position search	Search method	Configurable by entering home position or limits; encoder (Z-phase) usable; automatic home position search selectable	
	Search speed	Configurable	
External contact output		Deviation pulse clear signal	
External contact input		Limit switch, home position, encoder z-phase	
Data backup		Backup using CPU module or flash ROM	

Positioning Module
(model with MECHATROLINK-II Interface)

F3NC96-0N

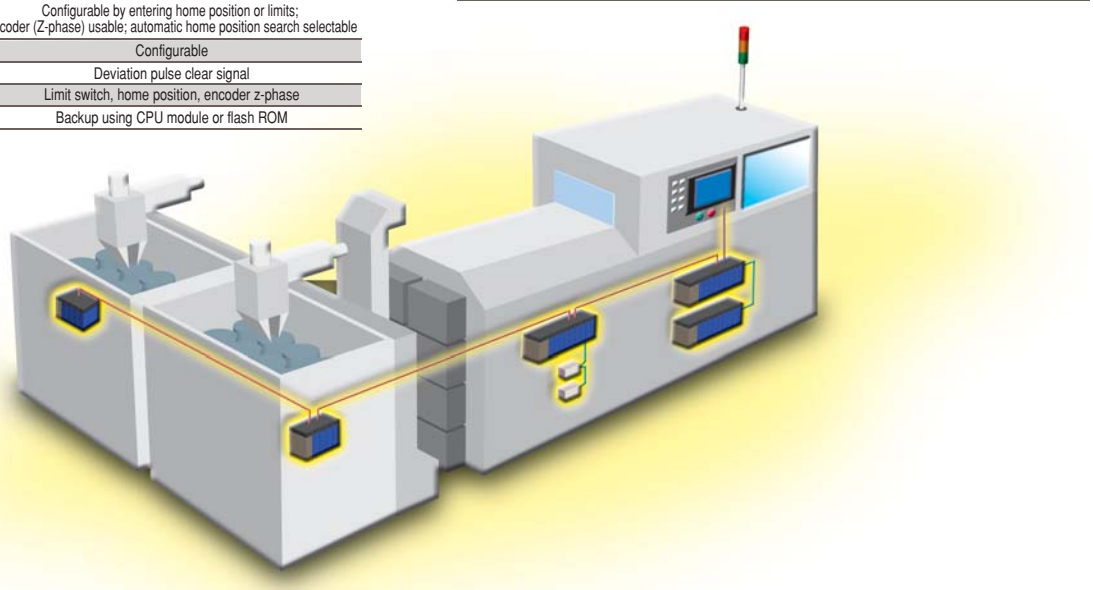
With an open motion-control network interface

This positioning module supports MECHATROLINK-II*, an open field network standard designed for high-speed motion control, and is the no. 1 choice for configuring a system involving many controlled axes.

The module implements motor control for up to 15 axes from a single slot. Featuring high transmission rate of 10Mbps and short cycle time of 1.0ms for 8 axes, it enables fast and accurate positioning control.

* MECHATROLINK-II is a registered trademark of Yaskawa Electric.

Item		Specification
Interface		MECHATROLINK-II compliant
Transmission rate		10 Mbps
Transmission bytes		32 bytes (including subcommands)
Cycle time/ no. of stations		1.0 ms for up to 8 axes, 2.0 ms for up to 15 axes (user selectable)
Network Topology		Bus (multi-drop)
Communications method		Master/slave synchronous
Transmission media		2-wire shielded twisted pair cable (proprietary cable)
Max. transmission distance		50 m (total length)
Min. distance between stations		0.5 m
Positioning functions	Position reference	-2, 147, 483, 648 to 2, 147, 483, 647 (reference unit)
	Functions	- Linear interpolation movement (simultaneous starting and stopping) - Independent axis movement using MECHATROLINK-II commands (depends on connected equipment and supported MECHATROLINK-II commands)
	Others	- Reading statuses (target position, current position, etc.) of external equipment - Reading/writing parameters of external equipment



Unlimited PLC Expansion and Distribution

FA Link H Module
F3LP02-0N

Uses twisted-pair for maximum speed

This interface module is fast. It uses shielded twisted-pair cables to achieve the maximum transmission rate of 1.25Mbps and is the best choice for connecting machines.

Item	Specification
Number of stations	Max. 32
Link relays	2048
Link registers	2048
Communication method	Token bus
Transmission media	Shielded twisted-pair cable (AWG-20 recommended)
Transmission distance	1 km/500 m/250 m/100 m
Transmission rate	125K/250K/625K/1.25M bps

Fiber-optic FA Bus Type 2 Module
F3LR02-0N

FA Bus Type 2 Module
F3LR02-1W

Establishes instantaneous remote I/O

These interface modules can be used to build a remote I/O system on a (fiber-optic or elecrtic wire) FA bus. The high transmission rate of 10 Mbps eliminates any concerns about I/O refresh time in ladder programming. Moreover, star, daisy-chain and loop connections are all supported, allowing flexible configuration.

Item	Specification F3LR02-0N	F3LR02-1W
Transmission method	Star, daisy chain, loop	
Transmission media	2-wire fiber-optic cable	two-pair (4-wire) shielded cable
Transmission distance	Max. total distance: 1.4 km (with 3 stations)	Max. total distance: 80 m
Transmission rate	10M bps	

A Wide Selection of Modules

To Suit Every Application Need

High-speed Data Acquisition Module

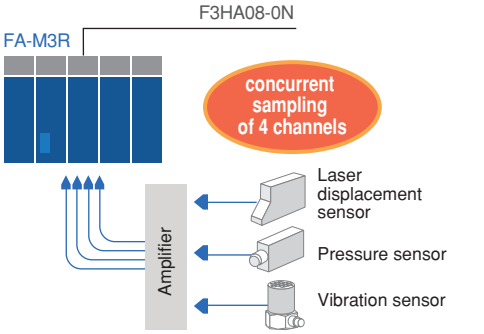
F3HA08-0N

Four built-in A/D converters

- This analog input module can acquire data from up to 8 input channels at high speed.
- 4 built-in A/D converters allow concurrent data acquisition for 4 channels with sampling period as short as 50µs.
- It enables high-speed, high-density data acquisition over an extended duration, driven either by a periodic timer or an external pacer input. Up to 24 K words of data may be accumulated for each input point in the buffer.

