for a greener tomorrow

MITSUBISHI ELECTRIC
Changes for the Better

FACTORY AUTOMATION

THE AUTOMATION BOOK

A world of solutions

- Global service & support
- Standards driven
- Innovative solutions
- Improving financial performance

Global impact of Mitsubishi Electric

Through Mitsubishi Electric's vision, "Changes for the Better" are possible for a brighter future.

Changes for the Better

We bring together the best minds to create the best technologies. At Mitsubishi Electric, we understand that technology is the driving force of change in our lives. By bringing greater comfort to daily life, maximising the efficiency of businesses and keeping things running across society, we integrate technology and innovation to bring changes for the better.

Mitsubishi Electric is involved in many areas including the following

Energy and electric systems

A wide range of power and electrical products from generators to large-scale displays.

Electronic devices

A wide portfolio of cutting-edge semiconductor devices for systems and products.

Home appliance

Dependable consumer products like air conditioners and home entertainment systems.

Information and communication systems

Commercial and consumer-centric equipment, products and systems.

Industrial automation systems

Maximising productivity and efficiency with cutting-edge automation technology.

Contents

Present right through Europe

From the development of products to the management of entire plants, our experience in the industrial market spans more than 80 years. The knowledge we have built up over the decades and our complete product portfolio allow us to work together with customers to create complete turnkey solutions that meet all specific needs. With a globe-spanning service network, we not only provide after-sales service, but also training and technical consultation.

An open working relationship between supplier and customer gets results faster and more efficiently.

Global partner, local friend

Mitsubishi Electric Factory Automation is synonymous with innovative, high-quality products. Our programmable logic controllers, drive solutions and industrial robots are among the most powerful on the market, and have been contributing to the success of European manufacturing for over 35 years.

Sales and support, never far away

The Factory Automation division has its own sales organisations in Germany, Great Britain, France, Ireland, Italy, Spain, Russia, Poland and Czech Republic. In addition, we have developed an extensive network of partner companies across the whole of Europe and neighbouring countries.

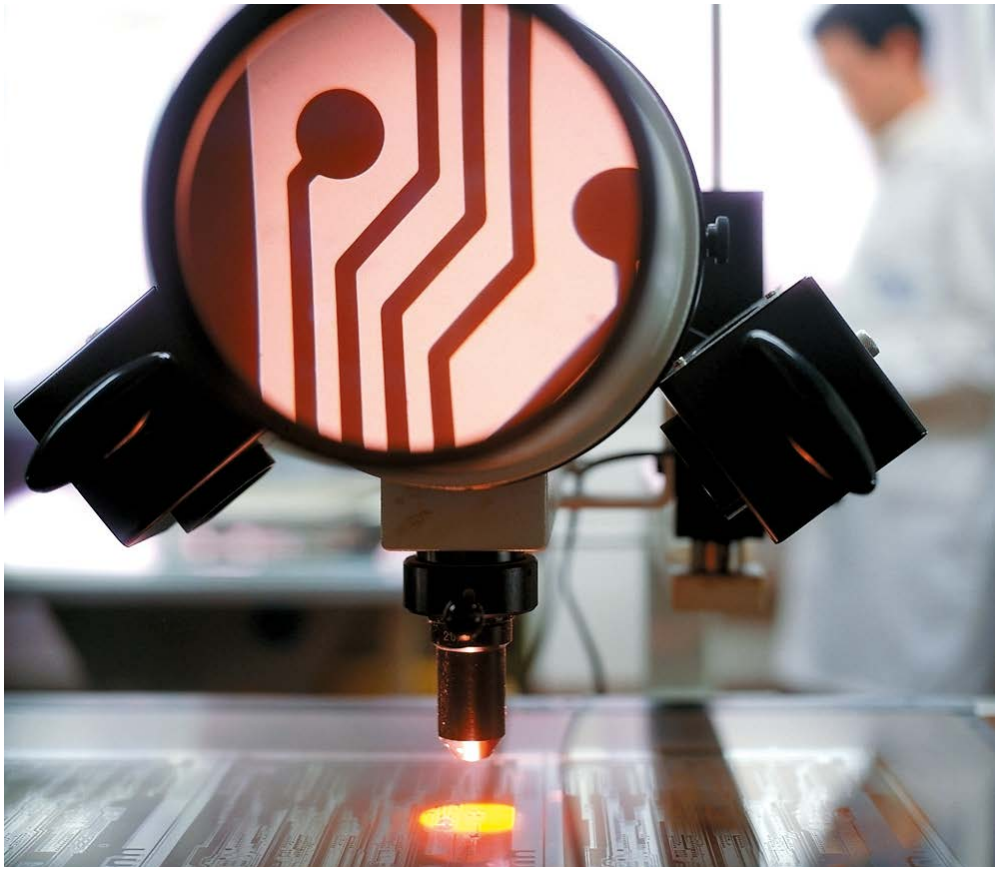
We coordinate and organise our local support throughout Europe to ensure the highest possible standards. Additional support services are available from our European Development Centre (EDC) and EMC Competence Centre.

Trust and loyalty is as important as products

Collaboration with capable partners in the automation industry is one of the key elements in Mitsubishi Electric's success. Today more than ever, customers expect automation solutions tailored to the specific requirements of their applications. Our partners' expertise in specific industries, coupled with Mitsubishi Electric's innovative automation technology, are the two main ingredients of a successful recipe for made-to-order solutions and perfect customer service.

A focus on service

The customer is always the focus of all our service activities. Our customers get the best possible support from experienced staff, who provide competent advice and help with planning, projects, installation and configuration, training and all automation questions and tasks. Optimized stocks and a central logistics centre ensure fast, efficient deliveries of replacement and spare parts. For fast technical information and support, we handle questions from customers all over Europe via our telephone hotline.



Attention to detail leaves little to chance.

Setting the standards

Mitsubishi Electric has a reputation for producing high quality products. This comes, in part, from our commitment to understanding and meeting the requirements of international standards and directives. In addition to European CE compliance, many products also have additional approvals such as:

- Shipping approvals like ABS, DNV, GL, RINA, BV, Lloyd's register
- International approvals like UL (USA), cUL (Canada) and EAC mark.

Market leaders

In the world of manufacturing, change is omnipresent. To ensure our products reflect the current needs of customers, we base every aspect of product development and production on the voice of the market. To keep our high levels of product reliability, we incorporate a quality control program that leaves nothing to chance, resulting in the high level of quality synonymous with the Mitsubishi Electric name.

Mitsubishi Electric products are widely regarded as being among the most innovative in the industry. In terms of volume, one in three PLCs in the world today is a Mitsubishi Electric.

Indeed, some of our competitors use Mitsubishi Electric's innovative power management technology in their own frequency inverters.

When all these factors are taken together, it is no wonder our customers think of Mitsubishi Electric's automation products as leading the market.

Water

Water is a critical element of life. Without a constant, clean supply for drinking and washing and effective handling of grey waste, society quickly breaks down. Automation solutions need to be reliable and flexible to meet the changing demands of the public but also the pressures to deliver shareholder value. That is why so many utility companies use Mitsubishi Electric.

Application in action

COMPANY
Klinting Vandvaerk

LOCATION
Denmark

AUTOMATION SPECIALIST
PRO/AUTOMATIC

APPLICATION
Water pumping station

PRODUCTS
Mitsubishi Electric modular PLCs, frequency inverter drives, Wago remote I/Os

NETWORK
CC-Link

NOTE
Bore holes were up to 1.2 km away from the main water station.

COMMENT
"It was easy to create the network systems and it has some very powerful unique features."
Jean Petersen PRO/AUTOMATIC

Food

The range of food available to the consumer today is vast, from ready prepared salads to pre-cooked pies and frozen meats. Much of it comes from far off places but must be processed and delivered on time, every time. Because food is so important to our daily lives there are strict rules and guidelines regarding traceability, labelling, packaging and quality control. Mitsubishi Electric has expertise in all of these areas.

Application in action

COMPANY
Virgin Trading (Virgin Cola)

LOCATION
Ireland

AUTOMATION SPECIALIST
Charles Wait

APPLICATION
Manufacture of cola concentrate

PRODUCTS
Mitsubishi Electric software and modular PLCs

NOTE
Production facility built to be one of the most efficient in the world with an on-site staff of 6 producing up to 2 billion litres of Cola per year

COMMENT
"We chose Mitsubishi Electric … because of their reputation for reliability and worldwide support particularly in the food and beverage industry."
Rod Golightly, Charles Wait

Manufacturing

Manufacturing, like all engineering fields, is constantly under pressure to deliver innovative products in the most cost effective way. Generally, manufacturers are looking for suppliers who offer automation solutions that support the wide variety of standards they need, as well as offering flexibility, availability and reliability.

This is one reason why the world's manufacturers have bought more than twelve million Mitsubishi Electric FX family PLCs and 23 million inverters since their introduction over 30 years ago.

Application in action

COMPANY
Kaba Group

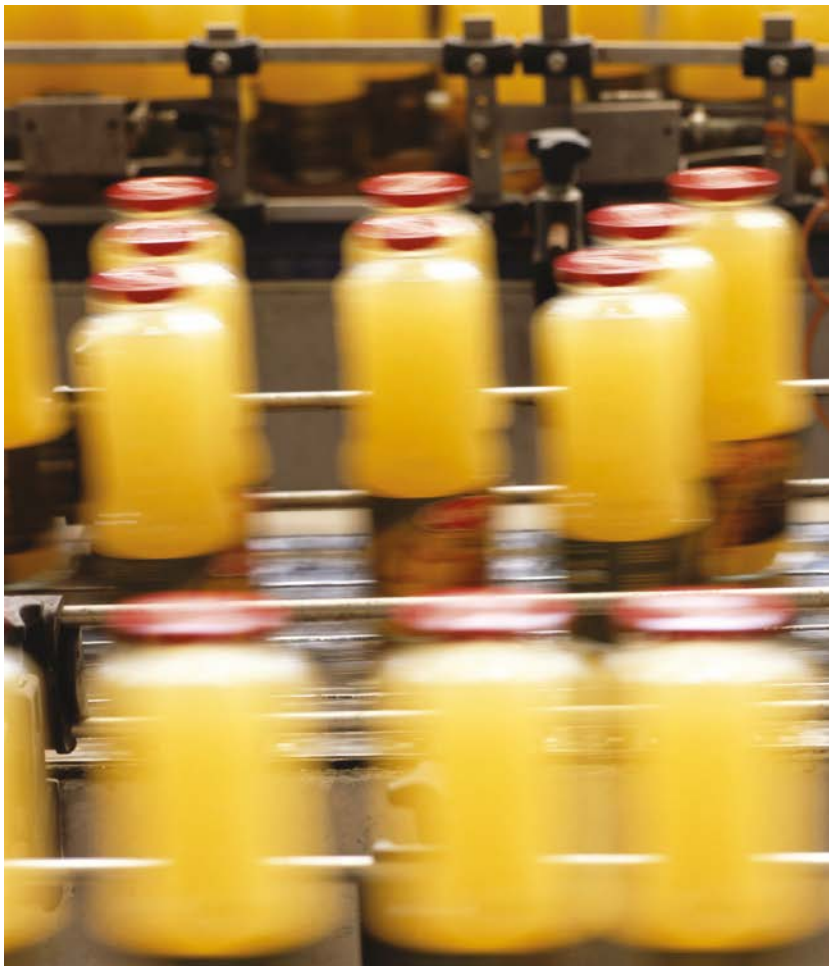
LOCATION
Austria

APPLICATION
Manufacture of keys

PRODUCTS
Mitsubishi Electric robots

NOTE
Two robots are used, one 's to place the brass workpiece in to the milling machine while a second robot picks up machined keys and applies the final finish from a rotating brush.

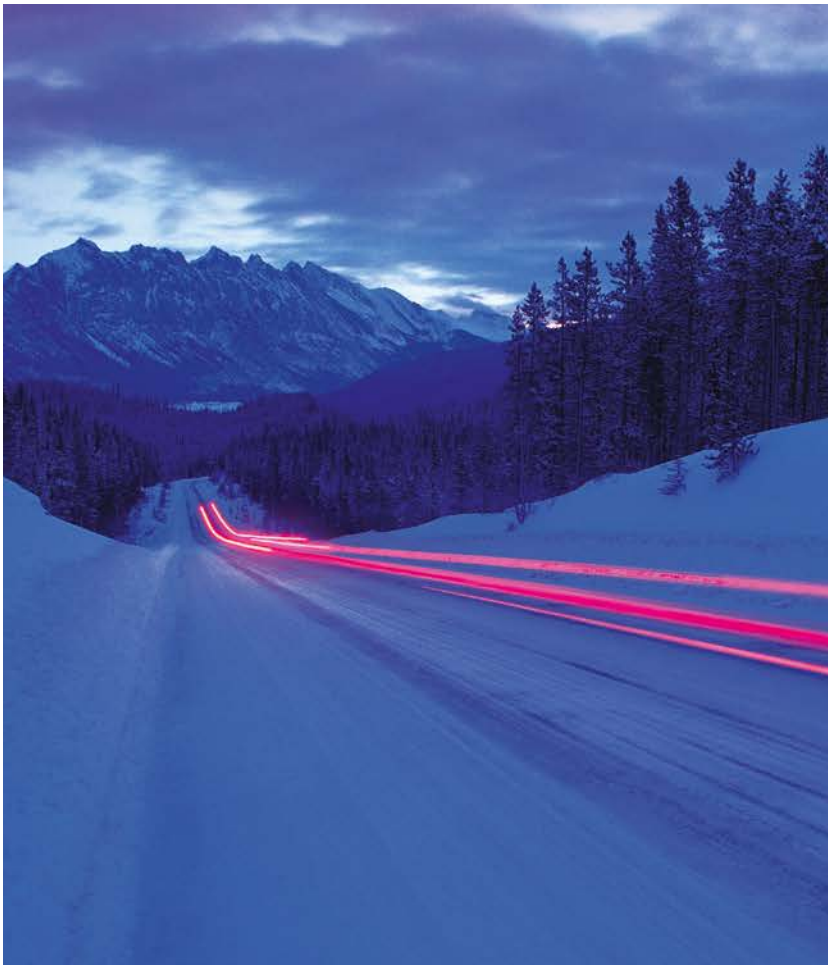
COMMENT
"Thanks to the use of the robot we were able to reduce costs and significantly improve the transit time."
Robert Weninghofer Production Manager at Kaba



Automotive

Shorter production cycles, adaptive manufacturing and integration of all areas in the manufacturing process are what make the automotive industry one of the most high power, high pressure, manufacturing sectors in the world.

This is also why these global brands turn to Mitsubishi Electric for the highest level of automation expertise.



Application in action

COMPANY
Global Engine Manufacturing Alliance (GEMA)

LOCATION
USA

APPLICATION
Manufacture of automotive engines

PRODUCTS
Mitsubishi Electric modular PLCs, HMI, servo amplifiers, CNC controllers and software

NOTE
GEMA is an alliance of the Chrysler Group, Mitsubishi Motors and Hyundai Motor Co. There are two facilities which will, together, produce up to 840,000 engines per year.

COMMENT
The Chrysler Group estimates that they will save annual costs of around 100 million dollars per year with the new automation concept.

Chemical

The chemical and pharmaceutical industries are among the world's most competitive, facing tough "speed to market" issues. New products developed in the laboratory have to be rushed into production. To do this safely, quickly and reliably, manufacturers need flexible automation solutions that support a wide range of standards. Mitsubishi Electric automation products answer these needs.

Application in action

COMPANY
Follmann & Co.

LOCATION
Germany

APPLICATION
Adhesive manufacture

PRODUCTS
Mitsubishi Electric compact PLCs, HMI, frequency inverter drives

NETWORK
Ethernet + Fieldbus

NOTE
The system has control over the manufacturing process for 17 different adhesives

COMMENT
"It was easy to create the network systems and it has some very powerful unique features."
Jean Petersen PRO/AUTOMATIC

Process

Many automated applications are a continuous process. They vary widely, ranging from power stations to waste incineration. However, all share a need for highly reliable systems. Moreover, control and management of operational waste is an issue undergoing greater regulation through directives such as IPPC. Mitsubishi Electric developed its MELSEC System Q specifically to meet these requirements.

Application in action

COMPANY
European Vinyls Corporation (EVC)

LOCATION
United Kingdom

AUTOMATION SPECIALIST
Tritec

APPLICATION
Combined Heat and Power (CHP) plant

PRODUCTS
Mitsubishi Electric modular PLCs and software

NOTE
Dual redundant PLC solution cost 25 % of traditional DCS solution. Installed system now saves £500,000 (approx. €530k) per year. Payback for the control system was 6 months.

COMMENT
"The PLC control system we developed had a system cost of around £0.25m, compared to £1m or more for a conventional system."
Tim Hartley, Tritec

Tomorrow's quality ...

Tomorrow's technology requires investment today

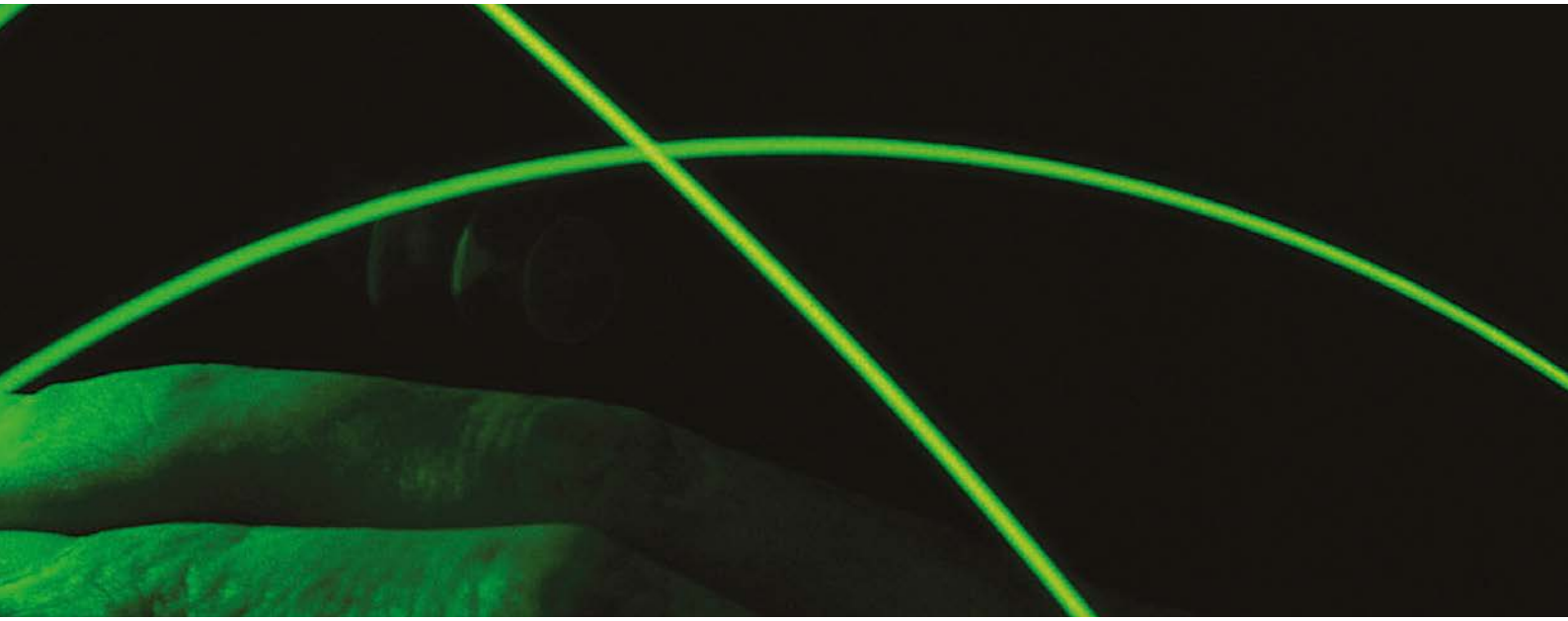
for a greener tomorrow

Eco Changes – for a greener future

Eco Changes is an expression of Mitsubishi Electric's commitment to environmental management. The programme is directed towards a greener future, achieved with innovative environmental technologies and manufacturing expertise.

Mitsubishi Electric's goal is to help create an ecological society by means of a broad spectrum of technologies and solutions for private households, offices, businesses, infrastructure and even space exploration. As a global company, we intend to make a key contribution to achieving the goal of a world with low carbon dioxide emissions and high recycling rates.

... today's goals



No matter what the application, the industry or a company's size, Mitsubishi Electric offers its customers the best service possible. This involves getting to know and understand the customer's needs, and being responsive to changing legal and social attitudes in order to develop products required tomorrow, in one year, or in five years.

R&D – lifeblood of the future

Research and development is the lifeblood of Mitsubishi Electric. Our research and development centres in Japan, the United States and in Europe are working on innovative technologies today for the breakthrough products of tomorrow. Mitsubishi Electric invests approximately 4 % of sales in developing tomorrow's technologies.

In a variety of ways, putting programmes and systems into place that help us get closer to our goal of actualizing a sustainable planet. From procurement to product design and manufacturing to logistics these activities demonstrate how environmentally conscious thinking and action are steadily becoming ingrained in our corporate culture.

Helping the environment

It's all about balance: the balance between effective use of resources, efficient use of energy, and safeguards against potentially harmful substances.

This insight into the balance between efficient automated manufacture and care for our environment helps us to better understand the needs of our customers. For example, the need to monitor and control waste in accordance with the European Integrated Pollution Prevention Control (IPPC) directive.

Working for a sustainable future.

This is an immense challenge, but one that Mitsubishi Electric is actively pursuing on a daily basis, while keeping focused on one goal. That goal is a global society where life can continually improve in harmonious coexistence with the natural environment.

And so Mitsubishi Electric factories work to ensure full ISO 14000 compliance, and to produce products with fewer harmful substances.

Product and service

Technical support is about getting the right answers first time.

When choosing an automation partner our customers look at many different factors, from company stability to market-leading products. Yet one thing they are all interested in is service and support.

Service in Europe

Networks, technology centres and partners spanning Europe ensure outstanding local support services.

The human element

Reliable technical support is only a call away

All repairs are carried out by qualified and experienced engineers.

Comprehensive training programs

Our customer hotline supports both current and older product lines. Local engineers then provide telephone support in native languages.

This local service can also provide in-depth technical support when necessary. Thanks to this mix of local and centralized support customers can always be sure they can get the support they need, when they need it.

Complementing our local support, the website https://eu3a.mitsubishielectric.com offers MyMitsubishi users access to manuals, CAD drawings, HMI drivers, GSD files and EPlan files for easy design etc. for free.

Minimizing downtime

Downtime caused by an operational failure is never good news. In today's tough business environment returning to full production as soon as possible is critical.

Our comprehensive services will help you to get your plant up and running again fast, keeping expensive downtime to a minimum.

Training for performance

Dealing with complex automation equipment in a fast-paced manufacturing environment requires well-trained personnel. Mitsubishi Electric offers the latest automation training in the use and maintenance of automation systems. This ensures optimum operating performance.

Automation solutions whatever the application

e-F@ctory is the Mitsubishi Electric solution for improving the performance of any manufacturing enterprise, providing three key benefits: Reduced total cost of ownership (TCO), Maximized productivity, and Seamless integration.

Companies often mull over and discuss factory or plant-wide management solutions for many years – but without ever actually implanting them. After all, they are understandably reluctant to halt production for an extended period while the new system is being fitted, and find the prospect of organizing and planning the whole activity daunting, especially since they often want to implement a new solution all at once.

e-F@ctory

The e-F@ctory solution from Mitsubishi Electric answers a lot of these issues. It is based on the MELSEC System Q and MELSEC iQ-R series automation platform concept. Thanks to the modular design of these automation controllers, it is now much easier to implement plant-wide control based on segmented or manufacturing cell solutions.

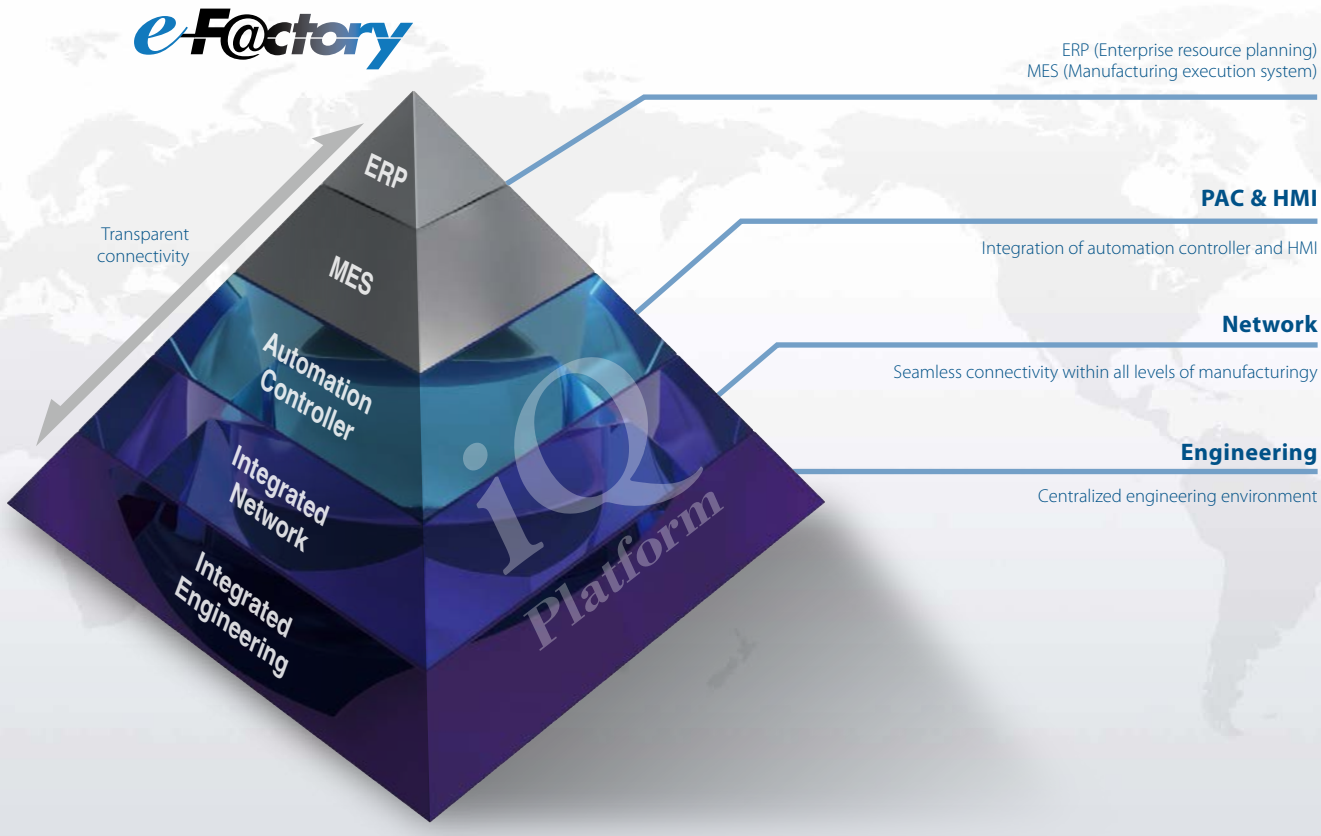
Communication

Plant-wide operations rely on good communication strategies. The MELSEC automation platform can support over 50 different forms of communication, including standard RS232, fieldbuses, Ethernet, webservers and redundant networks.

Making life easy

Traditionally, the interface between MES and the production environment has been separated by a layer of management PCs and master PLCs used for concentrating data and cell information. With the MELSEC automation platform, this structure can be simplified by embedding the PC directly on the same backplane. This removes a layer of management structure as well as simplifies implementation.

Each customer's requirements are different and the automation solutions from Mitsubishi Electric are designed to offer a wide range of solutions that can be easily adapted. The MELSEC automation platform enables the use of local embedded webserver technology, meaning that Ethernet and web-based browsing can be used for capturing data. Moreover, a dedicated MES interface allows MELSEC System Q and the iQ-R series to "talk" directly to the MES software without any intermediary devices, reducing implementation and on-going maintenance costs.



Compact PLCs

The world's favourite compact PLC brings together power and simplicity in equal measure.

Motion control

Mitsubishi Electric Servo and Motion systems offer scalable solutions from 1 to 192 synchronized axes.

Modular PLCs

The MELSEC L series, iQ-R series and MELSEC System Q are high-performance modular controllers. With a wealth of integrated functions, they enable configuration of optimum solutions for all automation tasks.

Robots

MELFA robots offer class leading technology for both SCARA and articulated arm systems.

MELSOFT

Productivity tools and software solutions to help you get the best out of your automation investment.

LV switchgear and energy management

Advanced low voltage technology covering switchgear and circuit breakers.

HMIs, GOTs and IPC

Mitsubishi Electric offers what is probably the biggest range of control terminals and industrial PCs (IPCs) available from any single manufacturer.

CNC control

Maximise your production and control with the utmost reliability.

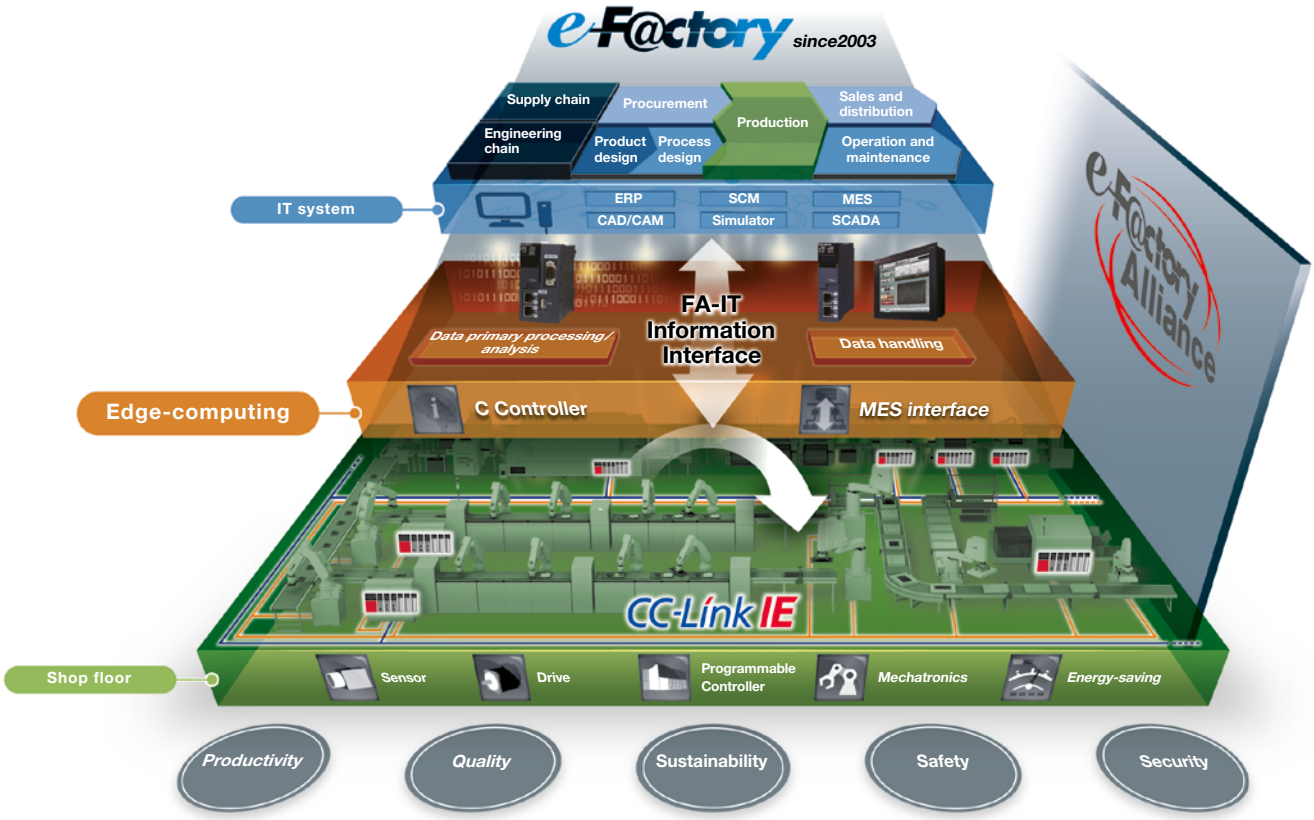
Inverters

Mitsubishi Electric offers reliable frequency inverters for any application. Our FR family stands for consistent engineering, highest energy efficiency and easy start up.

EDM machines

Mitsubishi Electric EDM - voted as the "Global Market Leader 2005" by Frost and Sullivan.

The e-F@ctory solution



Get maximum system efficiency and performance with e-F@ctory

Our solutions for your benefit

e-F@ctory was born out of the expertise Mitsubishi Electric has developed as a global manufacturing enterprise, facing essentially the same challenges our customers face. Our solution has been implemented in our factories with dramatic results. We are now sharing this expertise with those who are looking for the same benefits from their own manufacturing operations.

An e-F@ctory plant solves various issues through the direct collection of a wide variety of production site data, such as production and operation performance results and quality information, in real-time from equipment and devices, and then utilizes this data in an enterprise IT system.

This real time integration of production data and enterprise IT solidly aids in improving quality, reducing lead time and increasing productivity. The e-F@ctory solution has several key parts as follows.

CC-Link network architecture

CC-Link provides a complete open network architecture that links all factory devices. The top layer is CC-Link IE, which provides the first gigabit industrial Ethernet backbone to meet the ever increasing data communication needs of modern factories.

This extends down the hierarchy with CC-Link IE Field, bringing gigabit bandwidth to all devices.

iQ Platform

The iQ Platform is the enabling controller hardware for the e-F@ctory solution. An iQ system unites PLC, motion, CNC, robot and process control in a single unified controller architecture, linked seamlessly by a high speed backplane.

MES Interface

The MES Interface IT products provide the vital link between the shop floor controllers such as the iQ Platform, and the enterprise IT systems. The connection is direct, with no intermediate PC hardware introducing maintenance or security issues.

For more information about Mitsubishi Electric MES interface products please refer to the technical part, chapter 11 in this catalogue.

The e-F@ctory Alliance

A key part of the e-F@ctory solution is the "e-F@ctory Alliance". We have teamed with other best-in-class suppliers to create partnerships that allow our customers to truly benefit from the most comprehensive solutions available. The e-F@ctory Alliance currently has over 31 partners and their number is growing.

Safety solutions

Comprehensive safety solutions

The European Machinery Directive or international standards such as ISO12100 impose strict regulations for the safety of plant and machinery. Just like the machines themselves, the automation systems that control them must also comply with the directives and standards to ensure the safety of personnel in all phases of the machines' service life.

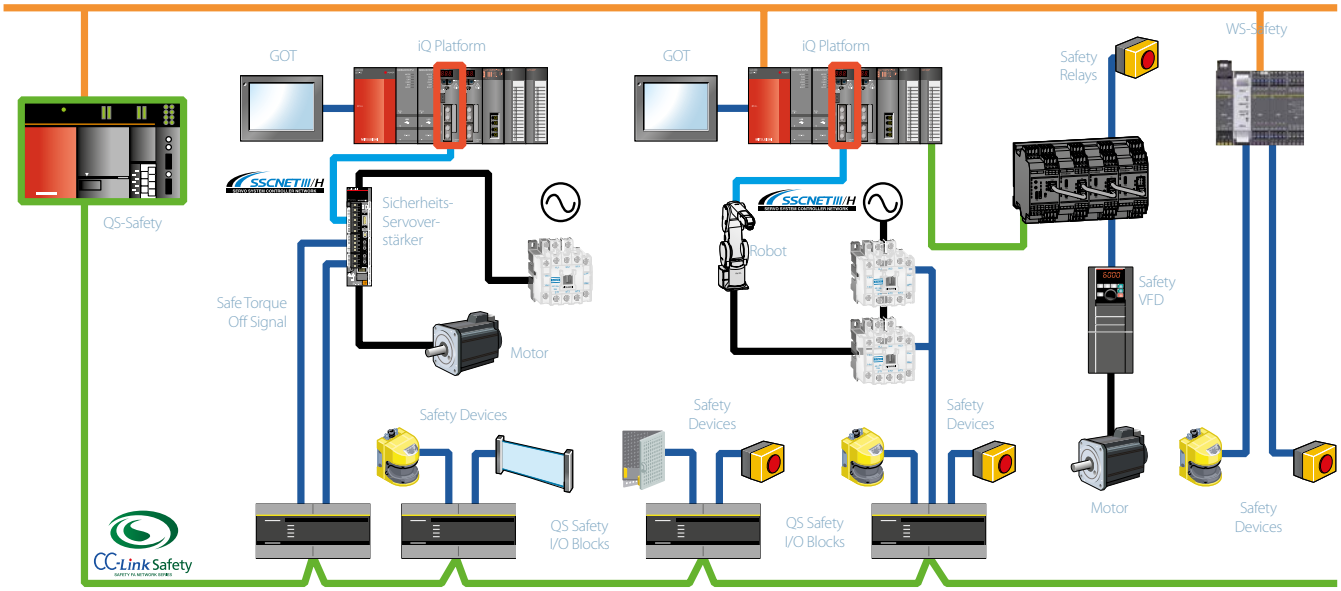
At the same time, the safety concept has shifted from human intervention based "zero accidents" to risk assessment based "zero risk". As a solution for this, Mitsubishi Electric provides a total safety solution by incorporating safety control devices, safety drive devices, and safety components required for safety systems. This allows optimal safety control to be realized, boosting productivity.

Many companies can offer you a choice of safety devices, or perhaps a safety system of some kind. However, few can provide a complete safety solution that fully integrates with the conventional automation of your systems. The result is not only worker, machine and process safety, but industry leading productivity and performance.

Please refer to the technical information section of this catalogue for more information and ask for our separatly available safety brochure.

Safety in every phase of your production

Safety control is fully integrated into the Mitsubishi Electric automation solution



Simple, easy, reliable

Proven reliability from standalone to complete installations

Simple

Mitsubishi Electric PLCs are simple to use. We have reduced many complex actions to a single instruction, making our PLCs much easier to program.

Easy

Moreover, we have designed programming and system configuration to be as flexible as possible. For example, our GX Works programming tools allow users to quickly create PLC programs and configure new modules.

Furthermore customers who wish to use more structured programming methods can choose from an array of languages supported by the IEC61131-3 standards.

All software packages are designed to reduce programming overheads through the use of intuitive layouts and functionality that guides the development of efficient code.

In addition, we offer innovative support tools such as GX Simulator. This package permits users to run PLC programs in a simulation mode without any additional hardware, helping to reduce expensive on-site commissioning time.

Reliable

We design and build our PLCs to the highest international standards gaining many marine and other special approvals in the process. We do this as part of our drive to supply the best quality products possible. A prime example of Mitsubishi Electric quality is the widespread use of our components in the global auto industry, where zero tolerance of product failure is fast becoming the norm.

A unified tool – iQ Works

The iQ Automation Platform is a leading solution for simplified management of complex and heterogeneous industrial production systems. The concept unites PLC, motion, robot and CNC technologies in a single compact hardware platform, enabling seamless interaction between the different control systems. One of the key benefits is the ability to use a single unified tool for development and maintenance of the component systems. iQ Works is that tool: A unified development environment that encompasses all aspects of development and maintenance and can be controlled entirely from a single central location.

PLC Programming

Package	GX Works3	GX Works2		GX Works2 FX	AL-PCS/WIN
	MELSEC iQ-F/ iQ-R series	MELSEC Q/L series	FX3 SPS	FX3 SPS	ALPHA series
Ladder	●	●	●	●	
Function Block Diagram	●	●	●	●	●
Structured Text	●	●	●	●	
SFC	●	●	●	●	
IEC61131 Compliant	●	●	●	●	

One system, one tool

Control to fit

A wide range of solutions

Mitsubishi Electric PLC and controller solutions are divided into three simple groups.

Logic controllers

These Mitsubishi Electric products are called ALPHA controllers. They are small compact units with input/output (I/O), CPU, memory, power supply and HMI built into a single unit. The units are programmed with a very intuitive Function Block-style programming tool (AL-PCS/WIN).

Compact PLCs

Compact PLCs are widely used in applications ranging from machine control to networked systems. Mitsubishi Electric's famous FX3 and FX5 range of PLCs are some of the most popular compact PLCs on the market, as demonstrated by sales of over 17 million controllers worldwide. Compact PLCs contain I/O, CPU, memory and power supply in a single unit.

Moreover, it can extend its capabilities by selecting different options such as I/O, analogue, temperature control, positioning and simple motion. One of the most popular additions is a networking connection. Network options can include Ethernet, Profibus DP, CC-Link, DeviceNet™ as well as CANopen and SAE J1939.

Modular PLCs

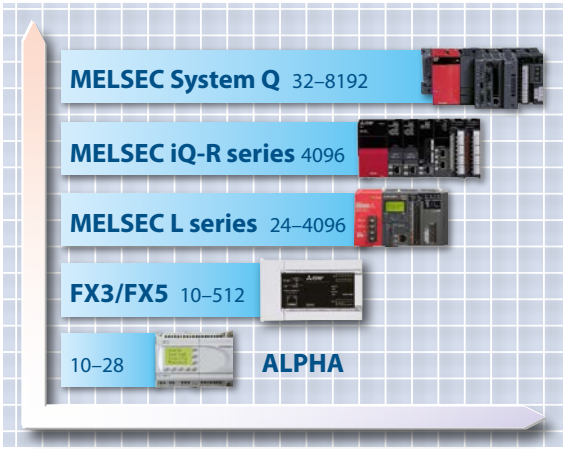
Modular controllers like Mitsubishi Electric's MELSEC L series, iQ-R series and MELSEC System Q are high-performance PLC systems with broad functionality. The range, power and function of these high-end PLCs is impressive, with operation times measured in nanoseconds. They are equipped with a separate power supply, CPU, I/O and special options mounted on a backplane.

Additional backplanes can be added as the system expands. Their modular architecture makes it easy to configure these controllers for any task. Modular PLCs comprise a power supply, one or more CPU modules and I/O and/or special function modules. These special function modules include analogue, communications and network modules and a special MES interface. A Web server module is also available for Internet access.

The CPU comes with an integrated Ethernet port for easy access to this standard network.

Mitsubishi Electric's MELSEC System Q demonstrates one of the greatest benefits of an automation platform. It makes it possible to integrate PLC CPUs, motion controllers, robot controllers and process CPUs all in a single system. In addition there are options for systems built around industrial PCs, redundant PLCs, as well as a recent innovation, the C controller.

	Logic controller	Compact PLC	Modular PLC		
	ALPHA2	FX3/FX5 series	MELSEC L series	MELSEC iQ-R series	MELSEC System Q
I/O	10–28	10–512	24–4096	4096	4096
Memory	200 function blocks	20–260 k steps	40–1200 k steps	40–1200 k steps	10–1000 k steps
Cycle period/log. instruction	20 µs	0.065–0.55 µs (65–550 ns)	0.0095–0.040 µs (9.5–40 ns)	0.98–1.96 ns	0.0095–0.2 µs (9.5–200 ns)



There is a solution to match your needs

iQ Platform

Mitsubishi Electric's iQ is the world's first automation platform combining all key automation types in one system. No longer are valuable engineering resources spent trying to make different systems from separate vendors work together. With iQ, Mitsubishi Electric takes care of system integration. We provide an extensive array of controller types that seamlessly operate together on the same backplane. Now your engineering staff can concentrate on the demands of the application itself right from the beginning.

Seeing is believing

Production line or remote plant intelligence – Mitsubishi Electric makes data accessible.

Mitsubishi Electric's visualization concept brings together a wide range of human machine interfaces, industrial PCs and software solutions that let you see what is really happening in the production process.

This combination of three visualisation technologies from a single supplier, allows users to choose the best solution to fit their requirements.

Dedicated HMI solutions

The GOT1000, GOT Simple and GOT2000 series of graphic operator terminals provide the very latest in touch-screen display technology. This gives users bright clear display of information with the flexibility of touch screen input.

The GOT units are designed for fundamental integration with Mitsubishi Electric automation technology. This means easier, faster project development as well as increased system performance and additional access to core functions in Mitsubishi's automation hardware.

Industrial PC (IPC) solutions

Mitsubishi Electric's range of IPC solutions offer customers a robust platform for developing their own solutions. They are designed to provide the flexibility of high- performance PC power but with a sturdy industrial design to protect them during operation. This means users can install an IPC in their manufacturing environment with complete confidence.

A range of Mitsubishi Electric automation software called MELSOFT supports the IPCs. This provides users with a choice of software components that they can embed in their own solution to complete visualisation packages, such as GT SoftGOT.

Perfect vision

HMI Programming/Simulation

Feature \ Package	GT Works3
Functions: Programming Simulation	● ●
Graphics Library	●
HMI Hardware	GOT1000 series/ GOT2000 series
Soft HMI Capability	GT SoftGOT1000/ GT SoftGOT2000

PC based visualisation

Feature \ Package	Soft HMI	PC Control		
	GT Soft-GOT	MX Sheet	MX Com-ponent	MX OPC Server
OPC			●	●
Active X			●	
VB/VBA	●	●	●	●
Web Deploy-able			●	●
ODBC				
Operation: Information Open Plant Factory Floor		● ● ●	● ● ●	● ● ●

Hardware with flexibility

When selecting the right visualisation application, a number of basic factors have to be taken into account.

Water protection

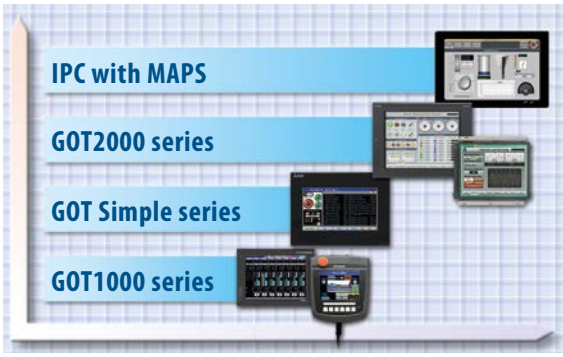
HMI products from Mitsubishi Electric provide a wide range of solutions catering to virtually every application need. All units have an IP65 ingress protection rating or higher – they can be safely hosed down for cleaning, for example. This is often the case in the food industry where high levels of hygiene have to be maintained at all times.

Communication

An important part of automation is communication. Mitsubishi Electric's HMI solutions can connect to leading networks like Ethernet, CC-Link (IE) and Modbus®. With access to hundreds of drivers, Mitsubishi Electric's HMI and SCADA solutions can also be used with automation products from other manufacturers.

Ease of use

Programming and using Mitsubishi Electric HMIs is easy. All of the packages come with pre-defined graphic libraries to help users get started quickly. More than one hundred drivers are available, making it possible to use Mitsubishi's HMI solutions with automation products from third-party manufacturers.



There is a solution to match your needs

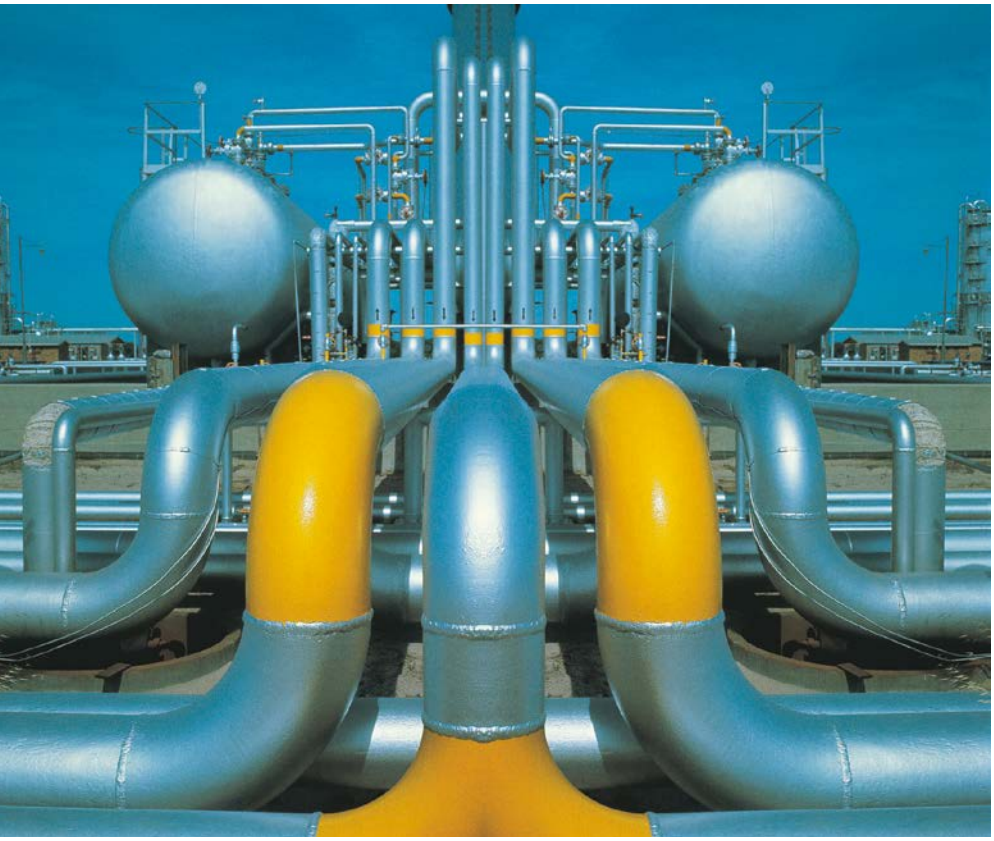
MELSOFT

The MELSOFT automation software suite offers users a range of solutions including PLC and HMI programming software components such as OPC servers and Active X containers for embedding directly into a user's solution.

MAPS (Mitsubishi Adroit Process Suite)

MAPS is an engineering tool that encompasses the entire product life cycle of automation solutions. The benefits of MAPS are already available in the development and integration phases. MAPS also makes it easier to integrate your data and enables customers to install extensions and perform maintenance themselves. The program uses predefined, user-configurable PLC function blocks and SCADA graphics based on the international S88 and S95 standards. This standardisation means that in addition to saving time, MAPS also reduces the development, testing and commissioning overheads of your automation projects. A range of import functions facilitate fast and easy configuration of the user interfaces for both SCADA and PLC projects. MAPS uses a central database for exchanging global variables, making accidental duplication of data records impossible.

Driving performance



Intelligent solutions for every task

Frequency inverters offer a good example of a widely accepted, widely used automation technology. Inverters allow engineers greater control over a motor's speed and torque performance. Increasingly, inverters are also seen as a simple but important way to reduce energy costs. Today, over 23 million Mitsubishi Electric frequency inverters are in operation around the world in a wide range of applications.

High standards

Our commitment to meeting international standards guides the design of Mitsubishi Electric inverters. Current certifications include the European CE, America's UL and cUL, the Russian EAC, as well as shipping approvals. These certifications help exporters who sell machines and systems with embedded inverters.

Mitsubishi Electric inverters mean reliability and performance. This is why two consecutive IMS Customer Satisfaction Surveys gave Mitsubishi Electric inverters top marks for reliability and technology.

The FR-D700 SC and FR-E700 SC inverter drive series come with the two-channel STO (Safe Torque Off) safety system integrated as standard equipment. This makes it possible to operate multiple inverter drives inexpensively with a single safety relay.

Cut costs

A standard industrial motor in a typical fan or pump application may only cost a few hundred euros to purchase. However, that same motor will consume hundreds of thousands of euros in electricity costs over its operational lifetime. Using an inverter can significantly reduce this outlay.

Intelligent solutions for every task

Mitsubishi Electric offers four types of inverter: Simple, Economy, Flexible and Advanced. Each has been optimized to offer the very best in control and performance.

In addition, depending upon the type selected, Mitsubishi Electric inverters can support the following networks: EtherNet/IP, CC Link, CC-Link IE Field, Profibus DP/DPV1, Profinet, DeviceNet™, EtherCat, CanOpen, SSCNET III/H, LonWorks, RS485, Modbus®/RTU and Modbus®/TCP/BacNet. This extensive communication ability makes it easier to integrate inverter control into larger automation systems.

Inverters help to reduce power consumption and machine wear.

Powering the future

FR-D700 SC

Micro

Mitsubishi Electric's entry level series combines ultra-compact dimensions with a wealth of new functions, including an emergency stop input for reliable stopping. Current vector control ensures that this frequency inverter can always deliver high torque, even at low speeds. An integrated brake transistor enables direct connection of a brake resistor for better braking performance. The FR-D700 SC is the ideal choice for driving fans, agitators and conveyor belt systems.

FR-E700 SC

Compact

Improved functions and capabilities make the FR-E700 SC inverters an economical and universal choice for a huge range of applications such as conveyor belts, hoists, stage systems, pumps, fans and extruders. Features include an integrated USB port, safe stop inputs for safety stop function, improved power delivery in the low-speed range, options for controlled shut down and a slot in which you can install one of the many available option cards for the 700 series.