Item	Specifications
Number of inputs	8 differential inputs
Input signal range*1	0 to 5 VDC (-0.25 to 5.25 VDC) -10 to 10 VDC (-11.0 to 11.0 VDC)
Isolation method	Isolated by photocouplers between input terminals and internal circuitry No isolation between input terminals
Input resistance	2MΩ
Resolution (12 bit ADC)	1.4 mV (for 0-5 V DC); 5.7 mV (for -10 to 10 V DC range)
Overall accuracy	23±2°C: ±0.2% of F. S. 0-55°C: ±0.5% of F. S.
Sampling period *2	50 µs min. when channels 1 to 4 are used. 500 µs min. when channels 1 to 8 are used.
Input buffer	2 4 K word
Scaling	Yes
Filter	Yes
A/D conversion	Activation by periodic timer or by external pacer input

* 1 Configurable independently for each channel by software.
* 2 Configurable on module basis. Valid data values depend on the number of channels used and whether filtering is used.



Analog Input Module

F3AD04-0□ / F3AD08-1□ / F3AD08-□R / F3AD08-4V

Analog Output Module

F3DA02-0N / F3DA04-1N / F3DA08-5N

High-speed accuracy conversion with excellent noise immunity

- Many models are available, including normal 12-bit and high resolution 16-bit models.
- Conversion cycle options, ranging from 50µs to 200ms, are provided to suit different applications.
- External input signals are individually configurable; both voltage input and current input are supported.
- Four or eight inputs can be read and scanned as they are switched by multiplexer. One D/A converter output is distributed to 2 or 4 output points by multiplexer, and the output for each output point is retained.
- Input filter and scaling processing functions allow processing of data into easily usable forms.

Item	Specifications		
	F3DA02-0N	F3DA04-1N	F3DA08-5N
No. of outputs	2	4	8
Output signal range*	-10 to 10 V DC 4 to 20 mA DC (one line common, floating type)		-10 to 10 V DC (one line common, floating type)
Isolation method	Isolated by photocouplers between output terminals and internal circuitry. No isolation between output terminals		
Allowable load resistance	5 kΩ or more for voltage output 600 Ω or less for current output		5 kΩ or more
Resolution (12bit A/D or D/A)	5.7 mV for voltage output 5.7 µA for current output		5.7mV
Overall accuracy	23±2°C : ±0.2% of F.S. 0 to 55°C : ±0.5% of F.S.		
Conversion Speed	2ms (fixed)	4ms (fixed)	
External power supply	24V DC±10%, 150mA	24V DC±10%, 180mA	
Scaling	Upper and lower limit values can be set to any values between -20,000 and 20,000		

*: Selectable by terminal for each channel.

Item	Specifications						
	F3AD04-0V	F3AD08-1V	F3AD04-0R	F3AD08-4R	F3AD08-5R	F3AD08-6R	F3AD08-4V
Number of inputs	4	8	4	8 differential inputs			←
Input signal range*	0 to 5VDC (-0.25 to 5.25VDC), 1 to 5VDC (-0.25 to 5.25VDC) -10 to10VDC (-11.0 to 11.0VDC)			Current signals only 0-20mADC (-1.0 to 21.0mADC) 4-20mADC (-1.0 to 21.0mADC)	Voltage signals only 0-5VDC (-0.25 to 5.25VDC) 1-5VDC (-0.25 to 5.25VDC) -10-10VDC (-11.0 to 11.0VDC) 0-10VDC (-0.5 to 10.5VDC)	Current or voltage signals 0-5VDC (-0.25 to 5.25VDC) 1-5VDC (-0.25 to 5.25VDC) -10-10VDC (-11.0 to 11.0VDC) 0-10VDC (-0.5 to 10.5VDC) 0-20mADC (-1.0 to 21.0mADC) 4-20mADC (-1.0 to 21.0mADC)	Current signals only 0-20mADC (-0.8 to 20.8mADC) 4-20mADC (3.2 to 20.8mADC)
Isolation method	Isolated by photocouplers between input terminals and internal circuitry. No isolation between input terminals						←
Resolution (12bit A/D or D/A)	1.43mV (0 to 5V/1 to 5VDC)		0.175mV (0 to 5V/1 to 5VDC)	0.4 mV (for 0-5 DC or 1-5 DC range); 0.5 mV (for -10 to 10 V DC or 0-10 V DC range) 1.6 µA (for 0-20 mA DC or 4-20 mA DC range) (16-bit A/D conversion)			5.6µA (for 0-20 mA DC or 4-20 mA DC range) (12-bit A/D conversion)
	5.71mV (-10 to 10VDC)		0.72mV (-10 to 10VDC)				
Overall accuracy	23±2°C: ±0.2% of F. S. 0-55°C: ±0.5% of F. S.		23±2°C: ±0.1% of F. S. 0-55°C: ±0.3% of F. S.	23±2°C: ±0.1% of F. S. 0-55°C: ±0.2% of F. S.			23±2°C: ±0.2% of span 0-55°C: ±0.5% of span
Conversion Speed External power supply	1ms x no. of inptus			50 µs, 250 µs, 1 ms, 16.6 ms, 20 ms, 100 ms, 166 ms, 200 ms x (number of input points) user-selectable on module basis			1ms x no. of inptus
Scaling	Yes			Upper and lower limit values can be set to: 20,000 < scale low limit < scale high limit < 20,000			←
Offset	—			User-definable offset to any value between -5000 to 5000			—

*: Selectable by software for each channel.

Memory Card Module

F3EM01-0N

Maintenance support without programming

- This module allows reading from and writing to various devices in the CPU module using a ladder program. It employs commercially-available compact flash memory and handles even large amounts of data.
- With online media insertion and removal, data exchange with a personal computer is extremely convenient.
- You can even upload and download programs and data without using any ladder program.

Item	Specifications
Memory media	Compact flash (Type1) (from SanDisk)
Media file system	FAT16 (supports long file names)
Number of media	1
Data types that can be stored	All devices in the CPU module, Ladder programs
Media insertion and removal	Online media insertion or removal is allowed
Functions	Reading from and writing to various devices using a ladder program, Maintenance function

FA-M3 Value2

F3SC23-1F / F3SC23-2F / F3SC23-1A

Incredible value for money

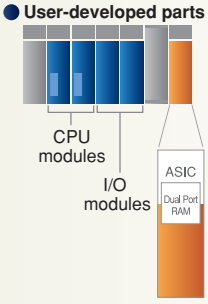
From the smallest to the largest (30 points or more), all these modules inherit the rich set of functions and superior performance of the range-free controller FA-M3R and come installed with CPU, power supply and I/O modules, providing incredible value for money. It allows you to start with a minimum system and grow by expanding the number of I/O points and adding new equipment. Regardless of the CPU type, all FA-M3R use the same spare parts and supports the use of the FA-M3 Programming Tool WideField2.

I/O Open

Open Partnership

FA-M3R design rules made open

The Open Partnership program empowers customers to develop their own I/O modules. By implementing proprietary know-how in the form of an FA-M3R-compatible user I/O module, users can achieve increased package density and performance. Moreover, complex data transfer between the CPU module and I/O modules is handled by an ASIC interface, which simply requires data to be written into a Dual Port RAM. Special parts required for module development such as ASIC, module casing and connectors can all be purchased from Yokogawa so customers only need to focus on the design of a printed circuit board.



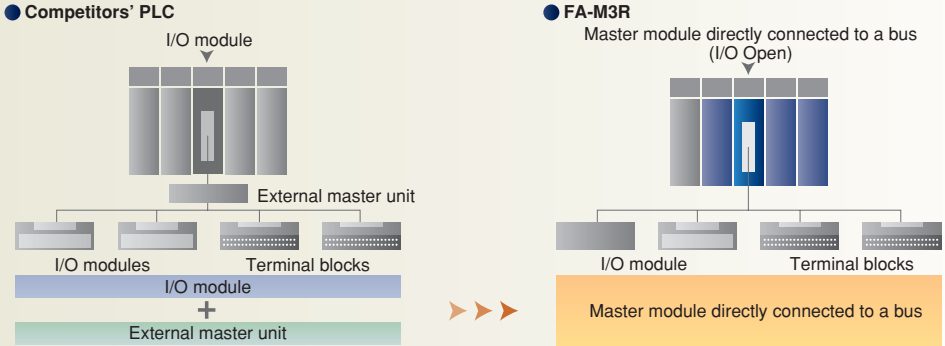
I/O Open implementation examples

- Wire saving system
- Position sensor input system
- Semi-conductor equipment (chiller control, cleaner, handler)
- Electronic weigher
- Electron accelerator
- Ice thermal storage system
- Automatic vending machine
- Components mounter/inserter
- Molding machine controller
- Car washing machine
- Audio communication system
- Small-power generation system
- Building airconditioning system
- Generator control system
- F/V convertor module
- Govenor control
- AGV

Note: Only some examples are listed above.

Reduced Wiring

- By minimizing redundant units, a simpler system configuration, higher speed and lower cost can be achieved.
- By eliminating connecting parts, higher reliability is ensured.



Peripherals

For use with FA-M3R

Connector Terminal Block

TA50-0N / TA50-1N / TA60-0N

A wide range of connector terminal blocks

Connector terminal blocks

- 40-point plug-type terminal block
  Compatible with 32-point and 64-point input/output modules and positioning modules (F3NC□□)*except F3NC32 and F3NC34
- Uses a connector terminal block cable for connection between the module and connector terminal block, leading to space savings and reduced wiring.
- No need for soldering during wiring of connector terminal block.

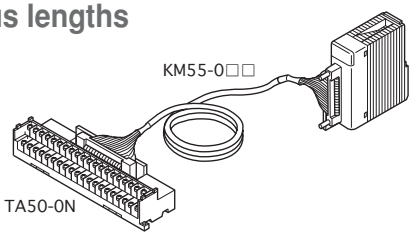
Item	Specification		
	TA50-0N	TA50-1N	TA60-0N
Number of I/O points	40		
Rated voltage	5-24 VDC		
Operating voltage range	4.5 to 26.4 VDC		
Maximum current	0.5 A DC/point		
Compatible cable	2 mm^2 max.	1.25mm^2 max.	0.08 to 0.26mm^2 max.
Terminal block screw	M3.5	M3	M2 (European terminal type)
Compatible terminal	Crimp-on terminal with max. diameter of 8 mm	Crimp-on terminal with max. diameter of 5.8 mm	—
Connector	HIF3BA-40PA-2.54DSA (compliant to MIL standard)		
Mounting	35 mm wide DIN rail or screws		
Mounting screw (When screw-mounted)	M4-size screws (2 places)		
Color	Black	Gray	
Weight	300 g	175 g	80 g

* This connector terminal block cannot be used on F3YP04, F3YP08, F3YP14, F3YP18, F3NC32, F3NC34.

Connector Terminal Block Cables

KM55-0□□

Connector terminal block cables of various lengths



Cables for connecting module and connector terminal block

Connector terminal block cables

Model	Cable length
KM55-005	0.5 m
KM55-010	1.0 m
KM55-015	1.5 m
KM55-020	2.0 m
KM55-025	2.5 m
KM55-030	3.0 m

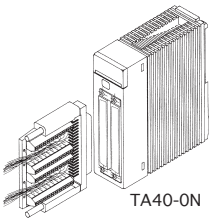
Terminal Block Unit

TA40-0N

- Ultra-thin connector enables space-saving with compact panel design.
- Connects directly to input/output module with no need of cables, leading to cost savings.
- Use of European type terminal block eliminates the hassle of soldering or crimping.
- Can be secured to an I/O module using screws to ensure reliable connection.

Item	Specification
Number of I/O points	40
Rated voltage	5-24 V DC
Operating voltage range	4.5-26.4 V DC
Maximum current	0.5A DC/point
Compatible cable	AWG23-28 (0.08-0.26mm^2)
Terminal block screw	Slotted M2-size screw
Mounting screw	Slotted M2.6-size screw
Color	Black
Weight	50g

* This connector terminal block cannot be used on F3YP14, F3YP18, F3NC32 and F3NC34.



Cables for Programming Tools

KM13-1S

Connects directly to USB port on PC

- Cable for connecting programming port of sequence CPU (F3SP☐☐) to USB port of PC.

Note: These cables for programming tools cannot be used with F3SP66 and F3SP67 sequence CPU modules.
Note: When using these cables for programming tools, use WideField2 R4.01 or a later version.

Fiber-optic Cables

KM60 / KM61 / KM62 / KM65 / KM67

Cables for connecting fiber-optic FA bus modules and fiber-optic FA link modules

Module name	Fiber-optic cords for wiring inside panel enclosure	Fiber-optic cables for indoor wiring	Fiber-optic cables for outdoor wiring
F3LR01 (for fiber-optic FA-bus module)	KM60-S06 (0.6m) KM60-001 (1m) KM60-003 (3m)	Optical connectors requiring bonding & grinding KM61-010 (10m) KM61-150 (150m) KM61-100 (100m) KM61-200 (200m)	KM62-100 (100m) KM62-200 (200m)
F3LR02 (for fiber-optic FA-bus 2 module)		Optical connectors requiring crimping & cutting KM65-001 (1m) KM65-010 (10m) KM65-002 (2m) KM65-012 (12m) KM65-003 (3m) KM65-015 (15m) KM65-004 (4m) KM65-020 (20m) KM65-005 (5m) KM65-025 (25m) KM65-007 (7m) KM65-030 (30m)	— KM67-300 (300m) KM67-400 (400m) KM67-500 (500m)

YHLS Communication Cables

KM80, KM81

Two cable types for different purposes

Cables for connecting YHLS master module (F3LH0☐) and YHLS slave units (TAH series) and cables for connecting YHLS slave units.