Comprehensive range from ultra compact to ultra powerful

Inverter range

	FR-D700 SC		FR-E700 SC		FR-F800			FR-A800					
	D720S SC	D740 SC	E720S SC	E740 SC	F820	F840/ F842	F846	A820	A840/ A842	A860 ①	A870	A862	FR-CC2
Input voltage	1-phase 200–240 V AC	3-phase 380–480 V AC	1-phase 200–240 V AC	3-phase 380–480 V AC	3-phase 200–240 V AC	3-phase 380–500 V AC	3-phase 380–500 V AC	3-phase 200–240 V AC	3-phase 380–500 V AC	3-phase 525–600 V AC	3-phase 525–690 V AC	3-phase 525–600 V AC	3-phase 380–600 V AC
Output [kW]	0.1–2.2	0.4–7.5	0.1–2.2	0.4–15	0.75–132	0.75–630	0.4–132	0.2–132	0.2–1300	0.4–250	160–200 ②	220–630	220–630
Overload	200 %		200 %		250 %/ 120 %	250 %/ 120 %	250 %/ 120 %	250 %/ 120 %	250 %/ 120 %	250 %/ 120 %	250 %/ 120 %	250 %/ 120 %	250 %/ 120 %
Rating	IP20		IP20		IP20	IP00/IP20	IP55	IP20	IP00	IP00	IP00	IP00	IP00

① not for the european market ② to be launched soon 37 to 630 kW

FR-F800*

Flexible

Many frequency inverter drives save power but the FR-F800 saves more. Its innovative AOEC technology (Advanced Optimum Excitation Control) ensures that exactly the right magnetic flux is always applied to the motor for maximum motor efficiency and minimum power consumption. FR-F800 inverters are particularly well suited for pump and fan, HVAC and building services applications.

FR-A800*

Powerful

The frequency inverters of the FR-A800 series deliver high-end performance and power. Their RSV (Real Sensorless Vector control) technology ensures maximum torque and optimum smooth running.

For greater flexibility these inverters have four overload ranges, options for controlled shutdown and integrated PLC functions. With their dynamic performance the FR-A800 inverters are ideal for cranes and hoisting gear, high-shelf storage systems, extruders, centrifuges, winding systems and positioning applications for IM and PM Motors.

* with built-in Ethernet connection (Modbus® TCP/IP & CCLIEFB)

Poetry in motion

Speed, accuracy and control when you need it

As the demands on manufacturing increase, there is a growing need to produce higher quantities of finished goods with lower wastage. To achieve this, all areas of automation are evolving to meet these new demands.

One area undergoing rapid growth is servo and motion control. The development of high performance servomotors combined with intuitive motion control is replacing traditional movement solutions.

Speed and performance

Servomotors allow users to create automation solutions that are faster, more precise and more compact.

Mitsubishi Electric has been pushing forward the boundaries of servomotor design, creating ultra compact brushless motors. All motors of the MR-JE series have an encoder with a resolution of 131,072 pulses per revolution. All motors of the MR-J4 series have an encoder with a resolution of 4,194,304 pulses per revolution. This permits greater machine speed and accuracy.

Plug and Play

Mitsubishi Electric servo and motion solutions offer easy system building and configuration based on PC "plug and play" concepts.

Simple connections

The availability of pre-made cables of different lengths means that connecting a servomotor to an amplifier or any other combination is quick and error free.

Automatic motor recognition

When a Mitsubishi Electric servomotor is connected to an amplifier it is automatically recognized. The correct parameters are then automatically loaded, ready for operation. This reduces the set-up time and the chance of errors.

Simple networking

High-speed servo and motion applications need special high-speed networking. Mitsubishi Electric's Servo System Controller Network (SSCNET III/H) provides the system capability, connecting and fully synchronising up to 192 axes using a simple plug and cable construction.

*) The MR-JE-BF and MR-J4-B series products use SSCNET III/H, a fibre based version of the network giving complete noise immunity.

Power and precision

Powerful amplifiers

A wide spectrum of Mitsubishi Electric MR-J4 series amplifiers is available, ranging in power from 100 W to 37 kW for 200 V operation, and 600 W to 55 kW for 400 V systems. With such a wide choice of types and series users are sure to find the solution they need.

Performance

With a speed frequency response of up to 2500 Hz Mitsubishi Electric servo systems offer world class performance.

Vibration suppression

Machine performance is often limited by mechanical constraints. The built-in vibration suppression of Mitsubishi Electric's amplifiers overcomes some of these limitations through precise control, reducing the effect of micro vibrations at the pulse point, helping users to get better more reliable machine performance. This function suppresses not only residual vibrations of the machine but also at the end of an arm.

„One-Touch-Tuning"

The new one-touch tuning function minimises time consuming system adjustments between machine and electronics by touching one button. Control parameters are optimised and resonance frequencies of the machine and the mechanics are detected and filtered. An individual adjustment of single applications is not needed. The result is a vibration free, highly precise and high speed positioning process – only by one click.

Motor solutions for all

Featuring the most advanced concentrated winding techniques and the latest technology, Mitsubishi Electric servomotors are among the most compact on the market.

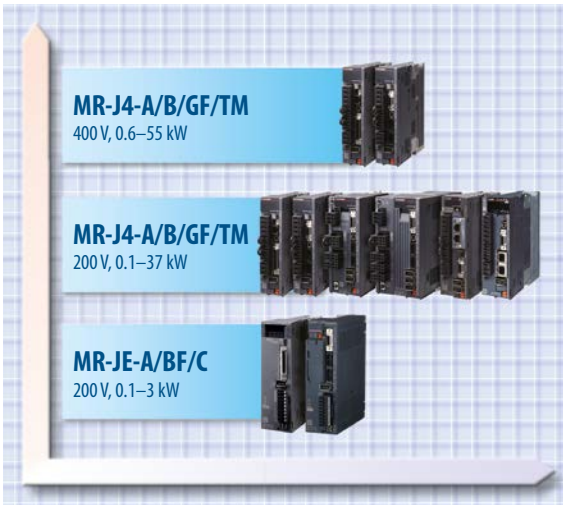
Motors are available in a range of options from 50 W to 55 kW in different designs, including specialised motors such as hollow shaft and pancake designs that suit most application needs.

Moreover, Mitsubishi Electric's low, ultra-low and medium inertia motor designs allow users to select the best motor characteristics for their application.

Motion controllers

Mitsubishi Electric offers a comprehensive range of solutions for positioning tasks and high-end motion control. Options include simple pulse train positioning controllers and dedicated motion cards. And for the most complex applications there are dedicated MELSEC System Q and iQ-R series motion CPUs. Users are able to select the type and style of control they are most familiar with, making system construction fast and efficient.

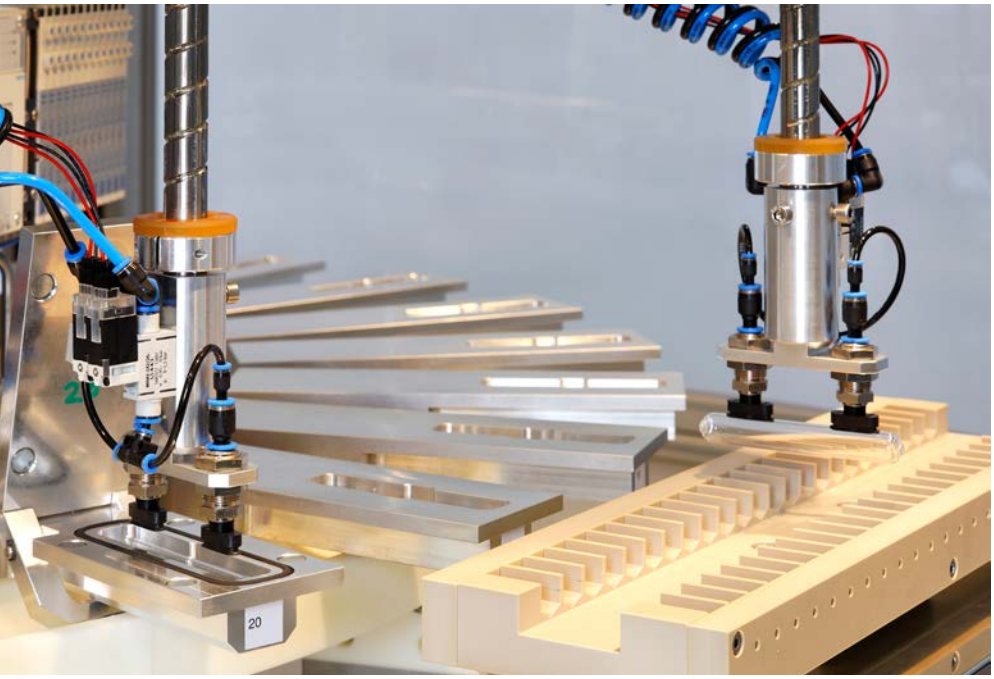
HG motor series – IP65/IP67 standard protection



A wide range of powerful amplifiers

Plug and play technology

Innovation in movement



High speed, high accuracy pick and place applications

Robots are already widely accepted as a cost-effective solution for high-speed, high-accuracy pick-and-place applications as well as some basic assembly tasks.

€ 1.65/hr

Robot usage can vary widely but an average application over a typical 7-year life cycle can cost as little as € 1.65 per hour to purchase and operate.

Powerful software helps you get the most out of your robot application.

BASIC talk

Programming a Mitsubishi Electric robot arm is easier than most people think. The programming language is a BASIC-like structure with commands reflecting the requested action. For example, the command MOV means "move", HCLOSE means "hand close". Furthermore, all Mitsubishi Electric robots are programmed using the same language, reducing the user's learning curve.

Making life easy

With the software RT ToolBox3 all robot models are programmable in a quick and easy way. Imported 3D CAD data, program variables and robot simulations can easily be displayed on the graphical surface of the programming software RT Toolbox3.

This leading edge software allows a robot application to be programmed and its operation simulated before the hardware is purchased. This makes system design and building quicker and easier. Moreover, it can identify potential hazards before robot integration begins.

Advanced control as standard

All Mitsubishi Electric robot controllers are shipped with the full control software as standard. This means users do not need to buy additional task- driven software modules at a later date.

Task driven

Thoughtful design

Due to the new motors developed by Mitsubishi Electric, the high arm rigidity and the unique controller technology the robots of the FR series achieve the highest speed in their class.

Ease of connection

Mitsubishi Electric robot arms feature a single connection point for power and pneumatics, making setup and commissioning easier.

In addition, each robot has body-mounted compressed air and signal connections mounted locally to the gripper flange for ease of use.

Standard gripper plates

All arm gripper mounting flanges are designed and built-in accordance with ISO9409-1, ensuring ease of connection to the user's choice of robot hand.

Extended axis

All MELFA robots can be mounted on an additional linear axis to provide greater reach and utilization of the robot arm.

Networked

Mitsubishi Electric's robot controllers can be embedded into larger automation cells by using networks such as Ethernet, Profibus, Profinet, Ethernet/IP and CC-Link, keeping users in control at every step of their process.

The ideal robots for all applications with payloads of up to 70 kg

Articulated arm robots

The range of the articulated-arm robots of the RV series starts with the powerful compact class with a payload from 2 kg up to the power pack with a payload of 70 kg. These robots are also available as a long arm version.

Higher handling weights and a larger movement area can be realised by the compact and slim construction of the robot arm. The standard protection class of IP67 allows the operation of the robots in industries like food, beverage and packaging.

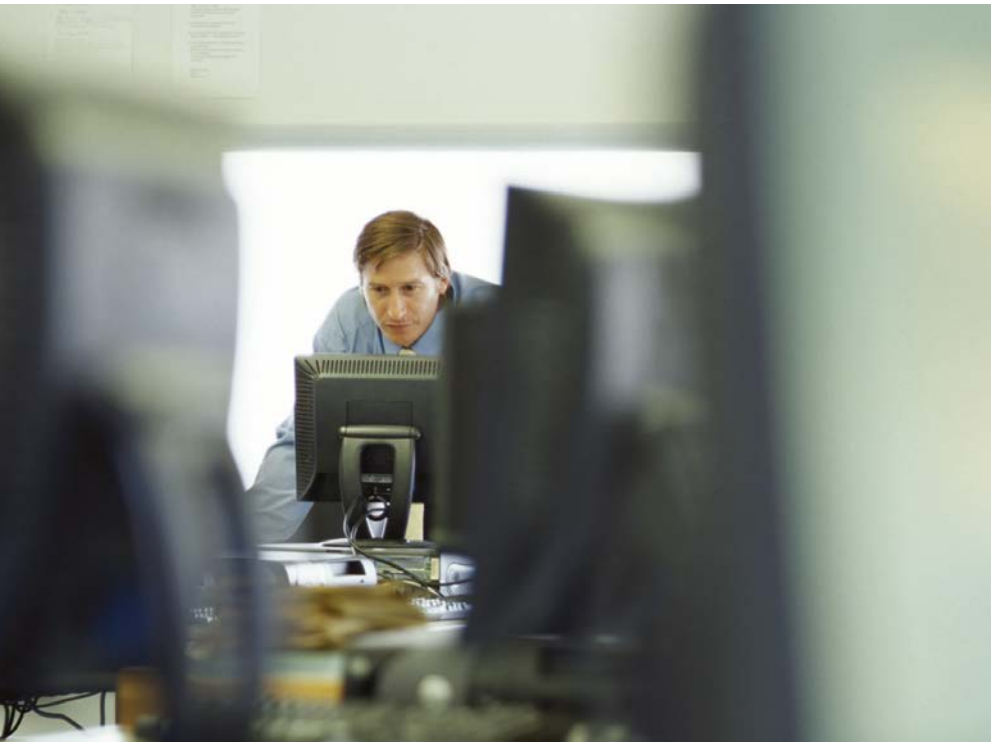
SCARA robots

Mitsubishi Electric's range of SCARA robots divides into two categories. The small RP-ADH robots feature outstanding repeatability (+/- 0.005 mm) at very high speed, making them ideal for micro assembly tasks and the population and soldering of SMD circuit boards.

The robots of the RH-FRH series are suitable ex factory for a multitude of industrial applications and can be adopted intersectoral. A cycle time of only 0.29 s for the 12" cycle ensures highly precise and powerful operation for increasing productivity on-site. By protection class IP54 and utilisation of lubrication grease suitable for use in food industry. The robots are capable of being fully integrated. The wiring routed inside the robot and led through at the ball screw end offers protection and safety.

Robot range			
Range	RP	RH	RV
Type	SCARA	SCARA	Articulated arm
Weight class [kg]	1–5	3–20	2–70
Reach [mm]	236–453	350–1000	504–2050

Breakthrough technology



Groundbreaking research and design

Standards are at the centre of our product development.

Mitsubishi Electric has been active in the low voltage (LV) switchgear market since 1933. Ever since Mitsubishi Electric developed and manufactured the first moulded case circuit breakers, the company has been committed to research and development in this field, making it one of the world's leading manufacturers of circuit breakers.

Innovation

Groundbreaking research and design has resulted in innovative LV switchgear, providing users with greater quality, safety and reliability. Today's LV products feature meticulously designed technology: even the casing material used in the PA (Polymer Ablation type Auto-Puffer) provides greater safety and high voltage breaking performance.

Leading edge

Jet Pressure Trip (JPT) is an extension of the PA concept, allowing switchgear to trip even faster than a traditional magnetic solution. This means that the switchgear can improve its current- limiting performance and circuit breaking reliability. Any connected devices are then better protected, a major benefit to users.

Other technologies such as ISTAC (Impulsive Slot-Type Accelerator, used as a high-speed arc-controlling technology) and developments in digital ETR (Electronic Trip Relay) and VJC (Vapour Jet Control) all contribute to making Mitsubishi Electric's LV products leading edge.

Global products

All LV products are designed to comply with international standards such as JIS, IEC, EN, GB, UL/CSA.

A complete solution

Mitsubishi Electric offers a complete solution for line and load side distribution, ranging from air circuit breakers to moulded case breakers and magnetic contactors.

Air circuit breakers (ACBs)

These compact Super AE units come in a broad spectrum of performance categories from 1,000 to 6,300 Amps. The basic unit is available as a fixed or "draw out" design, which can be augmented with options for enhanced overload control, network and energy consumption.

Thanks to these features Mitsubishi Electric's ACBs provide users with the flexibility to meet most applications.

Moulded case circuit breakers (MCCBs)

Mitsubishi Electric's MCCBs of the World Super Series (WS) provide protection across the current range from 32 to 1,600 Amps. Each unit is available in a fixed or slot–in design and has a range of additional options such as electronic trips

Magnetic contactors, thermal overload relays, contactor relays

The MS range of LV switchgear is a reliable and customizable solution for load side connection. The MS-N range is made up of magnetic contactors, thermal overload relays and contactor relays.

These space-efficient products are up to 25 % smaller than similar units. In addition the MS range has enhanced performance. For example, the magnetic contactors withstand voltage drops of up to 35 % while still ensuring reliable operation.

The MS-N units can be customised with a wide range of options, including thermal overload relays, time delay modules, auxiliary contacts and trip indicators to suit the user's specific needs.

Miniature circuit breakers (MCB)

- Trip free mechanism

During fault MCB trips even if handle is held in ON position.

- Low watt loss

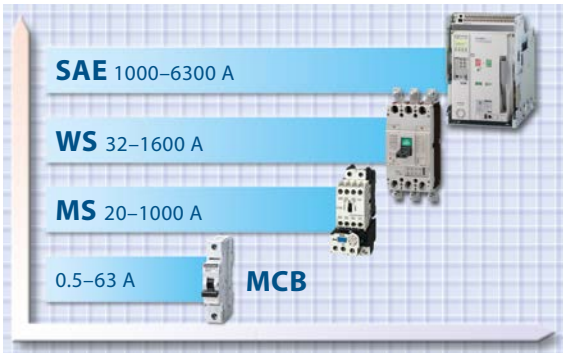
Power loss values are much lesser than IEC specified values; making it one of the most energy efficient MCB.

- Energy limiting class: 3

High current limiting performance under fault conditions achieved due to ultra fast contact opening and rapid quenching of arc.

- Circuit identification

Legend plates for circuit identifications and hence enhanced safet



Advanced low voltage technology

Motor circuit breaker (MMP)

- Self-protected manual motor controller
- Reliable protection and superior performance
- Compact design
- Smart wiring
- Safety & quality
- Global standards

Energy monitoring (ME96 and EMU4)

- Multi-measuring instrument Super-S series (ME96)

Mitsubishi Electric multi-measuring instrument SS series features high performance and crystal clear display. With simple operating functions, SS series is the best support to your measuring and monitoring systems.

- Energy measuring unit EcoMonitorLight (EMU4)

Simple & easier providing energy visualization. Introducing the EcoMonitorLight, an energy measuring unit with an integrated display that provides easy energy visualization in order to provide ways to save energy and to comply with the Energy Saving Act in response to the need for a simple manner to figure out energy consumption.

Where have Mitsubishi Electric products been used?

Remote management solutions include SCADA, Networking, Telemetry and Industrial Modems.

Customer applications with Mitsubishi Electric products have been wide spread from critical applications in pharmaceutical industries to sublime applications in the leisure industry.

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

- Agriculture
  - Plant watering systems
  - Plant handling systems
  - Sawmill (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 manufacturing (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
  - Pollution 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
- Automotive
- Printing
- Textiles
- Transportation
  - Sanitation on passenger ships
  - Sanitation on rail rolling stock
  - Fire tender pump management
  - Waste disposal truck management
- Utilities
  - Waste water disposal
  - Fresh water pumping
  - Clarification plants

Automotive control solutions

Technical Information Section

More information?

The catalogue at hand is designed to give an overview of the extensive product range of Mitsubishi Electric Europe B.V., Factory Automation.
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 https://eu3a.mitsubishielectric.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 Electric partners and distributors are only too happy to help answer your technical questions or help with configuration building. For a list of Mitsubishi Electric partners please see the back of this catalogue or alternatively take a look at the "contact us" section of our website.

About this technical information section

This section 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.

The products of Mitsubishi Electric Europe B.V., that are listed and described in this document, are neither subject to approval for export nor subject to the Dual-Use List.

Overview

Software

Our MELSOFT suite embodies a wide range of software to optimise your plant productivity: from visualisation and control systems to historic and downtime monitoring capabilities. A core design feature of our software is that it is scalable. It is a well accepted truism that one solution rarely fits all, so within each application category there are a range of products offering different levels of functionality and connectivity designed to meet your individual needs. All products are based on Microsoft standards (OPC etc), giving you a broad range of connectivity options and a familiar interface. The MELSOFT suite consists of three main areas:

- **Visualisation.** This type of software is aimed at monitoring and controlling your automation processes.
- **Programming.** Our extensive range of programming software enables users to write their own PLC code for their application. We have software solutions for each of the following products groups; servos, inverters, logic blocks, PLCs, HMIs and networking.
- **Communication.** Our communication software is designed to integrate our products with common third party software packages. This provides you with the reliability and quality of Mitsubishi Electric hardware, combined with the familiarity of software packages/tools such as Microsoft Excel, ActiveX and OPC.

Unified engineering environment: iQ Works

iQ Works integrates the functions necessary to manage every part of the system cycle.

System design

The intuitive system configuration diagram allows for the graphic assembly of systems, centralized management of disparate projects and batch configuration of the entire control system.

Programming

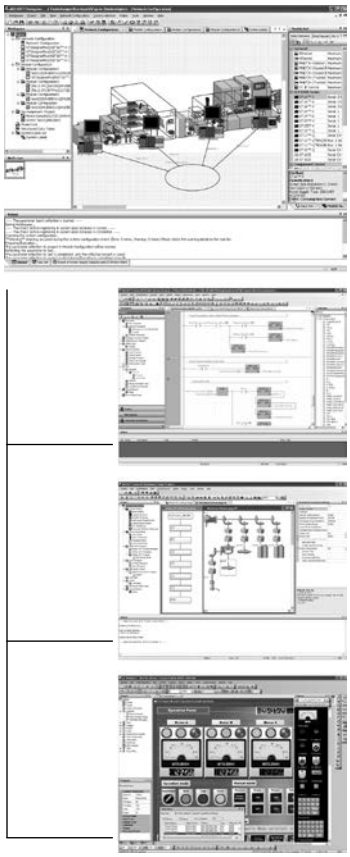
Use system labels to seamlessly share device data between GOTs, PLCs and motion controllers. Save the time and hassle of changing device values in each program by using the update system labels feature.

Test and startup

Debug and optimize programs using the simulation functions. Use the included diagnostics and monitoring functions to quickly identify the source of errors.

Operation and maintenance

Speed up the process of commissioning, configuring and updating the system by using the batch read feature. Virtually eliminate the confusion associated with system management.



MELSOFT Navigator

– is the heart of iQ Works. It enables the effortless design of entire upper-level systems and seamlessly integrates the other MELSOFT programs included with iQ Works. Functions such as system configuration design, batch parameter setting, system labels and batch read all help to reduce TCO.

MELSOFT GX Works

– represents the next generation in MELSOFT PLC maintenance and programming software, with improvements made throughout to increase productivity and drive down engineering costs.

MELSOFT MT Works

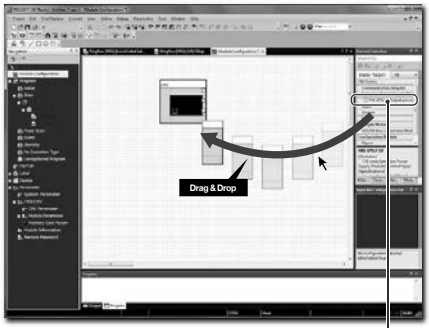
– is a comprehensive motion CPU maintenance and program design tool. Its many useful functions, such as intuitive settings, graphical programming and digital oscilloscope, simulator, different Motion OS support, assistance help, to reduce the MT Works2 associated with motion systems.

MELSOFT GT Works

– is a complete HMI programming, screen creation and maintenance program. In order to reduce the labor required to create detailed and impressive applications, the software's functionality has been built around the concepts of ease of use, simplifications (without sacrificing functionality) and elegance (in design and screen graphics).

PLC programming

GX Works2/GX Works3



Simply drag & drop when adding a module

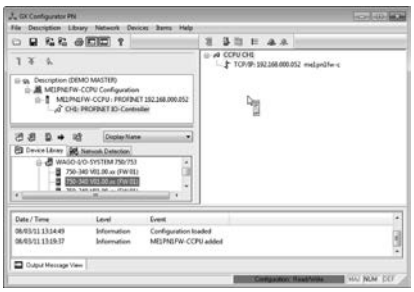
GX Works2 supports all MELSEC PLCs (except MELSEC iQ-R/iQ-F), while GX Works3 supports the MELSEC iQ-R and iQ-F series and offers numerous functions to faciliate programming work and support the user. GX Works2 FX has the same functionality as GX Works2 but just for FX3 PLC´s.

Programming	MELSEC series				
	FX	iQ-F	iQ-R	Q	L
GX Works2	●			●	●
GX Works3		●	●		
GX Works2 FX	●				

GX Configurator DP

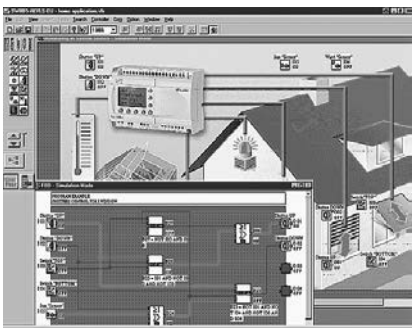
GX Configurator DP is a setup and configuration software for Profibus DP networks. It can be used to configure Mitsubishi Electric Profibus DP master and all slave modules including inverters and HMI's as well as other manufacturers products.

GX Configurator PN



GX Configurator PN is the configuration tool for Profinet I/O modules. This software offers functions for the configuration of the Profinet I/O network, testing the configuration and transfer of the settings to the Profinet module.

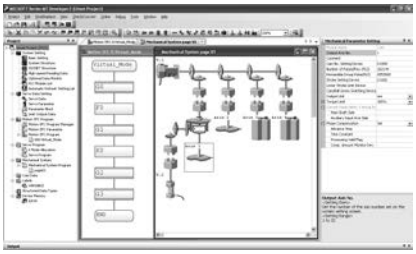
ALPHA – ALVLS (AL-PCS/WIN)



The original visual based function block programming software for logic controllers. Easy to use Windows based software that requires no prior experience or training by the user. Program elements are placed on screen, with inputs on the left and outputs on the right and the function blocks in the middle.

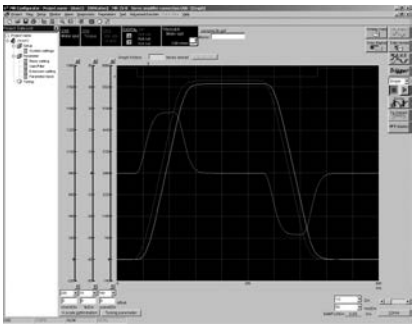
Programming of drive systems

MT Works2



MT Works2 is an integral start-up software used to structure and configure a system for MELSEC System Q motion and iQ-R series controller applications.

MR Configurator2

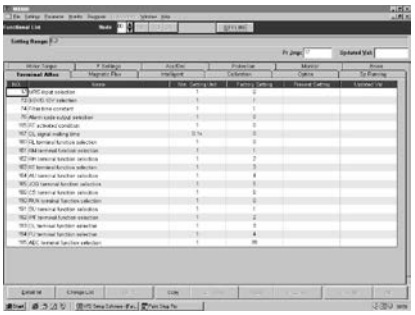


MR Configurator2 is a user-friendly software for easy setup, tuning and operation of the MELSERVO servo systems. Tuning, monitor display, diagnosis, reading/writing parameters, and test operations are easily performed on a personal computer. This start-up support tool achieves a stable machine system, optimum control, and short setup time.

FX Configurator FP

FX Configurator FP is a special configurator tool for the FX3U PLC SSCNET III positioning module. This software reduces programming and setup time for any level of positioning application.

FR Configurator/FR Configurator2



FR Configurator and FR Configurator 2 are powerful frequency inverter configuration and management tools. It runs in Windows making it possible to manage your inverters with a standard PC. It allows the inverters to be monitored and the parameters to be configured, providing a user friendly environment to control single or multiple inverters.

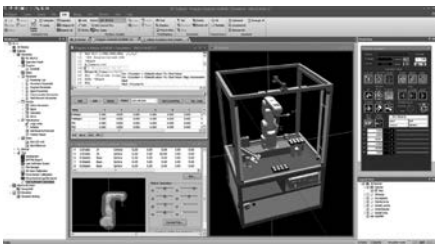
Visualisation software – HMI programming

GT Works3

With GT Works3 you will get a comprehensive tool for programming, maintenance and screen creation. It is composed of the software GT Designer3, GT SoftGOT1000 and GT SoftGOT2000 as well as the simulation tool GT Simulator and a converter for already existing projects.

Robots programming

RT Toolbox3



RT Toolbox3 is a software for program creation and total engineering support.

This PC software supports everything from system startup to debugging, simulation, maintenance and operation. This includes programming and editing, operational checking before robots are installed, measureing process tact time, debugging during robot startup, monitoring robot operation after startup, and trouble shooting.

RT Toolbox3 Pro offers an add-in tool 1 for SolidWorks 2 used for robot simulation in production systems on PC's converting processing paths of workpieces into robot position data.

PC data management

MX Sheet

MX Sheet enables users to gather data from their PLC and analyse it using the familiar tools and functions of Excel. MX Sheet can analyse and display real-time data in tables, graphs and charts as it happens.

MX OPC Server

The MX OPC Server is a Mitsubishi Electric I/O driver OPC Data Access (DA) and Alarm/Events (AE) server that provides the interface and communications protocol between a wide range of Mitsubishi Electric hardware and your process control software. Mitsubishi Electric drivers incorporate OLE Automation technology and OPC compliance to provide flexibility and ease-of-use.

MX Component

MX Component provides users with powerful ActiveX controls that simplify the communication between a PC and PLC. Users to not have to design complex communication protocols and is ideal for implementing specific software applications requiring PLC connectivity.

MX Component supports a wide variety of powerful and standardised programming languages such as Visual C++ .NET, VBA and VB Script.

MAPS visualisation solutions

Life-cycle engineering, SCADA, HMI, reports and operational excellence for industrial applications

The Mitsubishi Electric Adroit Process Suite (MAPS) creates advanced, secure and integrated solutions that deliver value to your business. The MAPS SCADA/MAPS HMI and related software products provide the latest automation software for general industrial users including water utilities, telecommunications, food and beverage, manufacturing, life sciences, processing or building and facilities management industries. MAPS is also built to deliver solutions around IIoT applications.

MAPS takes raw data from the front end device like a Programmable Logic Controller (PLC) or Remote Telemetry Unit (RTU) in the process field and transforms it into an easy to understand graphic representation, whilst adding the ability to log history, do alarming and process values.

MAPS SCADA helps identify and manage key factors such as quality, production and energy efficiency, which ultimately lead to greater business profits.

The MAPS SCADA is at the forefront of the SCADA/HMI market, making it one of the most open, advanced and scalable SCADA platforms available.

Networks

From simple stand alone systems and basic AS-Interface networks to Ethernet based networks and even Global networks based on Remote Telemetry Technology, Mitsubishi Electric has the answers. Here is an overview of some of the networks Mitsubishi Electric provides:

Ethernet

If you are looking for the widest possible set of connectable technologies, Ethernet is unrivalled. The Ethernet interface allows communication via CC-Link IE Field, Profinet, Modbus®/TCP, EtherNet/IP and EtherCat.

EtherNet/IP

EtherNet/IP is an open Ethernet standard for industrial networks using TCP/IP technology. It incorporates the Common Industrial Protocol (CIP) as application protocol.

CC-Link, CC-Link IE Control, CC-Link IE Field, CC-Link IE Field Basic and CC-Link Safety

If you need unparalleled ease of connection between Mitsubishi Electric products or you are looking for a single supplier for your control network needs, then CC-Link is the natural choice.

AnyWireASLINK

AnyWireASLINK is a sensor-level network that realizes a smaller installation space and reduces wiring due to its easy wiring topology. The ability to monitor the network system from a centralized location reduces commissioning time and improves productivity.

Profibus DP

Profibus is one of the most widely used automation networks in Europe. It provides a wide possible range of compatible devices while delivering fast and robust communication.

Profinet

Open industrial Ethernet standard for automation. Profinet uses TCP/IP and IT standards, is capable of real-time Ethernet and allows the integration of field bus systems.

Modbus®/TCP, Modbus®/RTU

The Modbus® protocol is a messaging structure which is used to establish master-slave/client-server communication between intelligent devices. It is a de facto standard, truly open and a widely used network protocol in the industrial manufacturing environment.

DeviceNet™

DeviceNet™ is another widely accepted open network type with a large variety of third party products. This network type is particularly popular in North America.

AS-Interface (Actuator Sensor Interface)

The Actuator Sensor Interface (AS-Interface) is the international standard for the lowest field bus level. The network suits versatile demands, as it's very flexible and easy to install. It is usually used to control sensors, actuators, I/O units and gateways.

MELSECNET/H

For the systems that demand uncompromising reliability and high speed performance, only a dedicated network can deliver. MELSECNET/H and it's predecessor MELSECNET/10 use high speed, redundant functionality to give deterministic delivery of large data volumes.

SSCNET III/H

Mitsubishi Electric's SSCNET III (Servo System Controller Network) is a dedicated motion controller network ensuring maximum control and flexibility for motion systems under all conditions.

The motion controllers and servo amplifiers can be linked via the SSCNET network.

CANopen

CANopen is an "open" implementation of the Controller Area Network (CAN), which is defined in the EN50325-4 standard. It was developed by members of the CAN in Automation international users and manufacturers group.

BACnet

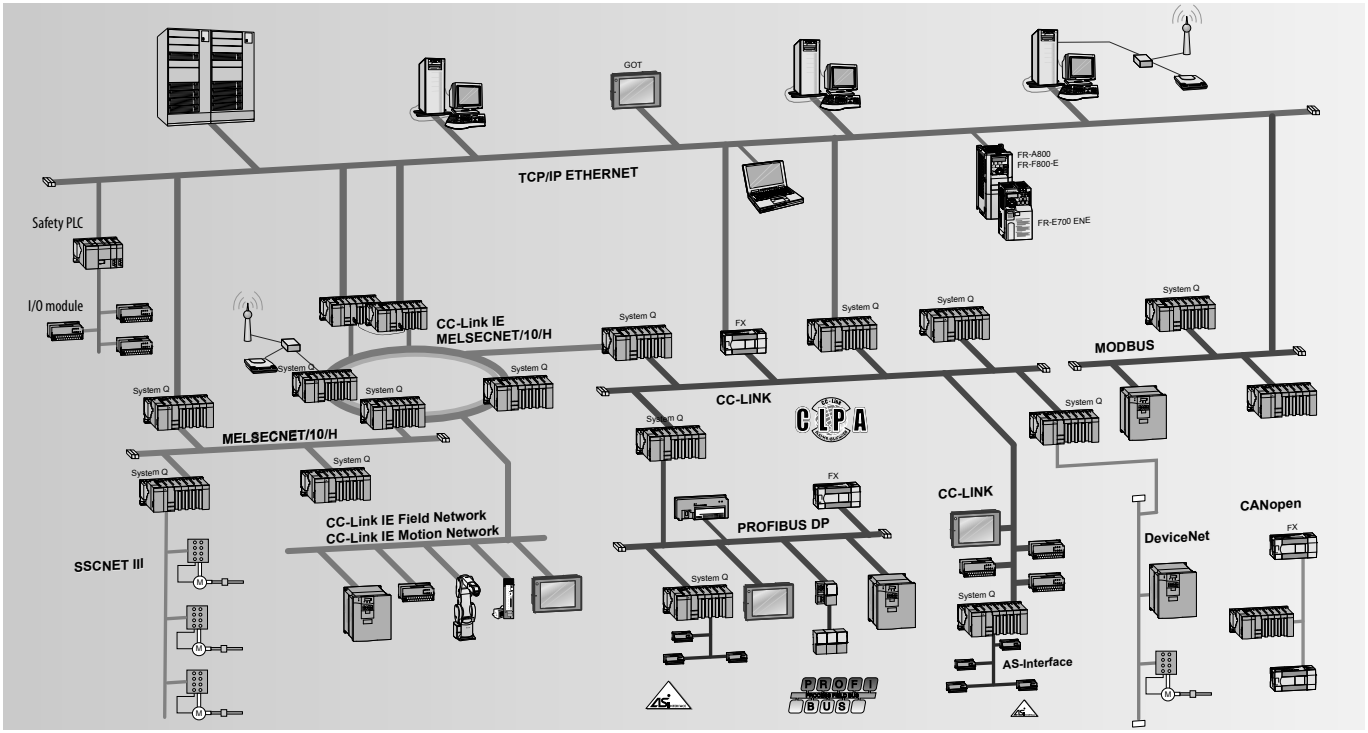
BACnet is a communications protocol for Building Automation and Control (BAC) networks that leverage the ASHRAE, ANSI and ISO 16484-5 protocol.

EtherCAT

EtherCAT is the abbreviation of Ethernet for Control Automation Technology. It is an open network communication between a master and slaves that uses real-time Ethernet.

Network		PLC			HMI	Inverter	Servo	Breaker	Robot	Energy meters
		Modular	Compact	ALPHA						
Ethernet	TCP/IP	●	●	—	●	●	—	—	●	—
	CC-Link IE Field	●	●	—	●	●	●	—	●	—
	CC-Link IE Control	●	—	—	●	—	—	—	—	—
	CC-Link IE Field Basic	●	●	—	●	●	●	—	●	—
	Modbus®/TCP	●	●	—	●	●	●	—	—	●
	Profinet	●	—	—	—	●	●	—	●	—
	EtherNet/IP	—	—	—	—	●	●	—	●	—
	EtherCat	—	—	—	—	●	●	—	—	—
CC-Link		●	●	—	●	●	●	●	●	●
Profibus DP		●	●	—	—	●	—	●	●	—
Modbus®/RTU		●	●	—	●	●	●	●	—	—
DeviceNet™		●	●	—	—	●	—	—	●	—
AS-Interface		●	—	●	—	—	—	—	—	—
MELSECNET/H		●	—	—	●	—	—	—	—	—
SSCNET III/H		●	●	—	—	●	●	—	●	—
CANopen		●	●	—	—	●	—	—	—	—
BACnet		● (iQ-R)	—	—	—	—	—	—	—	—

Typical distributed control structure



CC-Link, CC-Link IE Control, CC-Link IE Field, CC-Link IE Field Basic and CC-Link Safety

Standard CC-Link modules

Series	Master/slave modules	Description	Art. no.
MELSEC iQ-R series	RJ61BT11	CC-Link master/local module	297346
MELSEC System Q	QJ61BT11N	CC-Link master/local module	154748
	QS0J61BT12	CC-Link Safety master module	203209
MELSEC L series	L26CPU-BT	CPU with integrated CC-Link master/local module	238056
	L26CPU-PBT	CPU with integrated CC-Link master/local module	244977
	LJ61BT11	CC-Link master/local module	238099
	LJ61CL12	CC-Link/LT master module	284432
MELSEC iQ-F series	FX5-CCL-MS	CC-Link master module/intelligent device station	312299
MELSEC FX series	FX3U-16CCL-M	CC-Link master module	248224
	FX3U-64CCL	CC-Link local module on FX3	217915
	FX2N-32CCL	CC-Link local module	102961
PCI Express	Q81BD-J61BT11	Master/local module for PCI Express bus	221859
PCI	Q80BD-J61BT11N	Master/local module for PCI/F PC master	200758
Frequency inverters	FR-A7NC	CC-Link interface for FR-A700/FR-F700	156778
	FR-A7NC-Ekit-SC-E	CC-Link interface for FR-E700 SC	239644
	FR-A8NC	CC-Link interface for FR-A800/FR-F800	269431
HMI	GT15-J61BT13	CC-Link interface for GOT1000	203494
Breakers	BIF-CC-W	CC-Link interface for SUPER AE air circuit breakers	168571
MELFA robots	2D-TZ576	CC Link Interface for robot controller CR750-D	219063
Energy meters	ME0040C-SS96	CC Link Interface for ME96SSA	273874
	EMU4CM-C	CC Link Interface for ME96SSA	292655

CC-Link IE Field Basic modules

Series	Master/slave modules	Description	Art. no.
MELSEC iQ-R series	R□CPU	CC-Link IE Field Basic master	various
	R□ENCPU		
MELSEC System Q	Q□UDVCPU		
	Q□UDPVCPU		
MELSEC L series	L□CPU		
MELSEC iQ-F series	FX5U		
	FX5UC		
HMI	GT27	CC-Link IE Field Basic slave	
	GT25		
	GT23		
	GT21		
	GS21		

Networks

CC-Link IE modules

Series	Master/slave modules	Description	Art. no.
MELSEC iQ-R series	RJ71GP21-SX	Control/normal station for CC-Link IE Control, 1 Gbps, fiber-optic cable	279571
	RJ71GF11-T2	CC-Link IE Field master/local station, 1 Gbps	279569
	RJ72GF15-T2	CC-Link IE Field remote head module, 1 Gbps, Cat5e	297947
	R04ENCPU	CC-Link IE Control master/slave or CC-Link IE Field master/slave	290226
	R08ENCPU		290227
	R16ENCPU		290228
	R32ENCPU		290232
	R120ENCPU		290234
MELSEC System Q	QJ71GF11-T2	CC-Link IE Field master/slave modul, 1 Gbps, Cat5e	236484
	QS0J71GF11-T2	CC-Link IE Field master/local module	245177
	QJ71GP21-SX	1 Gbps, master/slave module for FO GI	208815
	QJ71GP21S-SX	1 Gbps, master/slave module for FO GI with external voltage supply	208816
	Q80BD-J71GP21-SX	1 Gbps, PCI PC card, master/slave for FO GI	208817
	Q80BD-J71GP21S-SX	1 Gbps, PCI PC card, master/slave for FO GI with external voltage supply	208818
	Q81BD-J71GF11-T2	PCI PC card, master/local module	253008
	NZ2GF-ETB	CC-Link IE Field network Ethernet adapter	253007
MELSEC L series	LJ71GF11-T2	CC-Link IE Field master/local module	246346
	LJ72GF15-T2	CC-Link IE Field head module	238100
MELSEC iQ-F series	FX5-CCLIEF	CC-Link IE Field intelligent device station	297444
Frequency inverters	FR-A7NCE	Option card for integration of a FR-A700/FR-F700 into a CC-Link IE Field network	244993
	FR-A8NCE	Option card for integration of a FR-A800/FR-F800 into a CC-Link IE Field network	273102
HMI	GT15-J71GP23-SX	GOT CC-Link IE interface for GT15/16 HMIs, 1 Gbps, fibre optic ring network	218576
	GT15-J71GF13-T2	GT16/15 CC Link IE Field network module	247574
MELFA robots	2F-DQ535-CCIEF-SET	CC-Link IE Field interface card for CR800-D robot controller	324560
Servo	MR-J4-☐GF	MR-J4 servo amplifiers with integrated CC-Link IE Field interface from 50 W to 22 kW	various

Ethernet interface modules for various network protocols

Series	Modules	Description	Art. no.
MELSEC iQ-R series	RJ71EN71	Ethernet interface module, 1 Gbps, 100 Mbps, 10 Mbps, two interfaces, multi-network connectivity (Ethernet/CC-Link iE)	279570
MELSEC System Q	QJ71E71-100	Ethernet interface module,100 Mbps,100BASE-TX/10BASE-T	138327
	QJ71E71-B2	Ethernet interface module, 10BASE2	129614
	QJ71E71-B5	Ethernet interface module, 10BASE5	147287
	QJ71MT91	Modbus®/TCP master and client 10BASE-T/100BASE-TX	155603
	NZ2EHG-T8	Compact-sized industrial switching HUB equipped with 8 ports capable of 1000BASE-T	259221
	NZ2EHF-T8	Compact-sized industrial switching HUB equipped with 8 ports capable of 100BASE-T	259222
MELSEC L series	LJ71E71-100	Ethernet interface module, 100 Mbps, 10 Mbps, 10BASE-T/100BASE-TX	263072
MELSEC FX series	FX3U-ENET-ADP	Ethernet interface module, 10BASE-T	157447
	FX3U-ENET	Ethernet interface module, 100BASE-TX/10BASE-T	166086
	FX3U-ENET-P502	Ethernet interface module, 100BASE-TX/10BASE-T, Modbus®/TCP ready	225142
HMI	GT15-J71E71-100	Ethernet interface module, 100BASE-TX/10BASE-T	166309
Frequency inverters	FR-A7N-WiE	WiFi Ethernet multi-protocol (Modbus®/TCP, EtherNet/IP, BACnet, MELSEC ABCSP according Modbus®/RTU) for FR-A700/FR-F700	264932
	A7NETH-2P	Ethernet protocol (EtherNet/IP ProfiNet I/O, BacNet/IP, EtherCat, Modbus®/TCP&MC) for FR-A700/FR-F700/FR-E700	283759
	A8NEIP_2P	EtherNet/IP 2port interface for FR-A800/FR-F800	262950

EtherCat

Series	Modules	Description	Art. no.
Frequency inverters	A8NECT_2P	EtherCat/IP 2port interface for FR-A800/FR-F800	284809
	A7NETH-2P	EtherCat/IP 2port interface for FR-A700/FR-E700	283759
Servo	MR-J4-☐TM-ECT	MR-J4 servo amplifiers with integrated EtherCAT interface from 50 W to 22 kW	various

Modbus®/TCP, Modbus®/RTU

Series	Master/slave modules	Description	Art. no.
MELSEC System Q	QJ71MB91	Serial Modbus® interface master/slave module	167757
	QJ71MT91	Modbus®/TCP interface master/slave module for Ethernet	155603
MELSEC L series	CPU-Module	Built-in Modbus®/TCP functionality (master/slave)	—
	LJ71C24	Serial Modbus®/RTU master module	238093
	LJ71C24-R2	Serial Modbus®/RTU master module	238094
MELSEC iQ-F series	FX5-232ADP	Serial Modbus® RS232C interface master/slave module	280513
	FX5-485ADP	Serial Modbus® RS485 interface master/slave module	280514
MELSEC FX series	FX3U-232ADP-MB	Serial Modbus® RS232C interface master/slave module	165276
	FX3U-485ADP-MB	Serial Modbus® RS485 interface master/slave module	165277
	FX3U-ENET-P502	Ethernet modul, 100BASE-TX/10BASE-T, Modbus®/TCP ready	225142
Breaker	BIF-MD-W	Modbus® interface for SUPER AE air circuit breakers	168573
Energy meters	ME0000MT-SS96	Modbus® interface for ME96SSA	297420
	EMU4-CM-MT	Modbus® interface for ME96SSA	304060
Servo	MR-JE-☐C	MR-JE servo amplifiers with Modbus®/TCP interface from 100 W to 3 kW	various

DeviceNet™

Series	Master/slave modules	Description	Art. no.
MELSEC System Q	QJ71DN91	DeviceNet™ interface master/slave module	136390
MELSEC FX series	FX2N-64DNET	DeviceNet™ interface slave module	131708
Frequency inverters	FR-A7ND	DeviceNet™ interface for FR-A700/FR-F700	158525
	FR-A7ND-Ekit-SC-E	DeviceNet™ interface for FR-E700 SC	239648
	FR-A8ND	DeviceNet™ interface for FR-A800	269432

AnyWireASLINK

Series	Modules	Description	Art. no.
MELSEC iQ-R series	RJ51AW12AL	AnyWireASLINK system master module	301856
MELSEC iQ-F series	FX5-ASL-M	AnyWireASLINK system master module	312300
MELSEC L series	LJ51AW12AL	AnyWireASLINK system master module	290898

AS-Interface

Series	Master/slave modules	Description	Art. no.
MELSEC System Q	QJ71AS92	AS-Interface module, version 2.11, dual network master	143531
ALPHA	AL2-ASI-BD	AS-Interface board for use with AL2-14MR or AL2-24MR	142525

Profinet

Series	Modules	Description	Art. no.
MELSEC iQ-R series	RJ71PN92	Profinet master module	308713
MELSEC System Q	ME1PN1FW-CCPU	Profinet master module	252935
Frequency inverters	A8NPRT_2P	Profinet interface for FR-A800/FR-F800, compliant to Profidrive	262949
	A7NETH-2P	Profinet interface for FR-A700/FR-E700	283759
MELFA robots	2D-TZ535-PN-SET	Profinet I/O interface for robot controller CR750-D/CR800-D	269546
Servo	MR-J4-□TM-PNT	MR-J4 Servo amplifiers with integrated Profinet interface from 50 W to 22 kW	various

Profibus DP(V1)

Master/slave module

Series	Modules	Description	Art. no.
MELSEC iQ-R series	RJ71PB91V	Profibus master/slave module	308714

Master modules

Series	Modules	Description	Art. no.
MELSEC System Q	QJ71PB92V	Profibus DP interface master module (DP V1/V2)	165374
MELSEC L series	ME1PB1-L	Profibus DP interface master module	268527
MELSEC FX series	FX3U-64DP-M	Profibus DP interface master module for FX3U PLCs	166085

Slave modules

Series	Modules	Description	Art. no.
MELSEC System Q	QJ71PB93D	Profibus DP slave module	143545
MELSEC L series	ME2PB1-L	Profibus DP slave module	278167
MELSEC FX series	FX3U-32DP	Profibus DP slave module for FX3U PLCs	194214
Frequency inverters	A8NDPV1	Profibus DPV1 interface for FR-A800, compliant to Profidrive, with D-sub connector	262948
	FR-A8NP	Profibus interface for FR-A800, only PPO support, compatible to FR-A7NP	274514
	FR-A7NP	Profibus interface for FR-A700/FR-F700	158524
	FR-A7NP-Ekit-SC-E	Profibus interface for FR-E700 SC	239646
	FR-A7NP-Ekit-SC-E-01	Profibus interface with D-sub connector for FR-E700/FR-E700 SC	273138
Breaker	BIF-PR-W	Profibus interface for SUPER AE air circuit breakers	168572

Slave I/O

Series	Module	Description	Art. no.
All PLC types	ST series/STlite series	Modular input/output system for connection to Profibus DP	refer to page 16 and following

I/O bridge modules

Series	Modules	Description	Art. no.
MELSEC FX series	FX2N-32DP-IF-D	Profibus remote I/O using FX2N I/O and special function modules; 24 V DC power supply	142763
MELFA robots	2D-TZ577	Profibus DP interface for robot controller CR750-D	218861

MELSECNET/H

Master, local station

Series	Modules	Description	Art. no.
MELSEC System Q	QJ71BR11	MELSECNET/H master/local, coaxial cable	127592
	QJ71LP21GE	MELSECNET/H master/local, GI 62.5/125 fibre optic cable	138959
	QJ71LP21-25	MELSECNET/H master/local, SI fibre optic cable	136391
	QJ71NT11B	MELSECNET/H master/local, twisted pair	221861

Slave (remote I/O)

Series	Modules	Description	Art. no.
MELSEC System Q	QJ72LP25-25	MELSECNET/H remote I/O controller, SI fibre optic cable	136392
	QJ72BR15	MELSECNET/H remote I/O controller, coaxial cable	136393

Normal station

Series	Modules	Description	Art. no.
HMI	GT15-J71LP23-25	MELSECNET/H communication unit, fiber-optic cable	229842
	GT15-J71BR13	MELSECNET/H communication unit, coaxial cable	229843

SSCNET III/H

Series	Modules	Description	Art. no.
MELSEC FX series	FX3U-20SSC-H	FX3U positioning module, 2 axes (SSCNET III)	206189
MELSEC iQ-F series	FX5-40SSC-S	Simple motion module, 4 axes	281405
	FX5-80SSC-S	Simple motion module, 8 axes	304187
MELSEC L series	LD77MS2	Simple motion module, 2 axes	268199
	LD77MS4	Simple motion module, 4 axes	268200
	LD77MS16	Simple motion module, 16 axes	268201
	LJ72MS15	Remote station (head module with END cover)	271040
MELSEC System Q	QD77MS2	Simple motion module, 2 axes	248702
	QD77MS4	Simple motion module, 4 axes	248703
	QD77MS16	Simple motion module, 16 axes	248704
	Q172DSCPU	Motion controller, 16 axes	248700
	Q173DSCPU	Motion controller, 32 axes	248701
Motion controller	Q170MSCPU(-S1)	Stand alone motion controller, 16 axes	266524 (266535)
	MR-MQ100	Singe axis motion controller, 1 axis (SSCNET III)	217705
Frequency inverters	FR-A7NS	SSCNET III interface for FR-A700	191403
	FR-A8NCE	SSCNET III/H interface for FR-A800	273102
Servo	MR-JE-☐BF	MR-JE servo amplifiers with SSCNET III/H interface from 100 W to 3 kW	various
	MR-J4-☐B	MR-J4 servo amplifiers with SSCNET III/H interface from 50 W to 55 kW	various

CANopen

Series	Modules	Description	Art. no.
MELSEC iQ-R series	RJ71CN91*	CANopen communication module	308735
MELSEC System Q	ME3CAN1-Q	CANopen communication module	278799
MELSEC L series	ME3CAN1-L	CANopen communication module	283159
MELSEC FX series	FX3U-CAN	CANopen communication module	252845
Frequency inverters	FR-A7NCA	CANopen communication module for FR-A700	191424
	FR-A7NCA E kit	CANopen communication module for FR-E700	210705
	FR-A8NCA	CANopen communication module for FR-A800/FR-F800	298153

* Please consult local Mitsubishi Electric representative to determine availability of these modules.

LonWorks

Series	Modules	Description	Art. no.
Frequency inverters	FR-A7NL	Option card for integration of a FR-A700 into a LonWorks network	156779
	FR-A7NL-Ekit-SC-E	Option card for integration of a FR-E700 SC into a LonWorks network	239645
	FR-A8NL	LonWorks Interface for FR-A800/FR-F800	318109

SAE J1939

Series	Module	Description	Art. no.
MELSEC FX series	FX3U-J1939	Communication module for SAE J1939 network	254276

CC-Link/CC-Link IE Field remote modules

These remote modules are intended to be installed near the control target. The advantages are reduced cabling and the capability of acquiring data and operation results of individual machine modules autonomously.

For wet environments six types of low profile waterproof remote I/O modules with IP67 protection are available featuring Input, Output and Combination modules.