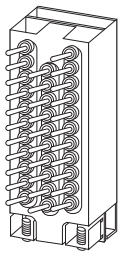
Model		Cable length
KM80 (Fixed Cable)	-010	10 m
	-050	50 m
	-100	100 m
	-200	200 m
	-300	300 m
KM81 (Flexible Cable)	-010	10 m
	-050	50 m
	-100	100 m
	-200	200 m
	-300	300 m

Note: These cables can also be used for FA Bus Type 2 Module (F3LR02-1W).

Input Simulator Switch

S9307UF

Handy tool for program debugging



- This is a simulator switch for 32-point input terminals compatible with F3XD32-☐F, F3XD64-☐F and F3WD64-☐F.

* Only one switch can be installed on a module.

Blank Module

F3BL00-0N

Installs in an empty slot for improved appearance

- Installing a bank module in an empty slot of a base module or a slot reserved for a planned installation improves appearance and prevents collection of dust on the base module and other modules.

Performance Specifications/Ladder Sequence Devices

	Item			Specification								
				F3SP08-SP	F3SP21-0N	F3SP28-3S	F3SP38-6S	F3SP53-4S	F3SP58-6S	F3SP59-7S	F3SP66-4S	F3SP67-6S
Performance	Control method			Repeating operation (by stored program)								
	I/O control method			Refresh method / Direct I/O command								
	Programming language			Structured-ladder language, object ladder language, mnemonic language								
	Number of I/O points			Max. 2048		Max. 4096	Max. 8192 (including remote I/O)	Max. 4096	Max. 8192 (including remote I/O)		Max. 4096	Max. 8192 (including remote I/O)
	Program capacity (ROM resident allowed)			Max. 10K steps		Max. 30K steps	Max. 120K steps	Max. 56K steps	Max. 120K steps	Max. 254K steps Max. 360K steps (Including tag name definition)	Max. 56K steps	Max. 120K steps
	No. of program blocks			Max. 32		Max. 1024						
	Number of instructions	Basic		25 types		37 types						
		Application		227 types		324 types					389 types	
	Instruction execution time	Basic		0.18 to 0.36 μs/instruction		0.045 to 0.18 μs/instruction			0.0175 to 0.07 μs/instruction			
		Application		0.36 μs/instruction or longer		0.18 μs/instruction or longer			0.07 μs/instruction or longer			
	Monitored scan time			10 to 200 ms (configurable in units of 1 ms)								
	Power-on or power recovery after power failure			Auto start, auto restart (automatic logging of power ON/OFF and momentary power failure events)								
	Other functions			• Sensor control function *1 (scan time 200 μs to 25 ms) • Configuration function (device capacity, data lock-up range at power failure, designation of output at error) • Constant scan function (1ms to 190 ms, settable on 0.1 ms basis) • Debug function (forced set/reset, online edit etc.) • Error log save function (64 items), user-definable log save function			• Data/clock function (year/month/day/hour/minute/second/day of the week) • Program protection function • Writing program data to ROM • Sampling trace function *1 • Personal computer link function (transmission rate 115K bps *1)					Same as specifications on left, plus: • Constant definition (header file) • Telegram message creation • Logging function • Security function • Making programs/data ROM-resident • Exclusive access
Ladder sequence device	Input relay		X	2048 points		4096 points	8192 points	4096 points	8192 points		4096 points	8192 points
	Output relay		Y									
	Internal relay		I	4096 points		16384 points	32768 points	16384 points	32768 points	65535 points	16384 points	32768 points
	Shared relay		E	–	2048 points	2048 points						
	Extended shared relay			–		2048 points						
	Link relay		L	2048 points		8192 points	16384 points	8192points	16384 points		8192 points	16384 points
	Special relay		M	2048 points		9984 points						
	Timer	100μs timer*2	T	–		2048 points	3072 points	2048 points	3072 points		2048 points	3072 points
		1ms timer *3		512 points								
		10ms timer										
		100ms timer										
	Continuous	100ms timer										
	Counter		C									
	Data register		D	5120 points		16384 points	32768 points	16384 points	32768 points	65535 points	16384 points	32768 points
	File register	latched	B	–		32768 points	262144 points	32768 points	262144 points		32768 points	262144 points
	Link register		W	2048 points		8192 points	16384 points	8192 points	16384 points		8192 points	16384 points
	Special register		Z	512 points		1024 points						
	Index register		V	32 points		256 points						
	Shared register		R	–		1024 points						
	Extended shared register			–	–	3072 points						
	Label		–	64		1024						
	Interrupt handler routine		–	4								
	Constant	Decimal	–	for 16-bit instruction: -32768 to 32767 for 32-bit instruction: -2147483648 to 2147483647								Same as specifications on left, plus: constant definition
		Hexadecimal	–	for 16-bit instruction: $0 to $FFFF for 32-bit instruction: $0 to $FFFFFFFF								Same as specifications on left, plus: constant definition
		String	–	–								16-bit instruction e.g. "AB" 32-bit instruction e.g. "ABCD" Constant definition (max. 255 char)
		Binary	–	–								Constant definition (max. 256 bytes of continuous data)
		IEEE single precision floating-point	–	–								32-bit instruction e.g. 1.23, -3.21 approx. -3.4×10^{38} to 3.4×10^{38} (constant definition allowed)
		Constant index	–	–								0 to 2047

*1: Not available with F3SP08 and F3SP21. *2: The max. number of settable points is 16 for F3SP28, F3SP38, F3SP52, F3SP58, F3SP59, F3SP66 and F3SP67 *3: The max. number of settable points is 16 for F3SP08 and F3SP21.

Performance Specifications for BASIC CPU Modules

Item	F3BP20	F3BP30
Programming language	YM-BASIC/FA	
Control method	Interpreter type (with pre-run function)	
Number of tasks	1	
Program capacity	120K bytes (ROM resident allowed)	510K bytes (ROM resident allowed)
Shared device *1	Shared register (R): Max. 1024 points	
Other functions	• Configuration function (setting user area size, common area size, etc.) • Program development and debugging function • Common data access (write/read) by personal computer link module • Program resident function	• Error log save function • Data/clock function (year/month/day/hour/ minute/second/day of the week) • Write program data to ROM

*1: Shared relays, shared registers, extended shared relays and extended shared registers cannot be used.

General Specifications

	Item	Specification					
		F3PU10-0S	F3PU20-0S	F3PU30-0S	F3PU16-0N	F3PU26-0N	F3PU36-0S
Power	Supply voltage	100 to 240 V AC, single-phase, 50/60 Hz			24 V DC		
	Supply voltage fluctuation range	85 to 264 V AC, 50/60 Hz±3 Hz			15.6 to 31.2 V DC		
	Power consumption	35 VA max.	85 VA max.	100 VA max.	15.4 W max.	33.1 W max.	46.2 W max.
	Allowable momentary power failure time	20 ms					
	Fail output	Provided on front terminal block of power supply module, contact rating: 24 V DC (both normal open and normal close terminals are provided)					
Withstanding voltage		1500 V AC for 1 minute (between AC external terminals (collective) and FG terminal)					
Insulation resistance		500 V DC, 5 MΩ or more (between AC external terminals (collective) and FG terminal)					
Environment	Operating ambient temperature	0 to 55 °C					
	Operating ambient humidity	10 to 90 %RH (no condensation allowed)					
	Ambient storage temperature	-20 to 75 °C					
	Ambient storage humidity	10 to 90 %RH (no condensation allowed)					
	Operating atmosphere	No corrosive gas, no excessive amount of dust					
	Grounding	JIS class 3					
	Noise immunity	Noise voltage 1500 Vp-p, measured by noise simulator with noise width of 1μs, rise time of 1ns and repeating frequency of 25 to 60 Hz					
	Vibration strength	Conforms to JIS C0911, frequency 10 to 55 Hz, amplitude 0.15 mm Frequency 55 to 150 Hz, acceleration 9.8 m/s^2 Swept 10 times in each X, Y and Z direction (1 octave, 1 minute)					
	Mechanical shock resistance	Conforms to JIS C 0911, 98 m/s^2, 3 times in each of three directions					
Structure/ Appearance	Structure	Built into panel					
	Cooling method	Natural cooling					
	Mounting method	Direct (with 4 or 5 screws (M4, 12 mm)), DIN rail (except for F3BU16-0N)					
	Paint color	Light cobalt blue: Munsell 6.2 PB4.6/8.8 or equivalent, lamp black: Munsell 0.8 Y2.5/0.4 or equivalent					
	Weight	Approx. 2.4 kg when 13-slot base module is fully occupied with contact modules.					

Software

Category	Name	Type Name	Category
Development tool	FA-M3 Programming Tool WideField2*1	SF620-MCW	Windows 2000, XP, Vista compatible, multi-lingual version, CD-ROM
	BASIC Programming Tool M3 for Windows	SF560-ECW	Windows 95, 98, Me, NT, 2000, XP compatible, English version, CD-ROM
Setup tool	ToolBox for Temperature Control and Monitoring Modules	SF661-ECW	Windows 2000, XP, Vista compatible, English version, CD-ROM (for F3CU04 and F3CX04)
	ToolBox for Positioning Module	SF662-ECW	Windows 2000, XP, Vista compatible, English version, CD-ROM (for F3NC3□)

*1: WideField2 R5.01 and later versions are multi-lingual versions supporting English and Japanese.
Note: Some PCs and printers cannot be used even if they are of the same series and from the same manufacturer, due to CPU type, clock frequency or number of printable digits.
Note: Personal computers with a built-in hard disk are recommended. For personal computers and printers other than those recommended, check with Yokogawa's sales office for compatibility.
Note: When using F3SP66 or F3SP67 sequence CPU module, beware that the module may be incompatible with some software versions.

Hardware List

Category	Name	Type name	Specification	
Base	Base module *1	F3BU04-0N	For Power supply (F3PU10/F3PU16) + 4 slots (CPU+I/O)	
		F3BU05-0D	For Power supply (F3PU20/F3PU30/F3PU26/F3PU36) + 5 slots (CPU+I/O)	
		F3BU06-0N	For Power supply (F3PU10/F3PU16) + 6 slots (CPU+I/O)	
		F3BU09-0N	For Power supply (F3PU20/F3PU30/F3PU26/F3PU36) + 9 slots (CPU+I/O)	
		F3BU13-0N	For Power supply (F3PU20/F3PU30/F3PU26/F3PU36) + 13 slots (CPU+I/O)	
		F3BU16-0N *5	For Power supply (F3PU20/F3PU30/F3PU26/F3PU36) + 16 slots (CPU+I/O)	
Power supply	Power supply module	F3PU10-0S	100 to 240 V AC, 5.0 V DC/2.0 A rated output (for 4 and 6 slots, M4 screws)	
		F3PU20-0S	100 to 240 V AC, 5.0 V DC/4.3 A rated output (for 9,13 and 16 slots, M4 screws)	
		F3PU30-0S	100 to 240 V AC, 5.0 V DC/6.0 A rated output (for 9,13 and 16 slots, M4 screws)	
		F3PU16-0N	24 V DC, 5.0 V DC/2.0 A rated output (for 4 and 6 slots)	
		F3PU26-0N	24 V DC, 5.0 V DC/4.3 A rated output (for 9, 13 and 16 slots)	
		F3PU36-0S	24 V DC, 5.0 V DC/6.0 A rated output (for 9, 13 and 16 slots, M4 screws)	
CPU	Sequence CPU module	F3SP21-0N	Ladder 10K steps, basic instruction 0.18 μs or longer, with memory	
		F3SP28-3S	Ladder 30K steps, basic instruction 0.045 μs or longer, with memory	
		F3SP38-6S	Ladder 120K steps, basic instruction 0.045 μs or longer, with memory	
		F3SP53-4S	Ladder 56K steps, basic instruction 0.0175 μs or longer, with memory	
		F3SP58-6S	Ladder 120K steps, basic instruction 0.0175 μs or longer, with memory	
		F3SP59-7S	Ladder 254K steps, basic instruction 0.0175 μs or longer, with memory	
		F3SP66-4S	Ladder 56K steps, basic instruction 0.0175 μs or longer, with network functions	
		F3SP67-6S	Ladder 120K steps, basic instruction 0.0175 μs or longer, with network functions	
	BASIC CPU module	F3BP20-0N	BASIC language, 120K bytes	
		F3BP30-0N	BASIC language, 510K bytes	
FA-M3 value2	Value (with I/O)	F3SC23-1F	Includes F3SP08-SP, F3BU04-0N, 16 inputs,16 outputs (DC input, TR sink output, 24VDC) Connector *2	
		F3SC23-2F	Includes F3SP08-SP, F3BU04-0N and F3WD64-3F	
		F3SC23-1A	Includes F3SP08-SP, F3BU04-0N ,F3XD16-3F and F3YD14-5A	
	Spare	F3SP08-SP	Sequence CPU (ladder 10K steps) with power supply (M4 screws)	
		F3WD32-3F *3	DC input sink/source, 24 V DC, TR output sink type, 24 V DC, 0.1 A, 16 points each	
Memory	ROM pack	RK10-0N	Ladder 5K steps (for F3SP08/21)	
		RK30-0N	BASIC 120K bytes (for F3BP20), ladder 20K steps (for F3SP08/21)	
		RK33-0N	Ladder 56K steps (for F3SP08/21/28/38/53/58/59)	
		RK53-0N	BASIC 510K bytes (for F3BP30), ladder 100K steps (for F3SP08/21)	
		RK73-0N	Ladder 120K steps (for F3SP28/38/53/58/59)	
		RK93-0N	Ladder 360K steps (for F3SP28-3S/38-6S/53-4S/58-6S/59-7S)	
Memory module	Memory card module	F3EM01-0N	Media: compact flash, FAT16 compatible	
I/O module	Input module	F3XA08-1N	100-120 V AC, 8 points	Terminal block
		F3XA08-2N	200-240 V AC, 8 points	Terminal block
		F3XH04-3N	High-speed input with pulse catch function, 24 V DC, 4 points	Terminal block
		F3XC08-0N	No-voltage contact input, 8 points	Terminal block
		F3XC08-0C	No-voltage contact input, 8 points, separate commons	Terminal block
		F3XD08-6F	For both DC input sink/source, 12-24 V DC, 8 points	Terminal block
		F3XD16-3F	For both DC input sink/source, 24 V DC, 16 points	Terminal block
		F3XD16-4F	For both DC input sink/source, 12 V DC, 16 points	Terminal block
		F3XD16-3H	DC input, positive common, 24 V DC, 16 points (high-speed input)	Terminal block
		F3XD32-3F	For both DC input sink/source, 24 V DC, 32 points	Connector *2
		F3XD32-4F	For both DC input sink/source, 12 V DC, 32 points	Connector *2
		F3XD32-5F	TTL input, 5 V DC, 32 points	Connector *2
		F3XD64-3F	For both DC input sink/source, 24 V DC, 64 points	Connector *2
		F3XD64-4F	For both DC input sink/source, 12 V DC, 64 points	Connector *2
		F3XD64-6M	For both DC input sink/source, 12 to 24 V DC, 64 points (8x8)	Connector *2