- Up to 64 I/O modules with a maximum of 32 inputs or 32 outputs each can be connected.
- All modules have a very compact design which is tough and highly shock-resistant.
- Status indicator LEDs for the inputs
- Standard electrical isolation between process and control via optocouplers
- Mounting with DIN rail adapters or screws
- Modules can be mounted in horizontal arrangement or in one of 4 orientations on a flat surface.
- Ready for use with all CC-Link master modules.

Product Range	Module	Type	No. of input	No. of output	Description	Art. no.
Digital in	AJ65BTB1-16D	Remote module	16	—	DC input (+COM/-COM)	75447
	AJ65BTB2-16D		16	—	DC input with 8 potential terminals (+COM/-COM)	75450
	AJ65SBTB1-8D	Compact remote module	8	—	DC input (+COM/-COM)	104422
	AJ65SBTB1-16D		16	—	DC input (+COM/-COM)	136026
	AJ65SBTB3-16D		16	—	DC input (+COM/-COM), 3-wire sensors	151186
	AJ65SBTB1-16D1		16	—	Fast DC input (+COM/-COM)	140144
	AJ65SBTB1-32D1		32	—	Fast DC input (+COM/-COM)	140145
	AJ65SBTB1-32D		32	—	DC input (+COM/-COM)	136025
	AJ65FBTA4-16D	Waterproof remote module	16	—	Protection IP67, DC input (sink type)	137587
	AJ65FBTA4-16DE		16	—	Protection IP67, DC input (source type)	137588
Digital out	AJ65BTB1-16T	Remote module	—	16	Transistor output, (sink type), 0.5 A	75449
	AJ65BTB2-16R		—	16	Relay output, 2 A	75453
	AJ65SBTB1-8TE	Compact remote module	—	8	Transistor output (source type), short circuit proof, 0.1 A	129574
	AJ65SBTB2-8T1		—	8	Transistor output (sink type), 0.5 A	144062
	AJ65SBTB1-16TE		—	16	Transistor output (source type), 0.5 A	129575
	AJ65SBTB1-32T		—	32	Transistor output (sink type), 0.5 A	138957
	AJ65SBTB2N-8R		—	8	Relay output, 2 A	140148
	AJ65SBTB2N-16R		—	16	Relay output, 2 A	140149
	AJ65SBTB1-16T1		—	16	Transistor output (sink type), 0.5 A	163966
	AJ65SBTB1B-16TE1		—	16	Transistor output (source type), 0.1 A	204679
	AJ65SBTB1-32TE1		—	32	Transistor output (source type), 0.1 A	204680
	AJ65SBTB2N-16S		—	16	Triac output, 0.6 A	159954
	AJ65FBTA2-16T	Waterproof remote module	—	16	Protection IP67, DC output (sink type), 0.5 A	150380
	AJ65FBTA2-16TE		—	16	Protection IP67, DC output (source type), 1 A	150381
Combine	AJ65BTB1-16DT	Remote module	8	8	DC input (sink type), transistor output (sink type)	75448
	AJ65BTB2-16DT		8	8	DC input with 16 potential terminals (sink type), transistor output (sink type)	75452
	AJ65BTB2-16DR		8	8	DC input (source type), relay output	75451
	AJ65FBTA42-16DT	Waterproof remote module	8	8	Protection IP67, DC output (sink type), DC input (sink type)	137589
	AJ65FBTA42-16DTE		8	8	Protection IP67, DC output (source type), DC input (source type)	137590
	AJ65SBTB1-32DT1	Compact combined modules	16	16	DC input (sink type), DC output (sink type), short circuit proof	166822
	AJ65SBTB1-32DTE1		16	16	DC input (source type), DC output (source type)	204681
Analog in	AJ65BT-64AD	Remote module	4	—	4-channel input, -10–10 V, -20–20 mA	75444
	AJ65BT-64RD3		4	—	4-channel input, for 3-wire-type Pt100 temperature sensors	88026
	AJ65BT-64RD4		4	—	4-channel input, for 4-wire-type Pt100 temperature sensors	88027
	AJ65BT-68TD		8	—	8-channel thermocouple input	88025
	AJ65SBT-64AD	Compact remote module	4	—	4-channel input, -10–10 V, 0 A–20 mA	140146
	AJ65SBT2B-64RD3		4	—	4-channel input, for Pt100 with three-wire technology	221862
Analog out	AJ65BT-64DAV	Remote module	—	4	4-channel voltage output, -10–10 V	75446
	AJ65BT-64DAI		—	4	4-channel current output, 4–20 mA	75445
	AJ65SBT-62DA	Compact remote module	—	2	2-channel voltage output, -10–10 V, 0 A–20 mA	140147
	AJ65SBT2B-64DA		—	4	4-channel voltage output, -10–10 V, 0 A–20 mA	221863
Repeater	AJ65SBT-RPT	Compact repeater	—	—	Repeater allowing 'T' branching and network extension	130353

High-speed counter

The high-speed counter modules acquire signals at frequencies beyond the range of normal digital input modules. Positioning tasks or frequency measurements for example can be performed.

Data exchange with peripherals

These modules allow communication with peripheral devices through a standard RS232C interface. The peripherals are connected point to point (1:1).

Open control loop positioning

Locating the positioning unit near the servo/ mechanical system not only reduces cable costs but also eliminates problems arising from noise and cable losses.

Product range	Module	Type	Description	Art. no.
Counter	AJ65BT-D62	Remote module	2 high-speed counter inputs, 5–24 V DC, up to 200 kHz	88028
	AJ65BT-D62D		2 high-speed counter inputs, EIA standard RS422 connection, up to 400 kHz (low current consumption)	88029
	AJ65BT-D62D-S1		2 high-speed counter inputs, EIA standard RS422 connection, up to 400 kHz	88030
Interface	AJ65BT-R2N	Remote module	Serial interface, RS232C (D-Sub, 9 pole), 1 channel	216545
Positioning	AJ65BT-D75P2-S3	Remote module	2 axes positioning module, pulse output, linear and circular interpolation	88002
Bridge Module	NZ2GF-CCB	CC-Link IE Field to CC-Link	Allows the connection of a CC-Link network to a CC-Link IE network.	266160
	NZ2AW1C1BY	CC-Link to AnyWire Bitty	Used for the connection between AnyWire Bitty having the DC transmission line system and CC-Link.	291717
	NZ2AW1C2AL	CC-Link to AnyWireASLINK	Bridge module used for the connection between AnyWireASLINK and CC-Link.	294278
	NZ2AW1C2D2	CC-Link to AnyWire DB A20	Used for the connection between AnyWire DB A20 having the full-duplex transmission mode and CC-Link Ver 2.00.	290899
	NZ2AW1GFAL	CC-Link IE Field to AnyWireASLINK	Seamlessly connects AnyWireASLINK products to CC-Link IE Field Network	297161
I/O modules	NZ2GF2B1-16D	CC-Link IE Field network remote I/O module	16 points input, 24 V DC (positive/negative common shared) 1-wire, terminal block type, response time 0–70 ms	260472
	NZ2GF2B1-32D		32 points input, 24 V DC (positive/negative common) 1-wire, terminal block type	312890
	NZ2GF2B1-32DT		32 points I/O, 24 V DC (16 inputs: positive common, 16 outputs: sink type, 0.5 A/point), 1-wire, screw terminal block	312893
	NZ2GF2B1-32DTE		32 points I/O, 24 V DC (16 inputs: negative common, 16 outputs: source type, 0.5 A/point), 1-wire, screw terminal block	312894
	NZ2GF2B1-16T		16 points output, 12 to 24 V DC, 0.5 A/point, 4 A/common, transistor output (sink type) 1-wire, terminal block type	260473
	NZ2GF2B1-32T		32 points output, 12/24 V DC (0.5 A), sink type, screw terminal block, 1-wire	312891
	NZ2GF2B1-16TE		16 points output, 12 to 24 V DC, 0.5 A/point, 4 A/common, transistor output (source type) 1-wire, terminal block type	260474
	NZ2GF2B1-32TE		32 points output, 12/24 V DC (0.5 A), source type, screw terminal block, 1-wire	312892
	NZ2GF2B2-16A		16 points input, 100–120 V AC, 50/60 Hz, screw terminal block, 2-wire	312905
	NZ2GF2B2-16R		16 points output, relay output, 24 V DC/240 V AC (2 A), screw terminal block, 2-wire	312906
	NZ2GF2B2-16S		16 point output, triac output, 100–240 V AC/0.6 A, screw terminal block, 2-wire	312907
	NZ2GF2S2-16A		16 point input, 100–120 V AC, 50/60 Hz, spring clamp terminal block, 2-wire	312908
	NZ2GF2S2-16R		16 points, relay output, 24 V DC/240 V AC (2 A), spring clamp terminal block, 2-wire	312909
	NZ2GF2S2-16S		16 points, triac output, 100–240 V AC/0.6 A, spring clamp terminal block, 2-wire	312910
	NZ2GFCF-D62PD2		2 high-speed counter inputs, 5/24 V DC/Differential inputs, up to 8 MHz	266159
	NZ2EX2B1-16D	CC-Link IE Field network extension I/O module	16 points input, 24 V DC (positive/negative common shared) 1-wire, terminal block type, response time 0–70ms	260507
	NZ2EX2B1-16T		16 points output, 12 to 24 V DC, 0.5 A/point, 4 A/common, transistor output (sink type) 1-wire, terminal block type	260508
	NZ2EX2B1-16TE		16 points output, 12 to 24 V DC, 0.5 A/point, 4 A/common, transistor output (source type) 1-wire, terminal block type	260509
	NZ2EXSS2-8TE	CC-Link IE Field Safety extension output module	8 points with single wiring/4 points with double wiring, 24 V DC (0.5 A), sink + source type, spring clamp terminal block, 2-wire	289991
	NZ2EX2B1N-16D	CC-Link IE Field extension module for block type remote module	16 input points, 24 V DC, response time 0–70 ms, positive/negative common shared, screw terminal block, 1-wire	304894
	NZ2EX2B1N-16T		16 points output, 12/24 V DC (0.5 A), transistor output (sink type), screw terminal block, 1-wire	305035
	NZ2EX2B1N-16TE		16 points output,24 V DC, 12/24 V DC (0.5 A), transistor output (source type), screw terminal block, 1-wire	305036
	NZ2EX2S1-16D		6 points input, 24 V DC, response time 0–70 ms, positive/negative common shared, spring clamp terminal block, 1-wire	297155
	NZ2EX2S1-16T		16 points output, 12/24 V DC (0.5 A), transistor output (sink type), spring clamp terminal block, 1-wire	297156
	NZ2EX2S1-16TE		16 points output, 12/24 V DC (0.5 A), transistor output (source type), spring clamp terminal block, 1-wire	297157
	NZ2GFSS2-32D	CC-Link IE Field Safety remote I/O module	Main safety input, 32 points with single wiring/16 points with double wiring, 24 V DC, response time 0.4 ms, negative common, spring clamp terminal block, 2-wire	289990
	NZ2GF2B1N-16D	CC-Link IE Field block type remote module	16 points input , 24 V DC, response time 0–70 ms, positive/negative common shared, screw terminal block, 1-wire	291254
	NZ2GF2B1N-16T		16 points output, 12/24 V DC (0.5 A), transistor output (sink type), screw terminal block,1-wire	291275
	NZ2GF2B1N-16TE		16 points output, 12/24 V DC (0.5 A), transistor output (source type), screw terminal block,1-wire	291276
	NZ2GFCE3-32D		32 points input, 24 V DC, response time 0–70 ms, positive common, sensor connector (e-CON), 3-wire	296462
	NZ2GFCE3-32T		32 points transistor (sink type), e-CON 32 points output, 12/24 V DC (0.5 A), transistor output (sink type), sensor connector (e-CON), 3-wire	296463
	NZ2GFCE3-32DT		32 point I/O combined, 16 points input, 24 V DC, response time 0–70 ms, positive common, 16 points output, 12/24 V DC (0.5 A), transistor output (sink type), sensor connector (e-CON), 3-wire	296464
	NZ2GFCF1-32D		32 points input, 24 V DC, response time 0–70 ms, positive/negative common shared, 40-pin connector, 1-wire	296515
	NZ2GFCF1-32T		32 points output, 12/24 V DC (0.1 A), transistor output (sink type), 40-pin connector, 1-wire	296516
	NZ2GFCF1-32DT		32 point I/O combined, 16 points input, 24 V DC, response time 0–70 ms, positive/negative common shared, 16 points output, 12/24 V DC (0.1 A), transistor output (sink type), 40-pin connector, 1-wire	296517
	NZ2GF2S1-16D		16 points input, 24 V DC, response time 0–70 ms, positive/negative common shared, spring clamp terminal block, 1-wire	297158
	NZ2GF2S1-16T		16 points output, 12/24 V DC (0.5 A), transistor output (sink type), spring clamp terminal block, 1-wire	297159
	NZ2GF2S1-16TE		16 points output, 12/24 V DC (0.5 A), transistor output (source type), spring clamp terminal block, 1-wire	297160
	NZ2GFCE3-16D		16 points input, 24 V DC, response time 0–70 ms, positive common, sensor connector (e-CON), 3-wire	306593
	NZ2GFCE3-16DE		16 points input, 24 V DC, response time 0–70 ms, negative common, sensor connector (e-CON), 3-wire	306594
	NZ2GFCE3-16T		16 points output, 12/24 V DC (0.5 A), transistor output (sink type), sensor connector (e-CON), 3-wire	306625
	NZ2GFCE3-16TE	CC-Link IE Field block type remote module	16 points output, 12/24 V DC (0.5 A), transistor output (source type), sensor connector (e-CON), 3-wire	306626

Product range	Module	Type	Description	Art. no.
I/O modules	NZ2GF12A4-16DE	CC-Link IE Field Waterproof/ dustproof type (IP67) remote module	16 points input, 24 V DC, response time 0–70 ms, negative common, waterproof connector, 2–4-wire	307261
	NZ2GF12A2-16TE		16 points output, 12/24 V DC (2 A), transistor output (source type), waterproof connector, 2-wire	307262
	NZ2GF12A2-16T		16 points output, 12/24 V DC (2 A), transistor output (sink type), waterproof connector, 2-wire	307420
	NZ2GF12A42-16DT		16 point I/O combined , 8 points input, 24 V DC, response time 0–70 ms, positive common, 2–4-wire, 8 points output, 12/24V DC (2 A), transistor output (sink type), 2-wire waterproof connector	307421
	NZ2GF12A42-16DTE		16 point I/O combined , 8 points input, 24 V DC, response time 0–70 ms, negative common, 2–4-wire, 8 points output, 12/24V DC (2 A), transistor output (source type), 2-wire waterproof connector	307422
	NZ2GF12A4-16D		16 points input, 24 V DC, response time 0–70 ms, positive common, waterproof connector, 2–4-wire	307423
	NZ2GF2B1N1-16D	CC-Link IE Field block type remote module	16 points input, 24 V DC, response time 0–70 ms, positive/negative common shared, screw terminal block, 1-wire	311383
	NZ2GF2B1N1-16TE		16 points output, 12/24 V DC (0.5 A), transistor output (sink type), screw terminal block, 1-wire	311859
Temperature control units	NZ2GF2B-60TCTT4	CC-Link IE Field	4 channels, thermocouple input, transistor output, screw terminal block	306627
	NZ2GF2B-60TCRT4		4 channels, RTD input, transistor output, screw terminal block	306628
Analog modules	NZ2GF2B-60AD4	CC-Link IE Field network analog-digital converter module	4 channels voltage/current analog-digital converter module (analog input type)	260505
	NZ2GF2S-60MD4		4 channel voltage/current/temperature analog-digital converter module (multi analog input type); conversion speed 40 ms/4 ch, spring clamp terminal block	312911
	NZ2GFCE-60ADV8		8 channel voltage analog-digital converter module (analog input type), -10–10 V DC; conversion speed 1 ms/ch; sensor connector (e-CON)	312912
	NZ2GFCE-60ADI8		8 channel current analog-digital converter module (analog input type), 0–20 mA DC; conversion speed 1 ms/ch; sensor connector (e-CON)	312913
	NZ2GF2B-60DA4	CC-Link IE Field network digital-analog converter module	4 channels voltage/current digital-analog converter module (analog output type)	260506
	NZ2GFCE-60DAV8		8 channel voltage digital-analog converter module (analog output type), -10–10 V DC; conversion speed 1 ms/ch; sensor connector (e-CON)	312914
	NZ2GFCE-60DAI8		8 channel voltage digital-analog converter module (analog output type), 0–20 mA DC; conversion speed 1 ms/ch; sensor connector (e-CON)	312915

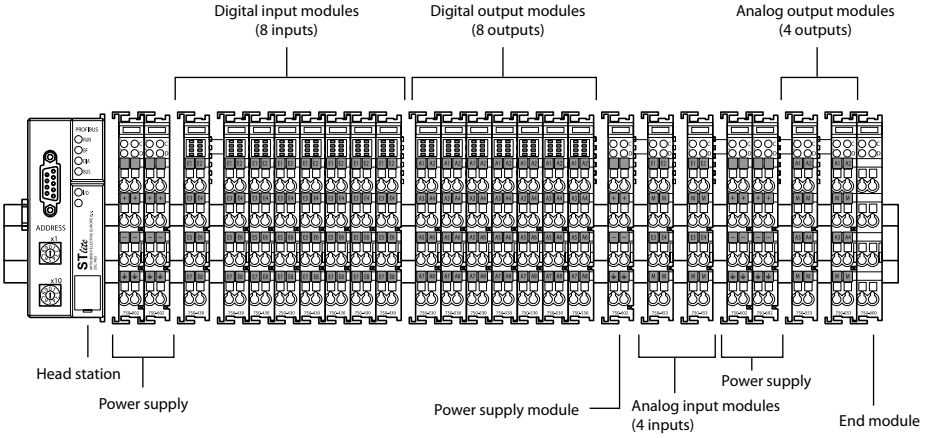
See also CC-Link Safety remote I/O modules, page 38
See also CC-Link Safety relays, page 39

The MELSEC STlite series – scalable I/O solutions for CC-Link, Profibus and Ethernet

Approved for a very wide range of applications, the STlite series features excellent module granularity and fieldbus-agnostic design, making it ideally suited for the requirements of today's distributed fieldbus systems. The devices are optimised for efficient processlevel communication, with scalable performance and high integration density.

- The range of potential applications is virtually unlimited.
- Reduces hardware and system overheads to a minimum.
- Simplifies handling and maximises efficiency.

The uncompromisingly modular architecture of the system also extends to its support for a wide range of fieldbus systems. You can install different head stations for different protocols, depending on the needs of your applications.



Optimised for real-life requirements

Module granularity:

- 2, 4 or 8 channels in a single I/O module

Fieldbus-agnostic:

- Head stations available for the leading fieldbus protocols CC-Link, Profibus DP and Ethernet

Safe investment:

- Fieldbus node design enables easy switching to new bus standards without changing the bus modules.

Clear labelling:

- Colour-coded group identification plate brackets and terminal tags

Versatile:

- Configuration options for digital/analog inputs/outputs and special functions with different voltages, powers and signals on a single fieldbus node.

Reliable:

- Approvals for industrial and marine automation applications ensure a wide range of deployment options – even in heavy-duty environments.
- Automatic contacting for power and data contacts
- Pluggable connections with bus plug connector
- CAGE CLAMP® spring terminals for input/output point connections

STlite series head stations

The head stations connect the STlite I/O systems with the Profibus DP, CC-Link or Ethernet fieldbus systems. Each head station recognises all inserted I/O and special function modules and generates a local process image from the configuration.

Specifications		STL-BT1	STL-PB1	STL-ETH1
Number of I/O modules		64	64	64
Communication protocol		CC-Link-Standard	Profibus DP	Ethernet TCP/IP ECO, Modbus®/TCP
Fieldbus	input process image	256 bytes	244 bytes	14 bytes digital, 2 bytes system, 32 bytes analog
	output process image	256 bytes	244 bytes	14 bytes digital, 2 bytes system, 32 bytes analog
Number of addressable modules		64	96 with repeater	Limited by Ethernet specification
Order information	Art. no.	242280	242279	242281
Accessories		STL-CCLink con: Art. no. 242314 The fieldbus connector connects a CC-Link device to a CC-Link line.		

Power supply modules

The power supply modules deliver power to the bus terminals at the required voltages.

Specifications		STL-PS	STL-BPS
Voltage supply		24 V DC (-25–30 %)	24 V DC (-25–30 %)
Input current	max.	—	500
Total current for I/O modules	mA	—	2000
Order information	Art. no.	242311	242312

Bus end module

One of these end modules must be installed at the end of each fieldbus node. The end module terminates the internal terminals bus and ensures reliable data communications.

Specifications		STL-ET
Order information	Art. no.	242313

Temperature input module

The analog temperature input module enables direct connection of Pt100 resistance temperature sensors, with either a 2-wire or 3-wire cable.

Specifications		STL-TI2
Module type		Analog temperature input module
Number of input channels		2
Sensor types		Pt100 and resistance measurement
Temperature measuring range		-200–850 °C (Pt100)
Resolution		0.1 °C
Order information	Art. no.	242307

Incremental encoder input module

This module provides an interface for incremental encoders with an RS422 port. A counter with a quadrature decoder and a null point signal latch can be read and activated by the controller.

Specifications		STL-ENC
Module type		Incremental Encoder Interface
Encoder connection		3 input channels
Counting range		32 bits binary
Max. counting frequency		250 kHz
Order information	Art. no.	242308

Digital I/O modules

Digital input modules

The digital input modules have 8 channels. They are used for inputting control signals from the field, for example from sensors.

Specifications		STL-DI8-V1	STL-DI8-V2
Module type		Digital input module	Digital input module
Integrated inputs		8, source type, 1-conductor connection	8, source type, 1-conductor connection
Order information	Art. no.	242282	242283

Digital output modules

Digital output modules are available with 4 or 8 outputs. They are used to send control signals from the automation controller to the connected actuators.

Specifications		STL-DO4	STL-DO8	STL-RO2
Module type		Digital output module	Digital output module	Digital relay output module
Integrated outputs		4, source type	8, source type	2 contacts (normally open)
Order information	Art. no.	242284	242295	242296

Digital relay output module

The relay output modules have two make contacts. The relays have floating contacts and are actuated with the internal system voltage.

Analog I/O modules

Analog input modules

The analog input modules with current input process standard 4–20 mA signals. The modules with voltage inputs can handle standard ±10 V or 0–10 V signals.

Specifications		STL-AD2-V	STL-AD2-I	STL-AD4-V1	STL-AD4-V2	STL-AD4-I
Module type		Analog input module				
Number of input channels		2	2	4	4	4
Signal input		0–10 V	4–20 mA	±10 V	0–10 V	4–20 mA
Order information	Art. no.	242297	242298	242299	242300	242301

Analog output modules

The analog output modules with current outputs generate standard 4–20 mA signals. The modules with voltage outputs generate standard ±10 V or 0–10 V signals.

Specifications		STL-DA2-I	STL-DA2-V	STL-DA4-V1	STL-DA4-V2	STL-DA4-I
Module type		Analog output module				
Number of output channels		2	2	4	4	4
Signal output		4–20 mA	0–10 V	0–10 V	±10 V	4–20 mA
Order information	Art. no.	242302	242303	242304	242305	242306

Up/Down counter module

This counter inputs binary 24 V signals and transmits the counter value to the installed bus system. An input is used to switch between Up and Down counting.

Specifications		STL-C100
Module type		Up/Down counter
Switching outputs		2
Counter inputs		1
Max. counting frequency		100 kHz
Order information	Art. no.	242309

Interface module

The SSI transmitter interface module enables direct connection of an SSI transmitter. To read out the transmitter the module emits a clock signal and represents the data flow as a data word in the process image.

Specifications		STL-SSI
Module type		Transmitter interface
Interface		SSI
Sensor connection		1 input/1 output channel
Order information	Art. no.	242310

The MELSEC ST series – premium product for process industry

System description

The ST series is designed as a modular input/output system for connection to CC-Link and Profibus DP. It comprises of:

- basic module (head station and bus node for CC-Link and Profibus DP)
- power supply modules
- digital and analog I/O modules

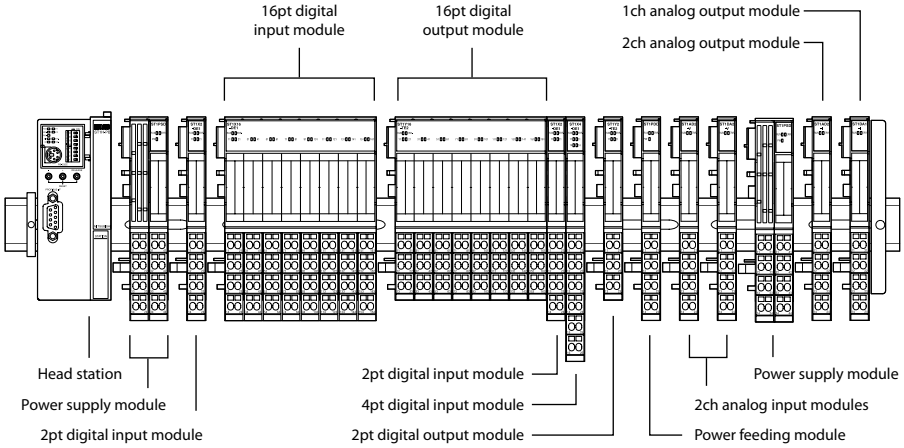
They can be combined freely to provide an efficient system configuration depending on your demands.

The name „ST" means „Slice-type Terminal" and comes from the physical appearance of the very slim modules (12.6 mm). As well as slice type modules, cost saving block modules with 16 inputs or outputs are also available.

The extension modules are designed as a 2-component system, that means they consist of electronic modules for the function and base modules as modular backplane bus (available with two types of terminals: spring clamp or screw clamp terminals).

The electronic modules can be clipped easily in the base modules without any tool. The combined unit can then be mounted on a DIN rail. Exchange of the electronic modules can be made on-line, so the system keeps running. Re-wiring is not needed.

Every electronic module provides LEDs for quick and easy diagnostics and also additional information. Error and status messages are also shown on the basic module.



Special features:

- ST = Slice terminals, only 12.6 mm wide
- Modular structure with no restriction on installation position
- Easy and complete handling via 3 push buttons
- Connection diagram on every module
- Applicable wire size for all base modules 0.5–2.5 mm², flexible wire with ferrule or solid core wire without ferrule
- Expandable in two-point increments
- Replaceable electronic modules
- Hot swap function without re-wiring
- Quick diagnostics via LED´s
- Distributed 24 V DC for actuators/sensors
- Gold contacts for all bus and signal connections
- Electronic modules are coded to prevent an incorrect unit being inserted
- Easy parameter setting with GX Configurator DP

Basic modules (head stations) of the MELSEC ST series

The basic module ST1H-PB connects the remote I/O modules of the ST series to CC-Link and Profibus DP.

Specifications		ST1H-BT	ST1H-PB
Occupied I/O points		4 inputs/4 outputs	4/4
Communications	protocol	CC-Link standard	Profibus DP
	medium	CC-Link cable	Shielded 2-wire
Interface	type	CC-Link	RS485
Supported operation modes		Remote station (1–4)	Sync mode, freeze mode
Order information	Art. no.	214496	152951

Bus power for head station and power feeding module

You need one ST1PSD beside the basic module to operate the ST station, a second or more are only needed depending on the power consumption of the connected items.

The power feeding module ST1PDD distributes 24 V DC only for the I/Os of the actuators and sensors.

Specifications		ST1PSD	ST1PDD
Module type		Power supply for head station, internal 5 V DC backplane bus and 24 V DC for I/Os (double function)	Power feeding module
Nominal voltage	V DC	24.0	24.0
Max. output current (5 V DC)	A	2.0	—
Max. output current (24 V DC)	A	8 (10 with fuse)	8 (10 with fuse)
Order information	Art. no.	152952	152953
Applicable base module for basic module supply	spring clamp type	ST1B-S4P2-H-SET, art. no. 152908	ST1B-S4P2-D, art. no. 152910
	screw clamp type	ST1B-E4P2-H-SET, art. no. 152918	ST1B-E4P2-D, art. no. 152920
Applicable base module for bus refreshing within the station	spring clamp type	ST1B-S4P2-R-SET, art. no. 152909	—
	screw clamp type	ST1B-E4P2-R-SET, art. no. 152919	—

Digital I/O modules

Digital input modules

The digital input modules of the ST series directly connect field devices (contacts, limit switches, sensors, etc.).

Digital output modules

The digital output modules of the ST series connect directly to field devices (e.g. contactors, valves, lights).

The TPE3 models provide advanced protection functions e.g. for thermal and short circuit failures.

Specifications		ST1X2-DE1	ST1X4-DE1	ST1X16-DE1	ST1X1616-DE1-S1
Number of input points		2	4	16	32
Applicable base module	spring clamp type	ST1B-S4X2, art. no. 152911	ST1B-S6X4, art. no. 152912	ST1B-S4X16, art. no. 152913	ST1B-S6X32, art. no. 169313
	screw clamp type	ST1B-E4X2, art. no. 152921	ST1B-E6X4, art. no. 152922	ST1B-E4X16, art. no. 152923	ST1B-E6X32, art. no. 169314
Connection cable type		3-wire 24 V DC (with shield)	3-wire 24 V DC	3-wire 24 V DC (with shield)	3-wire 24 V DC (with shield)
Order information	Art. no.	152964	152965	152966	169309

Specifications		ST1Y2-TE2	ST1Y16-TE2	ST1Y2-TE8	ST1Y2-TPE3	ST1Y16-TPE3	ST1Y2-R2
Number of output points		2	16	2	2	16	2
Output type		Transistor	Transistor	Transistor	Transistor	Transistor	Relay
Applicable base module	spring clamp type	ST1B-S3Y2, art. no. 152914	ST1B-S3Y16, art. no. 152915	ST1B-S3Y2, art. no. 152914	ST1B-S3Y2, art. no. 152914	ST1B-S3Y16, art. no. 152915	ST1B-S4IR2, art. no. 152916
	screw clamp type	ST1B-E3Y2, art. no. 152924	ST1B-E3Y16, art. no. 152925	ST1B-E3Y2, art. no. 152924	ST1B-E3Y2, art. no. 152924	ST1B-E3Y16, art. no. 152925	ST1B-E4IR2, art. no. 152927
Connection cable type		2-wire 24 V DC with shield	2-wire 24 V DC with shield	2-wire 24 V DC with shield	2-wire 24 V DC with shield	2-wire 24 V DC with shield	2 wires (internal connected)
Order information	Art. no.	152967	152968	169408	152969	152970	152971

Analog I/O modules

Analog input modules

The analog input modules of the ST series convert analog process data like pressure, temperature, etc. into digital values that are sent to the Profibus DP/CC-Link master.

Analog output modules

The analog output modules of the ST series convert the digital values sent from the Profibus DP/CC-Link master into an analog voltage signal.

Analog temperature input modules

The analog temperature input modules of the ST series convert analog temperature data into digital values that are sent to the Profibus DP/CC-Link master.

Specifications		ST1AD2-V	ST1AD2-I	ST1TD2	ST1RD2
Module type		Analog input module	Analog input module	Analog temperature input module	Analog temperature input module
Occupied I/O points		4/4	4/4	4/4	4/4
Signal input		-10–10 V, 0–10 V, 0–5 V, 1–5 V	0–20 mA, 4–20 mA	Thermocouple input: K, T, E, J, B, R, S or N	Pt100, Pt1000
Resolution		12 bit + sign	12 bit + sign	0.1–0.8 °C ①	0.1 °C
Conversion speed		0.1 ms per channel	0.1 ms per channel	30/60 ms per channel	80 ms per channel
Applicable base module	spring clamp type	ST1B-S4IR2, art. no. 152916	ST1B-S4IR2, art. no. 152916	ST1B-S4TD2, art. no. 161736	ST1B-S4TD2, art. no. 161736
	screw clamp type	ST1B-E4IR2, art. no. 152927	ST1B-E4IR2, art. no. 152927	ST1B-E4TD2, art. no. 161737	ST1B-E4TD2, art. no. 161737
Order information	Art. no.	152972	152973	161734	169406

① Depends on the thermocouple used

Specifications		ST1DA2-V/-F01	ST1DA1-I/-F01	ST1SS1
Module type		Analog output module	Analog output module	Absolute encoder interface with SSI (synchronal serial interface)
Occupied I/O points		4/4	4/4	4/4
Signal output range		-10–10 V, 0–10 V, 0–5 V, 1–5 V	0–20 mA, 4–20 mA	31 bit binary (0–2147483647)
Resolution		12 bit + sign	12 bit + sign	2 to 31 bits
Applicable base module	spring clamp type	ST1B-S4IR2, art. no. 152916	ST1B-S4IR2, art. no. 152916	ST1B-S4IR2, art. no. 152916
	screw clamp type	ST1B-E4IR2, art. no. 152927	ST1B-E4IR2, art. no. 152927	ST1B-E4IR2, art. no. 152927
Order information	Art. no.	152975/217631	152976/217632	193660

For detailed information, please refer to the family catalogues.

Modular PLCs – MELSEC iQ-R series, System Q and L series

Modular controllers like Mitsubishi Electric's MELSEC iQ-R series, System Q and the L series are high-performance PLC systems with broad functionality. The range, power and function of these high-end PLCs is impressive, with operation times measured in nanoseconds.

The modular design allows flexible usage in a broad range of applications. Additional backplanes can be added as the system expands.

Modular PLCs comprise a power supply, one or more CPU modules and I/O and/or special function modules.

Use of digital and special function modules

The use of digital and analog modules and most special function modules is dependent only on the maximum available number of addresses and thus on the CPU used in each case.

The following modules are available for assembling the system:

Pulse catch and interrupt modules

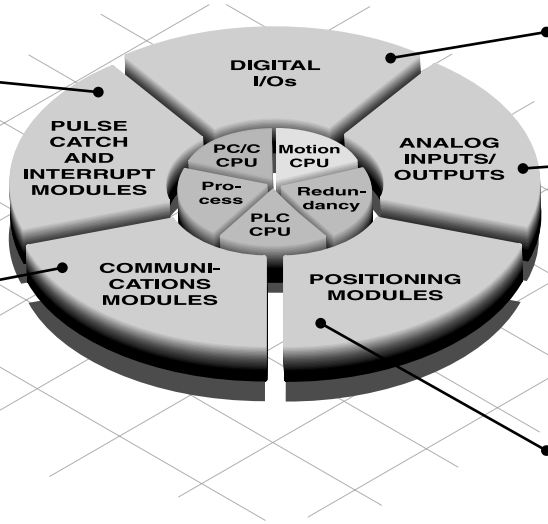
Digital input modules for pulse storage and for processing subroutines.

Communications modules

Interface modules with RS232/RS422/RS485 interface for connection of peripherals or for PLC-PLC communication.

Network modules

For interfacing with Ethernet, CC-Link, CC-Link IE, Profibus DP/Profinet, Modbus®/TCP/RTU, DeviceNet™, AS-Interface and MELSEC networks.



Digital input/output modules

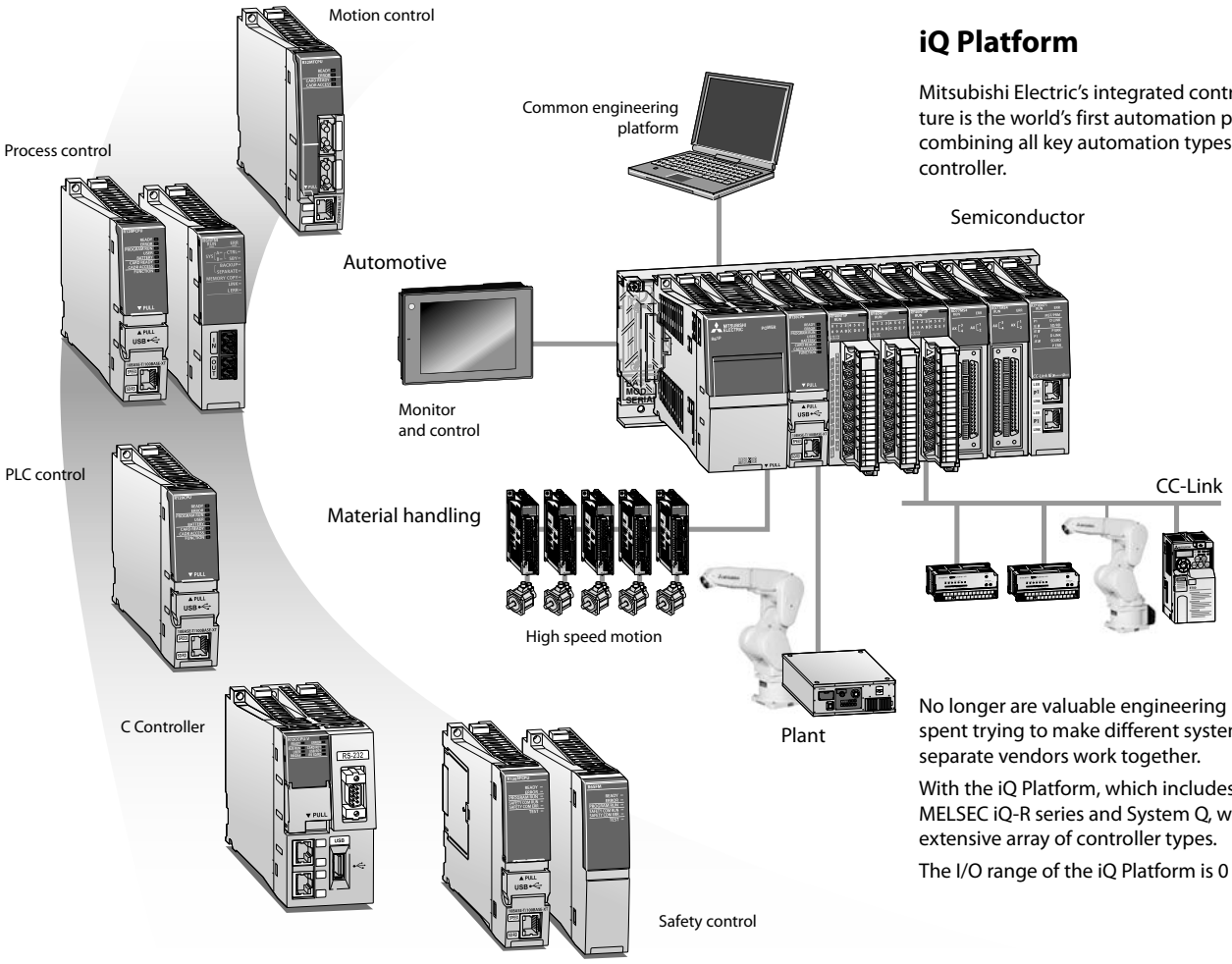
For various signal levels with transistor, relay or triac switches.

Analog input/output modules

For processing current/voltage signals and for temperature value acquisition as well as temperature control with direct connection of Pt100 resistance thermometers or thermocouples. A HART enabled module for current input is also available for the MELSEC System Q.

Positioning modules

High-speed counter modules with possibility for connection of incremental shaft encoder or multiaxial positioning modules for servo and step drives with up to 8 axes per module.



iQ Platform

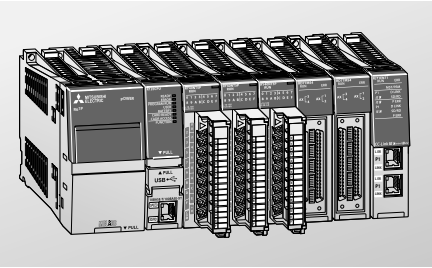
Mitsubishi Electric's integrated control architecture is the world's first automation platform combining all key automation types on one controller.

No longer are valuable engineering resources spent trying to make different systems from separate vendors work together.

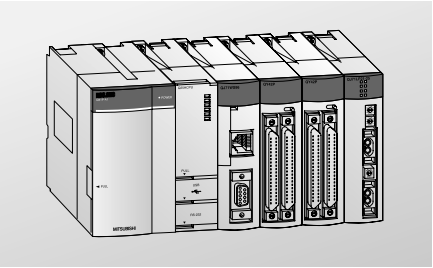
With the iQ Platform, which includes the MELSEC iQ-R series and System Q, we provide an extensive array of controller types.

The I/O range of the iQ Platform is 0 to 12,228.

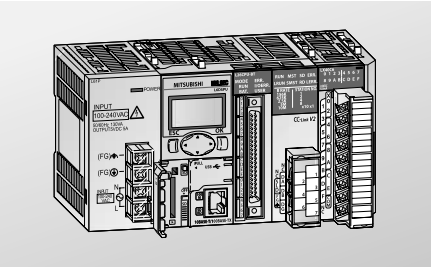
Modular PLCs



MELSEC iQ-R series



MELSEC Sytem Q



MELSEC L series

MELSEC iQ-R series

The iQ Platform builds on the power of Mitsubishi Electric's high performance programmable automation controllers (PAC), complementing this with a broad range of control modules and network interfaces.

The iQ-R series CPU offers dramatic improvements in performance, setting new benchmark standards for processing speed. At the same time, the iQ-R series offers reductions in development cost, maintenance cost and risk of system failure, while providing an innovative upgrade path that will enable users to take advantage of ongoing developments through software upgrades rather than hardware upgrades.

Mounting of multiple CPUs on an iQ-R series backplane is supported, enabling users to develop vastly more complex and sophisticated automation applications from a single PAC backplane.

- Productivity – Improve productivity through advanced performance/functionality
- Scalability – offers Multi CPU solutions on a single backplane
- Connectivity – Seamless connectivity within all levels of manufacturing
- Flexibility – solutions can combine various CPU types as a seamless solution; PLC, Motion, Robots, NC, PC and Process CPUs
- Engineering – Reducing development costs through intuitive engineering
- Compatibility – Compatible with most existing MELSEC System Q I/O
- Security – Unauthorized access protection across distributed control network
- Maintenance – Reduce maintenance costs and downtime utilizing easier maintenance features

MELSEC System Q

MELSEC System Q has been designed to be at the heart of your manufacturing process, as it is at the heart of Mitsubishi Electric's component automation concept. It offers you total integration of your control and communication needs from a single platform – connecting your automation with your business needs.

- Communication – is a communication hub connecting to fieldbus or data networks including 100 Mbps Ethernet
- Scalability – offers Multi CPU solutions on a single backplane
- Flexibility – solutions can combine various CPU types as a seamless solution; PLC, Motion, Robots, NC, PC and Process CPUs
- MES and web server module for quick and simple connectivity to the IT world
- Redundancy options ranging from full redundant PLC hardware to redundant network options improve uptime and productivity

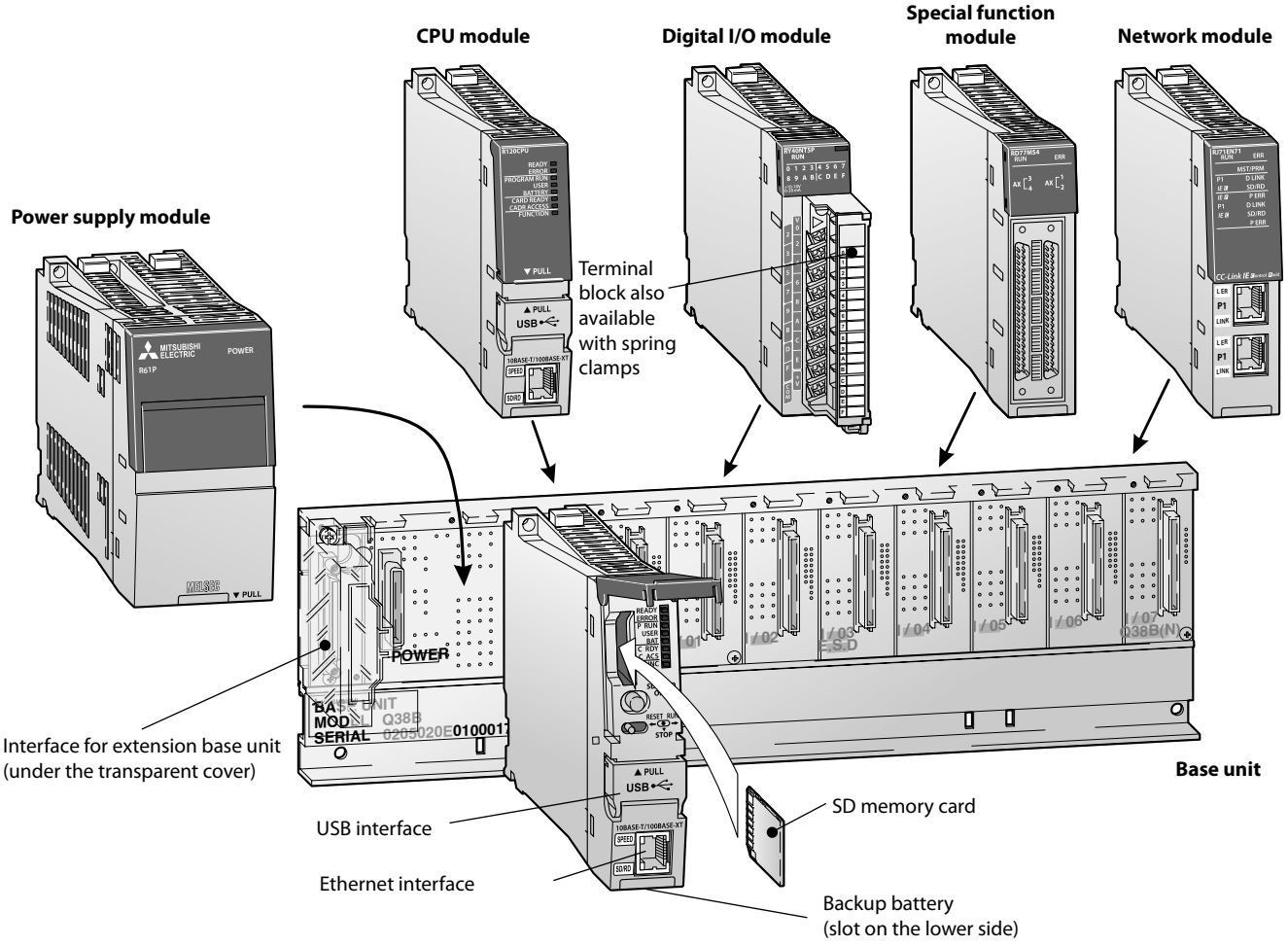
MELSEC L series

The MELSEC L series is a powerful but compact modular controller with many features built-in to the CPU itself. The rack-free design promotes high system flexibility with minimum form factor. Built-in Mini-B USB and Ethernet allow for easy communication, along with a built-in SD/SDHC memory slot for data logging and memory storage, and built-in digital I/O for simple high-speed counting and positioning functions.

The high-performance version CPU also includes a built-in CC-Link interface for Master/Local Station networking. This highly flexible architecture makes the MELSEC L series ideal for both standalone and networked machines.

- Rack-free design
- CPUs packed with comprehensive built-in features/functions
- Integrated data logging
- Built-in I/O features
- Communication and networking capabilities
- High-end 16-axis motion expansion possible using SSCNET III/H

MELSEC iQ-R series – What a system looks like



System structure

The CPU and modules are connected to a base unit which has an internal bus connection for high-speed communication between the individual modules and the CPUs. A power supply module which supplies the voltage for the entire modules is also installed on this base unit.

The base units are available in different versions with 5 to 12 module slots.

Each base unit can be supplemented by means of an extension unit providing additional slots. Up to seven extension base units can be connected and a maximum of 64 modules installed at any one time. An RQ extension base unit is also available, ensuring compatibility with existing MELSEC System Q modules.

For cabling larger systems and machines – e. g. in a modular design – the use of remote I/O modules offers additional communications facilities

What you need

Base units

Main base units (Standard, Extended temperature range)

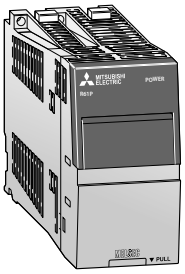
The main base unit is used for mounting and connecting up to four CPUs, power supply unit, input modules, output modules and special function modules.

Specifications		R35B	R38B	R310RB	R312B	R310B-HT	R38RB-HT
Slots for I/O modules		5	8	10	12	10	8
Slots for power supply modules		1	1	2	1	1	2
Order information	Art. no.	279583	279584	301652	279585	308780	301650

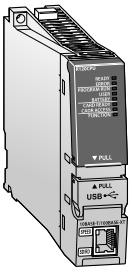
Extension base units (Standard, Extended temperature range), RQ extension base unit

The extension base units are connected to the main base unit by means of preassembled bus cables. The RQ extension base units are for MELSEC System Q modules.

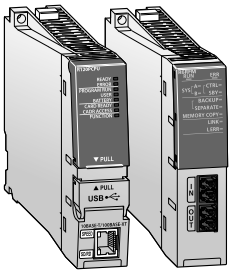
Specifications		R65B	R68B	R610RB	R612B	RQ65B	RQ68B	RQ612B	R610B-HT	R68RB-HT
Slots for I/O modules		5	8	10	12	5	8	12	10	8
Slots for power supply modules		1	1	2	1	1	1	1	1	2
Order information	Art. no.	279590	279589	301653	279588	279591	279586	279587	308782	301651



R61P
Power supply



R120CPU
PLC CPU module



R120PCPU/R6RFM
Process CPU and redundant function module

Standard and redundant power supply modules

These units power all the modules mounted to a base unit. The choice is dependent on the power consumption of the individual modules (this is especially important when using multiple CPUs) and the available input power supply voltage.

Specifications		R61P	R62P	R63P	R63RP	R64P *	R64RP
Input voltage		100–240 (85–264) V AC	100–240 (85–264) V AC	24 (15.6–31.2) V DC	24 (19.2–31.2) V DC	100–240 (85–264) V AC	100–240 (85–264) V AC
Rated output current	5 V DC A	6.5	3.5	6.5	6.5	9	9
	24 V DC ±10 % A	—	0.6	—	—	—	—
Order information	Art. no.	279581	285507	279582	308710	285508	301649

* Redundant power supply

CPU modules

The MELSEC iQ-R series includes a wide range of programmable automation controllers capable of catering to diversified automation control needs.

PLC CPU modules

At the core of the MELSEC iQ-R series is a programmable controller CPU. This CPU is the heart of the control system and includes various features for different applications. The most common CPU is the programmable controller CPU, into which various features are embedded, enabling it to perform a wide range of control tasks.

Specifications	R04CPU R04ENCPU	R08CPU R08ENCPU	R16CPU R16ENCPU	R32CPU R32ENCPU	R120CPU R120ENCPU
I/O points	4096	4096	4096	4096	4096
Memory capacity for PLC program	40 k steps (160 kByte)	80 k steps (320 kByte)	160 k steps (640 kByte)	320 k steps (1280 kByte)	1200 k steps (4800 kByte)
Order information Art. no.	279576 290226	279577 290227	279578 290228	279579 290232	279580 290234
Accessories	NZ1MEM-2GBSD; 2 GB SD memory card; NZ1MEM-4GBSD; 4 GB SDHC memory card; NZ1MEM-8GBSD; 8 GB SDHC memory card; NZ1MEM-16GBSD; 16 GB SDHC memory card; NZ2MC-1MBS; 1 MB extended SRAM cassette; NZ2MC-2MBS; 2 MB extended SRAM cassette; NZ2MC-4MBS; 4 MB extended SRAM cassette; NZ2MC-8MBS(E); 8 MB extended SRAM cassette; only supported by safety and process CPU; NZ2MC-16MBS; 16 MB extended SRAM cassette; safety CPU is not supported				

Process CPU modules and redundant function module

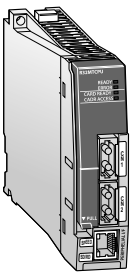
The MELSEC iQ-R process CPUs are designed specifically for medium- to large-scale process control systems requiring high-speed performance coupled with the handling of large PID loops.

When paired with a redundant function module, a highly reliable (redundant) control system can be realized with a tracking data capacity of up to 1 M words between the control and standby systems supported.

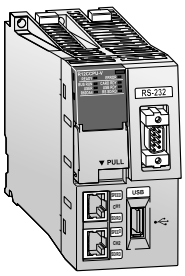
Specifications		R08PCPU	R16PCPU	R32PCPU	R120PCPU
I/O points		4096	4096	4096	4096
Memory capacity	data memory	5 MByte	10 MByte	20 MByte	40 MByte
	for PLC program	80 k steps (320 kByte)	160 k steps (640 kByte)	320 k steps (1280 kByte)	1200 k steps (4800 kByte)
Order information	Art. no.	285496	285499	285500	285497

Specifications	R6RFM
Type	Redundant process CPU
Occupied I/O points	32
Tracking cable data capacity (word)	1 M
Order information Art. no.	301648

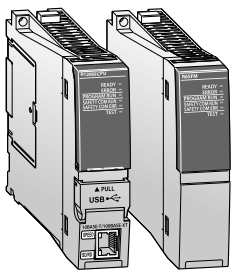
Specifications		R08PSFCPU-SET	R16PSFCPU-SET	R32PSFCPU-SET	R120PSFCPU-SET
Type		SIL2 Process CPUs			
Memory capacity	overall	5 MByte	10 MByte	20 MByte	40 MByte
	for PLC program	80 k steps (40 k steps for safety programs)	160 k steps (40 k steps for safety programs)	320 k steps (40 k steps for safety programs)	1200 k steps (40 k steps for safety programs)
Order information	Art. no.	317842	317843	317844	317895



R32MTCPU
Motion CPU



R12CCPU-V
C Controller CPU



R120SFCPU/R6SFM
Safety CPU and
safety function module

Motion CPUs for advanced applications

The motion CPU module is a dedicated high-precision control CPU module, designed solely for applications that require advanced motion control such as positioning control, synchronous control, and speed-torque control at a very high accuracy. A motion system requires a motion controller CPU and a PLC CPU. Only after combining a highly dynamic positioning control CPU and a PLC, an innovative Motion Control system is created.