Category	Name	Type name	Specification	
I/O module	Output module	F3YA08-2N	Triac output (100/240 V AC), 1 A, 8 points	Terminal block
		F3YC08-0C *8	Relay output (5-24 V DC, 100-240 V AC), 2 A, isolated commons, 8 points	Terminal block
		F3YC08-0N *8	Relay output (5-24 V DC, 100-240 V AC), 2 A, 8 points	Terminal block
		F3YC16-0N *8	Relay output (5-24 V DC, 100-240 V AC), 2 A, 16 points	Terminal block
		F3YD04-7N	TR output, 24 V DC, 2A, isolated commons, 4 points	Terminal block
		F3YD08-6A	TR sink output, 12-24 V DC, 1 A, 8 points	Terminal block
		F3YD08-6B	TR source output, 12-24 V DC, 1 A, 8 points	Terminal block
		F3YD08-7A	TR sink output, 12-24 V DC, 2 A, 8 points	Terminal block
		F3YD14-5A	TR sink output, 12-24 V DC, 0.5 A, 14 points	Terminal block
		F3YD14-5B	TR source output, 12-24 V DC, 0.5 A, 14 points	Terminal block
		F3YD32-1B	TR source output, 12-24 V DC, 0.1 A, 32 points	Connector *2
		F3YD32-1H	TR sink output, 12-24 V DC, 0.1 A, 32 points, with output short-circuit protection	Connector *2
		F3YD32-1P	TR sink output, 12-24 V DC, 0.1 A, 32 points, with output short-circuit protection	Connector *2
		F3YD32-1T	TTL output, 5 V DC, 16 mA, 32 points	Connector *2
		F3YD64-1M	TR output, matrix scan, 12/24 V DC, 64 points (8x8)	Connector *2
		F3YD64-1P	TR sink output, 12-24 V DC, 0.1 A, 64 points, with output short-circuit protection	Connector *2
	I/O module	F3WD64-3F	Input, TR output, sink, 24 V DC, 32 points each	Connector *2
		F3WD64-4F	Input, TR output, sink, 12 V DC, 32 points each	Connector *2
Analog I/O/ temperature module	Analog input module	F3AD04-0N	0-5V, 1-5 V DC or -10 to 10 V DC input, 4 points	Terminal block
		F3AD04-0V	0-5V, 1-5 V DC or -10 to 10 V DC input, 4 points	Terminal block
		F3AD04-0R	0-5V, 1-5 V DC or -10 to 10 V DC input, 4 points, 16-bit high res. ADC	Terminal block
		F3AD08-1V	0-5V, 1-5 V DC or -10 to 10 V DC input, 8 points	Terminal block
		F3AD08-4R	0-20mA,4-20mA input, 8 points, 16-bit high-res. ADC, sampling at 50 μs/point	Terminal block
		F3AD08-5R	0-5V,0-10V,1-5V,-10 to 10V DC input, 8 points, 16-bit high res. ADC, sampling at 50 μs/point	Terminal block
		F3AD08-6R	0-5V,1-5V,-10 to 10VDC,0-20mA,4-20mA input, 8 points, 16-bit high res. ADC, sampling at 50 μs/point	Terminal block
		F3AD08-4V	0-20mA,4-20mA input, 8 points, 12-bit ADC, sampling at 1 ms/point	Terminal block
	High-speed data acquisition module	F3HA08-0N	0-5 or -10 to 10 V DC input, 8 points (4 points at the same time), 24 V DC trigger input x 1	Terminal block
	Analog output module	F3DA02-0N	-10 to 10 V DC, 4-20 mA DC output, 2 points	Terminal block
		F3DA04-1N	-10 to 10 V DC, 4-20 mA DC output, 4 points	Terminal block
		F3DA08-5N	-10 to 10 V DC output, 8 points	Terminal block
	Temperature control and PID module	F3CU04-0S	4 universal inputs (TC, RTD or voltage), 100 ms for 2 channels or 200 ms for 4 channels	Terminal block
		F3CU04-1S	4-20 mA continuous output in addition to the functions of F3CU04-0N	Terminal block
	Temperature monitoring module	F3CX04-0N	4 universal inputs (TC, RTD or voltage)	Terminal block
Communications module	Personal computer link module	F3LC11-2F	115 kbps max., RS-422/RS-485 port x 1	Connector
		F3LC11-1F	115 kbps max., RS-232-C port x 1, with modem interface function	Connector
		F3LC12-1F	115 kbps max., RS-232-C port x 2, with modem interface function	Connector
	UT link module	F3LC51-2N	RS-422 / RS-485 port x 1, allows easy connection of digital indicating controller	Terminal block
	DeviceNet interface module	F3LD01-0N	500 kbps max., DeviceNet port x 1, with master/scanner function	Terminal block
	Ethernet interface module	F3LE01-5T	10 Mbps, 10BASE5/10BASE-T, with higher-level link, event transmission function	Connector
		F3LE11-0T	10/100 Mbps, 10BASE-T/100BASE-TX , with E-mail function	Connector
		F3LE12-0T	10/100 Mbps, 10BASE-T/100BASE-TX, with higher-level link, (UDP/IP) messaging function	Connector
	FL-net interface module	F3LX02-1N *6	FL-net (OPCN-2) protocol Ver. 2.0 compliant, 10 Mbps max.	Connector
	ASi master module	F3LA01-0N	AS-interface V2.1 compliant, total transmission distance 100m, 167 kbps	Connector
	PROFIBUS-DP interface module	F3LB01-0N	12 Mbps max., PROFIBUS-DP port x 1	Connector
	YHLS master module	F3LH01-1N	12 Mbps max., YHLS port x 1	Terminal block
		F3LH02-1N	12 Mbps max., YHLS port x 2	Terminal block
	NX Interface module	F3NX01-0N	10 Mbps, 10BASE5/10BASE-T, with Autonomous Distribution*4 protocol	Connector
	RS-232-C communications module	F3RS22-0N	19200 bps max., RS-232-C port x 2 (for F3BP20, F3BP30)	Connector
	RS-422 communications module	F3RS41-0N	19200 bps max., RS-422/RS-485 port x 1 (for F3BP20, F3BP30)	Terminal block
	Ladder communications module	F3RZ81-0F	115 kbps max., RS-232C port x 1	Connector
		F3RZ82-0F	115 kbps max., RS-232C port x 2	Connector
		F3RZ91-0F	115 kbps max., RS-422/RS-485 port x 1	Terminal block
	GP-IB communications module	F3GB01-0N	GP-IB port x 1	Connector

Category	Name	Type name	Specification	
FA link/ FA-bus module (fiber-optic)	FA link H module	F3LP02-0N	32 stations max., total transmission distance 1km, 1.25M bps max.	Terminal block
	Fiber-optic FA-bus module	F3LR01-0N	7 stations max., total transmission distance 200 m, 10M bps max.	Connector
	Fiber-optic FA-bus Type 2	F3LR02-0N	32 stations max., total transmission distance 1.4 km, max. distance betw. stations 500 m, 10 Mbps max.	Connector
	FA-bus Type 2 module	F3LR02-1W	7 stations max., total transmission distance 80m, max. distance betw. stations 10m, 10Mbps max., wired	Terminal block
Counter/ positioning module	High-speed counter module	F3XP01-0H	Up/down counter, phase difference, pulse + direction, addition/subtraction, 400 kpps (for x4), 32-bit channel x 1	Connector *2
		F3XP02-0H	Up/down counter, phase difference, pulse + direction, addition/subtraction, 400 kpps (for x4), 32-bit channel x 2	Connector *2
	Pulse input module	F3XS04-3N	Ring-up counter, 0-20 kHz, 24 V DC input, 16-bit channel x 4	Terminal block
		F3XS04-4N	Ring-up counter, 0-20 kHz, 12 V DC input, 16-bit channel x 4	Terminal block
	Positioning module (with multi-channel pulse output)	F3YP14-0N	4-axis control, max. 499.75 kpps for stepping motor control or 3.998Mpps for servo/DD/linear motor control	Connector *2
		F3YP18-0N	8-axis control, max. 499.75 kpps for stepping motor control or 3.998Mpps for servo/DD/linear motor control	Connector *2
	Positioning module (with pulse output)	F3NC32-0N	2-axis control, 5 Mpps max. pulse output, PTP and linear/circular interpolation, direct/pattern operation, counter for ABS encoder I/O (2 ch)	Connector *2
		F3NC34-0N	4-axis control, 5 Mpps max. pulse output, PTP and linear/circular/helical interpolation, direct/pattern operation, counter for ABS encoder I/O (4 ch)	Connector *2
	Positioning module (with analog voltage output)	F3NC51-0N	1-axis control with speed reference voltage output type	Connector *2
		F3NC52-0N	2-axis control with speed reference voltage output type	Connector *2
	Positioning module (with MECHATROLINK-II interface)	F3NC96-0N	15-axis control with MECHATROLINK-II *7 interface	Connector

*1: The rail mount kit must be purchased separately.
*2: Connector for external connection and connector cover must be purchased separately.
*3: F3WD32-3F is to be used with F3SP08-SP.
*4: Autonomous Distribution® is a registered trademark of Hitachi, Ltd.
*5: This unit cannot be used with the rail mount kit.
*6: F3LX02-1N is not compatible with F3LX01-0N. Contact Yokogawa sales office for F3LX01-0N.
*7: MECHATROLINK-II is a registered trademark of Yaskawa Electric.
*8: Relays of relay output modules are not of hermetically sealed type so their service life may be affected by dust or corrosive gases. When switched on/off in an atmosphere containing silicone gases from silicone-based materials, these relays may suffer from poor electrical contact due to SiO_2 (silicon dioxide) deposits, especially under load conditions below 24 VDC and 500 mA for which transistor output or other modules employing semiconductor elements are recommended.
(Note) For coating treatment, contact Yokogawa's sales office.