Specifications		R16MTCPU	R32MTCPU	R64MTCPU
Number of control axes		16	32	64
Interpolation functions		Linear interpolation for up to 4 axes, circular interpolation for 2 axes, helical interpolation for 3 axes		
Programming language		Motion SFC, dedicated instruction		
Interfaces		Ethernet 100/10 Mbps, SSCNET III/H (USB, RS232C via PLC CPU), PERIPHERAL I/F, SD memory card		
Order information	Art. no.	280227	280288	295076

C Controller CPU

The C Controller module is part of the application-specific range in the MELSEC iQ-R series. The multi-core ARM®-based controller pre-installed with VxWorks® version 6.9, realizes the simultaneous execution of programs, thereby providing a robust and deterministic alternative to computer based systems.

Specifications		R12CCPU-V
Number of I/Os		4096
Memory		Work RAM: 256 MB; ROM: 12 MB; battery-backed-up RAM: 4 MB
Communication interfaces		Ethernet 100BASE-T/100BASE-TX (2 ch.), RS232 (1 ch.)
SD memory card slot		1 slot
Order information	Art. no.	285498

Safety function module and safety CPU

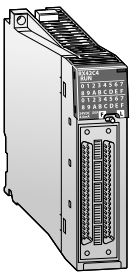
The safety function module must be mounted next to the iQ-R safety CPU module. It is included with the purchase of an iQ-R safety CPU set, and cannot be purchased independent from the set.

Specifications		R6SFM
I/O points		16
Control method		Stored program cyclic operation
Memory capacity Safety program	program capacity	40 k steps (160 kByte)
	program memory	160 kByte
	device/label memory	80 kByte

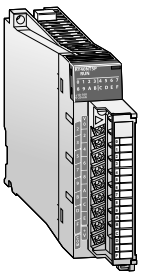
Note: This product ships as part of the R□SFCPU-SET.

Specifications		R08SFCPU-SET ①	R16SFCPU-SET ①	R32SFCPU-SET ①	R120SFCPU-SET ①
Safety integrity level (SIL)		SIL 3 (IEC 61508)			
Performance level (PL)		PL e (EN/ISO 13849-1)			
Memory capacity	program capacity	80 k steps (40 k steps for safety programs)	160 k steps (40 k steps for safety programs)	320 k steps (40 k steps for safety programs)	1200 k steps (40 k steps for safety programs)
	program memory	320 kByte	640 kByte	1280 kByte	4800 kByte
	device/label memory	1178 kByte	1710 kByte	2306 kByte	3370 kByte
	data memory	5 MByte	10 MByte	20 MByte	40 MByte
Order information	Art. no.	289989	290199	290200	290201

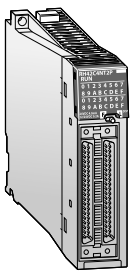
① Product package includes a safety CPU(R□SFCPU) and safety function module (R6SFM).



RX42C4
Digital input module



RY40NT5P
Digital output module



RH42C4NT2P
Combined I/O module

Digital (high-speed) input and output modules

Digital I/O modules are the senses of the automation system and provide an interface of various processes to the controller.

I/O modules are available in a wide range of densities (16, 32 and 64-points) depending on the I/O requirements and minimum use of space in the control cabinet.

Terminal blocks are interchangeable with MELSEC System Q I/O terminals and can save on the cost of upgrading from existing control systems.

Digital input modules

Specifications	RX10	RX28	RX40C7	RX40PC6H*/ RX40NC6H*	RX40NC6B	RX41C4	RX41C6HS*	RX42C4	RX61C6HS*
Number of input channels	16	8	16	16	16	32	32	64	32
Rated input voltage	100–120 V AC (50/60 Hz)	100–120 V AC (50/60 Hz)	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	5 V DC
Order inform. Art. no.	279546	308711	279533	290235/290236	301646	279534	307424	279545	304546

* High-speed module

Digital output modules

Specifications	RY10R2	RY18R2	RY20S6	RY40NT5P	RY40PT5P	RY40PT5B
Number of output channels	16	8	16	16	16	16
Output type	Relay	Relay	Triac	Transistor (sink)	Transistor (source)	Transistor with diagnostic functions (source)
Rated output voltage	24 V DC/ 240 V AC	24 V DC/ 240 V AC	100–240 V AC	12–24 V DC	12–24 V DC	24 V DC
Order inform. Art. no.	279550	308712	308676	279547	279551	301647

Specifications	RY41PT1P	RY41NT2H*	RY41NT2P	RY41PT2H*	RY42NT2P	RY42PT1P
Number of output channels	32	32	32	32	64	64
Output type	Transistor (source)	Transistor (sink)	Transistor (sink)	Transistor (source)	Transistor (sink)	Transistor (source)
Rated output voltage	12–24 V DC	5–24 V DC	12–24 V DC	5–24 V DC	12–24 V DC	12–24 V DC
Order inform. Art. no.	279552	308707	279548	304547	279549	279553

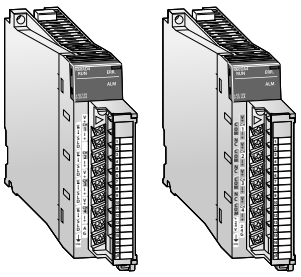
* High-speed module

Combined I/O module

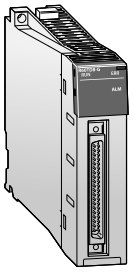
Specifications	RH42C4NT2P
Number of input channels	32
Rated input voltage	24 V DC
Number of output channels	32
Rated output voltage	12–24 V DC
Order inform. Art. no.	279554

Flexible high-speed I/O control module

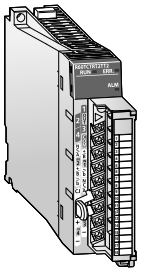
Specifications	RD40PD01
Number of input channels	12
Rated input voltage	5/24 V DC
Number of output channels	8
Rated output voltage	5 – 24 V DC
Order inform. Art. no.	307562



R60AD4/R60DA4
Analog I/O modules



R60TD8-G
Analog module for temperature measurement



R60TCTRT2TT2
Temperature control module

Analog (high-speed) input modules

MELSEC iQ-R series analog modules are the interface between external analog signals and the control system. Various modules are available to cover a wide range of requirements.

Specifications			R60AD4	R60ADV8	R60ADI8	R60AD8-G	R60AD16-G	R60ADH4*
Number of input channels			4	8	8	8	16	4
Analog input	voltage	V	-10–10	-10–10	—	-10–10	-10–10	-10–10
	current	mA	0–20	—	0–20	0–20	0–20	0–20
Overall accuracy			±0.3 %, ±0.1 %	±0.3 %, ±0.1 %	±0.3 %, ±0.1 %	±0.1 %	±0.1 %	±0.2% ±0.1 %
Order information		Art. no.	279556	279558	279561	285502	285501	308708

*High-speed analog input module

Analog output modules

MELSEC iQ-R series analog output modules reliably deliver accurate analog values. A variety of modules (voltage, current, or mixed) are available to cover a wide range of application requirements, such as frequency inverters, valves or slide valves.

Faster, smoother predefined wave signal output

The analog output module enables pre-registration of waveforms easily using MELSOFT GX Works3, realizing a smoother continuous output that closely matches the precision required for the application, such as torque control for a press or injection molding machine.

Specifications			R60DA4	R60DAH4	R60DAV8	R60DAI8	R60DA8-G	R60DA16-G
Number of output channels			4	4	8	8	8	16
Analog output	voltage	V	-10–10	-10–10	-10–10	—	-10–10	-10–10
	current	mA	0–20	0–20	—	0–20	0–20	0–20
Overall accuracy			±0.3 %, ±0.1 %	±0.3 %, ±0.1 %	±0.3 %, ±0.1 %	±0.3 %, ±0.1 %	±0.1 %	±0.1 %
Order information		Art. no.	279557	307260	279560	279559	285504	285503

Analog modules for temperature measurement

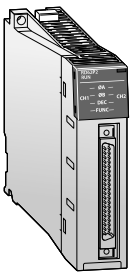
Temperature sensors are connected directly to these modules. They convert measured analog values into16-bit signed binary temperature measurement values.

Specifications		R60RD8-G	R60TD8-G
Number of input channels		8	8
Connectable thermocouple	type	Pt100, JPt100, Ni100, Pt50	B, R, S, K, E, J, T, N
Temperature measuring range		Depends on the thermocouple used	
Order information	Art. no.	285505	285506

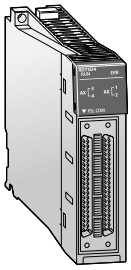
Temperature control modules

MELSEC iQ-R series temperature control modules are ideal for applications requiring highly stable and responsive temperature control. The series comes with thermocouple and RTD input module types and are available with or without heater disconnection detection.

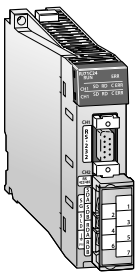
Specifications		R60TCTRT2TT2	R60TCRT4	R60TCTRT2TT2BW	R60TCRT4BW
Control output	type	Transistor	Transistor	Transistor	Transistor
Supported temperature sensors		R, K, J, T, S, B, E, N, U, L, PLII, W5Re/W26Re	Pt100, JPt100	R, K, J, T, S, B, E, N, U, L, PLII, W5Re/W26Re	Pt100, JPt100
Sampling cycle		Switchable between 250 ms and 500 ms/4 channels			
Control output cycle	s	0.5–100	0.5–100	0.5–100	0.5–100
Temperature control method		PID ON/OFF impulse or 2-position control			
Order information	Art. no.	290202	290203	290204	290225



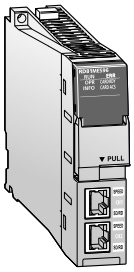
RD62P2
High-speed counter module



RD75D4
Positioning modules



RJ71C24
Interface module



RD81MES96
MES Interface module

High-speed counter modules

The MELSEC iQ-R series counter modules are capable of 200k pulse/s for the DC input type, and 8M pulse/s for differential input. When used with a high-accuracy incremental encoder, positional tracking can also be realized.

The pulse measurement feature enables measuring of the pulse cycle.

Specifications		RD62P2	RD62P2E	RD62D2
Number of counter input channels		2	2	2
Count input signal	phase	1-phase-input (multiple of 1 or 2), CW/CCW input, 2-phase input (multiple of 1, 2 or 4)		
	signal levels	5/12/24 V DC (2–5 mA)	5/12/24 V DC (2–5 mA)	EIA Standard RS422-A Differential line driver level
Max. counting speed		200 kHz	200 kHz	8 MHz
Order information	Art. no.	279566	279568	279567

Positioning modules

The MELSEC iQ-R series offers a choice of two positioning modules, transistor output or differential drive output, depending on the connected amplifier. The modules are capable of transmission speeds up to 5 M pulses/s, and the differential driver output module supports wiring up to a distance of 10 m.

Specifications		RD75P2	RD75P4	RD75D2	RD75D4
Number of control axes		2	4	2	4
Acceleration/deceleration processing		Trapezoidal acceleration/deceleration, S-curve acceleration/deceleration			
Max. output pulse	kpps	200	5000	200	5000
Internal power consumption (5 V DC)	A	0.38	0.54	0.42	0.78
Order information	Art. no.	279562	279563	279564	279565

Interface modules

The serial communication modules enable serial devices with up to 230.4 kbps transmission speeds to be connected per channel. Communications protocols such as Modbus® are supported via the pre-defined protocol feature.

Specifications		RJ71C24	RJ71C24-R2	RJ71C24-R4
Interface type	channel 1	RS232-compliance (D-sub 9P female)	RS232-compliance (D-sub 9P female)	RS422/485-compliance (2-piece terminal block)
	channel 2	RS422/485-compliance (2-piece terminal block)	RS232-compliance (D-sub 9P female)	RS422/485-compliance (2-piece terminal block)
Order information	Art. no.	279573	279574	279575

Network modules

The network and interface modules of the MELSEC iQ-R series ensure a vast selection of interconnectivity possibilities with various protocols and network topologies providing the best-fit solution for various applications.

Specifications	RJ71GF11-T2	RJ71EN71	RJ71GP21-SX	RJ61BT11	RJ72GF15-T2
Network type	CC-Link IE Field	Ethernet	CC-Link IE control	CC-Link	CC-Link IE Field remote head
Order information Art. no.	279569	279570	279571	279572	297947

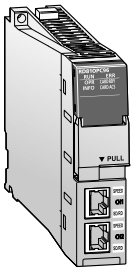
Specifications	RJ71PN92	RJ71PB91V	RJ71CN91	RJ71BAC96	RJ71DN91
Network type	Profinet	Profibus DP	CANopen	BACnet	DeviceNet
Order information Art. no.	308713	308714	308735	311945	317838

MES Interface module

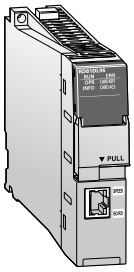
A MES Interface module provides direct database connectivity for IT systems and facilitates automatic SQL* text generation using intuitive configuration setup software. This module allows production data from the shop floor to be inserted into database records directly.

* Structured Query Language is a programming language designed for managing data in a relational database.

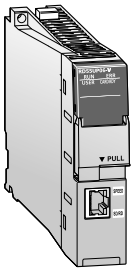
Specifications		RD81MES96
Module type		MES Interface module
Transmission method		Ethernet
Database connection	supported database	Oracle® Database, Microsoft® SQL Server, Microsoft® Access
	SQL text transmission	SELECT, INSERT, UPDATE, DELETE, Multi-SELECT, STORED PROCEDURE
	accessible CPU module	iQ-R series (direct, remote), Q series (remote), L series (remote)
Order information	Art. no.	295423



RD81OPC96
OPC UA module



RD81DL96
High-speed data logger module



RD55UP06-V
C intelligent function module

OPC UA server module

The MELSEC iQ-R series OPC UA server module integrates the OPC UA server directly into the equipment control system as a robust alternative to a computer-based configuration.

Specifications		RD810PC96
Card slot		SD memory card/SDHC memory card (2–16 GB)
Ethernet port	number of channels	2
	data transmission speed	1 Gbps, 100 Mbps, 10 Mbps
	max. number of cascaded stages ①	2 (100 Mbps), 4 (10 Mbps)
	max. segment length ② m	100 (between hup and node)
	interface	RJ45
Setup software		MX OPC UA Module Configurator-R (SW1DND-ROPCUA-E)
Order information	Art. no.	312973

① Based on use with a repeater hup. For switching hup, refer to the manufacturers documentation.
② for maximum segment length between hups, refer to switching hup manufacturer documentation.

iQ-R C-Application server

The C-Application server is based on modern web services and supports all kind of IoT requests. Its strength is to collect information in real time, provide analysis and forwards the results to a variety of cloud systems.

Specifications		C-Application server for R12CCPU-V
Transmission type		Ethernet, Serial
Database		SQLite3, MySQL, Redis
Function		CCPU and MD library function support, CAS specific functions, HTML5, Websocket, Lua API, Lua server pages, XML parser, Event handler, REST, AJAX, SOAP, JSON, XML-RPC Web-Services, WebDAV, SMTP, SMTPS, STARTTLS, SSL, Shark SSL, SMQ, PikeHTTP
Order information	Art. no.	308736

High-speed data logger module

This module enables logging of various data such as Unicode, CSV, and BIN text formats, which can be utilized for spreadsheet reporting owing to the automatic report generation feature: BIN text format data can be ported directly to Microsoft® Windows® Excel®. Logging files can also be automatically sent to a FTP server or directly into a Microsoft® Windows® share folder.

Specifications		RD81DL96
Accessible CPU modules		iQ-R series (direct, remote), System Q series (remote), L series (remote)
Function	data logging	Logs CPU module device values at specified data sampling intervals.
	event logging	Monitors sampled device values from the CPU module, and logs events that occur.
	report	Outputs the data sampled by the high speed data logger module as an Excel® file.
	recipe	Executes the following operations using recipe files stored in the SD memory card: ● Transfer device values written on the recipe files to devices in the CPU module. ● Transfer device values in the CPU module to the recipe files.
Order information	Art. no.	308709

C intelligent function module

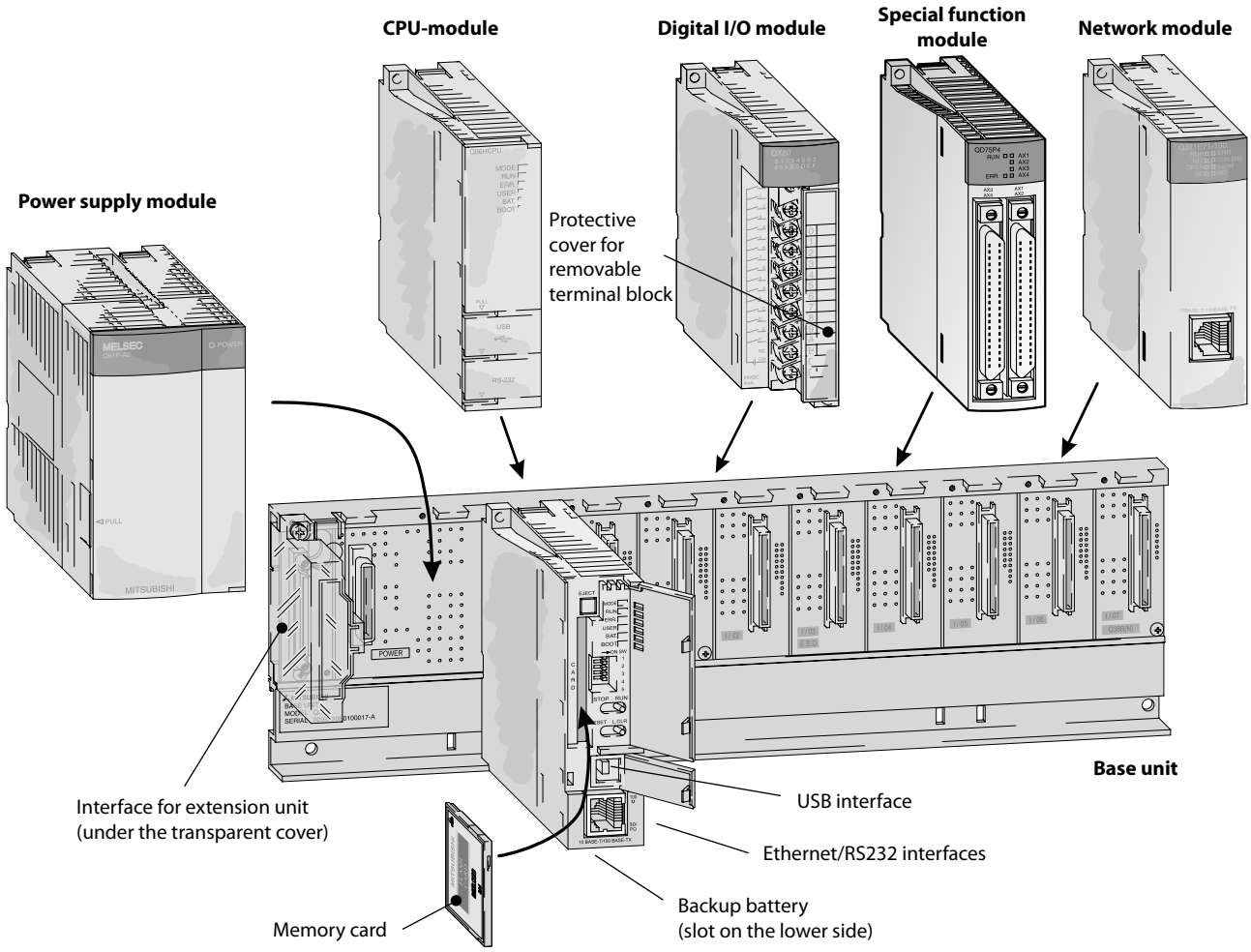
C/C++ program execution

The C Intelligent function module is available with a multi-core ARM®-based controller pre-installed with VxWorks® Version 6.9, which realizes simultaneous execution of programs, thereby providing a robust and deterministic alternative to computer-based systems. This module can be used for applications such as in-line production quality testing or as a gateway for various industry-specific communications protocols.

Specifications		RD55UP06-V
Hardware	endian format	Little endian
	MPU	ARM® Cortex-A9 Dual Core
Software	operating system	VxWorks Version 6.9
	programming language	C language (C/C++)
	programming development environment	CW Workbench/Wind River Workbench3.3
	setting/monitoring tool	GX Works3 (SW1DND-GXW3-E) ①
Communication interface		Ethernet (1000BASE-T/100BASE-TX/10BASE-T) (1 ch.)
Order information	Art. no.	303298

① Setting and monitoring of the module is integrated within the GX Works3 engineering software.

MELSEC System Q – What a system looks like



System structure

The CPU and modules are connected to a base unit which has an internal bus connection for communication between the individual modules and the CPUs. The power supply module which supplies the voltage for the entire system is also installed on this base unit.

The base units are available in 4 different versions with 3 to 12 module slots.

Each base unit can be supplemented by means of an extension unit providing additional slots.

If you wish to keep open the option of subsequent extension of your PLC or if you have free slots on your base unit, you can insert dummy modules in vacant module positions.

They serve to protect the free slots from soiling or from mechanical effects and can also be used for reserving I/O points.

For cabling larger systems and machines – e. g. in a modular design – the use of remote I/O modules offers additional communications facilities.

What you need

Base units

Main base units

The main base unit is used for mounting and connecting CPUs, power supply unit, input modules, output modules and special function modules.

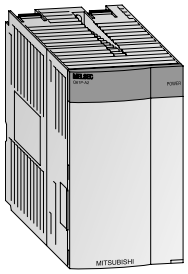
Specifications	Q32SB	Q33B	Q33SB	Q35B	Q35SB	Q35DB	Q38B	Q38DB*	Q38RB	Q312B	Q312DB*
Slots for I/O modules	2	3	3	5	5	5	8	8	8	12	12
Slots for power supply modules	1	1	1	1	1	1	1	1	2	1	1
Order inf. Art. no.	147273	136369	147284	127586	147285	249091	127624	207608	157067	129566	207609

* These base units are required for the new iQ Platform motion, NC and robot CPUs.

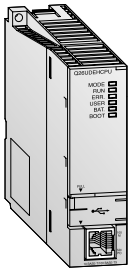
Safety main base unit

The safety main base unit holds and connects the safety CPU and up to two CC-Link safety master modules as well as network modules (CC-Link IE Field, CC-Link IE Controller Network, Ethernet and MELSECNET/H, one module each).

Specifications	QS034B
Slots for I/O modules	4
Slots for power supply modules	1
Order inf. Art. no.	203206



Q61P-A2
Power supply module



Q26UDEHCPU
Universal PLC CPU

Extension base units

The extension base units are connected to the main base unit by means of pre-assembled bus cables.

Specifications	Q52B	Q55B	Q63B	Q65B	Q68B	Q68RB	Q612B	Q65WRB	QA1S51B
Slots for I/O modules	2	5	3	5	8	8	12	5	1
Slots for power supply modules	—	—	1	1	1	2	1	1	—
Order inf. Art. no.	140376	140377	136370	129572	129578	157066	129579	210163	249092

Power supply modules

These units power all the modules on the backplane. The choice is dependent on the power consumption of the individual modules (this is especially important when using multiple CPUs).

Specifications		Q61P	Q61P-D	Q61SP	Q62P	Q63P	Q63RP	Q64PN	Q64RPN	Q5061P-A1	Q5061P-A2
Input voltage		85–264 V AC	100–240 V AC	85–264 V AC	100–240 V AC	24 V DC	24 V DC	100–240 V AC	100–240 V AC	100–120 V AC	200–240 V AC
Rated output current	5 V DC A	6	6	2	3	6	8.5	8.5	8.5	6	6
	24 V DC ±10 % A	—	—	—	0.6	—	—	—	—	—	—
Order information Art. no.		190235	221860	147286	140379	136371	166091	217627	283021	203207	203208

PLC CPU modules

The CPU modules of the MELSEC System Q are available as single and multi processor CPUs through which they achieve a wide application range.

Universal PLC CPUs

These universal PLC CPUs are the latest generation of modular CPUs for the MELSEC System Q controller platform and they are the foundation of the iQ Platform system. They can be combined with the motion, robot and NC CPUs to configure scalable and highly flexible modular automation systems.

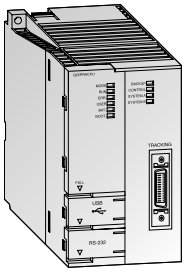
Specifications	Q00UJCPU	Q00UCPU	Q01UCPU	Q02UCPU	Q03UDCPU, Q03UDECPU
I/O points	256/8192	1024/8192	1024/8192	2048/8192	4096/8192
Memory capacity for PLC program	10 k steps (40 kByte)	10 k steps (40 kByte)	15 k steps (60 kByte)	20 k steps (80 kByte)	30 k steps (120 kByte)
Order information Art. no.	221575	221576	221577	207604	207605, 217899

Specifications	Q04UDHCPU, Q04UDEHCPU	Q06UDHCPU, Q06UDEHCPU	Q10UDHCPU, Q10UDEHCPU	Q13UDHCPU, Q13UDEHCPU
I/O points	4096/8192	4096/8192	4096/8192	4096/8192
Memory capacity for PLC program	40 k steps (160 kByte)	60 k steps (240 kByte)	100 k steps (400 kByte)	130 k steps (520 kByte)
Order information Art. no.	207606, 217900	207607, 215808	221578, 221579	217619, 217901

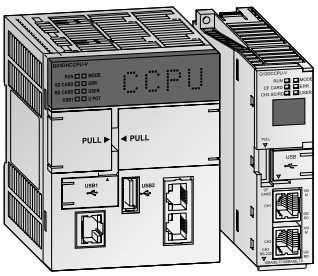
Specifications	Q20UDHCPU, Q20UDEHCPU	Q26UDHCPU, Q26UDEHCPU	Q50UDEHCPU *	Q100UDEHCPU *
I/O points	4096/8192	4096/8192	4096/8192	4096/8192
Memory capacity for PLC program	200 k steps (800 kByte)	260 k steps (1040 kByte)	500 k steps (2000 kByte)	1000 k steps (4000 kByte)
Order information Art. no.	221580, 221581	217620, 217902	242368	242369

* is supported by GX Works2 only

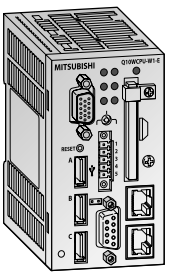
Specifications	Q03UDVCPU	Q04UDVCPU	Q06UDVCPU	Q13UDVCPU	Q26UDVCPU
I/O points	4096/8192				
Memory capacity for PLC program	30 k steps (120 kByte)	40 k steps (160 kByte)	60 k steps (240 kByte)	130 k steps (520 kByte)	260 k steps (1040 kByte)
Order information Art. no.	266161	266162	266163	266164	266165
Accessories	Q4MCA-1MBS; 1 MB memory cassette for Q☐UDVCPU Art. no. 266134; Q4MCA-2MBS; 2 MB memory cassette for Q☐UDVCPU Art. no. 266155; Q4MCA-4MBS; 3 MB memory cassette for Q☐UDVCPU Art. no. 266156 Q4MCA-8MBS; 4 MB memory cassette for Q☐UDVCPU Art. no. 266157				



Q12PRHCPU
Redundant PLC CPU



Q24DHCCPU-V
Q12DCCPU-V
C Controller CPU



Q10WCPU-WI-E
PC CPU

Process CPU modules

The MELSEC System Q process CPU allows flexible system design based on off-the-shelf components, which reduces both initial and implementation costs.

The MELSEC Process Control system is best suited for food manufacturing and chemical plant applications.

Specifications			Q02PHCPU	Q06PHCPU	Q12PHCPU	Q25PHCPU
I/O points			4096/8192	4096/8192	4096/8192	4096/8192
Memory capacity	overall		≤32 MByte	≤32 MByte	≤32 MByte	≤32 MByte
	max. for PLC program		28 k steps (112 kByte)	60 k steps (240 kByte)	124 k steps (496 kByte)	252 k steps (1008 kByte)
Order information		Art. no.	218138	218139	143529	143530

Redundant PLC CPU modules

Two PLC systems with the same configuration can provide a hot standby system through automatic synchronisation of data. This is the key to a redundant system and high availability. Down time and costs for re-starting are also dramatically reduced. If the control system fails, the standby system takes over without interruption of the process.

Specifications			Q12PRHCPU	Q25PRHCPU
I/O points			4096/8192	4096/8192
Memory capacity	overall		≤32 MByte	≤32 MByte
	max. for PLC program		124 k steps (496 kByte)	252 k steps (1008 kByte)
Order information		Art. no.	157070	157071

C Controller CPUs

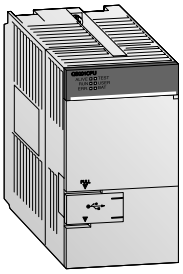
The C Controller allow the integration and programming of the MELSEC System Q automation platform with C++. Using the worldwide established real time operating system VxWorks, the realisation of complex tasks, communication and protocols becomes very easy.

Specifications		Q12DCCPU-V	Q24DHCCPU-V	Q24DHCCPU-LS
Programming language		C or CC++	C or CC++	—
Memory		Standard RAM: 3 MB; Work RAM: 128 MB; Battery-backed-up RAM: 128 kB	Standard RAM: 0–4 MB; Standard ROM: 382 MB; Work RAM: 512 MB; Battery-backed-up RAM: 1–5 MB	Work RAM: 512 MB; Battery-backed-up RAM: 5 MB
Communication interfaces		RS232 (1 ch.), 10BASE-T/100BASE-TX (2 ch.), USB (1 ch.)	Ethernet (3 ch.), USB (2x), PCI Express, RS232	Ethernet (3 ch.), USB (2x), PCI Express, RS232
CF card I/F		1 slot for a TYPE I card (Max. 8 GB CF card is supported)	1 slot for SD memory card	1 slot for SD memory card
Order information	Art. no.	221925	260296	273605

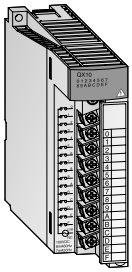
PC CPU modules

The Q10WCPU uses the Microsoft Windows® operating system and can be combined with the power supplies, racks, I/O and special modules from the MELSEC System Q. The CPU module can be used in stand-alone mode or in multi-CPU mode, in conjunction with PLC CPU modules for example. This enables a seamless connection between the process and the data processing system.

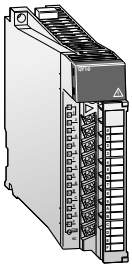
Specifications			Q10WCPU-WI-E	Q10WCPU-WI-CFE
CPU			Intel® Atom™ Processor N450 1.66 GHz	
Chip set			Intel® ICH8M	
Processing frequency		GHz	1.66	
Memory	L1 cache		Instruction 32 kB + data 24 kB	
	L2 cache		512 kB	
	Main		1 GB	
Video			Analog-RGB, resolution 1400x1050 at 60 Hz (16 million colors)	
Interfaces			Serial (RS232C), USB, keyboard/mouse, LAN, monitor	
PC card slots			1 slot for CF memory card (type I)	
Order information		Art. no.	252826	252827



QS001CPU
Safety CPU module



QX10
Digital input module



QY10
Digital output module

Safety CPU module

The CC-Link safety network eliminates the complex wiring needed in conventional safety controller systems. The remote safety I/O stations are connected to the CC-Link safety master module in the safety PLC using standard CC-Link cables.

The safety CPU module conforms to the safety requirements of EN 954-1 Category 4, ISO 13849-1 PL e, and IEC 61508 (JIS C 0508) SIL 3 and is certified by TÜV Rheinland.

Specifications	QS001CPU
I/O points	4096/8192
Programming language (Sequence Control)	Relay symbol language, function block
Memory capacity	128 kB
Order information Art. no.	203205

iQ Platform CPUs

Robot CPU (see Robots chapter)
NC CPU (please contact your nearest Mitsubishi Electric distributor for more details)

Digital I/O modules

Various input modules are available for converting digital process signals with different voltage levels into the levels required by the PLC.

The MELSEC System Q output modules have different switching elements for adaptation to many control tasks.

Digital input modules

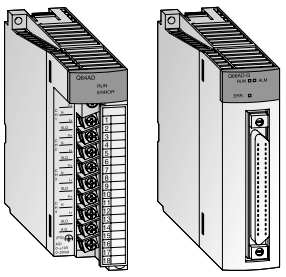
Specifications	QX10	QX10-TS	QX28	QX40	QX40-TS	QX40-S1	QX41	QX41-S1	QX41-S2	QX42	QX42-S1
Input points	16	16	8	16	16	16	32	32	32	64	64
Rated input voltage	100–120 V AC (50/60 Hz)	100–120 V AC (50/60 Hz)	100–240 V AC (50/60 Hz)	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC
Order inf. Art. no.	129581	221838	136396	132572	221839	136574	132573	146921	229239	132574	146922

Specifications	QX50	QX70	QX71	QX72	QX80	QX80-TS	QX81	QX81-S2	QX82	QX82-S1
Input points	16	16	32	64	16	16	32	32	64	64
Rated input voltage	48 V DC	5 V DC/12 V DC	5 V DC/12 V DC	5 V DC/12 V DC	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC
Order inf. Art. no.	204678	136397	136398	136399	127587	221840	129594	229240	150836	150837

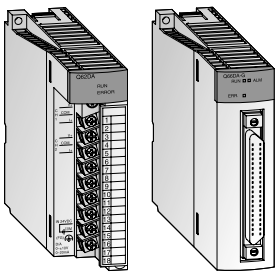
Digital output modules

Specifications	QY10	QY10-TS	QY18A	QY22	QY40P	QY40P-TS	QY41H	QY41P
Output points	16	16	8	16	16	16	32	32
Output type	Relay	Relay	Relay	Triac	Transistor (sink type)	Transistor (sink type)	Transistor high-speed (sink type)	Transistor (sink type)
Rated output voltage	24 V DC/240 V AC	24 V DC/240 V AC	24 V DC/240 V AC	100–240 V AC	12/24 V DC	12/24 V DC	5–24 V DC	12/24 V DC
Order inf. Art. no.	129605	221841	136401	136402	132575	221842	308738	132577

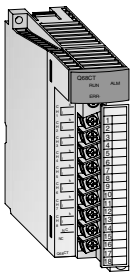
Specifications	QY42P	QY50	QY68A	QY70	QY71	QY80	QY80-TS	QY81P	QY82P
Outputs	64	16	8	16	32	16	16	32	64
Output type	Transistor (sink type)	Transistor (sink type)	Transistor (sink/source type)	Transistor (sink type)	Transistor (sink type)	Transistor (source type)	Transistor (source type)	Transistor (source type)	Transistor (source type)
Rated output voltage	12/24 V DC	12/24 V DC	5–24 V DC	5/12 V DC	5/12 V DC	12/24 V DC	12/24 V DC	12/24 V DC	12/24 V DC
Order inf. Art. no.	132577	132578	136403	136404	136405	127588	221843	129607	242366



Q64AD/Q68AD-G
Analog input modules



Q62DA/Q66DA-G
Analog output modules



Q68CT
Analog CT input module

Combined analog I/O module

With the analog input/output module Q64AD2DA the user has a module that has both, four analog inputs and two analog outputs.

Specifications			Q64AD2DA
Input points			4
Analog input	voltage	V	-10–10
	current	mA	0–20
Accuracy			±0.4 % (0–55 °C), ±0.1 % (20–30 °C)
Output points			2
Analog output	voltage	V	-10–10
	current	mA	0–20
Accuracy			±0.3 % (0–55 °C), ±0.1 % (20–30 °C)
Order inform.	Art. no.		229238

Analog input modules

The analog input modules convert analog process signals, for example pressure, flow or fill level, linearly into digital values, which are further processed by the Q CPU.

The analog input modules Q62AD-DGH, Q64ADGH, Q66AD-DG and Q68AD-G are designed for applications requiring high accuracy.

The functionality of a HART master station is integrated in the ME1AD8HAI-Q.

Specifications	Q62AD-DGH	Q64AD	Q64ADH	Q64AD-GH	Q66AD-DG	Q68AD-G	Q68ADV	Q68ADI	ME1AD8HAI-Q
Input points	2	4	4	4	6	8	8	8	8
Analog input	4 mA/20 mA	-10 V/10 V (0/20 mA)	-10 V/10 V (0/20 mA)	-10 V/10 V (0/20 mA)	0/4/20 mA	-10 V/10 V (0/20 mA)	-10 V/10 V	0/20 mA	0/4/20 mA
Overall accuracy	±0.05 %	±0.4 %, ±0.1 %	±0.2 %, ±0.1 %	±0.05 %	±0.1 %	±0.1 %	±0.4 %, ±0.1 %	±0.4 %, ±0.1 %	±0.15 %
Order inform. Art. no.	145036	129615	251331	143542	204676	204675	129616	129617	229238

Analog output modules

The analog output modules convert digital values predetermined by the CPU into analog current or voltage signal. For example, frequency inverters, valves or slide valves are controlled by means of these signals.

The analog output module Q66DA-G is especially designed for applications requiring high accuracy.

The analog output modules Q62DAN, Q64DAN, Q68DAVN and Q68DAIN isolate the analog output channel from the external power supply.

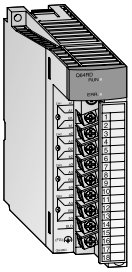
The functionality of a HART master station is integrated in the ME1DA6HAI-Q.

Specifications	Q62DAN	Q62DA-FG	Q64DAN	Q64DAH	Q66DA-G	Q68DAVN	Q68DAIN	ME1DA6HAI-Q
Output points	2	2	4	4	6	8	8	6
Analog output	-10–10 V DC (0 mA–20 mA DC)	-10–10 V DC (0 mA–20 mA DC)	-10–10 V DC (0 mA–20 mA DC)	-10–10 V DC (0 mA–20 mA DC)	-12–12 V DC (0 mA–22 mA DC)	-10–10 V DC	0 mA–20 mA DC	0/4 mA–20 mA DC
Overall accuracy	±0.1 %	±0.1 %	±0.1 %	±0.1 %	±0.1 %	±0.1 %	±0.1 %	0.15 %
Order inform. Art. no.	200689	145037	200690	266158	204677	200691	200692	236649

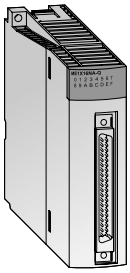
Analog CT input module

Up to eight current transformers can be connected directly to the analog CT input module Q68CT. External signal converters are not required anymore.

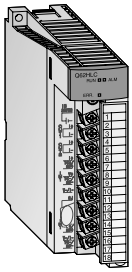
Specifications	Q68CT
Input points	8
Analog input (via CT sensor)	5/50/100/200/400/600 A AC
Overall accuracy	±0.5 %
Order inform. Art. no.	145036



Q64RD
Analog module for temperature measurement



ME1X16NA-Q
NAMUR input module



Q62HLC
Loop control module

Analog modules for temperature measurement

These modules are designed to convert external platinum temperature-measuring resistor input values into16 or 32-bit signed binary temperature measurement values and scaling values.

Specifications		Q64RD	Q64RD-G	Q64TD	Q64TDV-GH	Q68RD3-G	Q68TD-G-H01/H02
Input channels		4	4	4	4	8	8
Connectable thermocouple	type	Pt100, JPt100	Pt100, JPt100, Ni100Ω	K, E, J, T, B, R, S, N	K, E, J, T, B, R, S, N	Pt100, JPt100, Ni100Ω	K, E, J, T, B, R, S, N
Temperature measuring range		Depends on the thermocouple used					
Order information	Art. no.	137592	154749	137591	143544	216482	216481/221582

Temperature control modules

These modules enable PID algorithm temperature control without placing any load on the PLC CPU for the temperature control tasks.

Specifications		Q64TCRTN	Q64TCRTBWN	Q64TCTTN	Q64TCTTBWN
Control output	type	Transistor	Transistor	Transistor	Transistor
Inputs		4 channels per module	4 channels per module/ broken wire detection	4 channels per module	4 channels per module/ broken wire detection
Supported temperature sensors		Pt100 (-200–600 °C), JPt100 (-200–500 °C)		R, K, J, T, S, B, E, N, U, L, PL II, W5Re/W26Re	
Order information	Art. no.	255456	255458	255455	255457

NAMUR input module

The ME1X16NA-Q is a digital input module for connection of up to 16 NAMUR sensors.

In contrast to an ordinary binary sensor with only two states (ON and OFF), a NAMUR sensor can indicate four states: ON, OFF, wire break and short circuit.

Specifications		ME1X16NA-Q
Number of NAMUR inputs		16
Sensor voltage (from internal power supply)	V DC	8.2
Order information	Art. no.	257846

Load cell input module

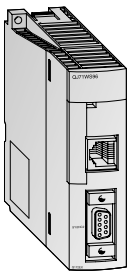
The load cell input module Q61LD can connect load cells directly to MELSEC System Q programmable controllers. External signal converters are no longer required.

Specifications		Q61LD
Analog input points (load cell output)		1
Resolution		0–10 000
Accuracy		Nonlineality: within ±0.01 %/FS (Ambient temperature: 25 °C)
Order information	Art. no.	229237

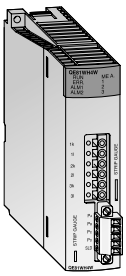
Loop control module

The Q62HLC loop control module uses a continuous proportional PID control format, which features a sampling period of 25 ms for high-accuracy, high-resolution thermocouple inputs, microvoltage inputs, voltage inputs, current inputs, and current outputs.

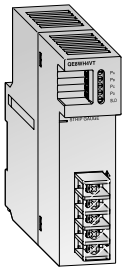
Specifications		Q62HLC
Input points		2
Analog input		Thermocouple -200–2300 °C, microvoltage -100–100 mV, voltage -10–10 V, current 0–20 mA
Supported thermocouples		K, J, T, S, R, N, E, B, PL II, W5Re/W26Re
Order information	Art. no.	200693



QJ71WS96
Web server module



QE81WH4W
Power measurement module



QE8WH4VT
Voltage converter

High-speed counter modules

These counter modules detect high frequency signals which cannot be handled by normal input modules. For example, simple positioning tasks or frequency measurements can be realised.

Specifications		QD62	QD62E	QD62D	QD60P8-G	QD63P6	QD64D2
Counter inputs		2	2	2	8	6	2
Max. counting frequency	kHz	200	200	500	30	200	4000
I/O type		Sink	source	differential	—	—	differential
Order information	Art. no.	132579	128949	132580	145038	213229	278855

Web server module

The web server module QJ71WS96 enables the remote control monitoring of MELSEC System Q.

Specifications		QJ71WS96
Module type		Web server, FTP server/client
Communications method		Ethernet: CSMA/CD
Interface	type	10BASE-T/100BASE-TX
Order information	Art. no.	147115

Power measurement modules

The power measurement modules QE81WH4W and QE83WH4W detect the voltage and current consumption of loads and calculate the power of the absorbed and emitted energy.

Specifications		QE81WH4W	QE83WH4W
No. of measuring circuits		1	3
Measured items		Current, voltage, frequency, current demand*, active power, active power demand*, power factor, active energy (consumption, regenerative), reactive energy, energy consumption over a specified time period	
Order information	Art. no.	259456	259457

* "Demand" is the average movement within the specified time period.

Voltage converter

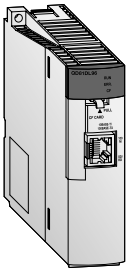
The voltage converter QE8WH4VT is required for voltage input to a power measurement module Q81WH4W or QE83WH4W.

Specifications		QE8WH4VT
Phase wire system		3-phase (4-wire)
Input voltage range		63.5/110 V to 277/480 V AC (cannot operate at less than 55/95 V AC)
Frequency		50/60 Hz
Order information	Art. no.	259458

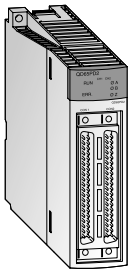
MES interface module

The MELSEC System Q MES module allows users to interface their production control systems directly to an MES database.

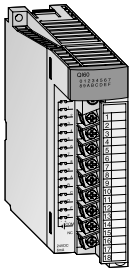
Specifications		QJ71MES96N
Module type		MES interface module
Communications method		Ethernet
Interface	type	10BASE-T/100BASE-TX
Order information	Art. no.	323230



QD81DL96
High speed data logger module



QD65PD2
Multi-function counter/timer module



QI60
Interrupt module

Q series C-Application server

The C-Application server is based on modern web services and supports all kind of IoT requests. Its strength is to collect information in real time, provide analysis and forwards the results to a variety of cloud systems.

Specifications	C-Application server for Q12DCCPU-V
Transmission type	Ethernet, Serial
Database	SQLite3
Function	QBF and MD library function support, CAS specific functions, HTML5, Websocket, Lua API, Lua server pages, XML parser, Event handler, REST, AJAX, SOAP, JSON, XML-RPC Web-Services, WebDAV, SMTP, SSL, Shark SSL, PikeHTTP
Order information Art. no.	289014

High speed data logger module

The high speed data logger module can log programmable controller devices without using a personal computer.

Specifications		QD81DL96
Ethernet	interface	10BASE-T/100BASE-TX
	data transmission rate	10BASE-T: 10 Mbps; 100BASE-TX: 100 Mbps
Number of mountable CompactFlash cards		1
Order information Art. no.		221934

Multi-function counter/timer module

Due to its high-speed counter inputs, PWM outputs for control DC drives and the integrated cam switching function with 8 outputs, the QD65PD2 is well suited for high precision positioning tasks.

Specifications	QD65PD2
Counter inputs	2
Max. counting frequency	DC input 200 kHz, differential input 8 MHz
Counting range	32 bits + sign (binary), -2147483648–2147483647
External digital input points	6
External digital output points	8
Order information Art. no.	245113

Interrupt module and high-speed inputs

The interrupt module QI60 is suitable for applications demanding quick responses.

Specifications		QI60	QX40H	QX70H	QX80H	QX90H
Input points		16	16	16	16	16
Rated input voltage	V DC	24 (sink type)	24	5	24	5
Order information	Art. no.	136395	221844	221855	221856	221857

Interface modules

This module enables communication with peripheral devices via a standard RS232 interface.

The peripherals are connected point-to-point on a 1:1 basis.

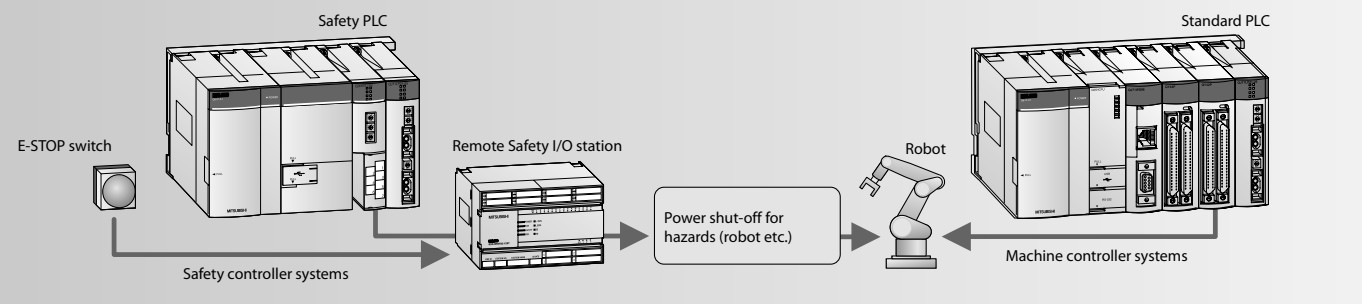
Specifications		QJ71C24N	QJ71C24N-R2	QJ71C24N-R4	QJ71MB91	QJ71MT91
Interface type	channel 1	RS232 (9-pin D-sub)	RS232 (9-pin D-sub)	RS422/RS485 (screw terminals)	RS232 (9-pin D-sub)	Ethernet (RJ45)
	channel 2	RS422/RS485 (screw terminals)	RS232 (9-pin D-sub)	RS422/RS485 (screw terminals)	RS422/RS485 (screw terminals)	—
Order information	Art. no.	149500	149501	149502	167757	155603

MELSEC Safety PLC

Even with increasing productivity, the safety of humans operating machinery and manufacturing facilities must still always have top priority. The MELSEC System QS PLC is specially designed for managing safety systems.

It is connected to safety devices like Emergency Stop switches and light curtains and has extensive diagnostics functions that enable it to reliably switch safety-critical outputs at the right time to turn machines off in the event of danger.

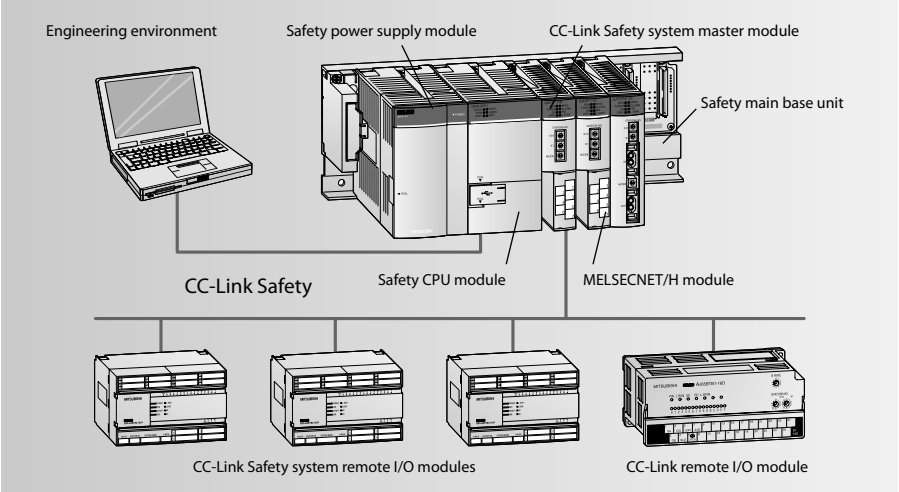
The actual machinery (conveyor belts, robots etc.) is still controlled by a conventional PLC.



CC-Link Safety

The CC-Link Safety network eliminates the complex wiring needed in conventional safety controller systems. The remote Safety I/O stations are connected to the CC-Link master module in the Safety PLC using standard CC-Link cables. In the event of communications errors powerful and effective error identification routines automatically switch off the outputs of both the Safety PLC and the remote Safety I/O stations.

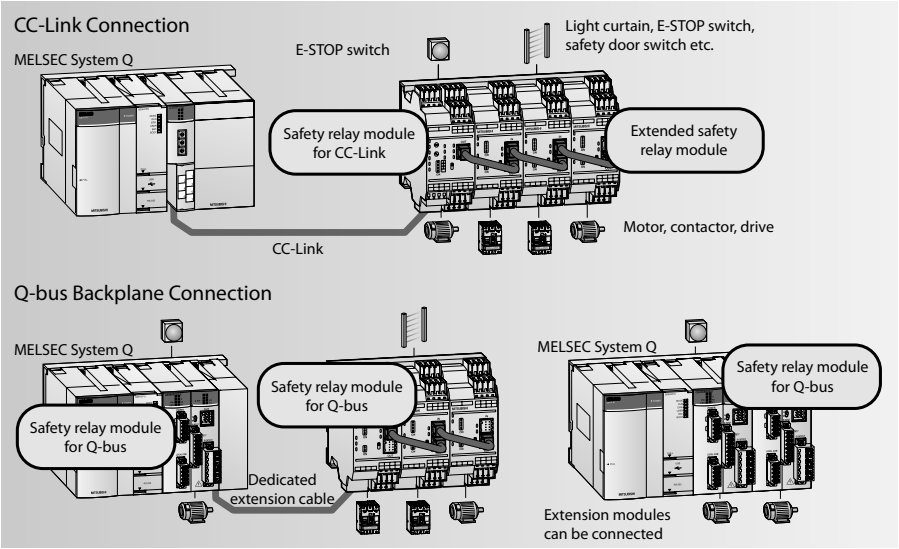
CC-Link Safety is also compatible with CC-Link. This means you can also use standard CC-Link I/O modules in a CC-Link Safety network for those inputs and outputs that are not critical for safety.



Type	Safety Controller Components	Art. no.
QS001CPU	Safety PLC, 14 K steps program capacity	203205
QS034B-E	Safety base unit, accommodates power supply unit, CPU and up to 4 modules	203206
QS061P-A1	Safety power supply unit, 100–120 V AC	203207
QS061P-A2	Safety power supply unit, 200–240 V AC	203208
QS0J61BT12	CC-Link Safety master module	203209
QS0J65BTB2-12DT	Safety remote I/O module, 8 dual safety inputs + 4 dual safety outputs	203210
QS0J65BTS2-8D	CC-Link Safety remote I/O module, 8 dual safety inputs	217625
QS0J65BTS2-4T	CC-Link Safety remote I/O module, 4 dual safety outputs	217626
QS0J71GF11-T2	CC-Link Safety master module (local module)	245177

Safety relays

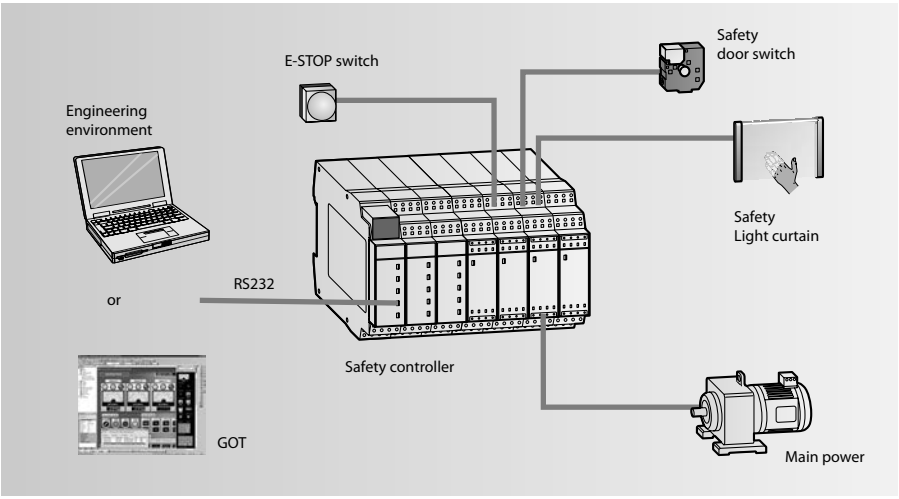
Safety relay modules are the ideal solution for applications where you don't need a separate Safety PLC. These modules are installed together with the standard MELSEC System Q components on the same base unit, or in a CC-Link network. This enables a normal PLC used as a controller to also perform safety functions, without the added cost of a separate safety controller and without additional programming and configuration.