Peripheral Devices

Category	Name	Type name	Specification
Peripheral device	CPU port / D-sub 9-pin conversion cable	KM10-0C	D-sub 9-pin, female, cable length approx. 0.5 m
	SIO port adaptor cable *1	KM10-0S	SIO port / D-sub 9-pin, female, cable length 0.5 m (for F3SP66-4S, F3SP67-6S)
	Cable for programming tool *2	KM11-2T	DOS/V compatible, cable length approx. 3 m
		KM13-1S	USB 1.1 compliant USB-serial converter, cable length approx. 3 m
	Monitor cables *1	KM21-2N	SIO port / D-sub 9-pin, male, cable length 3 m (for F3SP66-4S, F3SP67-6S)
		KM21-2T	SIO port / D-sub 9-pin, female, cable length 3 m (for F3SP66-4S, F3SP67-6S)
	Cable for fiber-optic FA bus (for use inside panel)	KM60-S06	For use inside panel, cable length approx. 0.6 m
		KM60-001	For use inside panel, cable length approx. 1 m
		KM60-003	For use inside panel, cable length approx. 3 m
	Cable for fiber-optic FA bus (for indoor use)	KM61-□□□	For indoor use, cable length *
		KM65-□□□	For indoor use, cable length *
	Cable for fiber-optic FA bus (for outdoor use)	KM62-□□□	For outdoor use, cable length *
		KM67-□□□	For outdoor use , cable length *
	YHLS slave units (TAH series)	TAHWD32-3PAM	16 DC inputs (positive common), 24 V DC, MIL, 16 TR outputs (sink-type, with short-circuit protection), 24 V DC 0.1 A, MIL
		TAHWD32-3NBM	16 DC inputs (negative common), 24 V DC, MIL, 16 TR outputs (source-type, with short-circuit protection), 24 V DC 0.1 A, MIL
		TAHXD16-3PEM	16 DC inputs (positive common), 24 V DC, MIL
		TAHXD16-3NEM	16 DC inputs (negative common), 24 V DC, MIL
		TAHYD16-3EAM	16 TR outputs (sink-type, with short-circuit protection), 24 V DC 0.1 A, MIL
		TAHYD16-3EBM	16 TR outputs (source-type, with short-circuit protection), 24 V DC 0.1 A, MIL
	YHLS communication cables	KM80-□□□	YHLS fixed cable, cable length *
		KM81-□□□	YHLS flexible cable, cable length *
	Terminal block unit	TA40-0N	Converts 40 point I/O connector to European type terminal block.
		TA50-0N	Connector terminal block (40 points), M3.5 screw
		TA50-1N	Connector terminal block (40 points), M3 screw
		TA60-0N	Connector terminal block (40 points), European type
	Cable for conector terminal block	KM55-□□□	Cable between module and terminal block, length from 0.5 m (-005) to 3 m (-030) in 0.5 m increments
	Blank module	F3BL00-0N	For empty I/O slots
	Input simulator switch	S9307UF	Simulator switch for input terminals (for F3XD32-□F, F3XD64-□F, F3WD64-□F)

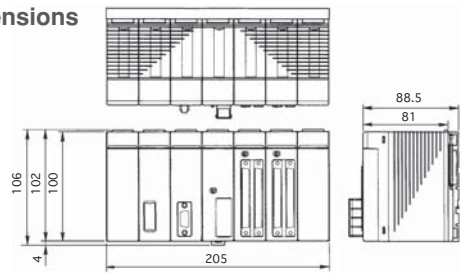
*1: The cable is to be connected to the connector labelled "SIO" located on the front panel of F3SP66/F3SP67 for higher-level link service (personal computer link functions). It is not to be used for online connection to FA-M3 programming tool WideField2.
*2: These cables for programming tools cannot be used with F3SP66 and F3SP67 CPU modules.
*: Contact Yokogawa's sales office.

Manuals

Name	Document No.
Hardware Manual	IM 34M6C11-01E
Memory Card Module	IM 34M6C22-01E
USB-Serial Converter	IM 34M6C91-01E
High-speed Data Acquisition Module	IM 34M6G02-01E
Analog Input/Output Modules	IM 34M6H11-01E
Analog Input Modules	IM 34M6H11-02E
Serial Communication Modules	IM 34M6H21-01E
Ladder Communication Modules (for F3RZ81-0F, F3RZ82-0F, F3RZ91-0F)	IM 34M6H22-02E
Ethernet Interface Module (F3LE01-5T, F3LE11-0T)	IM 34M6H24-01E
Ethernet Interface Module (F3LE12-0T)	IM 34M6H24-04E
UT Link Module	IM 34M6H25-01E
DeviceNet Interface Module	IM 34M6H28-01E
NX Interface Module	IM 34M6H29-01E
FL-net (OPCN-2) Interface Module	IM 34M6H32-02E
ASi Master Module	IM 34M6H33-01E
PROFIBUS-DP Interface Module	IM 34M6H34-01E
Personal Computer Link Modules	IM 34M6H41-02E
FA-Link H Module and Fiber-optic FA Link H Module	IM 34M6H43-01E
Fiber-optic FA-bus Module and Fiber-optic FA-bus Type 2 Module	IM 34M6H45-01E
YHLS Slave Units (TAH Series)	IM 34M6H46-03E
YHLS Master Module (F3LH01-1N, F3LH02-1N)	IM 34M6H46-04E
High-speed Counter Modules	IM 34M6H53-01E
Pulse Input Module	IM 34M6H54-01E
Positioning Modules (with Multi-channel Pulse Output) (F3YP14-0N, F3YP18-0N)	IM 34M6H55-02E
Positioning Modules (with Pulse Output)	IM 34M6H56-02E
Positioning Modules (with Analog Voltage Output)	IM 34M6H58-01E
Positioning Modules (with MECHATROLINK-II Interface)	IM 34M6H60-02E
Temperature Control and PID Module	IM 34M6H62-01E
Temperature Control and PID Module (for F3CU04-0S, F3CU04-1S)	IM 34M6H62-02E
Temperature Monitoring Module	IM 34M6H63-01E
Sequence CPU Modules – Functions (for F3SP21, F3SP25 and F3SP35)	IM 34M6P12-02E
Sequence CPU – Instructions	IM 34M6P12-03E
Sequence CPU – Functions (for F3SP28-3N/3S, F3SP38-6N/6S, F3SP53-4H/4S, F3SP58-6H/6S and F3SP59-7S)	IM 34M6P13-01E
Sequence CPU – Functions (for F3SP66-4S, F3SP67-6S)	IM 34M6P14-01E
Sequence CPU – Network Functions (for F3SP66-4S, F3SP67-6S)	IM 34M6P14-02E
Personal Computer Link Commands	IM 34M6P41-01E
FA-M3 Programming Tool WideField2*1	IM 34M6Q15-01E
BASIC CPU Modules and YM-BASIC/ FA Programming Language*1	IM 34M6Q22-01E
BASIC Programming Tool M3 for Windows*1	IM 34M6Q22-02E
FA-M3 ToolBox Manual*1	IM 34M6Q30-01E
FA-M3 ToolBox for Positioning Modules*1	IM 34M6Q31-01E
FA-M3 ToolBox for Temperature Control and Monitoring Modules*1	IM 34M6Q31-02E

*1: Supplied with the software package as PDF file. Paper documentation can be ordered separately if necessary.

External Dimensions



Unit: mm

Base module	Number of slots	Number of I/O slots *	Total width
F3BU04	4	3	147
F3BU05	5	4	205
F3BU06	6	5	205
F3BU09	9	8	322
F3BU13	13	12	439
F3BU16	16	15	527

* The number of available I/O slots is indicated assuming that one CPU module is installed.

FA-M3R Website

www.yokogawa.com/itc

Trademarks:

- FA-M3R is a registered trademark of Yokogawa Electric Corporation.
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⚠ Caution

- For proper and safe use of this product, read the instruction manual thoroughly.
- If faults of this product are expected to result in accidents or losses, install additional external protection and/or safety circuits.
- If the product is to be used in applications which may directly affect or threaten human lives and safety, such as railway facilities, aviation and space navigation, medical equipment or transport equipment, please contact Yokogawa's sales office.

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