Specifications		Module	Type	Art. no.
Safety relay modules	For installation in a CC-Link station	QS90SR2SP-CC	P-Type, 1 safety input, 1 safety output	215801
		QS90SR2SN-CC	N-Type, 1 safety input, 1 safety output	215803
	For installation on a MELSEC System Q base unit	QS90SR2SP-Q	P-Type, 1 safety input, 1 safety output	215799
		QS90SR2SN-Q	N-Type, 1 safety input, 1 safety output	215800
Extension modules	Can be connected to safety relay modules	QS90SR2SP-EX	P-Type, 1 safety input, 1 safety output	215804
		QS90SR2SN-EX	N-Type, 1 safety input, 1 safety output	215805

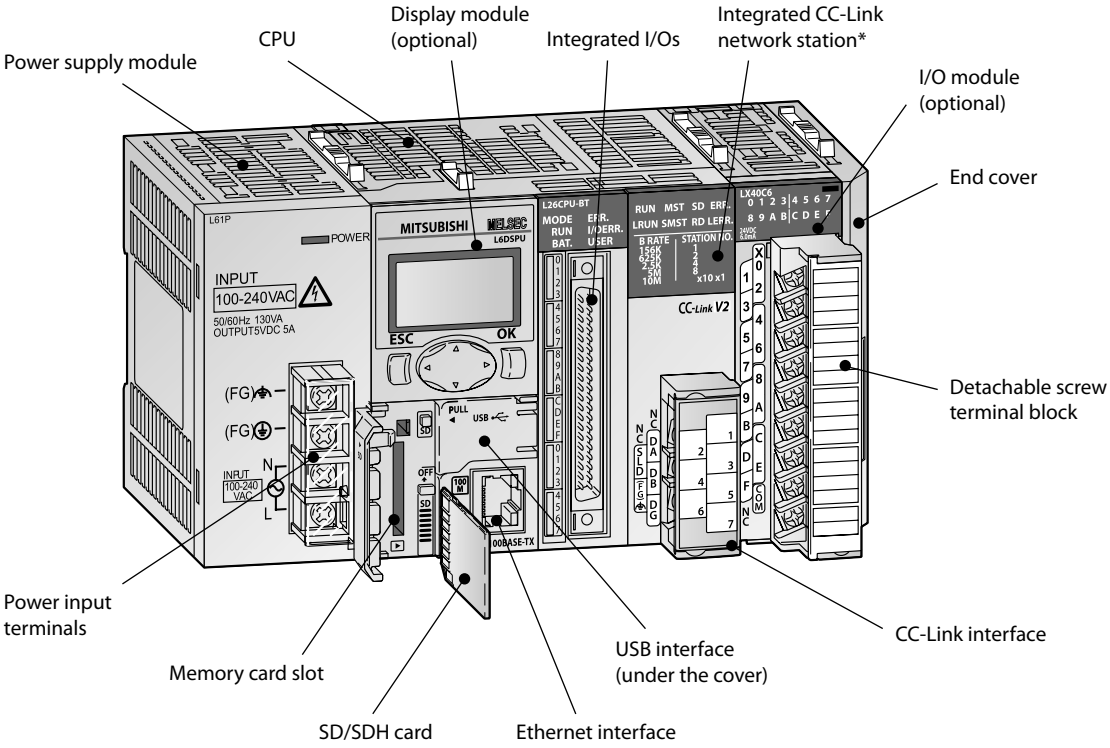
MELSEC WS Safety Controller

The MELSEC WS Safety Controller provides a cost effective way to add a safety controller capability to individual machines, or smaller scale systems. Mitsubishi Electric is proud to announce that the WS is a joint development with SICK AG of Germany, an acknowledged leader in the global machine safety industry. Its compact size insures easy placement in most control cabinets, without adding extra cost. Configuration saves engineering time by using a graphical icon based method, and program development and certification is simplified by the use of safety function blocks. For more complex needs, the WS is also scalable by simply adding additional I/O modules. Finally, integration with conventional control systems is easily achieved with the CC-Link open network connection or Ethernet.



Function	Module	Description	Art. no.
CPU	WS0-CPU000200	Program memory: 255 function blocks	230057
	WS0-CPU130202	Program memory: 255 function blocks; EFI (direct communication with SICK safety devices)	230058
Input module	WS0-XTDI80202	8 safety inputs	230059
Input/output modul	WS0-XTIO84202	8 safety inputs; 4 safety outputs	230060
Output module	WS0-4RO4002	4 safety relay outputs	230064
Communication module	WS0-GETH00200	Module for Ethernet communication	230063
	WS0-GCC100202	Module for CC-Link communication	235441
Memory	WS0-MPL000201	Memory plug	230061
Programming cable	WS0-C20R2	Serial programming cable	230062

MELSEC L series – What a system looks like



* High-performance CPU only

System structure

The MELSEC L series is a powerful but compact modular controller with many features built-in to the CPU itself. The rack-free design promotes high system flexibility with minimum form factor. By connecting various types of modules, the system can be enhanced according to the application. Up to 10 expansion modules can be added per system configuration. As a baseless structure is employed, the space of the control panel can be used effectively without being limited by the size of the base.

MELSEC L series controllers are all-in-one programmable controllers that have the following functions built into the CPU module:

- 2 channels of high-speed counters up to 200 kHz
- Positioning possibilities for two axes, also up to 200 k pulses per second
- Built-in Ethernet communication
- Built-in I/Os which are available via a 40-pin high density connector supporting several I/O options
- High-speed data logging to the SD memory card
- CC-Link Ver. 2 Master/Slave interface (in the high-performance CPU)
- Full support in iQ Works and GX Works2
- Modbus®/TCP functionality (Master/Slave)

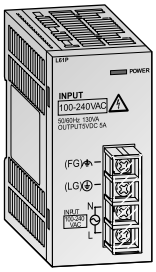
What you need

CPU modules

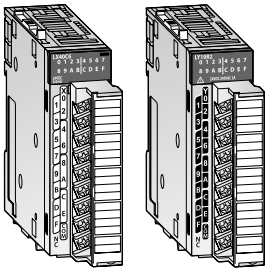
The CPU modules are the heart of a MELSEC L series system and contain a diverse range of control functions. Every CPU comes with 24 points of built-in I/Os.

Specifications		L02SCPU/ L02SCPU-P	L02CPU/ L02CPU-P	L06CPU/ L06CPU-P	L26CPU/ L26CPU-P	L26CPU-BT/ L26CPU-PBT
Number of I/O points		1024/8192*	1024/8192*	4096/8192*	4096/8192*	4096/8192*
Program size (no. of steps)		20 k	20 k	60 k	260 k	260 k
Order information	Art. no.	263070/269668	238057/244976	263068/**	263069/**	238056/244977

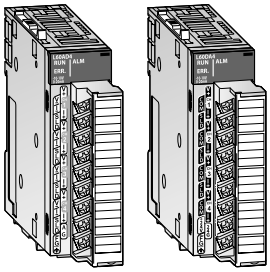
* number of points available on a program ** on request
Model name with "P": source type digital output, model name without "P": sink type digital output.



L61P
Power supply module



LX40C6/LY10R2
Digital I/O modules



L60AD4/L60DA4
Analog I/O modules

Power supply modules

This provides 5 V DC power for all modules on the back plane. There are three types of power supplies available, the selection is dependent on the available supply voltage.

Specifications		L61P	L63P	L63SP
Input voltage		100–240 V AC	24 V DC	24 V DC
Rated output current (5 V DC)	A	5	5	5
Order information	Art. no.	238063	238064	279592

Digital I/O modules

There is a wide selection of digital input and output modules depending on the signal level, sink or source designation and density of points required. Modules are available in 16 point input or output with screw terminals mounted on the module, higher densities of 32 and 64 point require a connector, cable and terminal block.

Digital input modules

Specifications		LX40C6	LX10	LX41C4	LX28	LX42C4
Number of input points		16	16	32	8	64
Rated input voltage		24 V DC	100–120 V AC, 50/60 Hz	24 V DC	100–240 V AC, 50/60 Hz	24 V DC
Order information	Art. no.	238085	255566	238086	255567	238087

Digital output modules

Specifications		LY10R2	LY18R2A	LY28S1A	LY20S6
Number of output points		16	8	8	16
Output type		Relay	Relay	Triac	Triac
Order information	Art. no.	238088	279074	279075	255568

Specifications		LY40NT5P	LY41NT1P	LY42NT1P	LY40PT5P	LY41PT1P	LY42PT1P
Number of output points		16	32	64	16	32	64
Output type		Transistor (sink type)	Transistor (sink type)	Transistor (sink type)	Transistor (source type)	Transistor (source type)	Transistor (source type)
Order information	Art. no.	242167	238089	238090	242168	242169	242170

Analog I/O modules

The analog input module converts analog process signals, for example pressure, flow or fill level, linearly into digital values, which are further processed by the MELSEC L series CPU.

The analog output module converts digital values predetermined by the CPU into analog current or voltage signal.

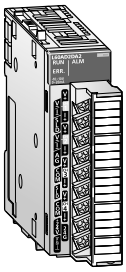
Analog input modules

Specifications		L60AD4	L60AD4-2GH	L60ADVL8	L60ADIL8
Input points		4	4	8	8
Digital output		-20480–20479 (-32768–32767)*	-32000–32000 (-32768–32767)*	-16384–16383 (-32768–32767)*	-8192–8191 (-32768–32767)*
Max. resolution	voltage input	200 µV	125 µV	500 µV	—
	current input	800 nA	500 nA	—	2000 nA
Overall accuracy		±0.1 %	±0.05 %	±0.2 %	±0.2 %
Conversion speed		20 µs/channel	40 µs/2 channels	1 ms/channel	1 ms/channel
Order information	Art. no.	238091	263071	279071	279065

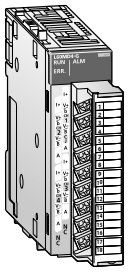
Analog output modules

Specifications		L60DA4	L60DAVL8	L60DAIL8
Output points		4	8	8
Digital input		-20480–20479 (-32768–32767)*	-16384–16383 (-32768–32767)*	-8192–8191 (-32768–32767)*
Max. resolution	voltage input	200 µV	320	—
	current input	700 nA	—	707
Overall accuracy		±0.3 % (0–55 °C), ±0.1 % (20–30 °C)	±0.5 % (0–55 °C), ±0.3 % (20–30 °C)	±1.0 % (0–55 °C), ±0.3 % (20–30 °C)
Conversion speed		20 µs/channel	200 µs/channel	200 µs/channel
Order information	Art. no.	238092	304494	304545

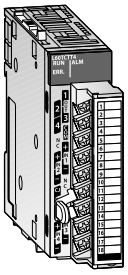
* Value in brackets when using the scaling function



L60AD2DA2
Combined analog input/output module



L60MD4-G
Multiple input module



L60TCTT4
Temperature control module

Combined analog input/output module

An analog I/O module has two sets of A/D conversion channels and D/A conversion channels.

Specifications			L60AD2DA2
Input channels			2
Analog input	voltage	V	-10–10
	current	mA	0–20
Accuracy			±0.3 % (0–55 °C), ±0.2 % (20–30 °C)
Output channels			2
Analog output	voltage	V	-10–10
	current	mA DC	0–20
Accuracy			±0.4 % (0–55 °C), ±0.2 % (20–30 °C)
Order information		Art. no.	269673

Multiple input module

The multiple input module L60MD4-G can measure voltages, currents and temperatures. An input type can be selected for each channel independently.

Specifications		L60MD4-G
Input points		4
Input range	voltage	-10–10 V DC
	current	0–20 mA DC
	microvoltage	-100–100 mV DC
	thermocouple	K, J, T, E, N, R, S, B, U, L, PLII, W5Re/W26Re
	resistance thermometer	Pt1000, Pt100, JPt100, Pt50
Conversion time		50 ms/channel
Order information	Art. no.	279072

Temperature input module

The RTD input module converts temperature data input by a corresponding RTD (nine types: Pt100, JPt100, Pt1000, Pt50, Ni100, Ni120, Ni500, Cu100, or Cu50) to a temperature measured value and digital operation value.

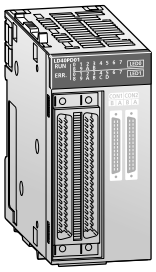
Specifications		L60RD8
Input channels		8
Applicable RTD		Pt100, JPt100, Pt1000, Pt50, Ni100, Ni120, Ni500, Cu100 or Cu50
Conversion speed		40 ms/channel
Order information	Art. no.	289962

Temperature control modules

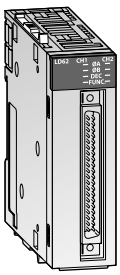
These modules apply the independent control of temperatures. This relieves the CPU of the PLC.

Specifications		L60TCTT4	L60TCRT4	L60TCTT4BW *	L60TCRT4BW *
Inputs		4 channels per module	4 channels per module	4 channels per module	4 channels per module
Supported temperature sensors		Thermocouple	Pt100 resistance thermometer	Thermocouple	Pt100 resistance thermometer
Order information	Art. no.	246347	246348	246349	246350

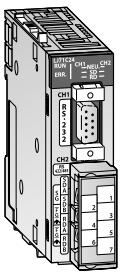
* Heating current monitoring to detect a defective or disconnected heater.



LD40PD01
Flexible high-speed I/O control module



LD62
High-speed counter module



LJ71C24
Interface module

Flexible high-speed I/O control module

Equipped with FPGA for high-speed I/O control

For the flexible high-speed I/O control module, users can easily create a high-speed, complicated hardware logic independent from the CPU module by graphically combining input/outputs, logical operation circuits, and counters with the configuration tool.

Specifications	LD40PD01	
	DC	Differential
Number of input points	12 points (5/24 V DC/differential)	
Number of output points	8 points (5–24 V DC, 0.1 A/point)	6 points
Number of interrupts	8 interrupts	
Order information Art. no.	296588	

IO-Link module

IO-Link is an extension of conventional digital inputs and outputs and allows the connection of intelligent sensors and actuators to a PLC.

Specifications	ME1I0L6-L
No. of channels	6
Channel configuration	IO-Link, digital output, digital input, disabled
Order information Art. no.	245825

High-speed counter modules

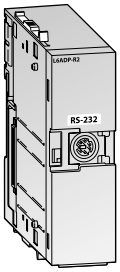
The counter modules detect high-frequency signals, which cannot be handled by normal input modules.

Specifications		LD62	LD62D
Counter inputs (channels)		2	2
Count input signal	phase	1-phase input (multiple of 1/2), CW/CCW, 2-phase input (multiple of 1/2/4)	
	signal level	5/12/24 V DC (2–5 mA)	EIA standard RS422A differential type line driver
Max. counting frequency	kHz	200	500
Order information	Art. no.	238097	238098

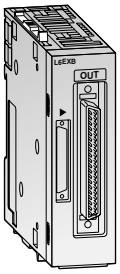
Interface modules

These modules enable communication with peripheral devices via a standard serial interface.

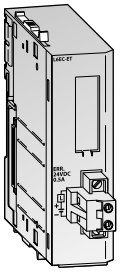
Specifications		LJ71C24	LJ71C24-R2
Interface type	channel 1	RS232-compliance (D-sub 9P female)	RS232-compliance (D-sub 9P female)
	channel 2	RS422/485-compliance (2-piece terminal block)	RS232-compliance (D-sub 9P female)
Order information	Art. no.	238093	238094



L6ADP-R2
Serial communications adapter



L6EXB
Branch module



L6EC-ET
End cover

Serial communications adapters

The L6ADP-R2 provides a RS232 and the L6ADP-R4 a RS422/485 interface for serial communication with the L series PLC.

Specifications		L6ADP-R2	L6ADP-R4
Application		Serial connection, e.g. GT10 terminals	Serial connection, e.g. GOT terminals
Order information	Art. no.	238059	273657

Branch/extension module

Extension for MELSEC L series PLC

With a L6EXB branch module, which is connected to the CPU, and with up to two (L02CPU, L02CP-P) or up to three extension modules (L26CPU-BT, L26CPUPBT), a PLC can be extended to max. 30/40 modules.

Specifications		L6EXB (branch module)	L6EXE (extension module)
Internal power consumption (5 V DC)	A	0.08	0.08
Order information	Art. no.	247227	247226

End cover

This end cover can be used instead of the standard end cover which comes with the CPU in the basic equipment.

The L6EC-ET end cover has a single relay output for error notification.

Specifications		L6EC-ET	L6EC
Application		Error notification via relay output	Standard end cover
Output		Screw terminal	—
Order information	Art. no.	238062	249151

Note: L series CPU modules are supplied with a standard end cover L6EC.

For detailed information, please refer to the family catalogues.

Compact PLCs

FX family

Micro PLCs have opened up the world of opportunities in Industrial Automation due to their small size and low cost. Now many applications that were never previously considered can benefit – from barriers to security systems and a host of others. The FX family is the world's best selling cost-effective 'brick' type PLCs, consisting of eight independent but compatible product ranges.

Depending on your application and control needs, you can choose from the small, attractively priced, "stand-alone" FX3S series or the more powerful FX3G, FX3GC, FX3GE, FX3U, FX3UC, FX5U and FX5UC series.

The MELSEC iQ-F includes the FX5U and the FX5UC series. Designed on the concepts of outstanding performance, superior drive control and user centric programming, the iQ-F reaches to new areas of application with a high-speed system bus (approx. 150-times faster than FX3U), extensive built-in functions and network support (built-in Ethernet and RS485 interface, build in analog inputs/output).

All FX series PLCs can be expanded to adapt them to the changing needs of your installations and applications.

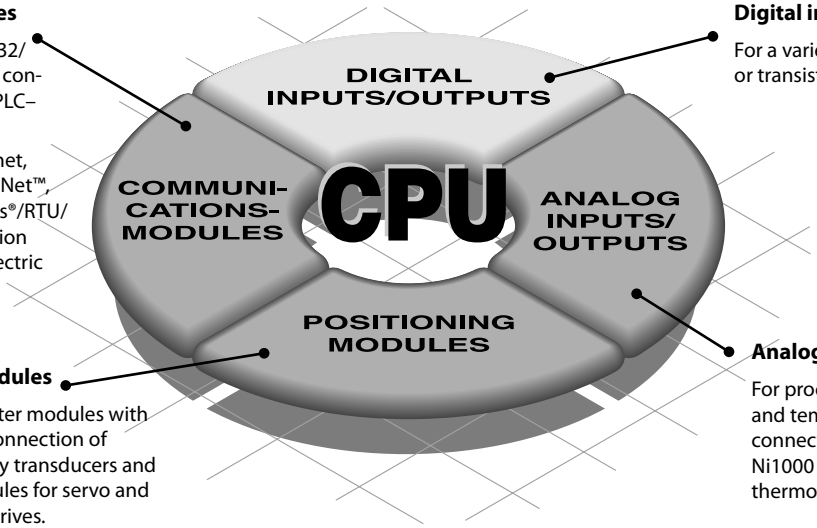
Network integration is also supported, making it possible for your FX controllers to communicate with other PLCs, controllers and HMIs.

Equipment features

Communications modules

Interface modules with RS232/RS422/RS485 or USB for the connection of peripherals and PLC–PLC links.

Network modules for Ethernet, Profibus DP, CC-Link, DeviceNet™, CANopen, Ethernet, Modbus®/RTU/ASCII and for the configuration of proprietary Mitsubishi Electric networks.



Digital input/output modules

For a variety of signal levels with relay or transistor switches.

Positioning modules

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

Analog input/output modules

For processing current/voltage signals and temperature registration with a direct connection option for Pt100, Pt1000 and Ni1000 resistance thermometers and thermocouplers.

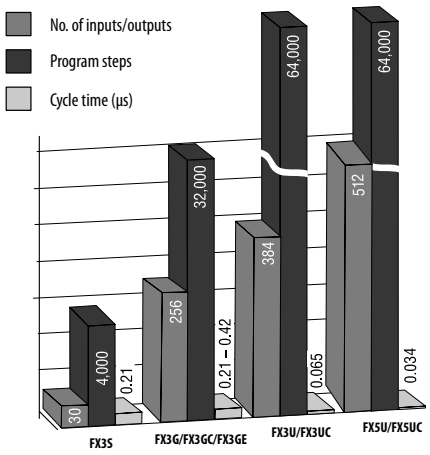
Expandability and power

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 up to 30 I/Os (FX3S) or a demanding, complex system with up to 384 I/O points for FX3U/FX3UC and up to 512 I/O points for FX5U/FX5UC.

The capacity of the CPUs of the FX family can be expanded with memory cassettes.

The diagram highlights the capabilities of each FX PLC type.



Micro controllers ALPHA series

ALPHA fills the gap between traditional relays and timers and a PLC. Offering functionality, reliability and flexibility but without the worry of cost of overheads. ALPHA is the perfect maintenance product, and yet can adequately control a new process from the start.

The ALPHA can be expanded to provide a small increase in I/O, analogue output, temperature input or networking capability.

The ALPHA2 can process up to 200 function blocks in a single program, and every single function (timers, counters, analog signal processing, calendar, clock etc.) can be used as many times as you need in all your programs.

What components are required 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 FX3S, FX3G, FX3U and FX5U can be AC or DC powered, the FX3GC, FX3UC and the FX5UC are only DC powered, both with a mix of input and output styles. The PLCs can be programmed with the user friendly GX Works2 and GX Works3 (FX5 PLCs) 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 512 points depending upon the FX range selected.

Extension boards

Except for the FX3GC, FX3UC and FX5UC series, extension adapter boards can be installed directly into the base unit and therefore do not require any additional installation space.

Programming is done directly via special commands and dedicated data register in the PLC.

For a small number of digital I/O (2 to 4) an extension adapter board can be installed directly into the FX3S, FX3G, FX3GE, FX3U or FX5U controller. Interface adapter boards can also provide the FX PLC with additional RS232, RS422, RS485 or USB interfaces.

Expansion adapters

The special Adapters, also called ADPs, add standard high-speed functions to a FX PLC. Mounted on the left side of a base unit, these units are extremely compact and easy to use.

The programming is similar to the expansion boards via special instructions and dedicated data registers in the PLC.

Available are various serial communication, analog, temperature input, positioning, high-speed counting and data logging ADPs. Compared to the BDs the ADPs offer more flexibility and performance. For the connection of ADP modules, a converter adapter is required for some base units.

Extension I/O modules

Unpowered and powered extension digital I/O modules can be added to the FX3G, FX3GC, FX3GE, FX3U, FX3UC, FX5U and FX5UC PLCs.

A wide range from 8 to 48 I/O points with different inputs and outputs are available. There is no limitation on the number of extension units or blocks, you can design the system to match application requirements, just make sure to check the system power supply and number of available I/O points.

Dedicated I/O blocks for the FX3GC and FX3UC are available as well.

Special function modules

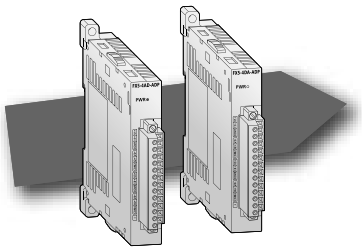
A wide variety of special function modules are available for the FX3G, FX3GC, FX3GE, FX3U FX3UC, FX5U and FX5UC PLCs. They cover networking functionality, analog control, high speed input, pulse train outputs, data logging function, temperature inputs and Simple Motion modules.

Thanks to the standardized communication via memory integrated into the special function modules, programming is straightforward.

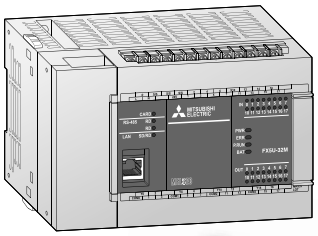
The integrated CPU performs PLC scan time independent operation perfectly fitted for networking or positioning tasks, thus reducing the load on the PLC base unit. Up to 8 different units can be connected to the base unit.

Memory extension and operator terminals

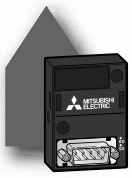
Each FX family base unit (except FX3GC/FX5U/FX5UC) can be equipped with a memory cassette. The programming unit interface enables the connection of programming tools like PC and hand held programming units as well as graphical operator terminals.



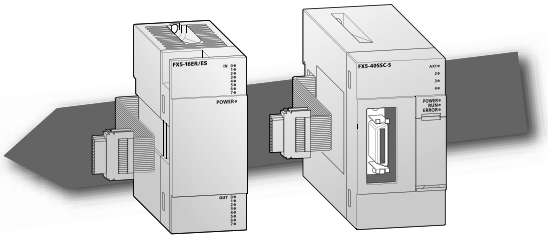
Expansion adapter



CPU Module



Expansion board



I/O extension module

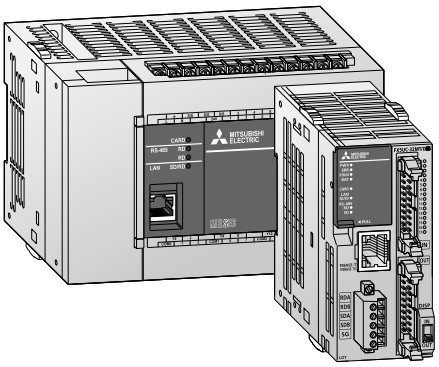
Special function module

Expansion possibilities		ALPHA2	FX3S	FX3G	FX3GC	FX3GE	FX3U	FX3UC	FX5U	FX5UC
Extensions for inside PLC installation	Digital	●	—	—	—	—	—	—	—	—
	Analog	●	—	—	—	—	—	—	—	—
Extension modules (installation outside the PLC)	Digital	—	—	●	●	●	●	●	●	●
	Analog	—	●	●	●	●	●	●	●	●
	Temperature	●	●	●	●	●	●	●	●	●
Network modules	Ethernet	—	●	●	●	— ①	●	●	●	●
	CC-Link	—	—	●	●	●	●	●	●	●
	CANopen	—	—	●	●	●	●	●	—	—
	Profibus DP	—	—	●	●	●	●	●	—	—
	DeviceNet	—	—	●	●	●	●	●	—	—
	Modbus® RTU/ASCII	—	—	●	●	●	●	●	●	●
	SSCNET III	—	—	—	—	—	●	●	●	●
	SAE J1939	—	—	●	●	●	●	●	—	—
Expansion boards	RS232	●	●	●	—	●	●	—	●	—
	RS422	—	●	●	—	●	●	—	●	—
	RS485	—	●	●	—	●	●	—	●	—
	USB	—	—	—	—	—	●	—	—	—
Communications modules	RS232	—	●	●	●	●	●	●	●	●
	RS485	—	●	●	●	●	●	●	●	●
Dedicated function modules	High speed counter	—	—	—	—	—	●	●	—	—
	Positioning	—	—	—	—	—	●	●	—	—
Memory cassettes		●	●	●	—	●	●	●	— ②	— ②
External display		—	—	●	—	●	●	—	—	—

① Base unit has built-in Ethernet interface
② No memory cassettes are used for FX5. SD card is available.

MELSEC iQ-F

FX5U/FX5UC series



The FX5U/FX5UC series CPU modules feature outstanding performance and superior drive control.

- High-speed system bus
- Built-in Ethernet port
- Built-in analog inputs/output (FX5U only)
- Built-in positioning (200 kpps, 4-axis)
- Built-in RS485 port (with Modbus® function)
- Built-in SD card slot
- Advanced security functions
- Battery-less and maintenance free
- Connection of FX5 and various FX3 expansion modules possible
- Connection of connector type FX5 I/O modules possible

FX5U base units with 32–80 I/Os

Specifications		FX5U-32MR/DS	FX5U-32MT/DSS	FX5U-32MR/ES	FX5U-32MT/ESS
Integrated inputs/outputs		32	32	32	32
Power supply		24 V DC	24 V DC	100–240 V AC	100–240 V AC
Integrated inputs		16	16	16	16
Integrated outputs		16	16	16	16
Output type		Relay	Transistor (source type)*	Relay	Transistor (source type)*
Order information	Art. no.	297436	297438	280489	280491

Specifications		FX5U-64MR/DS	FX5U-64MT/DSS	FX5U-64MR/ES	FX5U-64MT/ESS
Integrated inputs/outputs		64	64	64	64
Power supply		24 V DC	24 V DC	100–240 V AC	100–240 V AC
Integrated inputs		32	32	32	32
Integrated outputs		32	32	32	32
Output type		Relay	Transistor (source type)*	Relay	Transistor (source type)*
Order information	Art. no.	301923	301945	280492	280494

Specifications		FX5U-80MR/DS	FX5U-80MT/DSS	FX5U-80MR/ES	FX5U-80MT/ESS
Integrated inputs/outputs		80	80	80	80
Power supply		24 V DC	24 V DC	100–240 V AC	100–240 V AC
Integrated inputs		40	40	40	40
Integrated outputs		40	40	40	40
Output type		Relay	Transistor (source type)*	Relay	Transistor (source type)*
Order information	Art. no.	301946	301948	280495	280497

* Sink type transistor output units on request.

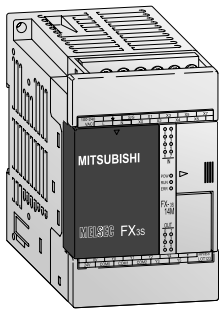
FX5UC base units with 32–96 I/Os

Specifications		FX5UC-32MT/DSS	FX5UC-32MT/DSS-TS	FX5UC-64MT/DSS	FX5UC-96MT/DSS
Integrated inputs/outputs		32	32	64	96
Power supply		24 V DC	24 V DC	24 V DC	24 V DC
Integrated inputs		16	16	32	48
Integrated outputs		16	16	32	48
Output type		Transistor (source type)*	Transistor (source type)*	Transistor (source type)*	Transistor (source type)*
Order information	Art. no.	283530	315551	294579	294581

* Sink type transistor output units on request.

MELSEC-F

FX3S series



The FX3S series base units are available with 10 to 30 input/output points.

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

- Integrated power supply (AC or DC powered)
- Maintenance-free EEPROM memory
- Ample memory capacity (4000 steps) and device ranges
- High-speed operations
- Incorporated positioning control
- Integrated real-time clock
- FX3S-30MT/ESS-2AD and FX3S-30MR/ES-2AD with two integrated analog inputs (0–10 V DC)
- 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, HMIs and hand-held programming units

Base units with 10–14 I/Os

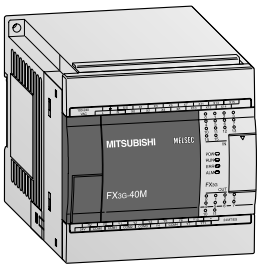
Specifications	FX3S-10 MR/ES	FX3S-10 MR/DS	FX3S-10 MT/ESS	FX3S-10 MT/DSS	FX3S-14 MR/ES	FX3S-14 MR/DS	FX3S-14 MT/ESS	FX3S-14 MT/DSS
Integrated inputs/outputs	10	10	10	10	14	14	14	14
Power supply	100–240 V AC	24 V DC	100–240 V AC	24 V DC	100–240 V AC	24 V DC	100–240 V AC	24 V DC
Integrated inputs	6	6	6	6	8	8	8	8
Integrated outputs	4	4	4	4	6	6	6	6
Output type	Relay	Relay	Transistor (source)*	Transistor (source)*	Relay	Relay	Transistor (source)*	Transistor (source)*
Order information Art. no.	267110	271687	267112	271695	267113	271688	267125	271696

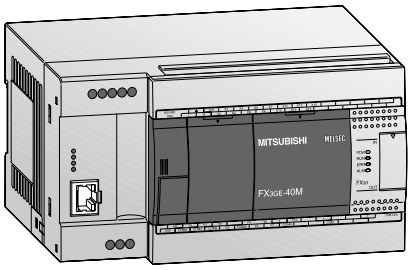
Base units with 20–30 I/Os

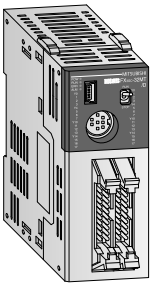
Specifications	FX3S-20 MR/ES	FX3S-20 MR/DS	FX3S-20 MT/ESS	FX3S-20 MT/DSS	FX3S-30 MR/ES	FX3S-30 MR/DS	FX3S-30 MR/ES-2AD	FX3S-30 MT/ESS	FX3S-30 MT/ESS-2AD	FX3S-30 MT/DSS
Integrated inputs/outputs	20	20	20	20	30	30	30	30	30	30
Power supply	100–240 V AC	24 V DC	100–240 V AC	24 V DC	100–240 V AC	24 V DC	100–240 V AC	100–240 V AC	100–240 V AC	24 V DC
Integrated inputs	12	12	12	12	16	16	16	16	16	16
Integrated outputs	8	8	8	8	14	14	14	14	14	14
Output type	Relay	Relay	Transistor (source)*	Transistor (source)*	Relay	Relais	Relais	Transistor (source)*	Transistor (source)*	Transistor (source)*
Order information Art. no.	267126	271689	267128	271697	267129	271690	271654	267131	271686	271698

* Sink type transistor output units on request.

FX3G/FX3GE/FX3GC series







The FX3G/FX3GE/FX3GC series base units are available in different versions and feature the following functions:

- 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 61131-3 (EN 61131-3) compatible programming software, HMIs and hand-held programming units

* (only FX3G and FX3GE)

Special features of the FX3GE series:

- Integrated analog input (2ch)
- Integrated analog output (1ch)
- Integrated Ethernet interface

Special features of the FX3GC series:

- Connection of inputs and outputs via connectors.

FX3G base units with 14–60 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 type)*	Relay	Transistor (source type)*	Relay	Transistor (source type)*	Relay	Transistor (source type)*
Order information	Art. no.	231466	231470	231474	231478	231467	231471	231475	231479

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 type)*	Relay	Transistor (source type)*	Relay	Transistor (source type)*	Relay	Transistor (source type)*
Order information	Art. no.	231468	231472	231476	231480	231469	231473	231477	231481

FX3GE base units with 24/40 I/Os

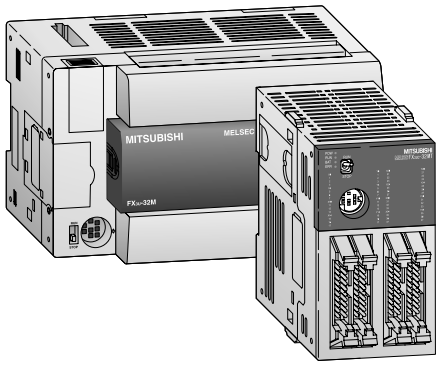
Specifications		FX3GE-24 MR/ES	FX3GE-24 MT/ESS	FX3GE-24 MR/DS	FX3GE-24 MT/DSS	FX3GE-40 MR/ES	FX3GE-40 MT/ESS	FX3GE-40 MR/DS	FX3GE-40 MT/DSS
Integrated inputs/outputs		24	24	24	24	40	40	40	40
Power supply		100–240 V AC	100–240 V AC	24 V DC	24 V DC	100–240 V AC	100–240 V AC	24 V DC	24 V DC
Integrated inputs		14	14	14	14	24	24	24	24
Integrated outputs		10	10	10	10	16	16	16	16
Output type		Relay	Transistor (source type)*	Relay	Transistor (source type)*	Relay	Transistor (source type)*	Relay	Transistor (source type)*
Order information	Art. no.	264869	269884	269917	269919	264870	269916	269920	269922

* Units with sink type transistor outputs on request.

FX3GC base units with 32 I/Os

Specifications		FX3GC-32 MT/D	FX3GC-32 MT/DSS
Integrated inputs/outputs		32	32
Power supply		24 V DC	24 V DC
Integrated inputs		16	16
Integrated outputs		16	16
Output type		Transistor (sink type)	Transistor (source type)
Order information	Art. no.	251545	251546

FX3U/FX3UC series



The FX3U/FX3UC series base units are available in different versions and feature the following functions:

- 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 (only FX3U)
- Integrated real-time clock
- Expandable with digital I/O modules, special function modules and ADP modules
- User-friendly programming systems, including IEC 61131-3 (EN 61131-3) compatible programming software, HMIs and hand-held programming units

Special features of the FX3UC series:

- Very compact dimensions
- Adapter modules and system cabling sets available for units with ribbon cable connectors

FX3U base units with 16–128 I/Os

Specifications		FX3U-16 MR/ES	FX3U-32 MR/ES	FX3U-48 MR/ES	FX3U-64 MR/ES	FX3U-80 MR/ES	FX3U-128 MR/ES
Integrated inputs/outputs		16	32	48	64	80	128
Power supply		100–240 V AC	100–240 V AC	100–240 V AC	100–240 V AC	100–240 V AC	100–240 V AC
Integrated inputs		8	16	24	32	40	64
Integrated outputs		8	16	24	32	40	64
Output type		Relay	Relay	Relay	Relay	Relay	Relay
Order information	Art. no.	231486	231487	231488	231489	231490	231491

Specifications		FX3U-16 MT/ESS	FX3U-32 MT/ESS	FX3U-48 MT/ESS	FX3U-64 MT/ESS	FX3U-80 MT/ESS	FX3U-128 MT/ESS
Integrated inputs/outputs		16	32	48	64	80	128
Power supply		100–240 V AC	100–240 V AC	100–240 V AC	100–240 V AC	100–240 V AC	100–240 V AC
Integrated inputs		8	16	24	32	40	64
Integrated outputs		8	16	24	32	40	64
Output type		Transistor (source type)*	Transistor (source type)*	Transistor (source type)*	Transistor (source type)*	Transistor (source type)*	Transistor (source type)*
Order information	Art. no.	231492	231493	231494	231495	231496	231497

Specifications		FX3U-16 MR/DS	FX3U-32 MR/DS	FX3U-48 MR/DS	FX3U-64 MR/DS	FX3U-80 MR/DS
Integrated inputs/outputs		16	32	48	64	80
Power supply		24 V DC	24 V DC	24 V DC	24 V DC	24 V DC
Integrated inputs		8	16	24	32	40
Integrated outputs		8	16	24	32	40
Output type		Relay	Relay	Relay	Relay	Relay
Order information	Art. no.	231498	231499	231500	231501	231502

Specifications		FX3U-16 MT/DSS	FX3U-32 MT/DSS	FX3U-48 MT/DSS	FX3U-64 MT/DSS	FX3U-80 MT/DSS
Integrated inputs/outputs		16	32	48	64	80
Power supply		24 V DC	24 V DC	24 V DC	24 V DC	24 V DC
Integrated inputs		8	16	24	32	40
Integrated outputs		8	16	24	32	40
Output type		Transistor (source type)*	Transistor (source type)*	Transistor (source type)*	Transistor (source type)*	Transistor (source type)*
Order information	Art. no.	231503	231504	231505	231506	231507

* Units with sink type transistor outputs on request.

FX3UC base units with 16–96 I/Os

Specifications		FX3UC-16 MT/DSS	FX3UC-32 MT/DSS	FX3UC-64 MT/DSS	FX3UC-96 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)*
Order information	Art. no.	231508	231509	231510	231511

* Units with sink type transistor outputs on request.

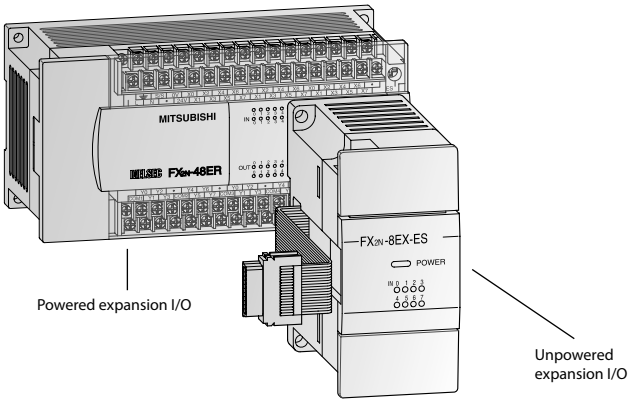
Expandability and functionality

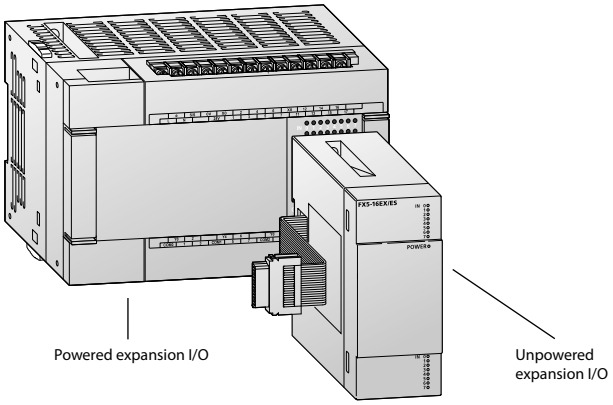
Additional special function and expansion modules are available that make it possible to extend the capacity of the PLC system. There are three basic categories of modules:

- Modules that occupy digital I/Os (connected on the right hand side of the base unit). These are the digital unpowered and powered extension units, as well as the special function modules.
- Communication and adapter modules that are connected to the left hand side of the base unit, for example FX3U-4AD-ADP and FX2NC-485ADP.
- Internal adapter boards for the FX3S, FX3G, FX3GE, FX3U and the FX5U series. These expansion units are installed directly in the base unit and do not occupy any digital I/O.

Note: To connect special function modules or extension units of the FX0N/FX2N/FX3U series to an FX3UC series base unit, an adapter FX2NC-CNV-IF or the power supply FX3UC-1PS-5V is required.
When connecting a special function module of the FX3U series to a FX5U/FX5UC base unit the communications adapter FX5U-CNV-BUS resp. FX5U-CNV-BUSC is required.

Expansion modules for the FX3/FX5 series





Various unpowered and powered extension units (FX3UC/FX5UC unpowered only) are available for extending the base units.

The unpowered units contain 16 or 32 digital inputs/outputs max. and do not need a separate power supply, since they are powered via the system bus.

The powered extension units contain a larger number of inputs/outputs and an integrated power supply unit, to power the system bus and the digital inputs.

Expansion modules for the FX3 series

Specifications	POWERED					
	FX2N-32 ER-ES/UL	FX2N-32 ET-ESS/UL	FX2N-48 ER-DS	FX2N-48 ER-ES/UL	FX2N-48 ET-DSS	FX2N-48 ET-ESS/UL
Integrated inputs/outputs	32	32	48	48	48	48
Application	FX3G and FX3U/FX3UC series base units					
Power supply AC range (+10 %, -15 %)	100–240 V	100–240 V	—	100–240 V	—	100–240 V
Integrated inputs	16	16	24	24	24	24
Integrated outputs	16	16	24	24	24	24
Output type	Relay	Transistor (source) ①	Relay	Relay	Transistor (source) ①	Transistor (source) ①
Order information Art. no.	65568	65569	66633	65571	66634	65572

Specifications	UNPOWERED												
	FX2N-8 ER-ES/UL	FX2N-8 EX-ES/UL	FX2N-8 EYR-ES/UL	FX2N-8 EYT-ESS/UL	FX2N-16 EX-ES/UL	FX2N-16 EYR-ES/UL	FX2N-16 EYT-ESS/UL	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
Integrated inputs/outputs	8	8	8	8	16	16	16	16	16	16	16	32	32
Application	FX3G/FX3GC/FX3GE and FX3U/FX3UC series base units							FX3GC/FX3UC series base units					
Power supply	All modular extension blocks are supplied by the base unit.												
Integrated inputs	4	8	—	—	16	—	—	16	—	16	—	32	—
Integrated outputs	4	—	8	8	—	16	16	—	16	—	16	—	32
Output type	Relay	—	Relay	Transistor (source) ①	—	Relay	Transistor (source) ①	—	Relay	—	Transistor (source) ①	—	Transistor (source) ①
Order information Art. no.	166285	166284	166286	166287	65776	65580	65581	128152	128153	104503	104504	104505	104506

① Sink type transistor output units on request.

Expansion modules for the FX5 series

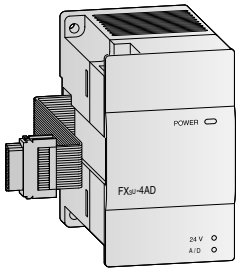
Specifications	POWERED					
	FX5-16 ER/ES	FX5-16 ET/ESS	FX5-32 ER/DS	FX5-32 ET/DSS	FX5-32 ER/ES	FX5-32 ET/ESS
Integrated inputs/outputs	16	16	32	32	32	32
Application	FX5U/FX5UC CPU modules					
Power supply AC range (+10 %, -15 %)	—	—	—	—	100–240 V	100–240 V
Integrated inputs	8	8	16	16	16	16
Integrated outputs	8	8	16	16	16	16
Output type	Relay	Transistor (source) ①	Relay	Transistor (source) ①	Relay	Transistor (source) ①
Order information Art. no.	304652	304654	297439	297441	280506	280508

Specifications	UNPOWERED						
	FX5-8 EX/ES	FX5-8 EYR/ES	FX5-8 EYT/ESS	FX5-16 EX/ES	FX5-16 EYR/ES	FX5-16 EYT/ESS	FX5-16 ET/ESS-H
Integrated inputs/outputs	8	8	8	16	16	16	16
Application	FX5U/FX5UC CPU modules						
Power supply AC range (+10 %, -15 %)	All unpowered I/O modules are supplied by the CPU module.						
Integrated inputs	8	—	—	16	—	—	8
Integrated outputs	—	8	8	—	16	16	8
Output type	—	Relay	Transistor (source) ①	—	Relay	Transistor (source) ①	Transistor (source) ①
Order information Art. no.	280498	280499	280501	280505	280502	280504	297443

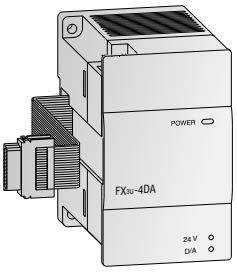
① Sink type transistor output units on request.

Specifications	UNPOWERED							
	FX5-C16 EX/DS	FX5-C16 EYT/DSS	FX5-C32 EX/DS	FX5-C32 EX/DS-TS	FX5-C32 EYT/DSS	FX5-C32 EYT/DSS-TS	FX5-C32 ET/DSS	FX5-C32 ET/DSS-TS
Integrated inputs/outputs	16	16	32	32	32	32	32	32
Application	FX5U/FX5UC CPU modules							
Power supply AC range (+10 %, -15 %)	All unpowered I/O modules are supplied by the CPU module.							
Integrated inputs	16	—	32	32	—	—	16	16
Integrated outputs	—	16	—	—	32	32	16	16
Output type	—	Transistor (source) ①	—	—	Transistor (source) ①	Transistor (source) ①	Transistor (source) ①	Transistor (source) ①
Order information Art. no.	294583	294585	283532	315552	283556	315554	283534	315636

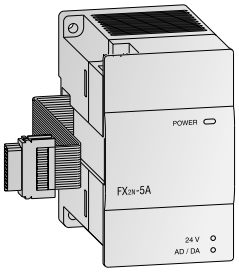
① Sink type transistor output units on request.



FX3U-4AD
Analog input module



FX3U-4DA
Analog output module



FX2N-5A
Combined analog I/O module

Analog input modules

The analog input modules provide the user with two to eight analog inputs. The module converts analog process signals into digital values which are further processed by the base unit.

Specifications		FX2N-2AD	FX3U-4AD	FX3UC-4AD	FX2N-8AD	FX5-4AD	FX5-8AD
Applicable for		Base units FX3G/FX3GC/ FX3GE/FX3U/ FX3UC	Base units FX3G/FX3GC/ FX3GE/ FX3U/FX3UC/ FX5U/FX5UC	Base units FX3GC/FX3UC	Base units FX3G/FX3GC/ FX3GE/FX3U/ FX3UC	Base units FX5U/FX5UC	Base units FX5U/FX5UC
Analog inputs		2	4	4	8	4	8
Analog input range		0–10 V DC/ 0–5 V DC/ 0/4–20 mA	-10–10 V DC/ -20–20 mA/ 4–20 mA	-10–10 V DC/ -20–20 mA/ 4–20 mA	-10–10 V DC/ -20–20 mA/ 4–20 mA	-10–10 V DC/ -20–20 mA/	-10–10 V DC/ -20–20 mA/ Temperature detector (K, J, T, B, R, S, Pt100, Ni100) ②
Resolution	voltage	2.5 mV, 1.25 mV, 4 µA (12 bit)	0.32 mV (15 bit + sign)	0.32 mV (15 bit + sign)	0.63 mV (14 bit + sign)	0.3125 mV (16 bit + sign)	0.3125 mV (16 bit + sign)
	current		1.25 µA (14 bit + sign)	1.25 µA (14 bit + sign)	2.5 µA (13 bit + sign)	0.625 µA (16 bit + sign)	0.625 µA (16 bit + sign)
Fullscale overall accuracy		±1 %	±0.3–1 % ①	±0.3–1 % ①	±0.3–0.5 % ①	±0.1–0.3 % [1]	±0.3–±0.5 %
Order information	Art. no.	102869	169508	210090	129195	334430	312297

① Dependent on the ambient temperature
② Please refer to manuals for further details of specification of temperature detectors.
Notes: 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.
To connect these modules to a FX3UC or FX3GC base unit, an adapter FX2N-CNV-IF or a power supply FX3UC-1PS-5V is required.
For the connection of a FX3U-4AD to a FX5U/FX5UC base unit, a bus conversion module FX5-CNV-BUSC resp. FX5-CNV-BUS is required.

Analog output modules

The analog output modules provide the user with two to four analog outputs. The modules convert digital values from a controller of the FX series to the analog signals required by the process.

Specifications		FX2N-2DA	FX3U-4DA	FX5-4DA
Applicable for		Base units FX3G/FX3GC/FX3GE/FX3U/FX3UC	Base units FX3G/FX3GC/FX3GE/ FX3U/FX3UC/FX5U/FX5UC	Base units FX5U/FX5UC
Analog outputs		2	4	4
Analog output range		0–10 V DC/0–5 V DC/4–20 mA	-10–10 V DC/0–20 mA/4–20 mA	-10–10 V DC/0–20 mA
Resolution	voltage	2.5 mV (12 bit)	0.32 mV (16 bit + sign)	0.3125 mV (16 bit + sign)
	current	4 µA (12 bit)	0.63 µA (15 bit)	0.625 µA (16 bit + sign)
Fullscale overall accuracy		±1 %	±0.3–0.5 % *	±0.1–0.3 % *
Order information	Art. no.	102868	169509	325715

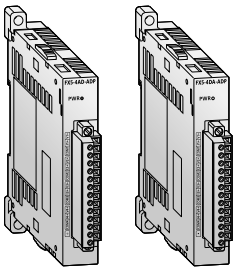
* Dependent on the ambient temperature
Notes: To connect these modules to a FX3UC or FX3GC base unit, an adapter FX2N-CNV-IF or a power supply FX3UC-1PS-5V is required.
For the connection of a FX3U-4DA to a FX5U/FX5UC base unit, a bus conversion module FX5-CNV-BUSC resp. FX5-CNV-BUS is required.

Combined analog I/O module

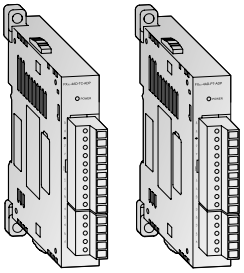
The analog input/output module provides provide the user with four analog inputs and one analog output. It serves for conversion of analog process signals into digital values, and vice versa.

Specifications		FX2N-5A
Applicable for		Base units FX3G/FX3GC/FX3GE/FX3U/FX3UC
Analog channels	inputs	4
	outputs	1
Resolution (input)	voltage	-10–10 V (15 bit + sign), -100–100 mV (11 bit + sign)
	current	-20–20 mA (14 bit + sign), 0/4–20 mA (14 bit)
Resolution (output)	voltage	-10–10 V (12 bit)
	current	0/4–20 mA (10 bit)
Order information	Art. no.	153740

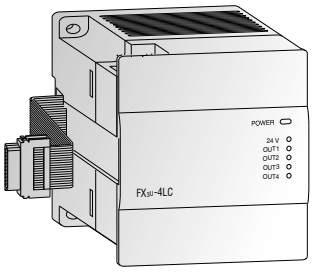
Note: To connect the module to a FX3UC or FX3GC base unit, an adapter FX2N-CNV-IF or a power supply FX3UC-1PS-5V is required.



FX5U-4AD-ADP
FX5U-4DA-ADP
Analog I/O adapter



FX3U-4AD-TC-ADP/
FX3U-4AD-PT-ADP
Analog temperature input adapter



FX3U-4LC
Temperature control module

Analog I/O adapters

The analog input adapter FX3U-4AD-ADP is mounted on the left side of the base unit and extends a controller of the FX3 series with four analog inputs.

The FX3U-4DA-ADP adapter module provides four analog outputs, the FX3U-3A-ADP two analog inputs and one analog output.

By adding a FX5U-4AD-ADP or FX5U-4DA-AD, a PLC of the FX5U or FX5UC series can be expanded with four analog inputs or four analog outputs respectively.

Specifications		FX3U-3A-ADP	FX3U-4AD-ADP	FX5U-4AD-ADP	FX3U-4DA-ADP	FX5U-4DA-ADP
Applicable for		Base units FX3S, FX3G, FX3GC, FX3GE, FX3U, FX3UC		Base units FX5U, FX5UC	Base units FX3S, FX3G, FX3GC, FX3GE, FX3U, FX3UC	Base units FX5U, FX5UC
Analog channels	inputs	2	4	4	—	—
	outputs	1	—	—	4	4
Analog range		0–10 V DC, 4–20mA	0–10 V DC, 4–20 mA	-10–10 V DC, -20–20 mA	0–10 V DC, 4–20 mA	-10–10 V DC, -20–20 mA
Resolution		2.5 mV/4 µA (12 bit)	2.5 mV/10 µA (12 bit/11 bit)	312.5 µV/1.25 µA (14 bit)	2.5 mV/4 µA (12 bit)	312.5 µV/1 µA (14 bit)
Overall accuracy		±0.5–1 %*	±0.5 %*/±1 %	±0.1 %*/±1 %	±0.5 %*/±1 %	±0.1 %*/±1 %
Order information	Art. no.	221549	165241	283559	165271	283560

*Dependent on the ambient temperature and signal quality
Notes: When connecting the analog adapters to a FX3G, FX3S or FX3U base unit, a communications adapter is required. A direct connection without adapter is possible if these modules are connected to a FX3GC, FX3GE or FX3UC base unit.

Analog temperature input adapters

The analog input adapters for thermocouples are used for processing temperatures. They have four independent inputs for detecting signals from thermocouples of various types.

The FX3U/FX5U-4AD-PT-ADP, FX3U-4AD-PTW-ADP and FX3U-4AD-PNK-ADP analog input adapters enable the connection of up to four resistance thermometers to the PLC system.

Specifications		FX3U-4AD-TC-ADP	FX3U-4AD-PT-ADP	FX3U-4AD-PTW-ADP	FX3U-4AD-PNK-ADP	FX5-4AD-PT-ADP	FX5-4AD-TC-ADP
Applicable for		Base units FX3S, FX3G, FX3GC, FX3GE, FX3U, FX3UC				Base units FX5U, FX5UC	
Analog inputs		4 (thermocouples, J or K type)	4 (Pt100)	4 (Pt100)	4 (Pt1000 or Ni1000)	4	4
Compensated temperature range	℃	-100–600 (J)/ -100–1000 (K)	-50–250	-100–600	-50–250 (Pt1000)/ -40–110 (Ni1000)	-200–850 (Pt100)/ -60–250 (Ni100)	-40–750(J)/ -200–1200 (K)/ 0–1600 (R, S)
Digital outputs		-1000–6000 (J)/ -1000–10000 (K)	-500–2500	-1000–6000	-500–2500 (Pt1000)/ -400–1100 (Ni1000)	-2000–8500 (Pt100)/ -600–2500 (Ni100)	-400–7500 (J)/ -2000–12000 (K)/ 0–16000 (R, S)
Resolution	℃	0.3 (J)/0.4 (K)	0.1	0.2–0.3	0.1	0.1	0.1 (K,J,T), 0.1–0.3 (B,R,S)
Total accuracy		±0.5 % (fullscale)	±0.5–1.0 % (fullscale)*			±0.4–2.4 ℃ (fullscale)*	±2.8–7.2 ℃ (fullscale)*
Order information	Art. no.	165273	165272	214173	214172	304298	304299

*Dependent on the ambient temperature
Notes: When connecting the FX3 analog adapters to a FX3G, FX3S or FX3U base unit, a communications adapter is required. A direct connection without adapter is possible if these modules are connected to a FX3GC, FX3GE or FX3UC base unit.

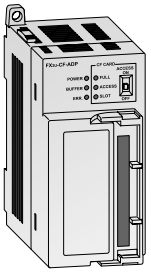
Temperature control modules

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.

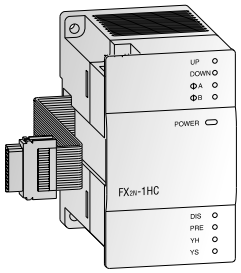
The temperature control module FX5U-4LC supports parameter transfer/automatic refreshing. The spring clamp terminal enables compact size and enhances vibration resistance.

Specifications		FX3U-4LC	FX5-4LC
Applicable for		Base units FX3G, FX3GC, FX3GE, FX3U, FX3UC, FX5U, FX5UC	Base units FX5U, FX5UC
Analog inputs		4 (thermocouple and Pt100 sensors)	4 (thermocouple, Pt100 and Pt1000 sensors)
Compensated temperature range	℃	-200–2300	-200–2300
Digital outputs		4 NPN transistor open collector output points	4 NPN transistor open collector output points
Resolution	℃	0.1 or 1	0.1 ℃ , 1.0 ℃ , 0.5 µV or 5.0 µV Varies depending on input range of used sensors
Fullscale overall accuracy		±0.3–0.7 % (fullscale, dependent on the ambient temperature)	
Order information	Art. no.	232806	312298

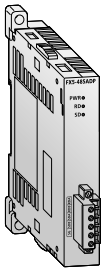
Notes: To connect these modules to a FX3UC or FX3GC base unit, an adapter FX2N-CNV-IF or a power supply FX3UC-1PS-5V is required.
For the connection of a FX5U-4LC to a FX5U/FX5UC base unit, a bus conversion module FX5-CNV-BUSC resp. FX5-CNV-BUS is required.



FX3U-CF-ADP
Data logger module



FX2N-1HC
High speed counter and pulse train module



FX5-485ADP
Communication expansion adapter

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.

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. number of files	63 (plus one FIFO file.)
FIFO function	One pattern (the file name gets automatically generated.)
Order information Art. no.	230104

High speed counter and pulse train modules

These high speed modules provide additional counting and pulse train output features to the FX3U/FX3UC PLC.

Specifications			FX2N-1HC	FX2NC-1HC	FX3U-4HSX-ADP	FX3U-2HSY-ADP	FX3U-2HC
Applicable for			Base units FX3U/FX3UC	Base units FX3UC	Base units FX3U	Base units FX3U	Base units FX3U/FX3UC/ FX5U/FX5UC
Signal level			5, 12, 24 V DC/7 mA	5, 12, 24 V DC/7 mA	5 V DC	Differential line driver	5, 12, 24 V DC
Counter	inputs		2 (1 phase) or 1 (2 phase)	2 (1 phase) or 1 (2 phase)	4	—	2
	outputs		—	—	—	2	2
Max. frequency	inputs	kHz	50	50	100/200	—	100/200
	outputs	kHz	—	—	—	200	—
Counting range (Up/down & ring counter)		16 bit	0–65535	0–65535	—	—	0–65535
		32 bit	-2147483648–2147483647	-2147483648–2147483647	—	—	-2147483648–2147483647
Order information	Art. no.		65584	217916	165274	165275	232805

Note: For the connection of a FX3U-2HC to a FX5U/FX5UC base unit, a bus conversion module FX5-CNV-BUSC resp. FX5-CNV-BUS is required.

Communication expansion adapters (RS485 and RS232)

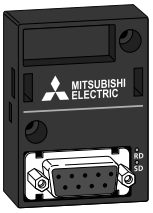
The addition of communication expansion adapters permit active communication between the PLC and surrounding devices.

An expansion adapter is mounted to the left side of an PLC base unit.

Specifications		FX3U-232ADP-MB	FX5-232ADP	FX3U-485ADP-MB	FX5-485ADP
Applicable for		Base units FX3G, FX3GC, FX3GE, FX3U, FX3UC	Base units FX5U, FX5UC	Base units FX3G, FX3GC, FX3GE, FX3U, FX3UC	Base units FX5U, FX5UC
Interface		RS232 with 9-pin D-sub connector; Modbus® RS232C		RS485; Modbus® RS485	
Communication speed*	kbps	0.3–19.2	0.3–19.2	0.3–19.2	0.3–19.2
Max. communication distance	m	15	15	500	500
Order information	Art. no.	206190	280513	206191	280514

* Speed depends on communication method (Parallel link, N:N network, no protocol, dedicated protocol etc.)

Note: When connecting a FX3U adapter to a FX3U, a communications adapter FX3U-□□□-BD is required. When connecting a FX3U adapter to a FX3G PLC the communications adapter FX3G-CNV-ADP is required.



FX5-485-BD
Communication
adapter board

FX3G-8AV-BD
Extension adapter

Interface module

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.

Specifications		FX2N-232IF
Applicable for		Base units: FX3U, FX3UC
Interface		RS232C with 9 pole D-SUB connector (photocoupler isolation)
Communication speed*	kbps	0.3–19.2
Max. communication distance	m	15
Order information	Art. no.	66640

Note: To connect this module to a FX3UC base unit, an adapter FX2NC-CNV-IF or a power supply FX3UC-1PS-5V is required.

Communication adapter boards

The communication adapter boards provide an additional communication interface for a MELSEC FX PLC.

They are installed directly in a PLC base unit and therefore do not require any additional installation space.

Specifications		FX3G-232-BD	FX3U-232-BD	FX5-232-BD
Applicable for		Base units FX3S/FX3G/FX3GE	Base units FX3U	Base units FX5U
Interface		RS232C with 9 pole D-sub connector		
Order information	Art. no.	221254	165281	280511

Specifications		FX3G-422-BD	FX3U-422-BD	FX5-422-BD-GOT
Applicable for		Base units FX3S/FX3G/FX3GE	Base units FX3U	Base units FX5U
Interface		RS422 with 8 pole Mini-DIN connector		
Order information	Art. no.	221252	165282	280515

Specifications		FX3G-485-BD	FX3G-485-BD-RJ	FX3U-485-BD	FX5-485-BD
Applicable for		Base units FX3S/FX3G/FX3GE	Base units FX3S/FX3G/FX3GE	Base units FX3U	Base units FX5U
Interface		RS485 (terminal block)			
Order information	Art. no.	221253	271699	165283	280512

The communication adapter board FX3U-USB-BD is an additional USB 2.0 interface for a FX3U base unit.

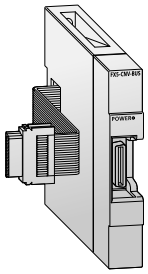
Specifications		FX3U-USB-BD
Applicable for		Base units FX3U
Function		USB interface (USB MINI B connector, female)
Order information	Art. no.	165284

Extension adapters

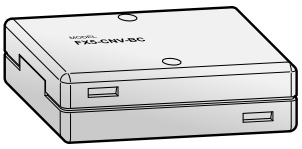
For the FX3G series PLCs a analog-digital converter with two analog inputs and a digital-analog converter with one analog output is available.

The FX3G-/FX3U-8AV-BD analog setpoint adapter enable the user to set 8 analog setpoint values.

Specifications		FX3G-2AD-BD	FX3G-1DA-BD	FX3G-8AV-BD	FX3U-8AV-BD
Applicable for		Base units FX3G	Base units FX3G	Base units FX3S/FX3G/FX3GE	Base units FX3U
Function		AD converter	DA converter	Analog setpoint	Analog setpoint
Order information	Art. no.	221265	221266	221267	237307



FX5-CNV-BUS
Communications adapter



FX5-CNV-BC
Connector
conversion adapter

Communications adapters, connection conversion modules/adapters

Communications adapters

The communications adapters enable the connection of the adapter modules FX□□-□□□ADP on the left hand side of the FX3S, FX3G and FX3U base units.

Specifications		FX3S-CNV-ADP	FX3G-CNV-ADP	FX3U-CNV-BD
Applicable for		Base units FX3S	Base units FX3G	Base units FX3U
Order information	Art. no.	267132	221268	165285

Bus conversion modules

The FX5-CNV-BUS and the FX5-CNV-BUSC are connection conversion modules for connecting intelligent function modules of the FX3U series or an extension power supply unit FX3U-1PSU-5V to a FX5 series PLC.

Specifications		FX5-CNV-BUS	FX5-CNV-BUSC
Applicable for		Base units FX5U	Base units FX5UC
Order information	Art. no.	280510	283558

Connector conversion modules

The FX5-CNV-IF is used to connect extension connector type modules of the MELSEC FX5UC series to FX5U CPU module systems.

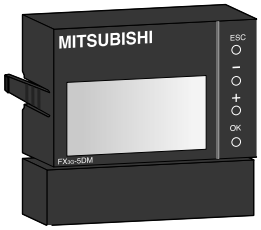
The FX5-CNV-IFC is used to connect I/O modules (extension cable type) or intelligent modules of the MELSEC FX5U series to FX5UC CPU module systems.

Specifications		FX5-CNV-IF	FX5-CNV-IFC
Conversion type		FX5 (extension cable type) -> FX5 (extension connector type)	FX5 (extension connector type) -> FX5 (extension cable type)
Applicable for		Base units FX5U	Base units FX5UC
Order information	Art. no.	297455	283557

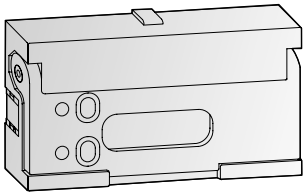
Connector conversion adapter

The FX5-CNV-BC is an adapter to convert the connector of an extended extension cable (FX5-30EC or FX5-65EC) used between modules of extension cable type.

Specifications		FX5-CNV-BC
Conversion type		Extended extension cable -> FX5 module (extension cable type)
Applicable for		Base units FX5U/FX5UC
Order information	Art. no.	297456



FX3G-5DM
Display module



FX3U-FLROM-64L
Memory cassette

Control and display panels, display panel holder

The display modules FX3S-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 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 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		**FX3S-5DM**	**FX3G-5DM**	**FX-10DM-E**
Applicable for		Base units FX3S	Base units FX3G	All base units FX3U
Display		LCD (with backlight)	LCD (with backlight)	LCD (with backlight)
Order information	Art. no.	282202	221270	132600

Specifications		**FX3U-7DM**	**FX3U-7DM-HLD**
Applicable for		Base units FX3U	Base units FX3U
Display		16 letters x 4 lines	—
Order information	Art. no.	165268	165287

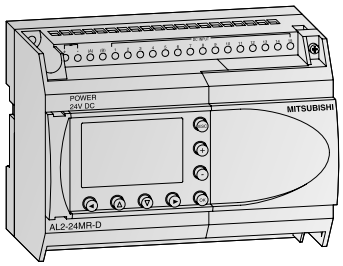
Memory cassettes

All FX base units are equipped with a slot for the 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.

Specifications		**FX3G-EEPROM-32L**
Applicable for		Base units FX3G
Size		32000 steps
Order information	Art. no.	221269

Specifications		**FX3U-FLROM-16**	**FX3U-FLROM-64**	**FX3U-FLROM-64L**	**FX3U-FLROM-1M**
Applicable for		Base units FX3U	Base units FX3U	Base units FX3U	Base units FX3U
Size		16000	64000	64000	64000 + 1.3 MB for source data
Order information	Art. no.	165278	165279	165280	245565

The ALPHA2 series



ALPHA2 base units

The ALPHA2 brings the benefits of the ALPHA closer to the functionality of a Micro PLC. A program capacity of 200 functions and 38 function blocks including mathematical operations, PWM,1 KHz high speed counter and SMS text messaging, open up new possibilities in all areas of building and industrial automation.

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
Integrated inputs/outputs	6/4	6/4	8/6	8/6	15/9	15/9
Power supply	100–240 V AC	24 V DC	100–240 V AC	24 V DC	100–240 V AC	24 V DC
Order information Art. no.	215070	215071	215072	215073	215074	215075

Digital extension modules

There are 4 different extension modules available for the ALPHA2, which allow the controller to be extended through additional inputs or outputs. The modules are inserted directly into the ALPHA2 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.

Specifications	AL2-4EX-A2	AL2-4EX	AL2-4EYR	AL2-4EYT
Inputs	4	4	—	—
Input voltage	220–240 V AC	24 V DC (+20 %, -15 %)	—	—
Outputs	—	—	4 (relay)	4 (transistor)
Order information Art. no.	142522	142521	142523	142524

Analog extension modules

The analog extension modules significantly increase the range of applications for the ALPHA2. 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 ALPHA2 and converts a digital input value into a voltage or a current. This module is inserted directly onto the ALPHA2.
- 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).

Specifications		AL2-2DA	AL2-2PT-ADP	AL2-2TC-ADP
Analog inputs		—	2	2
Connectable temperature sensors		—	Pt100 sensor Temp. coefficient 3.850 ppm/°C (IEC 751)	Thermocouple (K type), isolated type (IEC 584-1 1977, IEC 584-2 1982)
Compensated range		—	-50–200 °C	-50–450 °C
Analog outputs		2	—	—
Analog output range	voltage	0–10 V DC (5 kΩ–1 MΩ)	—	—
	current	4–20 mA (max. 500 Ω)	—	—
Order information Art. no.		151235	151238	151239

For detailed information, please refer to the family catalogues.

Human Machine Interfaces

HMI control units for interaction between operator and machine

The interface between operator and technics

In automatisation technologie the HMI represents the face of the machine and should show all important process and status information to the operator. The control units of the HMI series provide an optimal dialog between operator and machine and they are completely integrated into the philosophy of Mitsubishi FA. Therefore they are the ideal extension for MELSEC PLC systems and other components of Factory Automation.

GOT control units provide a maximum transparency for all system processes and the deep integration into FA products offers a very fast troubleshooting and many other advantages. This reduces down time and raises the added value of the production.

GOTs can be installed directly to the machine while the connection to other FA products is simple and cost-efficient. Without big efforts it is possible to show all relevant information in graphical form to the operator.

Even under heavy duty conditions the HMIs remain operational due to the protective structure IP65 (and higher).

Special features

- Integration with Mitsubishi Electric FA components
- Diagnostic functions
- Alarm handling
- Data logging
- Data base connectivity
- User management
- Recipe mamagement
- Remote access
- WLAN

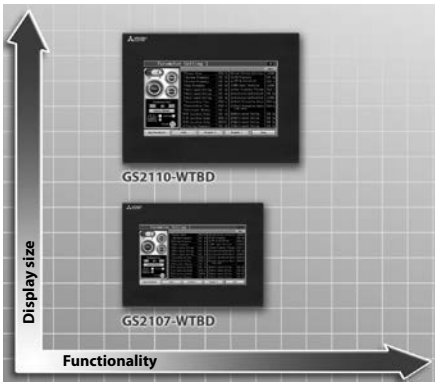
Mitsubishi Electric offers three GOT series: GOT2000, GOT Simple and GOT1000. These series cover the whole range of individual applications from basic model to high end model.

The graphs on this and the following page are showing the full range of the main ranges of HMIs.

GOT2000

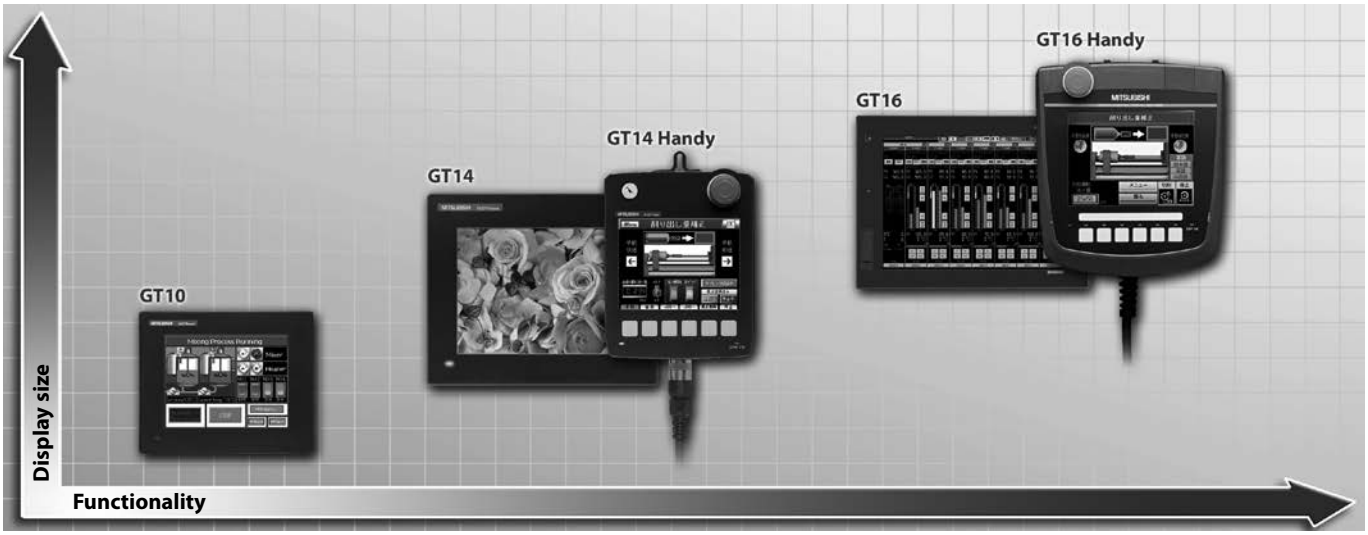
GOT2000 series		GT21 (13 models)	GT23 (4 models)	GT25 (32 models)	GT27 (34 models)
Display	type	TFT, LCD	TFT, LCD	TFT, LCD	TFT, LCD
	dimensions	3.8–7"	8.4–10.4"	5.7–12.1"	5.7–15"
	text	User definable	User definable	User definable	User definable
	graphical resolution (pixels)	320x128 to 800x480	640x480	640x480 to 800x600	640x480 to 1024x768
Power supply		24 V DC	24 V DC/100–240 V AC	24 V DC/100–240 V AC	24 V DC/100–240 V AC
Internal memory capacity		Internal memory (ROM): 15 MB Working memory (RAM): 3 MB	Internal memory (ROM): 9 MB Working memory (RAM): 9 MB	Internal memory (ROM): 32 MB Working memory (RAM): 80 MB	Internal memory (ROM) 57 MB Working memory (RAM): 128 MB
External memory card		1 (SD memory card)	1 (SD memory card)	1 (SD memory card)	1 (SD memory card)
Keyboard		Touch panel	Touch panel	Touch panel	Touch panel
Function keys		Touch keys	Touch keys	Touch keys	Touch keys
Interfaces	serial	RS232, RS422/485	RS232, RS422/RS485	RS232, RS422/RS485	RS232, RS422/RS485
	others	Ethernet (TCP/IP), USB, SD memory card	Ethernet (TCP/IP), USB (front), SD memory card	Ethernet (TCP/IP), USB (front), SD memory card	Ethernet (TCP/IP), USB (front), SD memory card
Network possibilities		Ethernet (TCP/IP), RS232, RS422/485, Modbus®/RTU, CC-Link/ID via G4, CC-Link IE Field Basic	Ethernet (TCP/IP), RS232, RS422/485, CC-Link IE Field Basic	Ethernet (TCP/IP), CC-Link (IE), CC-Link IE Field Basic, Modbus®, RS232, RS422/485, A bus, Q bus, MELSECNET/10/H	Ethernet (TCP/IP), CC-Link (IE), CC-Link IE Field Basic, Modbus®, RS232, RS422/485, A bus, Q bus, MELSECNET/10/H
IP rating (front panel)		IP67	IP67	IP67	IP67

GOT Simple



GOT Simple series		GS21 (2 models)
Display	type	TFT, LCD
	dimensions	7–10"
	text	User definable
	graphical resolution (pixels)	800x480
Power supply		24 V DC
Internal memory capacity		Internal memory (ROM): 9 MB, working memory (RAM): 9 MB
External memory card		1 (SD memory card)
Keyboard		Touch panel
Function keys		Touch keys
Interfaces	serial	RS232, RS422
	others	Ethernet (TCP/IP), SD memory card
Network possibilities		Ethernet (TCP/IP), RS232, RS422
IP rating (front panel)		IP65

GOT1000



GOT1000 series		GT10 (2 models)	GT14 (4 models)	GT16 (20 models)
Display	type	STN	TFT	TFT
	dimensions	5.7"	5.7"	5.7–15"
	text	User definable	User definable	User definable
	graphical resolution (pixels)	320x240	320x240	640x480 to 1024x768
Power supply		24 V DC	24 V DC	24 V DC/100–240 V AC
Internal memory capacity		3.0 MB	9 MB	15 MB (expandable up to 57 MB)
External memory card		—	1 (CompactFlash, 2 GB max.)	1 (CompactFlash, 2 GB max.)
Keyboard		Touch panel	Touch panel	Touch panel
Function keys		Touch keys	Touch keys	Touch keys
Interfaces	serial	RS422/RS232 (depending on model)	RS232, RS422, RS485	RS232
	others	GT104□/GT105□: USB (back side)	USB (Mini-B, front side), USB (Type A, back side)	USB (front), USB host for memory stick (2 GB max.)
Network possibilities		Serial	Ethernet, RS422, RS485, RS232	Ethernet (TCP/IP), CC-Link (IE), RS232, RS422, RS485, A bus, Q bus, MELSECNET/10/H, Modbus®/TCP
IP rating (front panel)		IP67	IP67	IP67

GOT2000 series

Overview

Model	Display unit			Interfaces								Art. no.
	Type	Colour	Dimensions (mm)	RS232	RS232C	RS422	RS485	USB	Ethernet	CF slot	SD memory card	
GT2103-PMBD	TFT	monochrome, 32 grey scales	89x35.6 (3.8")			●	●	●	●		● optional	279809
GT2103-PMBDS	TFT	monochrome, 32 grey scales	89x35.6 (3.8")	●		●	●	●			● optional	279810
GT2103-PMBDS2	TFT	monochrome, 32 grey scales	89x35.6 (3,8")	●				●			● optional	288038
GT2103-PMBLS	TFT	monochrome, 32 grey scales	89x35.6 (3.8")	●		●		●				288039
GT2104-PMBD	TFT	monochrome, 32 grey scales	109.4x36.5 (4.5")			●	●	●	●		●	290600
GT2104-PMBDS	TFT	monochrome, 32 grey scales	109.4x36.5 (4.5")	●		●	●	●			●	290601
GT2104-PMBDS2	TFT	monochrome, 32 grey scales	109.4x36.5 (4.5")	●				●			●	312446
GT2104-PMBLS	TFT	monochrome, 32 grey scales	109.4x36.5 (4.5")					●			●	298333
GT2104-RTBD	TFT	LCD 65536 colours	95x53.8 (4.3")	●		●	●	●	●		●	283924
GT2105-QMBDS	TFT	monochrome, 32 grey scales	115x86 (5,7")	●		●	●	●			●	297852
GT2105-QTBDS	TFT	LCD, 65536 colours	115x86 (5,7")	●		●	●	●			●	297851
GT2107-WTBD	TFT	LCD, 65536 colours	180.5x133.5 (7")	●		●	●	●	●		●	313329
GT2107-WTSD	TFT	LCD, 65536 colours	180.5x133.5 (7")	●		●	●	●	●		●	311489
GT2308-VTBA	TFT	LCD, 65536 colours	170.9x128.2 (8.4")	●		●	●	●	●		●	270570
GT2308-VTBD	TFT	LCD, 65536 colours	170.9x128.2 (8.4")	●		●	●	●	●		●	270571
GT2310-VTBA	TFT	LCD, 65536 colours	211.2x158.4 (10.4")	●		●	●	●	●		●	270568
GT2310-VTBD	TFT	LCD, 65536 colours	211.2x158.4 (10.4")	●		●	●	●	●		●	270569
GT2505-VTBD	TFT	LCD, 65536 colours	153x121 (5.7")	●		●	●	●	●		●	323265
GT2507-WTBD	TFT	LCD, 65536 colours	180.5x133.5 (7")	●		●	●	●	●		●	313826
GT2507-WTSD	TFT	LCD, 65536 colours	180.5x133.5 (7")	●		●	●	●	●		●	313825
GT2508-VTBA-GF	TFT	LCD, 65536 colours	170.9x128.2 (8.4")	●		●	●	●	●		●	293288
GT2508-VTBD-GF	TFT	LCD, 65536 colours	170.9x128.2 (8.4")	●		●	●	●	●		●	293289
GT2508-VTBA	TFT	LCD, 65536 colours	170.9x128.2 (8.4")	●		●	●	●	●		●	276819
GT2508-VTBD	TFT	LCD, 65536 colours	170.9x128.2 (8.4")	●		●	●	●	●		●	276820
GT2508-VTWA-GF	TFT	LCD, 65536 colours	170.9x128.2 (8.4")	●		●	●	●	●		●	293290
GT2508-VTWD-GF	TFT	LCD, 65536 colours	170.9x128.2 (8.4")	●		●	●	●	●		●	293291
GT2508-VTWA	TFT	LCD, 65536 colours	170.9x128.2 (8.4")	●		●	●	●	●		●	276821
GT2508-VTWD	TFT	LCD, 65536 colours	170.9x128.2 (8.4")	●		●	●	●	●		●	276822
GT2510-WXTSD	TFT	LCD, 65536 colours	243.5x185.5(10.1")	●		●	●	●	●		●	313793
GT2510-VTBA-GF	TFT	LCD, 65536 colours	211.2x158.4 (10.4")	●		●	●	●	●		●	293284
GT2510-VTBD-GF	TFT	LCD, 65536 colours	211.2x158.4 (10.4")	●		●	●	●	●		●	293285
GT2510-VTBA	TFT	LCD, 65536 colours	211.2x158.4 (10.4")	●		●	●	●	●		●	276815
GT2510-VTBD	TFT	LCD, 65536 colours	211.2x158.4 (10.4")	●		●	●	●	●		●	276816
GT2510-VTWA-GF	TFT	LCD, 65536 colours	211.2x158.4 (10.4")	●		●	●	●	●		●	293286
GT2510-VTWD-GF	TFT	LCD, 65536 colours	211.2x158.4 (10.4")	●		●	●	●	●		●	293287
GT2510-VTWA	TFT	LCD, 65536 colours	211.2x158.4 (10.4")	●		●	●	●	●		●	276817
GT2510-VTWD	TFT	LCD, 65536 colours	211.2x158.4 (10.4")	●		●	●	●	●		●	276818
GT2512-STBA-GF	TFT	LCD, 65536 colours	246x184.5 (12.1")	●		●	●	●	●		●	293282
GT2512-STBD-GF	TFT	LCD, 65536 colours	246x184.5 (12.1")	●		●	●	●	●		●	293283
GT2512-STBA	TFT	LCD, 65536 colours	246x184.5 (12.1")	●		●	●	●	●		●	281858
GT2512-STBD	TFT	LCD, 65536 colours	246x184.5 (12.1")	●		●	●	●	●		●	281859
GT2508F-VTND	TFT	LCD, 65536 colours	170.9x128.2 (8.4")	●		●	●	●	●		●	296314
GT2508F-VTNA	TFT	LCD, 65536 colours	170.9x128.2 (8.4")	●		●	●	●	●		●	296313
GT2510F-VTND	TFT	LCD, 65536 colours	211.2x158.4 (10.4")	●		●	●	●	●		●	296312
GT2510F-VTNA	TFT	LCD, 65536 colours	211.2x158.4 (10.4")	●		●	●	●	●		●	296311
GT2512F-STND	TFT	LCD, 65536 colours	246x184.5 (12.1")	●		●	●	●	●		●	296310
GT2512F-STNA	TFT	LCD, 65536 colours	246x184.5 (12.1")	●		●	●	●	●		●	296309
GT2705-VTBD-GF	TFT	LCD, 65536 colours	115x86 (5.7")	●		●	●	●	●		●	293281
GT2705-VTBD	TFT	LCD, 65536 colours	115x86 (5.7")	●		●	●	●	●		●	288037
GT2708-STBA-GF	TFT	LCD, 65536 colours	170.9x128.2 (8.4")	●		●	●	●	●		●	293277
GT2708-STBD-GF	TFT	LCD, 65536 colours	170.9x128.2 (8.4")	●		●	●	●	●		●	293278
GT2708-STBA	TFT	LCD, 65536 colours	170.9x128.2 (8.4")	●		●	●	●	●		●	270564
GT2708-STBD	TFT	LCD, 65536 colours	170.9x128.2 (8.4")	●		●	●	●	●		●	270565
GT2708-VTBA-GF	TFT	LCD, 65536 colours	170.9x128.2 (8.4")	●		●	●	●	●		●	293279
GT2708-VTBD-GF	TFT	LCD, 65536 colours	170.9x128.2 (8.4")	●		●	●	●	●		●	293280
GT2708-VTBA	TFT	LCD, 65536 colours	170.9x128.2 (8.4")	●		●	●	●	●		●	270566
GT2708-VTBD	TFT	LCD, 65536 colours	170.9x128.2 (8.4")	●		●	●	●	●		●	270567
GT2710-STBA-GF	TFT	LCD, 65536 colours	211.2x158.4 (10.4")	●		●	●	●	●		●	293271
GT2710-STBD-GF	TFT	LCD, 65536 colours	211.2x158.4 (10.4")	●		●	●	●	●		●	293272
GT2710-STBA	TFT	LCD, 65536 colours	211.2x158.4 (10.4")	●		●	●	●	●		●	270558
GT2710-STBD	TFT	LCD, 65536 colours	211.2x158.4 (10.4")	●		●	●	●	●		●	270559
GT2710-VTBA-GF	TFT	LCD, 65536 colours	211.2x158.4 (10.4")	●		●	●	●	●		●	293273
GT2710-VTBD-GF	TFT	LCD, 65536 colours	211.2x158.4 (10.4")	●		●	●	●	●		●	293274
GT2710-VTWA-GF	TFT	LCD, 65536 colours	211.2x158.4 (10.4")	●		●	●	●	●		●	293275
GT2710-VTWD-GF	TFT	LCD, 65536 colours	211.2x158.4 (10.4")	●		●	●	●	●		●	293276
GT2710-VTBA	TFT	LCD, 65536 colours	211.2x158.4 (10.4")	●		●	●	●	●		●	270560
GT2710-VTBD	TFT	LCD, 65536 colours	211.2x158.4 (10.4")	●		●	●	●	●		●	270561
GT2710-VTWA	TFT	LCD, 65536 colours	211.2x158.4 (10.4")	●		●	●	●	●		●	270562
GT2710-VTWD	TFT	LCD, 65536 colours	211.2x158.4 (10.4")	●		●	●	●	●		●	270563

Model	Display unit			Interfaces								Art. no.
	Type	Colour	Dimensions (mm)	RS232	RS232C	RS422	RS485	USB	Ethernet	CF slot	SD memory card	
GT2712-STBA-GF	TFT	LCD, 65536 colours	246x184.5 (12.1")	●		●	●	●	●		●	293267
GT2712-STWA-GF	TFT	LCD, 65536 colours	246x184.5 (12.1")	●		●	●	●	●		●	293269
GT2712-STBD-GF	TFT	LCD, 65536 colours	246x184.5 (12.1")	●		●	●	●	●		●	293268
GT2712-STWD-GF	TFT	LCD, 65536 colours	246x184.5 (12.1")	●		●	●	●	●		●	293270
GT2712-STBA	TFT	LCD, 65536 colours	246x184.5 (12.1")	●		●	●	●	●		●	270504
GT2712-STWA	TFT	LCD, 65536 colours	246x184.5 (12.1")	●		●	●	●	●		●	270556
GT2712-STBD	TFT	LCD, 65536 colours	246x184.5 (12.1")	●		●	●	●	●		●	270555
GT2712-STWD	TFT	LCD, 65536 colours	246x184.5 (12.1")	●		●	●	●	●		●	270557
GT2715-XTBA-GF	TFT	LCD, 65536 colours	304.1x228.1 (15")	●		●	●	●	●		●	293265
GT2715-XTBD-GF	TFT	LCD, 65536 colours	304.1x228.1 (15")	●		●	●	●	●		●	293266
GT2715-XTBA	TFT	LCD, 65536 colours	304.1x228.1 (15")	●		●	●	●	●		●	275975
GT2715-XTBD	TFT	LCD, 65536 colours	304.1x228.1 (15")	●		●	●	●	●		●	275976

GOT Simple series

Overview

Model	Display unit			Interfaces								Art. no.
	Type	Colour	Dimensions (mm)	RS232	RS232C	RS422	RS485	USB	Ethernet	CF slot	SD memory card	
GS2107-WTBD	TFT	LCD, 65536 colours	154x85.9 (7")	●		●			●		●	273362
GS2110-WTBD	TFT	LCD, 65536 colours	222x132.5 (10")	●		●			●		●	273361

GOT1000 series

Overview

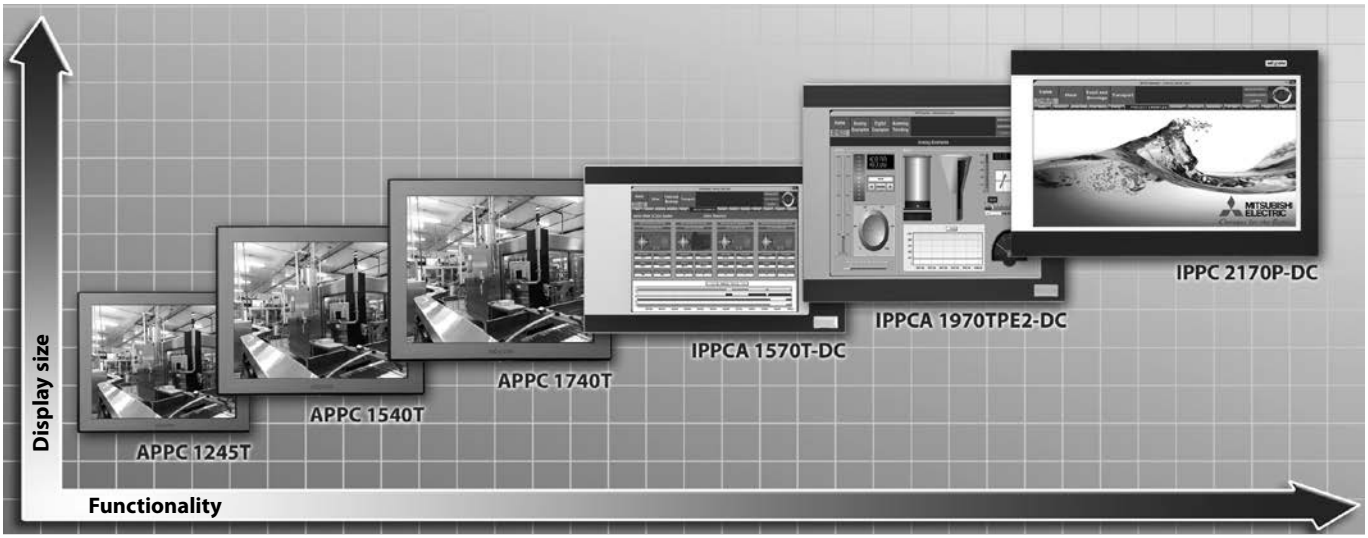
Model	Display unit			Interfaces								Art. no.
	Type	Colour	Dimensions (mm)	RS232	RS232C	RS422	RS485	USB	Ethernet	CF slot	Human sensor	
GT1050-QBBD	STN	blue/white, 16 scales	115x86 (5.7")	●		●		●				218492
GT1055-QSBD	STN	256 colours	115x86 (5.7")	●		●		●				218491
GT1450-QMBDE	TFT	16 grey scales	115x86 (5.7")				●	● (2x)				281252
GT1455-QTBDE	TFT	colour LCD	115x86 (5.7")	●		●		● (2x)				248881
GT1455HS-QTBDE	TFT	colour LCD	115x86 (5.7")	●		●		● (2x)				271384
GT1450HS-QMBDE	TFT	monochrome, 16 grey scales	115x86 (5.7")	●		●		● (2x)				271455
GT1655-VTBD	TFT	65536 colours	115x86 (5.7")	●		●	●	●	●	●		244210
GT1662-VNBA	TFT	16 colours	171x128 (8.4")	●		●	●	●	●	●		237194
GT1662-VNBD	TFT	16 colours	171x128 (8.4")	●		●	●	●	●	●		237194
GT1665HS-VTBD	TFT	65536 colours	132.5x99.4 (6.5")	●		●	●	●	●	●		237248
GT1672-VNBA	TFT	16 colours	211x158 (10.4")	●		●	●	●	●	●		237192
GT1672-VNBD	TFT	16 colours	211x158 (10.4")	●		●	●	●	●	●		237193
GT1675-VNBA	TFT	4096 colours	211x158 (10.4")	●		●	●	●	●	●		237190
GT1675-VNBD	TFT	4096 colours	211x158 (10.4")	●		●	●	●	●	●		237191
GT1665M-STBA	TFT	16 colours	171x128 (8.4")	●		●	●	●	●	●	●	221949
GT1665M-STBD	TFT	16 colours	171x128 (8.4")	●		●	●	●	●	●	●	221950
GT1665M-VTBA	TFT	16 colours	171x128 (8.4")	●		●	●	●	●	●	●	221951
GT1665M-VTBD	TFT	16 colours	171x128 (8.4")	●		●	●	●	●	●	●	221952
GT1675M-STBA	TFT	65536 colours	211x158 (10.4")	●		●	●	●	●	●	●	221945
GT1675M-STBD	TFT	65536 colours	211x158 (10.4")	●		●	●	●	●	●	●	221946
GT1675M-VTBA	TFT	65536 colours	211x158 (10.4")	●		●	●	●	●	●	●	221947
GT1675M-VTBD	TFT	65536 colours	211x158 (10.4")	●		●	●	●	●	●	●	221948
GT1685M-STBA	TFT	65536 colours	249x184.5 (12.1")	●		●	●	●	●	●	●	221360
GT1685M-STBD	TFT	65536 colours	249x184.5 (12.1")	●		●	●	●	●	●	●	221361
GT1695M-XTBA	TFT	65536 colours	304.1x228.1 (15")	●		●	●	●	●	●	●	221358
GT1695M-XTBD	TFT	65536 colours	304.1x228.1 (15")	●		●	●	●	●	●	●	221359

Industrial panel PCs

Nowadays industrial PCs are a inherent part of automation and process control. The series of APPC/IPPC panel PCs provides outstanding computer performance based on energy-saving Intel® processors. Designed for use in demanding applications in industrial environments, these IPCs feature high quality, fast performance, attractive design and brilliantly legible displays. A wide operating and storage temperature range, tough vibration resistance and high IP ratings mean these IPCs can be used in locations users could never consider before.

All IPCs are equipped with a fanless high performance CPU (Intel® Celeron™/Core™ i3) and SSD drives. This reduces the risk of a production stop with all the consequences and cost due to the failure of a moving part.

APPC/IPPC panel PC series



APPC/IPPC series	APPC 1245T-J1900-WL	APPC 1540T-J1900-WL	APPC 1740T-J1900-WL	IPPCA 1570T-DC	IPPCA 1970TPE2-DC	IPPC 2170P-DC
Display	12.1" TFT	15" TFT	17" TFT	15" TFT	19" TFT	21.5" TFT
Resolution pixel	1024x768	1024x768	1280x1024	1024x768	1280x1024	1920x1080
Format	4:3	4:3	4:3	4:3	4:3	16:9
Brightness cd/m²	500	400	350	400	350	300
Touchscreen	Resistive, 5 wire	Resistive, 5 wire	Resistive, 5 wire	Resistive, 5 wire	Resistive, 5 wire	Projective capacitive
Backlight	LED	LED	LED	LED	LED	LED
Colour	Pantone black/ RAL 15 00 front bezel w/ Pantone 400C/RAL 090 80 10 metal style membrane	Pantone black/ RAL 15 00 front bezel w/ Pantone 400C/RAL 090 80 10 metal style membrane	Pantone black/ RAL 15 00 front bezel w/ Pantone 400C/RAL 090 80 10 metal style membrane	Pantone 432C/ RAL 70 24 front bezel Aluminum front bezel with SPPC nickel plated housing	Pantone 432C/ RAL 70 24 front bezel Aluminum front bezel with SPPC nickel plated housing	Pantone 432C/ RAL 70 24 front bezel Aluminum front bezel with SPPC nickel plated housing
Mounting	Panel/wall/stand/VESA	Panel/wall/stand/VESA	Panel/wall/stand/VESA	Panel/wall/stand/VESA 100x100 mm	Panel/wall/stand/VESA 100x100 mm	Panel/wall/stand/VESA 100x100 mm
Processor	Celeron J1900 2.42 GHz	Celeron J1900 2.42 GHz	Celeron J1900 2.42 GHz	Intel® Core™ i3-4350T, 3.1 GHz	Intel® Core™ i5-3610ME, 2.7 GHz	Intel® Core™i3-4350T 3.1 GHz
RAM	4 GB	4 GB	4 GB	4 GB	4 GB	4 GB
Interfaces	2x RS232/422/485, 2x LAN, 1x VGA, 1x Mic, 3x USB, PS2, 4x DIG/IN, 4x DIG/OUT	2x RS232/422/485, 2x LAN, 1x VGA, 1x Mic, 3x USB, PS2	2x RS232/422/485, 2x LAN, 1x VGA, 1x Mic, 3x USB, PS2	1x RS232/422/485, 2xRJ45, 1x DVI-I, 1x DisplayPort, 1x Line-out, 1x Line-in, 1x Mic, 1x Front USB 2.0, 4x Rear USB 3.0, 1x PS2	1x RS232/422/485, 2x RJ45, 1x DVI-I, 1x DisplayPort, 1x Line-out, 1x Line-in, 1x Mic, 1x Front USB 2.0, 4x Rear USB 3.0, 1x PS2	2xRSJ45, 1xDVI-I (DVI-D + DVI-A), 1xDisplayPort, 1xLine-out; 1xLine-in; 1xMic-in, 4xUSB3.0, 1xPS2
Field bus options	—	—	—	Profinet, Profibus, DeviceNet™, EtherNet/IP and EtherCAT	Profinet, Profibus, DeviceNet™, EtherNet/IP and EtherCAT	Profinet, Profibus, DeviceNet™, EtherNet/IP and EtherCAT
Drives	64 GB SSD MLC	64 GB SSD MLC	64 GB SSD MLC	64 GB SSD MLC	64 GB SSD MLC	64 GB SSD MLC
Power supply	12 V–30 V DC	12 V–30 V DC	12 V–30 V DC	9 V–30 V DC	9 V–30 V DC	12 V–30 V DC
Cooling	Fanless	Fanless	Fanless	Fanless	Fanless	Fanless
Protection class	IP65 (front)	IP65 (front)	IP65 (front)	IP66 (front)	IP66 (front)	IP66 (front)
OS	Windows®7 Pro	Windows®7 Pro	Windows®7 Pro	Windows®7 Pro	Windows®7 Pro	Windows®7 Pro
Weight kg	4	5	6.7	9	10.6	11.7
Dimensions (WxHxD) mm	317x243x65.89	384.37x309.95x63.2	410.4x340.4x65.9	477.64x310x95.72	477.64x399.24x99.38	562.4x382.4x105.05
Order information Art. no.	314713	317456	317457	317458	325820	338701

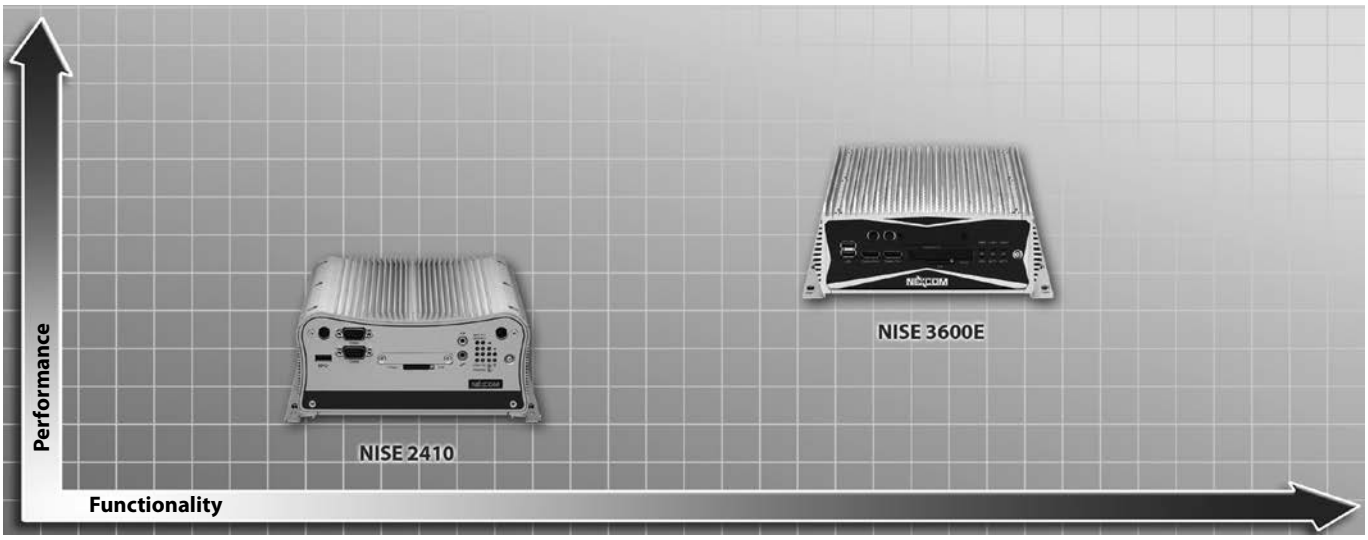
Industrial box PCs and displays

The industrial box PC and display offering is a flexible way to deploy an industrial PC system as it offers the possibility to combine the display and the PC part independently from each other to match the needs of an application perfectly.

All NISE series PCs offer the same technical features as the panel PCs like a fanless high performance CPU (Intel® Atom™/Core™ i5) and SSD drives.

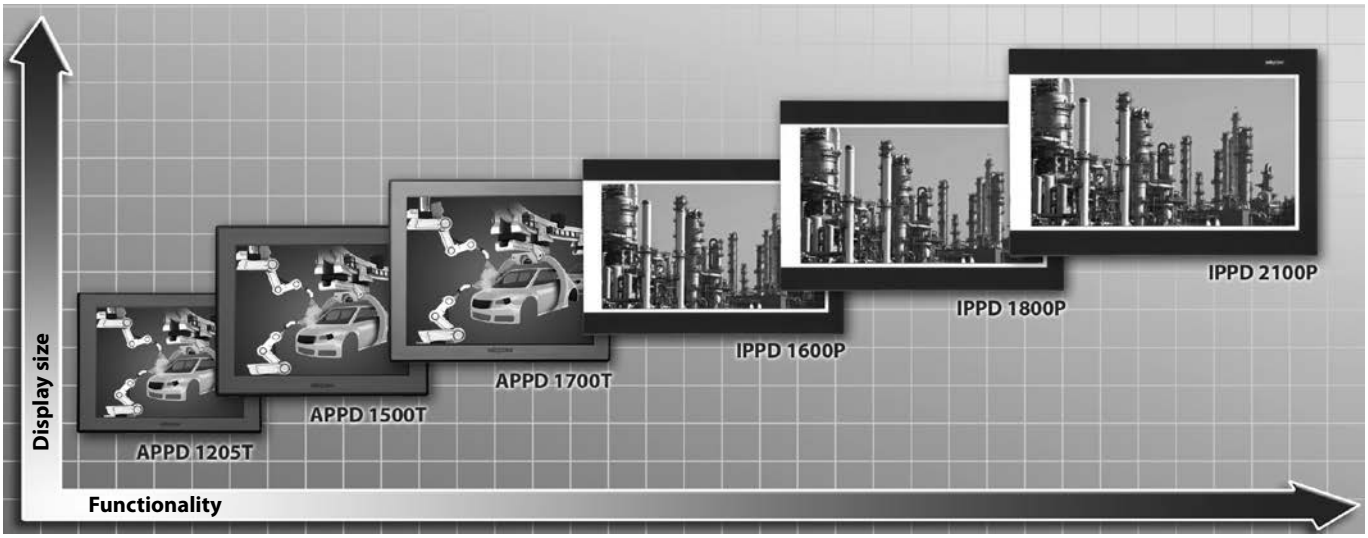
The high resolution APPD/IPPD series displays ranging from 12.1" to 21.5" are built for use in industrial environments. They are available as 4:3 resistive and 16:9 capacitive touchscreens.

NISE box PC series



Specifications		NISE 2410	NISE 3600E
Processor		Intel® Atom™ E3827, 1.75 GHz	Intel® Core™ i5-3610ME, 2.7 GHz
RAM		4 GB	4 GB
Display option		Dual independent display	Three*/dual independent display (*only 3rd generation processor)
I/O interface	front	ATX power on/off switch, 1x power status, 1x HDD access, 1x battery low, 4x programming, LEDs, 4x Tx/Rx LEDs, 2x LAN LEDs, 2x DB9 RS232 for COM1/COM2 1x external CFast socket, 1x SIM card holder, 1x USB 3.0 (900 mA per each), 1x mic-in and 1x line-out, 2x antenna holes for optional Wi-Fi/3.5 G antenna	ATX power on/off switch, HDD access/power status LEDs, 2x USB3.0 ports, 2x display port (can be converted to DVI-D or HDMI via cables), 2x antenna holes, 1x external CFast (optional), 1x SIM card socket
	rear	4x USB 2.0, 1x DVI-I display output, 1x HDMI display output, 1x remote power on/off switch, 2x Intel® I210IT GbE LAN ports; support WoL, Teaming and PXE, 2x DB9 for COM3/COM4, both support RS232/422/485 with auto flow control, 1x 3-pin DC input, support 9–30 V DC input	2x DB9 for COM5/COM6 (RS232), 1x DB44 serial port, 4x COM port (COM1/COM3/COM4: RS232; COM2: RS232/422/485), 2x Intel® GbE LAN ports (Intel® 82574L and 82579LM); support WoL, Teaming and PXE, 2x USB2.0 ports, 2x USB3.0 ports, 1x DB15 VGA port, 1x DVI-D port, 1x line-out and 1x mic-in, 2-pin remote power on/off switch, 9–30 V DC input
	internal	4x GPI and 4 GPO (5V, TTL Type)	—
Drives		64 GB SSD MLC	64 GB SSD MLC
Expansion slot		2x mini-PCIe socket for optional Wi-Fi/4G LTE/3.5 G NISE 2410: one PCI expansion, NISE 2410E: 1x PCIe x4 expansion (only support PCIex1 speed and signal)	1x PCIex4 expansion slot, 1x mini-PCIe socket
Power supply		9–30 V DC	9–30 V DC
Cooling		Fanless	Fanless
OS		Windows®7 Pro	Windows®7 Pro
Dimensions (WxHxD)	mm	195x90x200	215x93x272
Order information	Art. no.	296393	296394

APPD/IPPD display series



APPD/IPPD series		APPD 1205T	APPD 1500T	APPD 1700T	IPPD 1600P	IPPD 1800P	IPPD 2100P
Display		12.1" LCD	15" LCD	17" LCD	15.6" LCD	18.5" LCD	21.5" LCD
Resolution	pixel	1024x768	1024x768	1280x1024	1366x768	1366x768	1920x1080
Format		4:3	4:3	4:3	16:9	16:9	16:9
Brightness	cd/m^2	500	400	380	300	400	300
Touchscreen		Resistive, 5 wire	Resistive, 5 wire	Resistive, 5 wire	10 points P-Cap (projected capacitive)	10 points P-Cap (projected capacitive)	10 points P-Cap (projected capacitive)
Backlight		LED	LED	CCFL	LED	LED	LED
Colour		Pantone black/ plastic front bezel	Pantone black/ plastic front bezel	Pantone black/ plastic front bezel	Pantone 425C/ RAL 70 24 front bezel Aluminum front bezel with metal housing	Pantone 425C/ RAL 70 24 front bezel Aluminum front bezel with metal housing	Pantone 425C/ RAL 70 24 front bezel Aluminum front bezel with metal housing
Mounting		Panel/wall/stand/ VESA 100x100 mm	Panel/wall/stand/ VESA 100x100 mm	Panel/wall/stand/ VESA 100x100 mm	Panel/wall/stand/ VESA 100x100 mm	Panel/wall/stand/ VESA 100x100 mm	Panel/wall/stand/ VESA 100x100 mm
Power supply		12 V–24 V DC	12 V–24 V DC	12 V–24 V DC	12–24 V DC	12–24 V DC	12–24 V DC
Cooling		Fanless	Fanless	Fanless	Fanless	Fanless	Fanless
Protection class		IP65 (front)	IP65 (front)	IP65 (front)	IP66 (front)	IP66 (front)	IP66 (front)
Weight	kg	2.9	3.98	5.3	5.48	6.24	7.87
Dimensions (WxHxD)	mm	317x243x53.5	384.37x309.95x51.2	410.4x340.4x43.7	417.4x312.4x51.75	490.8x320.6x50.65	562.4x382.4x50.85
Order information	Art. no.	296428	296429	296430	296425	296426	296427
Accessory		DVI-D cable, art. no. 296431					

For detailed information, please refer to the family catalogues.

Frequency inverters

Mitsubishi Electric's comprehensive range of frequency inverters offers a wealth of benefits for the user, making it easy to choose the perfect solution for every drive application.

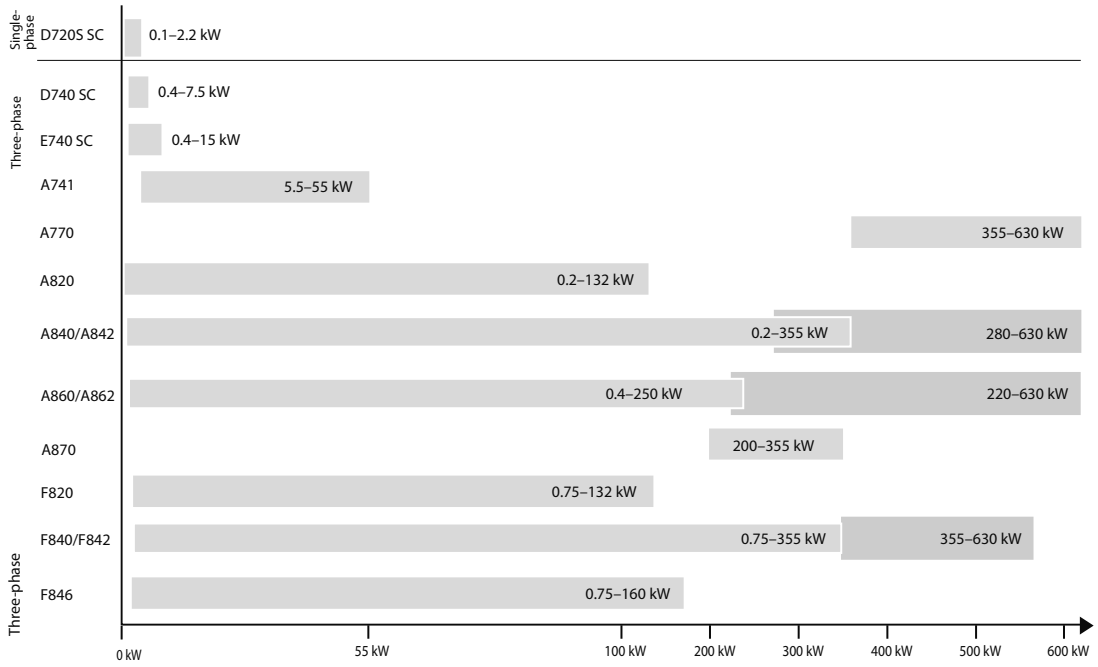
The Mitsubishi Electric frequency inverters support an overload capacity up to 250 % (depend on type) is standard. This means they deliver double the performance of the competing inverters with the same kw rating.

Mitsubishi Electric inverters also have active current limiting. This provides the perfect response characteristics of the current vector system and gives you the confidence you need for demanding drive applications. The system instantly identifies overcurrents and limits them automatically with its fast response, allowing the motor to continue operating normally at the current threshold.

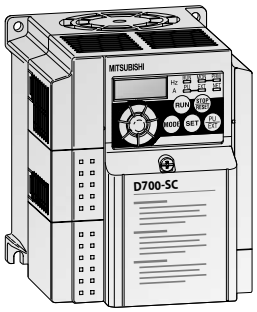
Mitsubishi Electric inverters are also able to communicate with industry standard bus systems, like CC-Link, CC-Link IE Field, Profibus DP/V1, PROFINET, DeviceNet™, EtherNet/IP, EtherCat, CanOpen, LonWorks, RS485/Modbus®/RTU, SSCNET III making it possible to integrate frequency inverters as part of a complete automation system.

Mitsubishi Electric inverters are real energy savers achieving maximum drive capacity utilisation with minimum power consumption. Flux optimisation ensures that the connected motor only gets exactly the amount of magnetic flux required for optimum efficiency. This is particularly important at low speeds as motors are normally using a voltage/frequency control system.

Feature	FR-D700 SC	FR-E700-SC	FR-F800	FR-A741/FR-A770	FR-A800
Rated motor output range	0.1–7.5 kW	0.1–15 kW	0.75–630 kW	FR-A741: 5.5–55 kW FR-A770: 355–560 kW	0.2–630 kW (FR-A842 up to 1300 kW in parallel operation)
Frequency range	0.2–400 Hz	0.2–400 Hz	0.2–590 Hz	0.2–400 Hz	0.2–590 Hz
Power supply	Single-phase, FR-D720S: 200–240 V (-15 %/+10 %) Three-phase, FR-D720: 200–240 V (-15 %/+10 %) FR-D740: 380–480 V (-15 %/+10 %)	Single-phase, 200–240 V (-15 %/+10 %) Three-phase, 380–480 V (-15 %/+10 %)	Three-phase, FR-F820: 200–240 V FR-F840: 380–500 V (-15 %/+10 %)	Three-phase, FR-A741: 380–480 V (-15 %/+10 %) FR-A770: 600–690 V (±10 %)	Three-phase, FR-A820: 200–240 V FR-A840: 380–500 V FR-A860: 525–600 V FR-A870: 525–759 V (available soon) (-15 %/+10 %)
Protection	IP20	IP20	FR-F820: IP20 FR-F840: IP00/IP20 FR-F842: IP00	IP00	FR-A820: IP20 FR-A840: IP00/IP20 FR-A842: IP00 FR-A846: IP55 FR-A860: IP00 FR-A870: IP00/20
Special functions	● V/f control ● Sensorless vector control ● Brake transistor ● Safe Torque Off (STO) according EN 61800-5-2 ● Energy saving control (Optimum excitation control) ● Life time diagnostics ● Dancer control	● V/f control ● Modbus®/TCP, CC-Link IE Field ● Sensorless vector control ● Brake transistor ● Safe Torque Off (STO) according EN 61800-5-2 ● Torque limit ● Ext. brake control ● Flying start ● Remote I/O ● Life time diagnostics	● Energy saving control ● Advanced magnetic flux vector control ● Modbus®/TCP, CC-Link IE Field Basic, BACnet ● Traverse function ● Switch motor to direct mains operation ● Special function for the water and HVAC application ● Regeneration avoidance function ● Flying start ● Life time diagnostics ● Integrated PLC function ● Integrated BACNet ● Pre-charge function	● Torque control ● Positon control ● Real sensorless vector control ● Closed loop vector control ● Integrated PLC function ● Easy gain tuning ● Life time diagnostics ● 4 Quadrant operation with 100 % regeneration of brake energy to grid (only A741)	● Torque control ● Positon control ● Real sensorless vector control ● PM sensorless vector control ● Closed loop vector control ● Safe Torque Off (STO) according EN 61800-5-2 ● Trace function ● Integrated PLC function ● AC & PM motor autotuning ● Anti sway function ● Easy gain tuning ● Life time diagnostics ● Integrated EMC filter
Specifications	Refer to page 69	Refer to page 70	Refer to page 71	Refer to page 76	Refer to page 78



FR-D700 SC series



The FR-D700 SC is a pace-setter in the miniature drive system class with integrated safe torque off function according EN61800-5-2. It features simple and secure operation and a wide range of technology functions.

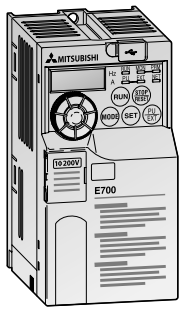
The small dimensions render the FR-D700 SC series frequency inverters ideal for use in restricted spaces. New functions such as intermediate circuit control of the output frequency, the dancer roll control or the traverse function, facilitate universal use in numerous applications such as

- Pumps
- Fans
- Presses
- Conveyor belts
- Industrial washing machines
- Automatic shelf systems

Product line				FR-D720S-□-SC-EC/-E6						FR-D740-□-SC-EC/-E6						
				008	014	025	042	070	100	012	022	036	050	080	120	160
Output	Rated motor capacity ①		kW	0.1	0.2	0.4	0.75	1.5	2.2	0.4 (0.55)	0.75 (1.1)	1.5 (2.2)	2.2 (3)	3.7 (4)	5.5 (7.5)	7.5 (11)
	Rated output capacity ②		kVA	0.3	0.5	1.0	1.6	2.8	3.8	1.2	2.0	3.0	4.6	7.2	9.1	13.0
	Rated current ③		A	0.8	1.4	2.5	4.2	7.0	10.0	1.2 (1.4)	2.2 (2.6)	3.6 (4.3)	5.0 (6.0)	8.0 (9.6)	12.0 (14.4)	16.0 (19.2)
	Overload capacity ④			150 % of rated motor capacity for 60 s; 200 % for 0.5 s												
	Voltage ⑤			3-phase AC, 0 V to power supply voltage												
	Brake transistor			—		Built-in										
	Maximum brake torque	regenerative ⑥		150 %		100 %		50 %	20 %	100 %		50 %	20 %			
		with FR-ABR(H) option		100 % torque/10 % ED												
Input	Power supply voltage			1-phase, 200–240 V AC, -15 %/+10 %						3-phase, 380–480 V AC, -15 %/+10 %						
	Voltage range			170–264 V AC at 50/60 Hz						325–528 V AC at 50/60 Hz						
	Power supply frequency			50/60 Hz ±5 %												
	Rated input capacity ⑦		kVA	0.5	0.9	1.5	2.3	4.0	5.2	1.5	2.5	4.5	5.5	9.5	12	17
Control	Acceleration/deceleration time			0.1 to 3600 s (may be set individually for acceleration and deceleration)												
	Acceleration/deceleration characteristics			Linear or S-pattern acceleration/deceleration mode selectable												
	Braking torque	DC braking		Operating frequency: 0–120 Hz, operating time: 0–10 s, voltage: 0–30 % (externally adjustable)												
Order information	Single painted PCB(EC)		Art. no.	247595	247596	247597	247598	247599	247600	247601	247602	247603	247604	247605	247606	247607
	Double painted PCB (E6)		Art. no.	266097	266098	266099	266100	266101	266102	266103	266104	266135	266136	266137	266138	266139

Remarks:
① The applied motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi Electric 4-pole standard motor. The motor capacity ratings in brackets are for ambient temperatures up to 40 °C.
② The specifications of the rated output capacity are related to a motor voltage of 440 V.
③ The rated output current in brackets are for ambient temperatures up to 40 °C.
④ The % value of the overload capacity indicated is the ratio of the overload current to the inverter's rated output current. For repeated duty, allow time for the inverter and motor to return to or below the temperatures under 100 % load.
⑤ The maximum output voltage does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range. However, the pulse voltage value of the inverter output side voltage remains unchanged at about √2 that of the power supply.
⑥ The braking torque indicated is a short-duration average torque (which varies with motor loss) when the motor alone is decelerated from 60 Hz in the shortest time and is not a continuous regenerative torque. When the motor is decelerated from the frequency higher than the base frequency, the average deceleration torque will reduce. Since the inverter does not contain a brake resistor, use the optional brake resistor FR-ABR-(H) when regenerative energy is large. A brake unit FR-BU2 or BU2 may also be used. (Option brake resisitor cannot be used for FR-D720S-008 SC and 014 SC.)
⑦ The power supply capacity varies with the value of the power supply side inverter impedance (including those of the input choke and cables).

FR-E700 SC series



This frequency inverter has enhanced functions and performance, like an integrated USB interface, an digital dial with display and higher power output at low speed. For communication a wide range of network connections are avalible like BACnet, EtherNet/IP, Modbus®/TCP etc., which can be realized with optioncards. The FR-E700 ENE version is equipped with built in CC-Link IE-Field Basic and Modbus®/TCP. Additional removable optioncards, like 16 bit digital input card (FR-A7AX E kit) or CC-Link card FR-A7NC E kit makes the inverter suitable for versatile applications like:

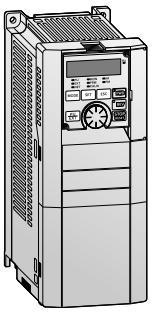
- Textile machines
- Door and gate actuators
- Elevators
- Cranes
- Material handling systems

Product line				FR-E720S-□SC-EC/-E6/-ENE						FR-E740-□SC-EC/-E6/-ENE								
				008	015	030	050	080	110	016	026	040	060	095	120	170	230	300
Output	Rated motor capacity ①		kW	0.1	0.2	0.4	0.75	1.5	2.2	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15
	Rated output capacity ②		kVA	0.3	0.6	1.2	2	3.2	4.4	1.2	2	3	4.6	7.2	9.1	13	17.5	23
	Rated current ③		A	0.8 (0.8)	1.5 (1.4)	3 (2.5)	5 (4.1)	8 (7)	11 (10)	1.6 (1.4)	2.6 (2.2)	4 (3.8)	6 (5.4)	9.5 (8.7)	12	17	23	30
	Overload capacity ④			150 % of rated motor capacity for 60 s; 200 % for 3 s														
	Voltage ⑤			3-phase AC, 0 V to power supply voltage						3-phase, 0 V up to power supply voltage								
	Brake transistor			—		Built-in												
	Maximum brake torque	regenerative ⑥		150 %		100 %		50 %	20 %	100 %		50 %	20 %					
		with FR-ABR(H) option		100 % torque/10 % ED													100 % torque/ 6 % ED	
Input	Power supply voltage			1-phase, 200–240 V AC, -15 %/+10 %						3-phase, 380–480 V AC, -15 %/+10 %								
	Voltage range			170–264 V AC at 50/60 Hz						325–528 V AC at 50/60 Hz								
	Power supply frequency			50/60 Hz ±5 %														
	Rated input capacity ⑦		kVA	0.5	0.9	1.5	2.5	4	5.2	1.5	2.5	4.5	5.5	9.5	12	17	20	28
Control	Acceleration/deceleration time			0.01–360 s, 0.1–3600 s (may be set individually for acceleration and deceleration)														
	Acceleration/deceleration characteristics			Linear or S-pattern acceleration/deceleration mode selectable														
	Braking torque	DC braking		Operating frequency: 0–120 Hz, operating time: 0–10 s, voltage: 0–30 % (externally adjustable)														

Order information	Single painted PCB (EC)	Art. no.	234795	234796	234797	234798	234799	234800	234801	234802	234803	234804	234805	234806	234807	234808	234809
	Single painted PCB (ENE)		316591	316592	316593	316594	316595	316596	316572	316573	316574	316585	316586	316587	316588	316589	316590
	Double painted PCB (E6)	Art. no.	240974	240975	240976	240977	240978	240979	240980	240981	240982	240983	240984	240985	240986	240987	240988

Remarks:
① The applied motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi Electric 4-pole standard motor.
② The specifications of the rated output capacity are related to a motor voltage of 440 V.
③ Setting 2 kHz or more in Pr. 72 PWM frequency selection to perform low acoustic noise operation with the ambient temperature exceeding 40 °C, the rated output current is the value in parenthesis.
④ The % value of the overload capacity indicated is the ratio of the overload current to the inverter's rated output current. For repeated duty, allow time for the inverter and motor to return to or below the temperatures under 100 % load.
⑤ The maximum output voltage does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range. However, the pulse voltage value of the inverter output side voltage remains unchanged at about√2 that of the power supply.
⑥ The braking torque indicated is a short-duration average torque (which varies with motor loss) when the motor alone is decelerated from 60 Hz in the shortest time and is not a continuous regenerative torque. When the motor is decelerated from the frequency higher than the base frequency, the average deceleration torque will reduce. Since the inverter does not contain a brake resistor, use the optional brake resistor FR-ABR-(H) when regenerative energy is large. A brake unit FR-BU2 or BU2 may also be used. (Option brake resisitor cannot be used for FR-E720S-008SC and 015SC.)
⑦ The power supply capacity varies with the value of the power supply side inverter impedance (including those of the input choke and cables).

FR-F800 series



Mitsubishi Electric's FR-F800 series is designed for unparalleled energy saving, optimised speed control, simple start-up, and versatility.

Main applications are to be used with pumps, fans and compressors and HVAC applications. It features many innovative functions that allow for the best compromise between efficiency and accurate control.

Additional features are the integrated standard protocols for CC-Link IE Field Basic (CCLIEFB), SLMP, Modbus®/TCP, BACnet/IP and the Drive to Drive communication.

- Air conditioning systems, e.g. in building management (integrated BACnet/IP)
- Air extraction systems
- Fans and blowers
- Compressors
- Ground water pumps
- Heat pumps
- Drive systems with high idling rates

Product line				FR-F840-□-E2-60													
				00023	00038	00052	00083	00126	00170	00250	00310	00380	00470	00620	00770	00930	01160
Output	Rated motor capacity ① kW	120 % overload capacity (SLD) ⑤		0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55
		150 % overload capacity (LD)		0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55
	Rated current ⑥ A	120 % overload capacity (SLD) ⑤	I rated ⑥	2.3	3.8	5.2	8.3	12.6	17	25	31	38	47	62	77	93	116
			I max. 60	2.5	4.2	5.7	9.1	13.9	18.7	27.5	34.1	41.8	51.7	68.2	84.7	102.3	127.5
			I max. 3 s	2.8	4.6	6.2	10	15.1	20.4	30	37.2	45.6	56.4	74.4	92.4	111.6	139.2
		150 % overload capacity (LD)	I rated ⑥	2.1	3.5	4.8	7.6	11.5	16	23	29	35	43	57	70	85	106
			I max. 60	2.5	4.2	5.8	9.1	13.8	19.2	27.6	34.8	42	51.6	68.4	84	102	127.2
			I max. 3 s	3.1	5.2	7.2	11.4	17.2	24	34.5	43.5	52.5	64.5	85.5	105	127.5	159
	Rated output capacity kVA	SLD ⑤		1.8	2.9	4.0	6.3	9.6	13	19.1	23.6	29.0	35.8	47.3	58.7	70.9	88.4
		LD		1.6	2.7	3.7	5.8	8.8	12.2	17.5	22.1	26.7	32.8	43.4	53.3	64.8	80.8
	Overload capacity ②	SLD		120 % of rated motor capacity for 3 s; 110 % for 1 min. (max. ambient temperature 40 °C) – inverse time characteristics													
		LD		150 % of rated motor capacity for 3 s; 120 % for 1 min. (max. ambient temperature 50 °C) – inverse time characteristics													
	Voltage ③			3-phase AC, 0 V to power supply voltage													
	Frequency range			0.2–590 Hz													
	Carrier frequency			0.7–14.5 kHz (user adjustable)													
Input	Power supply voltage			3-phase, 380–500 V AC, -15 %/+10 %													
	Voltage range			323–550 V AC at 50/60 Hz													
	Power supply frequency			50/60 Hz ±5 %													
	Rated input capacity ④ kVA	SLD ⑤		2.5	4.1	5.9	8.3	12	17	24	31	37	44	59	74	88	107
		LD		2.3	3.7	5.5	7.7	12	17	24	29	34	41	57	68	81	99
Control	External power supply 24 V			23–25.5 V DC, max. 1.4 A													
	Acceleration/deceleration time			0 to 3600 s (can be set individually)													
	Acceleration/deceleration characteristics			Linear or S-form course, user selectable													
	DC injection brake			Operating frequency (0–120 Hz), operating time (0–10 s) and operating voltage (0–30 %) can be set individually. The DC brake can also be activated via the digital input.													
Order information ⑦	Ethernet version		Art. no.	307171	307172	307173	307174	307215	307216	307217	307218	307219	307220	307221	—	—	—
	Input power frame			—	—	—	—	—	—	—	—	—	—	—	307162	307163	307164
	Control card (Ethernet)			—	—	—	—	—	—	—	—	—	—	—	307205	307205	307205

Remarks:
① The performance figures at the rated motor capacity are based on a motor voltage of 440 V AC.
② The overload capacity in % is the ratio of the overload current to the inverter's rated current in the respective operating mode. For repeated duty cycles allow sufficient time for the inverter and the motor to cool below the temperature reached at 100 % load. The waiting periods can be calculated using the r.m.s. current method (I^2xt), which requires knowledge of the duty.
③ The maximum output voltage cannot exceed the power supply voltage. The output voltage can be varied over the entire power supply voltage range.
④ The rated input capacity varies depending on the impedance values on the power supply side of the inverter (including the cables and input choke).
⑤ When the load curve with 120 % overload capacity is selected the maximum permitted ambient temperature is 40 °C.
⑥ When operating with carrier frequencies ≥2.5 kHz this value is reduced automatically as soon as the frequency inverter exceeds 85 % of the rated output current.
⑦ All inverters with circuit board coating (IEC60721-3-3 3C2/3S2)

Product line				FR-F840-□-E2-60									
				01800	02160	02600	03250	03610	04320	04810	05470	06100	06830
Output	Rated motor capacity ① kW	120 % overload capacity (SLD) ⑤		90	110	132	160	185	220	250	280	315	355
		150 % overload capacity (LD)		75	90	110	132	160	185	220	250	280	315
	Rated current ⑤ A	120 % overload capacity (SLD) ⑤	I rated ⑥	180	216	260	325	361	432	481	547	610	683
			I max. 60	198	238	286	357	397	475	529	602	671	751
			I max. 3 s	216	259	312	390	433	518	577	656	732	820
		150 % overload capacity (LD)	I rated ⑥	144	180	216	260	325	361	432	481	547	610
			I max. 60	173	216	259	312	390	433	518	577	656	732
			I max. 3 s	216	270	324	390	487	541	648	721	820	915
	Rated output capacity kVA	SLD ⑤		137	165	198	248	275	329	367	417	465	521
		LD		110	137	165	198	248	275	329	367	417	465
	Overload capacity ②	SLD		120 % of rated motor capacity for 3 s; 110 % for 1 min. (max. ambient temperature 40 °C) – inverse time characteristics									
		LD		150 % of rated motor capacity for 3 s; 120 % for 1 min. (max. ambient temperature 50 °C) – inverse time characteristics									
	Voltage ③			3-phase AC, 380–500 V to power supply voltage									
	Frequency range			0.2–590 Hz									
	Carrier frequency			0.7–6 kHz (user adjustable)									
Input	Power supply voltage			3-phase, 380–500 V AC, -15 %/+10 %									
	Voltage range			323–550 V AC at 50/60 Hz									
	Power supply frequency			50/60 Hz ±5 %									
	Rated input capacity ④ kVA	SLD ⑤		137	165	198	248	275	329	367	417	465	520
		LD		110	137	165	198	248	275	329	367	417	465
Control	External power supply 24 V			23–25.5 V DC, max. 1.4 A									
	Acceleration/deceleration time			0 to 3600 s (can be set individually)									
	Acceleration/deceleration characteristics			Linear or S-form course, user selectable									
	DC injection brake			Operating frequency (0–120 Hz), operating time (0–10 s) and operating voltage (0–30 %) can be set individually. The DC brake can also be activated via the digital input.									
Order information ⑦	Ethernet version			—	—	—	—	—	—	—	—	—	—
	Input power frame		Art. no.	307185	307186	307187	307188	307189	307190	307191	307192	307193	307194
	Control card (Ethernet)			307205	307205	307205	307205	307205	307205	307205	307205	307205	307205

Remarks:

① The performance figures at the rated motor capacity are based on a motor voltage of 440 V AC.

② The overload capacity in % is the ratio of the overload current to the inverter's rated current in the respective operating mode. For repeated duty cycles allow sufficient time for the inverter and the motor to cool below the temperature reached at 100 % load. The waiting periods can be calculated using the r.m.s. current method (I^2xt), which requires knowledge of the duty. When using the FR-F820-01250(30K) or lower and FR-F840-00620(30K) or lower at the surrounding air temperature of 40 °C or less (30 °C or less for the SLD rated inverter), side-by-side installation (0 cm clearance) is available.

③ The maximum output voltage cannot exceed the power supply voltage. The output voltage can be varied over the entire power supply voltage range.

④ The rated input capacity varies depending on the impedance values on the power supply side of the inverter (including the cables and input choke).

⑤ When the load curve with 120 % overload capacity is selected the maximum permitted ambient temperature is 40 °C.

⑥ When operating with carrier frequencies ≥2.5 kHz this value is reduced automatically as soon as the frequency inverter exceeds 85 % of the rated output current.

⑦ All inverters with circuit board coating (IEC60721-3-3 3C2/3S2)

Product line				FR-F842-□-E2-60				
				07700	08660	09620	10940	12120
Output	Rated motor capacity ① kW	120 % overload capacity (SLD) ④		400	450	500	560	630
		150 % overload capacity (LD)		355	400	450	500	560
	Rated current ⑤ A	120 % overload capacity (SLD) ④	I rated ⑤	770	866	962	1094	1212
			I max. 60	847	953	1058	1203	1333
			I max. 3 s	924	1039	1154	1313	1454
		150 % overload capacity (LD)	I rated ⑤	683	770	866	962	1094
			I max. 60	820	924	1039	1154	1313
			I max. 3 s	1024	1155	1299	1443	1641
	Rated output capacity kVA	SLD ④		587	660	733	834	924
		LD		521	587	660	733	834
	Overload capacity ②	SLD		120 % of rated motor capacity for 3 s; 110 % for 1 min. (max. ambient temperature 40 °C) – inverse time characteristics				
		LD		150 % of rated motor capacity for 3 s; 120 % for 1 min. (max. ambient temperature 50 °C) – inverse time characteristics				
	Voltage ③			3-phase AC, 380–500 V to power supply voltage				
	Frequency range			0.2–590 Hz				
	Carrier frequency			0.7–6 kHz (user adjustable)				
Input	DC power supply voltage			430–780 V DC				
	Control power supply voltage			1-phase, 380–500 V AC, 50/60 Hz				
	Control power supply range			Frequency ±5 %, voltage ±10 %				
Control	External power supply 24 V			23–25.5 V DC, max. 1.4 A				
	Acceleration/deceleration time			0 to 3600 s (can be set individually)				
	Acceleration/deceleration characteristics			Linear or S-form course, user selectable				
	DC injection brake			Operating frequency (0–120 Hz), operating time (0–10 s) and operating voltage (0–30 %) can be set individually. The DC brake can also be activated via the digital input.				
Order information ⑥	Ethernet version			—	—	—	—	—
	Input power frame		Art. no.	307195	307196	307197	307198	307199
	Control card (Ethernet)			307205	307205	307205	307205	307205

Remarks:
① The performance figures at the rated motor capacity are based on a motor voltage of 440 V AC.
② The overload capacity in % is the ratio of the overload current to the inverter's rated current in the respective operating mode. For repeated duty cycles allow sufficient time for the inverter and the motor to cool below the temperature reached at 100 % load. The waiting periods can be calculated using the r.m.s. current method (I^2xt), which requires knowledge of the duty.
③ The maximum output voltage cannot exceed the power supply voltage. The output voltage can be varied over the entire power supply voltage range.
④ When the load curve with 120 % overload capacity is selected the maximum permitted ambient temperature is 30 °C.
⑤ When operating with carrier frequencies ≥2.5 kHz this value is reduced automatically as soon as the frequency inverter exceeds 85 % of the rated output current.
⑥ All inverters with circuit board coating (IEC60721-3-3 3C2/3S2)

Product line				FR-F846-□-E2-60L2									
				00023	00038	00052	00083	000126	00170	00250	00310	00380	00470
Output	Rated motor capacity ①	kW	150 % overload capacity (LD)	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22
	Rated current	A	150 % overload capacity (LD)	2.1	3.5	4.8	7.6	11.5	16	23	29	35	43
	Overload capacity ②		LD	120 % of rated motor capacity for 60 s; 150 % for 3 s (max. ambient temperature 50 °C)									
	Voltage ③			3-phase, 380–500 V to power supply voltage									
	Frequency range		Hz	0.2–590									
	Control method			V/f; advanced magnetic flux vector, real sensorless vector (RSV), closed loop vector, PM sensorless vector control									
	Maximum brake torque		regenerative	10 % torque/continuous									
Input	Power supply voltage			3-phase, 380–500 V AC, -15 %/+10 %									
	Voltage range			323–550 V AC at 50/60 Hz (low voltage level adjustable by parameter)									
	Power supply frequency			50/60 Hz ±5 %									
	Rated input current ④	A	LD	2.1	3.5	4.8	7.6	11.5	16	23	29	35	43
	Power supply capacity ⑤	kVA	LD	1.6	2.7	3.7	5.8	9	12	18	22	27	33
Control	External power supply 24 V			23–25.5 V DC, max. 1.4 A									
	Acceleration/deceleration time			0–3600 s (can be set individually), linear or S-pattern acceleration/deceleration mode, backlash measures acceleration/deceleration can be selected.									
	Acceleration/deceleration characteristics			Linear or S-form course, user selectable									
	DC injection brake			Operating frequency (0–120 Hz), operating time (0–10 s) and operating voltage (0–30 %) can be set individually. The DC brake can also be activated via the digital input.									
Order information ⑥			Art. no.	318057	318058	318059	318060	318061	318062	318063	318064	318065	318066

Product line				FR-F846-□-E2-60L2								
				00620	00770	00930	01160	01800	02160	02600	03250	03610
Output	Rated motor capacity ①	kW	150 % overload capacity (LD)	30	37	45	55	75	90	110	132	160
	Rated current	A	150 % overload capacity (LD)	57	70	85	106	144	180	216	260	325
	Overload capacity ②		LD	120 % of rated motor capacity for 60 s; 150 % for 3 s (max. ambient temperature 50 °C)								
	Voltage ③			3-phase, 380–500 V to power supply voltage								
	Frequency range		Hz	0,2–590								
	Control method			V/f; advanced magnetic flux vector, real sensorless vector (RSV), closed loop vector, PM sensorless vector control								
	Maximum brake torque		regenerative	10 % torque/continuous								
Power supply	Power supply voltage			3-phase, 380–500 V AC, -15 %/+10 %								
	Voltage range			323–550 V AC at 50/60 Hz (low voltage level adjustable by parameter)								
	Power supply frequency			50/60 Hz ±5 %								
	Rated input current ④	A	LD	57	70	85	106	144	180	216	260	325
	Power supply capacity ⑤	kVA	LD	43	53	65	81	110	137	165	198	248
Control	External power supply 24 V			23–25.5 V DC, max. 1.4 A								
	Acceleration/deceleration time			0–3600 s (can be set individually), linear or S-pattern acceleration/deceleration mode, backlash measures acceleration/deceleration can be selected.								
	Acceleration/deceleration characteristics			Linear or S-form course, user selectable								
	DC injection brake			Operating frequency (0–120 Hz), operating time (0–10 s) and operating voltage (0–30 %) can be set individually. The DC brake can also be activated via the digital input.								
Order information ⑥			Art. no.	318067	318068	318069	318070	318071	318072	318073	318074	318075

Remarks:
① The applied motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi Electric 4-pole standard motor. The 200 % overload capacity (ND) is the factory default setting.
② The % value of the overload capacity indicates the ratio of the overload current to the inverter's rated output current. For repeated duty, allow time for the inverter and motor to return to or below the temperatures under 100 % load. The waiting periods can be calculated using the r.m.s. current method (I^2xt), which requires knowledge of the duty.
③ The maximum output voltage does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range. However, the pulse voltage value of the inverter output side voltage remains unchanged at about √2 that of the power supply.
④ The rated input capacity varies depending on the impedance values on the power supply side of the inverter (including the cables and input choke).
⑤ The power supply capacity is the value at the rated output current. It varies by the impedance at the power supply side (including those of the input choke and cables).
⑥ All inverters with circuit board coating (IEC60721-3-3 3C2/3S2)

Product line				FR-F820-□-3-N6								
				00046	00077	00105	00167	00250	00340	00490	00630	00770
Output	Rated motor capacity ①	kW	120 % overload capacity (SLD) ⑤	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5
			150 % overload capacity (LD)	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5
	Rated current ⑥	A	120 % overload capacity (SLD) ⑤ I rated ⑥	4.6	7.7	10.5	16.7	25.0	34.0	49.0	63.0	77.0
			I max. 60	5.1	8.5	11.5	18.4	27.5	37.4	53.9	69.3	84.7
			I max. 3 s	5.5	9.3	12.6	20.0	30.0	40.8	58.8	75.6	92.4
			150 % overload capacity (LD) I rated ⑥	4.2	7.0	9.6	15.2	23.0	31.0	45.0	58.0	70.5
			I max. 60	5.0	8.4	11.5	18.2	27.6	37.2	54.0	69.6	84.6
			I max. 3 s	6.3	10.5	14.4	22.8	34.5	46.5	67.5	87.0	105.8
	Rated output capacity	kVA	SLD ⑤	1.8	2.9	4.0	6.4	10.0	13.0	19.0	24.0	29.0
			LD	1.6	2.7	3.7	5.8	8.8	12.0	17.0	22.0	27.0
	Overload capacity ②		SLD	120 % of rated motor capacity for 3 s; 110 % for 1 min. (max. ambient temperature 40 °C) – inverse time characteristics								
			LD	150 % of rated motor capacity for 3 s; 120 % for 1 min. (max. ambient temperature 50 °C) – inverse time characteristics								
	Voltage ③			3-phase AC, 0 V to power supply voltage								
	Frequency range			0.2–590 Hz								
	Carrier frequency			0.7–14.5 kHz (user adjustable)								
Input	Power supply voltage			3-phase, 200–240 V AC, -15 %/+10 %								
	Voltage range			170–264 V AC at 50/60 Hz								
	Power supply frequency			50/60 Hz ±5 %								
	Rated input capacity ④	kVA	SLD ⑤	2.0	3.4	5.0	7.5	12.0	17.0	24.0	31.0	37.0
			LD	1.9	3.2	4.7	7.0	11.0	16.0	22.0	29.0	35.0
Control	External power supply 24 V			23–25.5 V DC, max. 1.4 A								
	Acceleration/deceleration time			0 to 3600 s (can be set individually)								
	Acceleration/deceleration characteristics			Linear or S-form course, user selectable								
	DC injection brake			Operating frequency (0–120 Hz), operating time (0–10 s) and operating voltage (0–30 %) can be set individually. The DC brake can also be activated via the digital input.								
Order information ⑦			Art. no.	289229	289230	289231	289232	289233	289234	289235	289236	289237

Product line				FR-F820-□-3-N6		FR-F820-□-3-60				FR-F820-□-3-U6	
				00930	01250	01540	01870	02330	03160	03800	04750
Output	Rated motor capacity ①	kW	120 % overload capacity (SLD) ⑤	22	30	37	45	55	75	90/110	132
			150 % overload capacity (LD)	22	30	37	45	55	75	90	110
	Rated current ⑥	A	120 % overload capacity (SLD) ⑤ I rated ⑥	93	125	154	187	233	316	380	475
			I max. 60	102.3	137.5	169.4	205.7	256.3	347.6	418	522.5
			I max. 3 s	111.6	150	184.8	246.8	279.6	379.2	456	570
			150 % overload capacity (LD) I rated ⑥	85	114	140	170	212	288	346	432
			I max. 60	102	136.8	168	204	257.4	345.6	415.2	518.4
			I max. 3 s	127.5	171	210	255	318	432	519	648
	Rated output capacity	kVA	SLD ⑤	35	48	59	71	89	120	145	181
			LD	32	43	53	65	81	110	132	165
	Overload capacity ②		SLD	120 % of rated motor capacity for 3 s; 110 % for 1 min. (max. ambient temperature 40 °C) – inverse time characteristics							
			LD	150 % of rated motor capacity for 3 s; 120 % for 1 min. (max. ambient temperature 50 °C) – inverse time characteristics							
	Voltage ③			3-phase AC, 0 V to power supply voltage							
	Frequency range			0.2–590 Hz							
	Carrier frequency			0.7–14.5 kHz (user adjustable)							
Input	Power supply voltage			3-phase, 200–240 V AC, -15 %/+10 %							
	Voltage range			170–264 V AC at 50/60 Hz							
	Power supply frequency			50/60 Hz ±5 %							
	Rated input capacity ④	kVA	SLD ⑤	44	58	70	84	103	120	145	181
			LD	41	53	68	79	97	110	132	165
Control	External power supply 24 V			23–25.5 V DC, max. 1.4 A							
	Acceleration/deceleration time			0 to 3600 s (can be set individually)							
	Acceleration/deceleration characteristics			Linear or S-form course, user selectable							
	DC injection brake			Operating frequency (0–120 Hz), operating time (0–10 s) and operating voltage (0–30 %) can be set individually. The DC brake can also be activated via the digital input.							
Order information ⑦			Art. no.	289238	289239	289240	289241	289242	289243	289255	289256

Remarks:

① The performance figures at the rated motor capacity are based on a motor voltage of 440 V AC.

② The overload capacity in % is the ratio of the overload current to the inverter's rated current in the respective operating mode. For repeated duty cycles allow sufficient time for the inverter and the motor to cool below the temperature reached at 100 % load. The waiting periods can be calculated using the r.m.s. current method (I^2xt), which requires knowledge of the duty.

③ The maximum output voltage cannot exceed the power supply voltage. The output voltage can be varied over the entire power supply voltage range.

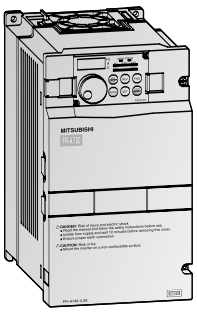
④ The rated input capacity varies depending on the impedance values on the power supply side of the inverter (including the cables and input choke).

⑤ When the load curve with 120 % overload capacity is selected the maximum permitted ambient temperature is 30 °C.

⑥ When operating with carrier frequencies ≥2.5 kHz this value is reduced automatically as soon as the frequency inverter exceeds 85 % of the rated output current.

⑦ All inverters with circuit board coating (IEC60721-3-3 3C2/3S2)

FR-A770 series



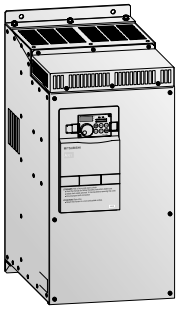
The frequency inverter FR-A770 is the first choice for operation under rough environmental conditions like waste water treatment, mining, oil industry or shipping. It was especially designed for industrial networks with 690 V power supply.

- The functionality of the FR-A770 is based on the series FR-A740-EC.
- Power supply voltage 690 V
- Rated motor capacity of 355 kW and 630 kW
- Overload capacity of 150 % for 60 sec
- Integrated PLC function
- Standard interfaces USB, RS485 and Modbus®/RTU
- Compatible to standard networks like CC-Link, CC-Link IE Field, Profibus DP, Profinet, EtherNet/IP, DeviceNet™ and LonWorks
- Plug and play integration into motion systems

Product line				FR-A770-□-K-79	
				355/400K	560/630K
Output	Rated motor capacity ①	150 % overload capacity		355/400	560/630
	Rated current A	150 % overload capacity	I rated	401 (344) ②	611 (545) ②
			I max. 60 s	602 (516)	917 (818)
	Rated output capacity kVA			479 (411)	730 (651)
	Overload capacity			150 % of rated motor capacity for 60 s	
	Frequency range			0.2–400 Hz	
	Modulation control			PPM control with 2 kHz carrier frequency	
Input	Power supply voltage			3-phase, 600–690 V AC, ±10 %	
	Voltage range			540–759 V AC at 50/60 Hz	
	Power supply frequency			50/60 Hz ±5 %	
	Rated input capacity kVA			463	730
Control	Acceleration/deceleration time			0; 0.1–3600 s (can be set individually)	
	Acceleration/deceleration characteristics			Linear or S-form course, user selectable	
	DC injection brake			Operating frequency (0–120 Hz), operating time (0–10 s) and operating voltage (0–30 %) can be set individually. The DC brake can also be activated via the digital input.	
Order information Art. no.				268859	268860

Remarks:
① Motor capacity derating is required when input voltage is below 660 V.
② When operating the vector control using a motor with encoder and a plug-in option FR-A7AP/FR-A7AL, the related output current is the value in parentheses and maximum surrounding air temperature reduces to 40 °C.
The following functions are not available: power failure-time deceleration-to-stop function, DC feeding, regenerative function, soft PWM operation selection.

FR-A741 high-end inverters with integrated power regeneration function



The FR-A741 is the latest addition to the high-performance FR-A700 series and sets new standards with an integrated power regeneration function that also improves braking performance.

Featuring a large number of innovative technologies, this compact frequency inverter delivers exceptional performance and is ideal for hoist drives and high-powered machines with torque that can be used for regenerative braking.

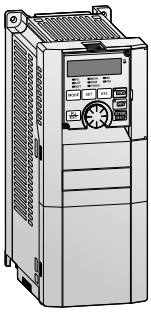
Compared to a frequency inverter with standard braking technology it offers decisive advantages:

- 100 % braking energy infeed
- No braking resistor required
- No external braking chopper required
- Up to 40 % less installation space, depending on the output capacity
- Integrated AC reactor
- Integrated PLC function
- PM auto tuning

Product line			FR-A741-□									
			5.5K	7.5K	11K	15K	18.5K	22K	30K	37K	45K	55K
Output	Rated motor capacity ①	kW 200 % overload capacity (ND)	5.5	7.5	11	15	18.5	22	30	37	45	55
	Rated current ③	A 200 % overload capacity (ND)	12	17	23	31	38	44	57	71	86	110
	Rated output capacity ②	kVA	9.1	13	17.5	23.6	29	32.8	43.4	54	65	84
	Overload capacity ③		150 % of rated motor capacity for 60 s; 200 % for 3 s (max. ambient temperature 50 °C)									
	Voltage ④		3-phase AC, 0 V to power supply voltage									
	Frequency range	Hz	0.2–400									
	Regenerative braking torque		100 % continuous/150 % for 60 s									
Input	Power supply voltage		3-phase, 380–480 V AC, -15 %/+10 %									
	Voltage range		323–528 V AC at 50/60 Hz									
	Power supply frequency		50/60 Hz ±5 %									
	Rated input capacity ⑤	kVA	12	17	20	28	34	41	52	66	80	100
Control	Acceleration/deceleration time		0; 0.1–3600 s (can be set individually)									
	Acceleration/deceleration characteristics		Linear or S-form course, user selectable									
	DC injection brake		Operating frequency (0–120 Hz), operating time (0–10 s) and operating voltage (0–30 %) can be set individually. The DC brake can also be activated via the digital input.									
Order information		Art. no.	216905	216906	216907	216908	216909	217397	216910	216911	216912	216913

Remarks:
① The rated motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi Electric 4-pole standard motor.
② The rated output capacity indicated assumes that the output voltage is 440 V.
③ The % value of the overload capacity indicates the ratio of the overload current to the inverter's rated output current.
For repeated duty, allow time for the inverter and motor to return to or below the temperatures under 100 % load.
④ The maximum output voltage does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range.
However, the pulse voltage value of the inverter output side voltage remains unchanged at about √2 that of the power supply.
⑤ The power supply capacity varies with the value of the power supply side inverter impedance (including those of the input choke and cables).

FR-A800 series



The FR-A800 frequency inverters combine innovative functions and reliable technology with maximum power, economy and flexibility.

The FR-A800 is the appropriate inverter for demanding drive tasks with requirements for high torque and excellent frequency precision and for positioning applications.

For applications under special environmental conditions, there is also a dust- and water-proof type available with protective structure IP55.

The wide range of functionality, like programmable PLC function, the outstanding drive features and the possibility of controlling IM and PM motors makes the inverter suitable for versatile applications like:

- Conveyor technology
- Chemical machines
- Winding machines
- Printing machines
- Cranes and lifting gear
- High-bay warehousing systems
- Extruders
- Centrifuges
- Machine tools

Product line				FR-A840-□-E2-60													
				00023	00038	00052	00083	00126	00170	00250	00310	00380	00470	00620	00770	00930	01160
Output	Rated motor capacity ① kW	120 % overload capacity (SLD)		0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55
		150 % overload capacity (LD)		0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55
		200 % overload capacity (ND)		0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45
		250 % overload capacity (HD)		0.2	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37
	Rated current A	120 % overload capacity (SLD)	I rated	2.3	3.8	5.2	8.3	12.6	17	25	31	38	47	62	77	93	116
			I max. 60 s	2.1	4.2	5.7	9.1	13.9	18.7	27.5	34.1	41.8	51.7	68.2	84.7	102.3	127.6
			I max. 3 s	2.8	4.6	6.2	10.0	15.1	20.4	30.0	37.2	45.6	56.4	74.4	92.4	111.6	139.2
		150 % overload capacity (LD)	I rated	2.1	3.5	4.8	7.6	11.5	16	23	29	35	43	57	70	85	106
			I max. 60 s	2.5	4.2	5.8	9.1	13.8	19.2	27.6	34.8	42.0	51.6	68.4	84.0	102.0	127.2
			I max. 3 s	3.2	5.3	7.2	11.4	17.3	24.0	34.5	43.5	52.5	64.5	85.5	105.0	127.5	159.0
		200 % overload capacity (ND)	I rated	1.5	2.5	4	6	9	12	17	23	31	38	44	57	71	86
			I max. 60 s	2.3	3.8	6.0	9.0	13.5	18.0	25.5	34.5	46.5	57.0	66.0	85.5	106.5	129.0
			I max. 3 s	3.0	5.0	8.0	12.0	18.0	24.0	34.0	46.0	62.0	76.0	88.0	114.0	142.0	172.0
		250 % overload capacity (HD)	I rated	0.8	1.5	2.5	4	6	9	12	17	23	31	38	44	57	71
			I max. 60 s	1.6	3.0	5.0	8.0	12.0	18.0	24.0	34.0	46.0	62.0	76.0	88.0	114.0	142.0
			I max. 3 s	2.0	3.8	6.3	10.0	15.0	22.5	30.0	42.5	57.5	77.5	95.0	110.0	142.5	177.5
	Overload capacity ②	SLD		110 % of rated motor capacity for 60 s; 120 % for 3 s (max. ambient temperature 40 °C) – inverse time characteristics													
		LD		120 % of rated motor capacity for 60 s; 150 % for 3 s (max. ambient temperature 50 °C) – inverse time characteristics													
		ND		150 % of rated motor capacity for 60 s; 200 % for 3 s (max. ambient temperature 50 °C) – inverse time characteristics													
		HD		200 % of rated motor capacity for 60 s; 250 % for 3 s (max. ambient temperature 50 °C) – inverse time characteristics													
	Voltage ③			3-phase AC, 380–500 V to power supply voltage													
	Frequency range			0.2–590 Hz													
	Control method			V/f; advanced magnetic flux vector, real sensorless vector (RSV), closed loop vector, PM sensorless vector control													
	Brake transistor 100 % ED			Built-in													
	Maximum brake torque	regenerative		100 % torque/2 % ED with built-in brake resistor							20 % torque/continuous						
		with FR-ABR option ⑥		100 % torque/10 %ED							100 % torque/6 %ED				—		
	Minimum brake resistance values ⑤		Ω	371	236	190	130	83	66	45	34	34	21	21	13.5	13.5	13.5
Input	Power supply voltage			3-phase, 380–500 V AC, -15 %/+10 %													
	Voltage range			323–550 V AC at 50/60 Hz (Undervoltage level is selectable by parameter.)													
	Power supply frequency			50/60 Hz ±5 %													
	Rated input current ⑦ A	SLD		3.2	5.4	7.8	10.9	16.4	22.5	31.7	40.3	48.2	58.4	76.8	97.6	115	141
		LD		3	4.9	7.3	10.1	15.1	22.3	31	38.2	44.9	53.9	75.1	89.7	106	130
		ND		2.3	3.7	6.2	8.3	12.3	17.4	22.5	31	40.3	48.2	56.5	75.1	91	108
		HD		1.4	2.3	3.7	6.2	8.3	12.3	17.4	22.5	31	40.3	48.2	56.5	75.1	91
	Power supply capacity ④ kVA	SLD		2.5	4.1	5.9	8.3	12	17	24	31	37	44	59	74	88	107
		LD		2.3	3.7	5.5	7.7	12	17	24	29	34	41	57	68	81	99
		ND		1.7	2.8	4.7	6.3	9.4	13	17	24	31	37	43	57	69	83
		HD		1.1	1.7	2.8	4.7	6.3	9.4	13	17	24	31	37	43	57	69
Control	External power supply 24 V			23–25.5 V DC, max. 1.4 A													
	Acceleration/deceleration time			0–3600 s (can be set individually), linear or S-pattern acceleration/deceleration mode, backlash measures acceleration/deceleration can be selected.													
	Acceleration/deceleration characteristics			Linear or S-form course, user selectable													
	DC injection brake			Operating frequency (0–120 Hz), operating time (0–10 s) and operating voltage (0–30 %) can be set individually. The DC brake can also be activated via the digital input.													

Order information															
	Ethernet version		297566	297567	297568	297569	297570	297571	297572	297573	297574	297575	297576	—	—	—
	Input power frame	Art. no.	—	—	—	—	—	—	—	—	—	—	—	307162	307163	307164
	Control card (Ethernet)		—	—	—	—	—	—	—	—	—	—	—	307202	307202	307202

Remarks:
Explanation for ① to ⑦ see next page.

Product line				FR-A840-□-E2-60									
				01800	02160	02600	03250	03610	04320	04810	05470	06100	06830
Output	Rated motor capacity ① kW	120 % overload capacity (SLD)		75/90	110	132	160	185	220	250	280	315	355
		150 % overload capacity (LD)		75	90	110	132	160	185	220	250	280	315
		200 % overload capacity (ND)		55	75	90	110	132	160	185	220	250	280
		250 % overload capacity (HD)		45	55	75	90	110	132	160	185	220	250
	Rated current A	120 % overload capacity (SLD)	I rated	180	216	260	325	361	432	481	547	610	683
			I max. 60 s	198	238	286	358	397	475	529	602	671	751
			I max. 3 s	216	259	312	390	433	518	577	656	732	820
		150 % overload capacity (LD)	I rated	144	180	216	260	325	361	432	481	547	610
			I max. 60 s	173	216	259	312	390	433	518	577	656	732
			I max. 3 s	216	270	324	390	488	542	648	722	821	915
		200 % overload capacity (ND)	I rated	110	144	180	216	260	325	361	432	481	547
			I max. 60 s	165	216	270	324	390	488	542	648	722	821
			I max. 3 s	220	288	360	432	520	650	722	864	962	1094
		250 % overload capacity (HD)	I rated	86	110	144	180	216	260	325	361	432	481
			I max. 60 s	172	220	288	360	432	520	650	722	864	962
			I max. 3 s	215	275	360	450	540	650	813	903	1080	1203
	Overload capacity ②	SLD		110 % of rated motor capacity for 60 s; 120 % for 3 s (max. ambient temperature 40 °C) – inverse time characteristics									
		LD		120 % of rated motor capacity for 60 s; 150 % for 3 s (max. ambient temperature 50 °C) – inverse time characteristics									
		ND		150 % of rated motor capacity for 60 s; 200 % for 3 s (max. ambient temperature 50 °C) – inverse time characteristics									
		HD		200 % of rated motor capacity for 60 s; 250 % for 3 s (max. ambient temperature 50 °C) – inverse time characteristics									
	Voltage ③			3-phase AC, 380–500 V to power supply voltage									
	Frequency range			0.2–590 Hz									
	Control method			V/f; advanced magnetic flux vector, real sensorless vector (RSV), closed loop vector, PM sensorless vector control									
	Brake transistor 100 % ED			Built-in	FR-BU2/BU-UFS (option)								
	Maximum brake torque ⑤	regenerative		20 % torque/ continuous	10 % torque/continuous								
		with FR-ABR option ⑥		—	—								
	Minimum brake resistance values ⑤		Ω	13.5	—								
Input	Power supply voltage			3-phase, 380–500 V AC, -15 %/+10 %									
	Voltage range			323–550 V AC at 50/60 Hz (Undervoltage level is selectable by parameter.)									
	Power supply frequency			50/60 Hz ±5 %									
	Rated input current ⑦ kVA	SLD		180	216	260	325	361	432	481	547	610	683
		LD		144	180	216	260	325	361	432	481	547	610
		ND		134	144	180	216	260	325	361	432	481	547
		HD		108	110	144	180	216	260	325	361	432	481
	Power supply capacity ④ kVA	SLD		137	165	198	248	275	329	367	417	465	521
		LD		110	137	165	198	248	275	329	367	417	465
		ND		102	110	137	165	198	248	275	329	367	417
		HD		83	84	110	137	165	198	248	275	329	367
Control	External power supply 24 V			23–25.5 V DC, max. 1.4 A									
	Acceleration/deceleration time			0–3600 s (can be set individually), linear or S-pattern acceleration/deceleration mode, backlash measures acceleration/deceleration can be selected.									
	Acceleration/deceleration characteristics			Linear or S-form course, user selectable									
	DC injection brake			Operating frequency (0–120 Hz), operating time (0–10 s) and operating voltage (0–30 %) can be set individually. The DC brake can also be activated via the digital input.									

Order information ⑧	Ethernet version			—	—	—	—	—	—	—	—	—	—
	Input power frame		Art. no.	307185	307186	307187	307188	307189	307190	307191	307192	307193	307194
	Control card (Ethernet)			307202	307203	307203	307203	307203	307203	307203	307203	307203	307203

Remarks:

① The applied motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi Electric 4-pole standard motor. The 200 % overload capacity (ND) is the factory default setting.

② The % value of the overload capacity indicates the ratio of the overload current to the inverter's rated output current. For repeated duty, allow time for the inverter and motor to return to or below the temperatures under 100 % load. The waiting periods can be calculated using the r.m.s. current method (I^2xt), which requires knowledge of the duty.

③ The maximum output voltage does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range. However, the pulse voltage value of the inverter output side voltage remains unchanged at about √2 that of the power supply.

④ The rated input capacity varies depending on the impedance values on the power supply side of the inverter (including the cables and input choke).

⑤ Value for the ND rating

⑥ The braking capability of the inverter can be improved with a optional brake resistor. Please do not use resistor values below the given minimum values.

⑦ The rated input current indicates a value at a rated output voltage. The impedance at the power supply side (including those of the input choke and cables) affects the rated input current.

⑧ All inverters with circuit board coating (IEC60721-3-3 3C2/3S2)

Product line				FR-A842-□-E2-60				
				07700	08660	09620	10940	12120
Output	Rated motor capacity ① kW	120 % overload capacity (SLD)		400	450	500	560	630
		150 % overload capacity (LD)		355	400	450	500	560
		200 % overload capacity (ND)		315	355	400	450	500
		250 % overload capacity (HD)		280	315	355	400	450
	Rated current A	120 % overload capacity (SLD)	I rated	770	866	962	1094	1212
			I max. 60 s	847	952	1058	1203	1333
			I max. 3 s	924	1039	1154	1314	1454
		150 % overload capacity (LD)	I rated	683	770	866	962	1094
			I max. 60 s	820	924	1039	1154	1314
			I max. 3 s	1024	1155	1299	1443	1641
		200 % overload capacity (ND)	I rated	610	683	770	866	962
			I max. 60 s	915	1024	1155	1299	1443
			I max. 3 s	1220	1366	1540	1732	1924
		250 % overload capacity (HD)	I rated	547	610	683	770	866
			I max. 60 s	1094	1220	1366	1540	1732
			I max. 3 s	1367	1525	1707	1925	2165
	Rated output capacity ② kVA	SLD		587	660	733	834	924
		LD		521	587	660	733	834
		ND		465	521	587	660	733
		HD		417	465	521	587	660
	Overload capacity ③	SLD		110 % of rated motor capacity for 60 s; 120 % for 3 s (max. ambient temperature 40 °C) – inverse time characteristics				
		LD		120 % of rated motor capacity for 60 s; 150 % for 3 s (max. ambient temperature 50 °C) – inverse time characteristics				
		ND		150 % of rated motor capacity for 60 s; 200 % for 3 s (max. ambient temperature 50 °C) – inverse time characteristics				
		HD		200 % of rated motor capacity for 60 s; 250 % for 3 s (max. ambient temperature 50 °C) – inverse time characteristics				
	Voltage ④			3-phase AC, 380–500 V to power supply voltage				
	Frequency range			0.2–590 Hz				
	Control method			V/f; advanced magnetic flux vector, real sensorless vector (RSV), closed loop vector, PM sensorless vector control				
	Maximum brake torque		regenerative	10 % torque/continuous				
Input	DC Power supply voltage			430–780 V DC				
	Control power supply voltage			2-phase AC, 380–500 V, 50/60 Hz				
	Control power supply range			Frequency ±5 %, voltage ±10 %				
Control	External power supply 24 V			23–25.5 V DC, max. 1.4 A				
	Acceleration/deceleration time			0–3600 s (can be set individually), linear or S-pattern acceleration/deceleration mode, backlash measures acceleration/deceleration can be selected.				
	Acceleration/deceleration characteristics			Linear or S-form course, user selectable				
	DC injection brake			Operating frequency (0–120 Hz), operating time (0–10 s) and operating voltage (0–30 %) can be set individually. The DC brake can also be activated via the digital input.				

Order information ⑤	Art. no.	Ethernet version		—	—	—	—	—
		Input power frame		307195	307196	307197	307198	307199
		Control card (Ethernet)		307203	307203	307203	307203	307203

Remarks:
① The applied motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi Electric 4-pole standard motor. The 200 % overload capacity (ND) is the factory default setting.
② The rated output capacity indicated assumes that the output voltage is 440 V.
③ The % value of the overload capacity indicates the ratio of the overload current to the inverter's rated output current. For repeated duty, allow time for the inverter and motor to return to or below the temperatures under 100 % load. The waiting periods can be calculated using the r.m.s. current method (I^2xt), which requires knowledge of the duty.
④ The maximum output voltage does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range. However, the pulse voltage value of the inverter output side voltage remains unchanged at about √2 that of the power supply.
⑤ All inverters with circuit board coating (IEC60721-3-3 3C2/3S2)

Product line				FR-A820-□-E1-N6								
				00046	00077	00105	00167	00250	00340	00490	00630	00770
Output	Rated motor capacity ① kW	120 % overload capacity (SLD)		0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5
		150 % overload capacity (LD)		0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.0
		200 % overload capacity (ND)		0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15.0
		250 % overload capacity (HD)		0.2	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11.0
	Rated current A	120 % overload capacity (SLD)	I rated	4.6	7.7	10.5	16.7	25.0	34.0	49.0	63.0	77.0
			I max. 60 s	5.1	8.5	11.5	18.4	27.5	37.4	53.9	69.3	84.7
			I max. 3 s	5.5	9.3	12.6	20.0	30.0	40.8	58.8	75.6	92.4
		150 % overload capacity (LD)	I rated	4.2	7.0	9.6	15.2	23.0	31.0	45.0	58.0	70.5
			I max. 60 s	5.0	8.4	11.5	18.2	27.6	37.2	54.0	69.6	84.6
			I max. 3 s	6.3	10.5	14.4	22.8	34.5	46.5	67.5	87.0	105.8
		200 % overload capacity (ND)	I rated	3.0	5.0	8.0	11.0	17.5	24.0	33.0	46.0	61.0
			I max. 60 s	4.5	7.5	12.0	16.5	26.3	36.0	49.5	69.0	91.5
			I max. 3 s	6.0	10.0	16.0	22.0	35.0	48.0	66.0	92.0	122.0
		250 % overload capacity (HD)	I rated	1.5	3.0	5.0	8.0	11.0	17.5	24.0	33.0	46.0
			I max. 60 s	3	6.0	10.0	16.0	22.0	35.0	48.0	66.0	92.0
			I max. 3 s	3.8	7.5	12.5	20.0	27.5	43.8	60.0	82.5	115.0
	Rated output capacity ② kVA	SLD		1.8	2.9	4.0	6.4	10.0	13.0	19.0	24.0	29.0
		LD		1.6	2.7	3.7	5.8	8.8	12.0	17.0	22.0	27.0
		ND		1.1	1.9	3.0	4.2	6.7	9.1	13.0	18.0	23.0
		HD		0.6	1.1	1.9	3.0	4.2	6.7	9.1	13.0	18.0
	Overload capacity ③	SLD		110 % of rated motor capacity for 60 s; 120 % for 3 s (max. ambient temperature 40 °C) – inverse time characteristics								
		LD		120 % of rated motor capacity for 60 s; 150 % for 3 s (max. ambient temperature 50 °C) – inverse time characteristics								
		ND		150 % of rated motor capacity for 60 s; 200 % for 3 s (max. ambient temperature 50 °C) – inverse time characteristics								
		HD		200 % of rated motor capacity for 60 s; 250 % for 3 s (max. ambient temperature 50 °C) – inverse time characteristics								
	Voltage ④			3-phase AC, 200–240 V to power supply voltage								
	Frequency range			0.2–590 Hz								
	Control method			V/f; advanced magnetic flux vector, real sensorless vector (RSV), closed loop vector, PM sensorless vector control								
	Brake transistor 100 % ED			Built-in								
	Maximum brake torque ⑨	regenerative		150 % torque/3 % ED ⑤			100 % torque/3 % ED ⑤		100 % torque/2 % ED ⑤		20 % torque/continuous	
		with FR-ABR option ⑥		100 % ED								
Input	Power supply voltage			3-phase, 200–240 V AC, -15 %/+10 %								
	Voltage range			170–264 V AC at 50/60 Hz								
	Power supply frequency			50/60 Hz ±5 %								
	Rated input capacity ⑦ kVA	SLD		2.0	3.4	5.0	7.5	12.0	17.0	24.0	31.0	37.0
		LD		1.9	3.2	4.7	7.0	11.0	16.0	22.0	29.0	35.0
		ND		1.5	2.4	4.0	5.4	8.6	13.0	17.0	23.0	30.0
		HD		0.9	1.5	2.4	4.0	5.4	8.6	13.0	17.0	23.0
Control	External power supply 24 V			23–25.5 V DC, max. 1.4 A								
	Acceleration/deceleration time			0–3600 s (can be set individually), linear or S-pattern acceleration/deceleration mode, backlash measures acceleration/deceleration can be selected.								
	Acceleration/deceleration characteristics			Linear or S-form course, user selectable								
	DC injection brake			Operating frequency (0–120 Hz), operating time (0–10 s) and operating voltage (0–30 %) can be set individually. The DC brake can also be activated via the digital input.								
Order information ⑧			Art. no.	297613	297614	297615	297616	297617	297618	297619	297620	297621

Remarks:
① The applied motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi Electric 4-pole standard motor. The 200 % overload capacity (ND) is the factory default setting.
② The rated output capacity indicated assumes that the output voltage is 220 V.
③ The % value of the overload capacity indicates the ratio of the overload current to the inverter's rated output current. For repeated duty, allow time for the inverter and motor to return to or below the temperatures under 100 % load. The waiting periods can be calculated using the r.m.s. current method (I^2xt), which requires knowledge of the duty.
④ The maximum output voltage does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range. However, the pulse voltage value of the inverter output side voltage remains unchanged at about $\sqrt{2}$ that of the power supply.
⑤ Value by the built-in brake resistor.
⑥ The braking capability of the inverter can be improved with a optional brake resistor. Please do not use resistor values below the given minimum values.
⑦ The rated input capacity varies depending on the impedance values on the power supply side of the inverter (including the cables and input choke).
⑧ All inverters with circuit board coating (IEC60721-3-3 3C2/3S2)
⑨ Value for the ND rating.

Product line				FR-A820-□-E1-N6		FR-A820-□-E1-60				FR-A820-□-E1-U6	
				00930	01250	01540	01870	02330	03160	03800	04750
Output	Rated motor capacity ① kW	120 % overload capacity (SLD)		22	30	37	45	55	75	90/110	132
		150 % overload capacity (LD)		22	30	37	45	55	75	90	110
		200 % overload capacity (ND)		18.5	22	30	37	45	55	75	90
		250 % overload capacity (HD)		15	18.5	22	30	37	45	55	75
	Rated current A	120 % overload capacity (SLD)	I rated	93	125	154	187	233	316	380	475
			I max. 60 s	102.3	137.5	169.4	205.7	256.3	347.6	418	522.5
			I max. 3 s	111.6	150	184.8	246.8	279.6	379.2	456	570
		150 % overload capacity (LD)	I rated	85	114	140	170	212	288	346	432
			I max. 60 s	102	136.8	168	204	257.4	345.6	415.2	518.4
			I max. 3 s	127.5	171	210	255	318	432	519	648
		200 % overload capacity (ND)	I rated	76	90	115	145	175	215	288	346
			I max. 60 s	114	135	172.5	217.5	262.5	322.5	432	519
			I max. 3 s	152	180	230	290	350	430	576	692
		250 % overload capacity (HD)	I rated	61	76	90	115	145	175	215	288
			I max. 60 s	122	152	180	230	290	350	430	576
			I max. 3 s	152.5	190	225	287.5	362.5	437.5	537.5	720
	Rated output capacity ② kVA	SLD		35	48	59	71	89	120	145	181
		LD		32	43	53	65	81	110	132	165
		ND		29	34	44	55	67	82	110	132
		HD		23	29	34	44	55	67	82	110
	Overload capacity ③	SLD		110 % of rated motor capacity for 60 s; 120 % for 3 s (max. ambient temperature 40 °C) – inverse time characteristics							
		LD		120 % of rated motor capacity for 60 s; 150 % for 3 s (max. ambient temperature 50 °C) – inverse time characteristics							
		ND		150 % of rated motor capacity for 60 s; 200 % for 3 s (max. ambient temperature 50 °C) – inverse time characteristics							
		HD		200 % of rated motor capacity for 60 s; 250 % for 3 s (max. ambient temperature 50 °C) – inverse time characteristics							
	Voltage ④			3-phase AC, 200–240 V to power supply voltage							
	Frequency range			0.2–590 Hz							
	Control method			V/f; advanced magnetic flux vector, real sensorless vector (RSV), closed loop vector, PM sensorless vector control							
	Brake transistor 100 % ED			Built-in						—	
	Maximum brake torque ⑧	regenerative		20 % torque/continuous						10 % torque/continuous	
		with FR-ABR option ⑤		100 % ED		—					
Input	Power supply voltage			3-phase, 200–240 V AC, -15 %/+10 %							
	Voltage range			170–264 V AC at 50/60 Hz							
	Power supply frequency			50/60 Hz ±5 %							
	Rated input capacity ⑥ kVA	SLD		44	58	70	84	103	120	145	181
		LD		41	53	68	79	97	110	132	165
		ND		37	43	57	69	82	101	110	132
		HD		30	37	43	57	69	82	82	110
Control	External power supply 24 V			23–25.5 V DC, max. 1.4 A							
	Acceleration/deceleration time			0–3600 s (can be set individually), linear or S-pattern acceleration/deceleration mode, backlash measures acceleration/deceleration can be selected.							
	Acceleration/deceleration characteristics			Linear or S-form course, user selectable							
	DC injection brake			Operating frequency (0–120 Hz), operating time (0–10 s) and operating voltage (0–30 %) can be set individually. The DC brake can also be activated via the digital input.							
Order information ⑦			Art. no.	284532	284533	284760	284761	284762	284763	284764	284775

Remarks:
① The applied motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi Electric 4-pole standard motor. The 200 % overload capacity (ND) is the factory default setting.
② The rated output capacity indicated assumes that the output voltage is 220 V.
③ The % value of the overload capacity indicates the ratio of the overload current to the inverter's rated output current. For repeated duty, allow time for the inverter and motor to return to or below the temperatures under 100 % load. The waiting periods can be calculated using the r.m.s. current method (I^2xt), which requires knowledge of the duty.
④ The maximum output voltage does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range. However, the pulse voltage value of the inverter output side voltage remains unchanged at about √2 that of the power supply.
⑤ The braking capability of the inverter can be improved with a optional brake resistor. Please do not use resistor values below the given minimum values.
⑥ The rated input capacity varies depending on the impedance values on the power supply side of the inverter (including the cables and input choke).
⑦ All inverters with circuit board coating (IEC60721-3-3 3C2/3S2)
⑧ Value for the ND rating.

Product line				FR-A860-□-1-N6					
				00027	00061	00090	00170	00320	00450
Output	Rated motor capacity ① kW	120 % overload capacity (SLD)		1.5	3.7	5.5	11	18.5	30
		150 % overload capacity (LD)		1.5	3.7	5.5	11	18.5	30
		200 % overload capacity (ND)		0.75	2.2	3.7	7.5	15	22
		250 % overload capacity (HD)		0.4	1.5	2.2	5.5	11	18.5
	Rated current ② A	120 % overload capacity (SLD)	I rated	2.7	6.1	9	14.4	27.2	45
			I max. 60 s	2.97	6.71	9.9	15.84	29.92	49.5
			I max. 3 s	3.24	7.32	10.8	17.28	32.64	54
		150 % overload capacity (LD)	I rated	2.5	5.6	8.2	16	27	41
			I max. 60 s	3	6.72	9.84	19.2	32.4	49.2
			I max. 3 s	3.75	8.4	12.3	24	40.5	61.5
		200 % overload capacity (ND)	I rated	1.7	4	6.1	12	22	33
			I max. 60 s	2.55	6	9.15	18	33	49.5
			I max. 3 s	3.4	8	12.2	24	44	66
		250 % overload capacity (HD)	I rated	1	2.7	4	9	16	24
			I max. 60 s	2	5.4	8	18	32	48
			I max. 3 s	2,5	6.75	10	22.5	40	60
	Rated output capacity ③ kVA	SLD		2.7	6.1	9	17	32	45
		LD		2.5	5.6	8.2	16	27	41
		ND		1.7	4	6.1	12	22	33
		HD		1	2.7	4	9	16	24
	Overload capacity ④	SLD		110 % of rated motor capacity for 60 s; 120 % for 3 s (max. ambient temperature 40 °C) – inverse time characteristics			110 % of rated motor capacity for 60 s; 120 % for 3 s (max. ambient temperature 30 °C) – inverse time characteristics		
		LD		120 % of rated motor capacity for 60 s; 150 % for 3 s (max. ambient temperature 50 °C) – inverse time characteristics					
		ND		150 % of rated motor capacity for 60 s; 200 % for 3 s (max. ambient temperature 50 °C) – inverse time characteristics					
		HD		200 % of rated motor capacity for 60 s; 250 % for 3 s; 280 % for 0.5 s (max. ambient temperature 50 °C) – inverse time characteristics					
	Voltage ⑤			3-phase AC, 525–600 V to power supply voltage					
	Frequency range			0.2–590 Hz					
	Control method			V/f; advanced magnetic flux vector, real sensorless vector (RSV), closed loop vector, PM sensorless vector control					
	Brake transistor 100 % ED			Built-in					
	Maximum brake torque ⑥	regenerative		20 % torque/continuous					
Input	Power supply voltage			3-phase, 525–600 V AC at 60 Hz					
	Voltage range			472–660 V AC at 60 Hz					
	Power supply frequency			60 Hz ±5 %					
	Rated input capacity ⑦ kVA	SLD		4.7	10.6	15	26.7	42,4	60.6
		LD		4.4	9.8	13.8	25.2	35.8	54.4
		ND		3	7	10.3	18.9	29.2	43.8
		HD		1.8	4.7	6.7	14.2	21.2	31.9
Control	External power supply 24 V			23–25.5 V DC, max. 1.4 A					
	Acceleration/deceleration time			0–3600 s (can be set individually), linear or S-pattern acceleration/deceleration mode, backlash measures acceleration/deceleration can be selected.					
	Acceleration/deceleration characteristics			Linear or S-form course, user selectable					
	DC injection brake			Operating frequency (0–120 Hz), operating time (0–10 s) and operating voltage (0–30 %) can be set individually. The DC brake can also be activated via the digital input.					
Order information			Art. no.	286057	286058	286059	286060	286061	286062

Remarks:
Explanation for ① to ⑦ see next page.

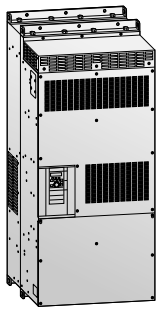
Product line				FR-A860-□-1-60							
				00680	01080	01440	01670	02430	02890	03360	04420
Output	Rated motor capacity ① kW	120 % overload capacity (SLD)		45	75	90	110	132	160	220	250
		150 % overload capacity (LD)		45	75	90	110	132	160	220	250
		200 % overload capacity (ND)		37	55	75	90	110	132	185	220
		250 % overload capacity (HD)		30	45	55	75	90	110	160	185
	Rated current ② A	120 % overload capacity (SLD)	I rated	68	108	144	167	242	288	335	441
			I max. 60 s	74.8	118.8	158.4	183.7	266.2	316.8	368.5	485.1
			I max. 3 s	81.6	129.6	172.8	200.4	290.4	345.6	402	529.2
		150 % overload capacity (LD)	I rated	62	99	131	152	221	254	303	401
			I max. 60 s	74.4	118.8	157.2	182.4	265.2	304.8	363.6	481.2
			I max. 3 s	93	148.5	196.5	228	331.5	381	454.5	601.5
		200 % overload capacity (ND)	I rated	55	84	104	131	152	221	254	303
			I max. 60 s	82.5	126	156	196.5	228	331.5	381	454.5
			I max. 3 s	110	168	208	262	304	442	508	606
		250 % overload capacity (HD)	I rated	41	63	84	104	131	152	202	254
			I max. 60 s	82	126	168	208	262	304	404	508
			I max. 3 s	102.5	157.5	210	260	327.5	380	505	635
	Rated output capacity ③ kVA	SLD		68	108	144	167	242	288	335	441
		LD		62	99	131	152	221	254	303	401
		ND		55	84	104	131	152	221	254	303
		HD		41	63	84	104	131	152	202	254
	Overload capacity ④	SLD		110 % of rated motor capacity for 60 s; 120 % for 3 s (max. ambient temperature 50 °C) – inverse time characteristics							
		LD		120 % of rated motor capacity for 60 s; 150 % for 3 s (max. ambient temperature 40 °C) – inverse time characteristics		120 % of rated motor capacity for 60 s; 150 % for 3 s (max. ambient temperature 50 °C) – inverse time characteristics					
		ND		150 % of rated motor capacity for 60 s; 200 % for 3 s (max. ambient temperature 40 °C) – inverse time characteristics		150 % of rated motor capacity for 60 s; 200 % for 3 s (max. ambient temperature 50 °C) – inverse time characteristics					
		HD		200 % of rated motor capacity for 60 s; 250 % for 3 s; 280 % for 0.5 s (max. ambient temperature 40 °C) – inverse time characteristics							
	Voltage ⑤			3-phase AC, 525–600 V to power supply voltage							
	Frequency range			0.2–590 Hz							
	Control method			V/f; advanced magnetic flux vector, real sensorless vector (RSV), closed loop vector, PM sensorless vector control							
	Brake transistor 100 % ED			Built-in		—					
	Maximum brake torque ⑥	regenerative		20 % torque/continuous							20 % torque/ continuous
Input	Power supply voltage			3-phase, 525–600 V AC at 60 Hz							
	Voltage range			472–660 V AC at 60 Hz							
	Power supply frequency			60 Hz ±5 %							
	Rated input capacity ⑦ A	SLD		86.8	107.6	143	166	245	288	335	440
		LD		79.1	98.6	130	151	220	254	303	400
		ND		70.2	107.6	104	130	151	220	254	303
		HD		52.3	80.7	84	104	130	151	201	254
Control	External power supply 24 V			23–25.5 V DC, max. 1.4 A							
	Acceleration/deceleration time			0–3600 s (can be set individually), linear or S-pattern acceleration/deceleration mode, backlash measures acceleration/deceleration can be selected.							
	Acceleration/deceleration characteristics			Linear or S-form course, user selectable							
	DC injection brake			Operating frequency (0–120 Hz), operating time (0–10 s) and operating voltage (0–30 %) can be set individually. The DC brake can also be activated via the digital input.							
Order information			Art. no.	286063	286064	286065	286066	286067	286068	286069	286070

Remarks:
① The applied motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi Electric 4-pole standard motor. The 200 % overload capacity (ND) is the factory default setting.
② The rated output capacity indicated assumes that the output voltage is 575 V.
③ When an operation is performed with the carrier frequency set to 3 kHz or more, and the inverter output current reaches the value indicated in the parenthesis, the carries frequency is automatically lowered. The motor noise becomes louder accordingly.
④ The % value of the overload capacity indicates the ratio of the overload current to the inverter's rated output current. For repeated duty, allow time for the inverter and motor to return to or below the temperatures under 100 % load. The waiting periods can be calculated using the r.m.s. current method (I^2xt), which requires knowledge of the duty.
⑤ The maximum output voltage does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range. However, the pulse voltage value of the inverter output side voltage remains unchanged at about √2 that of the power supply.
⑥ Value by the built-in brake resistor.
⑦ The rated input capacity varies depending on the impedance values on the power supply side of the inverter (including the cables and input choke).

Product line				FR-A862-□-1-60		
				05450	06470	08500
Output	Rated motor capacity ① kW	120 % overload capacity (SLD)		400	450	630
		150 % overload capacity (LD)		355	400	560
		200 % overload capacity (ND)		280	355	450
		250 % overload capacity (HD)		220	280	400
	Rated current ② A	120 % overload capacity (SLD)	I rated	545	647	850
			I max. 60 s	599.5	711.7	935
			I max. 3 s	654	776.4	1020
		150 % overload capacity (LD)	I rated	496	589	773
			I max. 60 s	595.2	706.8	927.6
			I max. 3 s	744	883.5	1159.5
		200 % overload capacity (ND)	I rated	402	496	663
			I max. 60 s	603	744	994.5
			I max. 3 s	804	992	1326
		250 % overload capacity (HD)	I rated	304	402	589
			I max. 60 s	608	804	1178
			I max. 3 s	760	1005	1472.5
	Rated output capacity ③ kVA	SLD		543	645	847
		LD		494	587	770
		ND		401	494	661
		HD		302	401	578
	Overload capacity ④	SLD		110 % of rated motor capacity for 60 s; 120 % for 3 s (max. ambient temperature 40 °C) – inverse time characteristics		
		LD		120 % of rated motor capacity for 60 s; 150 % for 3 s (max. ambient temperature 50 °C) – inverse time characteristics		
		ND		150 % of rated motor capacity for 60 s; 200 % for 3 s (max. ambient temperature 50 °C) – inverse time characteristics		
		HD		200 % of rated motor capacity for 60 s; 250 % for 3 s; 280 % for 0.5 s (max. ambient temperature 50 °C) – inverse time characteristics		
	Voltage ⑤			3-phase AC, 525–600 V to power supply voltage		
	Frequency range			0.2–590 Hz		
	Control method			V/f; advanced magnetic flux vector, real sensorless vector (RSV), closed loop vector, PM sensorless vector control		
	Maximum brake torque ⑥	regenerative		10 % torque/continuous		
Input	DC power supply voltage			618–933 V DC		
	Control power supply voltage			1-phase, 525–600 V AC, 50/60 Hz		
	Control power supply range			Frequency ±5 %, voltage ±10 %		
Control	External power supply 24 V			23–25.5 V DC, max. 1.4 A		
	Acceleration/deceleration time			0–3600 s (can be set individually), linear or S-pattern acceleration/deceleration mode, backlash measures acceleration/deceleration can be selected.		
	Acceleration/deceleration characteristics			Linear or S-form course, user selectable		
	DC injection brake			Operating frequency (0–120 Hz), operating time (0–10 s) and operating voltage (0–30 %) can be set individually. The DC brake can also be activated via the digital input.		
Order information			Art. no.	286240	286241	286242

Remarks:
Explanation for ① to ⑥ see a page before.

Converter module FR-CC2



The converter module FR-CC2 is a diode converter unit. The FR-CC2-H has to be used together with the FR-A842, the FR-CC2-C together with the FR-A862 inverter unit. The separation of the inverter and the converter module allows flexible design of different systems such as parallel drive and common bus line to reduce cost and to minimize installation space.

At a rated motor capacity of 220 kW and higher the frequency inverter is divided in a converter unit (FR-CC2) and an inverter unit (FR-A842/ FR-A862). Both units are connected via DC bus.

The FR-CC2 supports a 12 pulse connection with additional phase-shifting transformers for reducing low-degree harmonic currents.

Product line			FR-CC2-H□K-60						
			315K	355K	400K	450K	500K	560K	630K
Output	Rated motor capacity	kW	315	355	400	450	500	560	630
	Overload current rating ①		200 % 60 s, 250 % 3 s				150 % 60 s, 200 % 3 s	120 % 60 s, 150 % 3 s	110 % 60 s, 120 % 3 s
	Voltage ②		430–780 V ④						
Input	Power supply voltage		3-phase, 380–500 V AC, -15 %/+10 %						
	Voltage range		323–550 V AC at 50/60 Hz						
	Power supply frequency		50/60 Hz ±5 %						
	Rated input capacity ③	kVA	465	521	587	660	733	833	924
Order information		Art. no.	274507	274508	274509	274510	274511	279637	279638

Product line			FR-CC2-C□K-60		
			355	400	560
Output	Rated motor capacity	kW	355	400	560
	Overload current rating ①	SLD	110 % of rated motor capacity for 60 s; 120 % for 3 s (max. ambient temperature 40 °C) – inverse time characteristics		
		LD	120 % of rated motor capacity for 60 s; 150 % for 3 s (max. ambient temperature 50 °C) – inverse time characteristics		
		ND	150 % of rated motor capacity for 60 s; 200 % for 3 s (max. ambient temperature 50 °C) – inverse time characteristics		
		HD	200 % of rated motor capacity for 60 s; 250 % for 3 s; 280 % for 0.5 s (max. ambient temperature 40 °C) – inverse time characteristics		
	Voltage ②		618–933 V DC⑤		
Input	Power supply voltage		3-phase, 525–600 V AC, -15 %/+10 %		
	Voltage range		323–550 V AC at 50/60 Hz		
	Power supply frequency		60 Hz ±5 %		
	Rated input capacity ③	SLD	543	644	847
		LD	494	587	770
		kVA ND	400	494	660
		HD	303	400	587
Order information		Art. no.	286237	286238	286239

① The % value of the overload current rating indicated is the ratio of the overload current to the inverter's rated output current. For repeated duty, allow time for the converter unit and the inverter to return to or below the temperatures under 100 % load.
② The converter unit output voltage varies according to the input power supply voltage and the load. The maximum point of the voltage waveform at the converter unit output side is approximately the power supply voltage multiplied by √2.
③ The power supply capacity is the value at the rated output current. It varies by the impedance at the power supply side (including those of the input choke and cables).
④ The permissible voltage imbalance ratio is 3 % or less. (Imbalance ratio = (highest voltage between lines – average voltage between three lines)/average voltage between three lines x100)

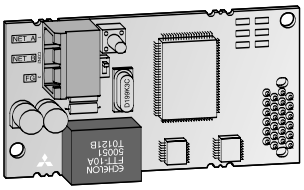
Compatible inverters

The table below shows the inverter models compatible with the FR-CC2 converter units.

Motor capacity [kW] ①	Converter unit FR-CC2-H□	Inverter											
		SLD (superlight duty)			LD (light duty)			ND (normal duty, initial value)			HD (heavy duty)		
		Model FR-A842-□		Rated current [A]	Model FR-A842-□		Rated current [A]	Model FR-A842-□		Rated current [A]	Model FR-A842-□		Rated current [A]
280	315K	—	—	—	—	—	—	—	—	—	315K	07700	547
315	315K	—	—	—	—	—	—	315K	07700	610	355K	08660	610
355	355K	—	—	—	315K	07700	683	355K	08660	683	400K	09620	683
400	400K	315K	07700	770	355K	08660	770	400K	09620	770	450K	10940	770
450	450K	355K	08660	866	400K	09620	866	450K	10940	866	500K	12120	866
500	500K	400K	09620	962	450K	10940	962	500K	12120	962	—	—	—

① The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi Electric 4-pole standard motor.

Internal and external options



A large number of options allows an individual adoption of the inverter to the according task. The options can be installed quickly and easily. Detailed information on installation and functions is included in the manual of the options.

The options can be divided into two major categories:

- Internal options
- External options

Internal options

The internal options comprise input and output extensions as well as communications options supporting the operation of the inverter within a network or connected to a personal computer or PLC.

External options

In addition to the parameter unit that enables interactive operation of the frequency inverter the available external options also include additional EMC noise filters, chokes for improving efficiency and brake units with brake resistors.

Option			Description	FR-D700 SC	FR-E700 SC	FR-F800	FR-A700	FR-A800	FR-HC2
Internal options	Digital input		Input of the frequency setting via BCD or binary code	—	●	●	●	●	—
	Digital output		Selectable standard output signals of the inverter can be output at the open collector.	—	●	●	●	●	—
	Expansion analog output		Selectable additional signals can be output and indicated at the analog output.	—	●	●	●	●	—
	Relay output		Selectable standard output signals of the inverter can be output through relay terminals.	—	●	●	●	●	—
	Orientation control, encoder feedback (PLG), vector and master slave control		These options are used for position control, precise speed control and master/slave control.	—	—	—	●	●	—
	Communications	CC-Link	Integration of a frequency inverter into a CC-Link.	—	●	●	●	●	●
		CC-Link IE Field	Integration of a frequency inverter into a CC-Link IE Field network.	—	—	—	●	●	—
		CC-Link IE Field Basic	Integration of a frequency inverter into a CC-Link IE Field Basic network.	—	—	●	—	●	—
		Modbus®/TCP	Integration of a frequency inverter into a Modbus®/TCP network.	—	●	●	●	●	●
		EtherNet/IP	Integration of a frequency inverter into a EtherNet/IP network.	—	●	●	●	●	●
		EtherCat	Integration of a frequency inverter into a EtherCat network.	—	●	●	●	●	—
		LonWorks	Integration of a frequency inverter into a LonWorks network.	—	●	●	●	●	—
		Profibus DPV1	Integration of a frequency inverter into a Profibus DPV1 network.	—	—	●	—	●	—
		Profibus DP PPO	Integration of a frequency inverter into a Profibus DP PPO network.	—	●	●	●	●	—
		Profinet	Integration of a frequency inverter into a Profinet network.	—	●	●	●	●	●
		DeviceNet™	Integration of a frequency inverter into a DeviceNet™.	—	●	●	●	●	—
		SSCNET III/H	Integration of a frequency inverter into a SSCNET III/H.	—	—	—	●	●	—
		CAN Bus	Integration of a frequency inverter into a CAN Bus network	—	—	●	—	●	—
		RS485 multi-protocol	RS485 multi-protocol interface card	—	—	●	●	—	●

Option			Description	FR-D700 SC	FR-E700 SC	FR-F800	FR-A700	FR-A800
External options	Parameter unit (8 languages)		Interactive parameter unit with LC display.	●	●	●	●	●
	FR-Configurator software		Parameterization and setup software for the Mitsubishi Electric inverter series.	●	●	●	●	●
	EMC noise filter		Noise filter for compliance with EMC directives.	●	●	●	●	●
	Brake unit		For an improvement of the brake capacity. For high inertia loads and active loads. Used in combination with a resistor unit.	●	●	●	●	●
	External high-duty brake resistor		To improve the brake capacity; used in combination with the internal brake transistor.	●	●	—	●	●
	DC choke AC chokes		For increased efficiency, reduction of mains feedback and compensation of voltage fluctuations.	●	●	●	●	●
	Floor standing unit FSU		IP20 physical contact protection in a freely-locatable floor-standing unit. Detailed information on request.	—	—	●	●	●
	Harmonic filter module		Passive harmonic filter to reduce mains pollution	●	●	●	●	●
	Regenerative unit		Regeneration of electrical energy in short-term operation (ED <50 %)	●	●	●	●	●
	Regenerative unit		Regeneration of electrical energy in short-term operation (ED =100 %)	●	●	●	●	●
	Harmonic converter		For power supply and regeneration of electrical energy (ED = 100 %)	●	●	●	●	●
	Communications	Profibus DP	High speed converter for Profibus DP to RS485 inverter protocol	●	●	●	●	●

For detailed information, please refer to the family catalogues.

Servo and motion systems

Mitsubishi Electric offers a variety of servo and motion system products providing solutions for applications covering point-to-point and synchronised systems. Systems can be built using a single axis or multi-axes, for example when using a MELSEC iQ-R motion CPU solution up to 192 axes can be controlled.

Therefore operation is possible by standard pulse train outputs as well as by different networks like SSCNET III/H, CC-Link IE Field, CC-Link IE Field Basic, EtherCAT, PROFINET und EtherNet/IP™.

The servo motors and amplifiers take Mitsubishi Electric Motion Control to new levels of precision with a wide range of motors and a wide range of amplifiers (up to 220 kW).

All MR-JE series motors are fitted with 131,072 pulse-per-revolution encoders, all MR-J4 series motors with 4,194,304 pulse-per-revolution encoders.

All Mitsubishi Electric servo and motion system hardware is complimented by a range of software packages allowing easy programming and set-up of the units.

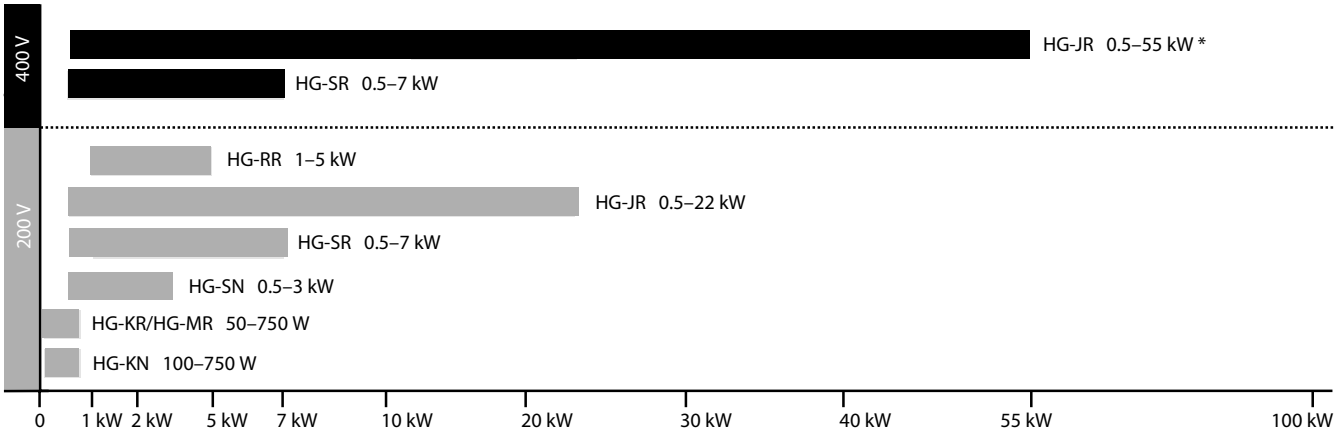
What are the components of a MR-J4 servo system?

Servo motors

Utilising the most advanced concentrated winding techniques and latest technology, these brushless servo motors are among the most compact on the market.

Mitsubishi Electric servo motors are made to high standards and offer a wide range of power, speed and inertia ratings providing a motor for all applications. With a range from 50 W to 55 kW and with a considerable number of motor types like rotary, linear and direct drive servo motors a complete line-up of products can be offered by Mitsubishi Electric.

Also, all motors in the MR-J4 series are fitted with absolute encoders as standard. Therefore, an absolute position system can be created by simply providing power to servo amplifier via a battery. Once this has been done the super capacitor inside the motor and back-up battery allow the servo motor position to be constantly monitored.



* For order information about servo motors higher than 22 kW, please contact your Mitsubishi Electric representative

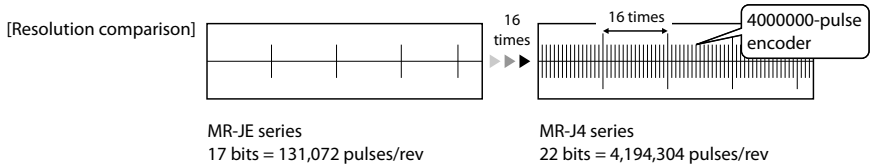
Improving machine performance with high-performance motors

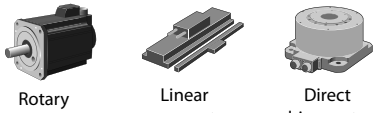
To raise your machine on a high productive level, you need not only powerful servo amplifiers but also high performance servo motors. These motors have to support the high encoder resolution of 22 bits with the MR-J4 series for improved accuracy and speed. Fully closed loop control is supported as standard. A variety of models is available to match various applications.

Rotary servo motors achieve high-accuracy, high-torque output during high speed positioning and smooth rotation with a high resolution encoder and improved processing speed. Linear servo motors support highly accurate tandem synchronous control. Direct drive motors are used for compact and rigid machine and high-torque operations.

For rough environment conditions some motor series are also available with higher protection class like IP65 or IP67.

The MR-J4 series servo amplifiers are able to operate rotary servo motors, linear servo motors, and direct drive motors as standard.





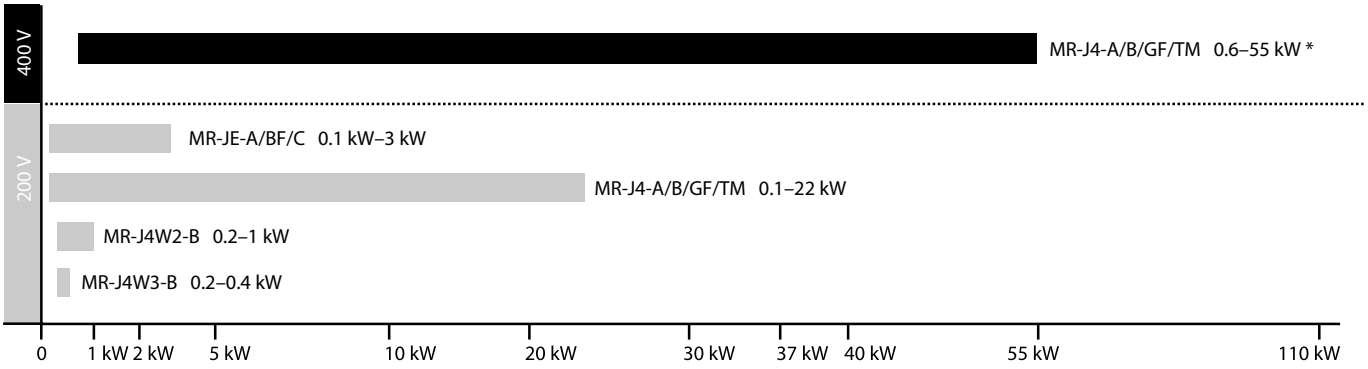
Servo amplifiers

Mitsubishi Electric offers a wide range of servo amplifiers to meet the demands of all types of applications. From standard digital pulse and analogue controlled amplifiers through to dedicated network bus type amplifiers, there is a product for all circumstances.

Real Time Adaptive Tuning (RTAT) is a unique Mitsubishi Electric technology, enabling the servo to deliver maximum dynamic performance, even if the load keeps changing, by automatically tuning online (during operation) to the application.

The digital pulse-train and analogue units of the MR-JE and the MR-J4 series from 100 W to 55 kW ab. The SSCNET III/H bus type amplifiers (type MR-J4-B/MR-JE-BF series) offer the user ease of connectivity, via SSCNET III/H.

Whereby the MR-J4-TM supports Ethernet based open network communication and MR-J4-GF comunicates via CC Link IE Field.



* For order information about servo amplifiers higher than 22 kW, please contact your Mitsubishi Electric representative

Positioning controllers

For the compact, cost effective, FX range of PLCs, the FX2N-10PG unit provides single-axis control with built-in positioning tables, fast external start and an output pulse rate of up to 1 MHz. The module FX3U-20SSC-H is a positioning module for the MR-J4-B series. This module provides a quick and easy, but efficient positoning control system for simpler applications.

For larger and more complex applications the MELSEC iQ F series, MELSEC iQ-R series, MELSEC L series and MELSEC System Q provide numerous positioning and Simple Motion modules (1, 2, 4 and 16 axes).

These are: open-collector output type (LD75P/QD75P/RD77P series), differential output type (LD75D/QD75DN/RD77D series) and SSCNET III bus type (FX3U-20SSC-H), SSCNET III/H bus type (LD77MS/QD77MS).

Using the SSCNET III/H system can provide much improved, easier to use positioning systems, with reduced wiring and better noise immunity. All positioning modules provide functions such as interpolation, speed control and positioning operations, etc. For advanced motion applications like axes synchronisation and CAM control the Simple Motion modules (FX5-□SSC-S/LD77/QD77/RD77) are available.

Additionally the simple motion modules of the MELSEC iQ-R series and MELSEC System Q provide a CC-Link IE Field interface.

Motion Controllers

For specialist applications requiring the highest level of control and precision, the dynamic servo technology provided by the iQ-R motion CPU is combined with the powerful processing power of the MELSEC iQ-R PLC CPU, creating a completely new generation of Motion Controller products.

This fully integrated and flexible system has the capability to control up to 192 axes using SSCNET III/H, which is more than capable for handling any motion application.

Advanced one-touch tuning function

Servo gain adjustment for precise vibration suppression control can be done only by one touch. Machine resonance suppression filter, advanced vibration suppression control II (adjustment for one frequency), and robust filter are adjusted just by turning on this function. The advanced vibration suppression control function enables the machine to operate with high speed at the highest performance.

Advanced vibration suppression control II

The vibration suppression algorithm supports a three-inertia system so that two types of low frequency vibrations are suppressed at the same time. For adjustment the setup software MR Configurator2 is used. This function is effective in suppressing vibration at the end of an arm and in reducing residual vibration in a machine. Droop pulses are reduced to a minimum.

Machine diagnosis function

This function is a powerful monitoring and maintenance support tool. It detects changes of machine parts (ball screw, guide, bearing, belt, etc.) by analyzing machine friction, load moment of inertia, unbalanced torque, and changes in vibration component from the data inside the servo amplifier. Monitoring is done with the setup software MR Configurator2. Timely maintenance of wear parts will be indicated before breakdown.

Multi-axis servo amplifier

2-axis and 3-axis servo amplifiers are available for operating two and three servo motors, respectively. They are designed to cut waste and save on space, wiring, and energy use. The 2-axis servo amplifier MR-J4W2-B requires 26 % less installation space than two units of MR-J4-B, and the 3-axis servo amplifier MR-J4W3-B requires 30 % less installation space than three units of MR-J4-B. Wiring of the 3-axis type is reduced by approx. 50 %, because the three axes use the same connections for main and control circuit power, peripheral equipment, control signal wire, etc. These multi-axis servo amplifiers enable energy-conservative and compact machine design at lower cost. Different types of servo motors including rotary servo motors, linear servo motors, and direct drive motors are freely combined as long as the servo motors are compatible with the servo amplifier.

MR-J4-□A
(General-purpose interface compatible/ Built-in positioning function)

Pulse train and analog input, etc., are provided as a standard for the command interface. The control mode can be switched accordingly for position, speed or torque control.

The MR-J4-A-RJ has an integrated positioning function. A simple positioning system can be configured without a con-troller such as positioning module.

Safety functions according EN IEC 61800-5-2: "Safe Torque Off" (STO) and "Safe Stop" (SS1), "Safe Brake Control" (SBC), "Safely Limited Speed" (SLS), "Safe Speed Monitor" (SSM) with optional safety module MR-D30 and the amplifier type MR-J4-A-RJ.

MR-J4-□TM
(open network compatible)

The MR-J4-TM combines industry leading performance, features and reliability of the MR-J4 series servo system with different open network interfaces like EtherCAT, EtherNet/IP™ and PROFINET. Even if the control system is specified by endcustomer, system manufactures can use Mitsubishi Electric servo technology and benefit of the highly compact, powerful technology.

MR-J4-□B
(SSCNET III/H compatible/Drive safety compatible/Fully closed loop control/ Operation with up to three axes)

Safety functions according EN IEC 61800-5-2: "Safe Torque Off" (STO) and "Safe Stop" (SS1), "Safe Brake Control" (SBC), "Safely Limited Speed" (SLS), "Safe Speed Monitor" (SSM) with optional safety module MR-D30 and the amplifier type MR-J4-B-RJ. Fully closed loop control is also supported.

The MR-J4W2-B servo is designed to drive two servo motors, the MR-J4W3-B to drive three servo motors. Both servo amplifier models are SSCNET III/H compatible.

MR-J4-□GF
(CC-Link IE Field/CC-Link IE Field Basic compatible)

CC-Link IE Field Network is a single network which combines the versatility of Ethernet and highly accurate synchronous operation for Motion control. With the single network, various field devices, such as servo amplifiers, I/O modules, and high-speed counter modules, are connected with no restriction. Beside point-to-point positioning, speed and torque control, advanced motion functions are availible in combination with the Simple Motion Module, like axes synchronisation, CAM and print mark control. The integrated safety function of the MR-J4-GF can be activated by the CC-Link IE Field network without additional wiring at the servo amplifier.

MR-JE-□A
(Multi function interface)

The MR-JE-A has a multi function interface, which is compatible to a maximum command pulse frequency of 4 Mpps. The response of 2.0 kHz reduces the settling time and the cycle time of the machine is considerably shortened. Additionally there are two analog control inputs availible.

MR-JE-□BF
(SSCNET III/H compatible)

The servo amplifiers MR-JE-BF support the SSCNET III/H bus system and can be combined with Simple Motion modules. The module have several motion commands, like mark detection, electrical CAM functions and synchronous control. Up to 16 axes can be combined to a multi-axes system in an easy way. Safety function "Safe Torque Off" (STO) according to EN IEC 61800-5-2: is integrated and "Safe Stop" (SS1) is offered in combination with MR-J3-D05 module.

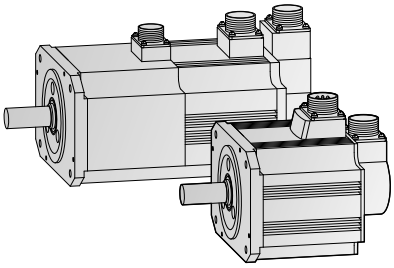
MR-JE-□C
(CC-Link IE Field Basic compatible)

The network operates on the standard Ethernet protocol stack, which can be used together with TCP/IP communications (such as HTTP, FTP). This feature allows CC-Link IE Field Basic compatible network products and Ethernet compatible products to be connected on the same Ethernet communications line, enabling a highly-flexible and cost-effective system. In addition Modbus®/ TCP network is supported for driving the servo from the master station.

Specifications	MR-J4-□A	MR-J4-□B	MR-J4W□-□B	MR-J4-□GF	MR-J4-□TM	MR-JE-□A	MR-JE-□BF	MR-JE-□C
Command interface	Pulse train/Analog/ RS422 multi-drop	SSCNET III/H	SSCNET III/H	CC-Link IE Field (Basic)	PROFINET, EtherCAT, Ethernet/IP	Pulse train/Analog/ RS422	SSCNET III/H	CC-Link IE Field Basic
Control mode	Position/Speed/ Torque	Position/Speed/ Torque/Fully closed loop control	Position/Speed/ Torque/Fully closed loop control	Position/Speed/ Torque/Fully closed	Position/Speed/ Torque/Fully closed	Position/Speed/ Torque	Position/Speed/ Torque	Position/Speed/ Torque
Power specifications	1-phase 200 V AC/ 3-phase 200 V AC/ 3-phase 400 V AC	1-phase 200 V AC/ 3-phase 200 V AC/ 3-phase 400 V AC	1-phase 200 V AC/ 3-phase 200 V AC	1-phase 200 V AC/ 3-phase 200 V AC/ 3-phase 400 V AC	1-phase 200 V AC/ 3-phase 200 V AC/ 3-phase 400 V AC	1-phase 200 V AC/ 3-phase 200 V AC/	1-phase 200 V AC/ 3-phase 200 V AC	1-phase 200 V AC/ 3-phase 200 V AC
Capacity range	100 W to 55 kW	100 W to 55 kW	MR-J4W2-□B: 200 W to 750 W per axis MR-J4W3-B: 200 W to 400 W per axis	100 W to 22 kW	100 W to 22 kW	100 W to 3 kW	100 W to 3 kW	100 W to 3 kW

For order information about servo amplifiers higher than 22 kW, please contact your Mitsubishi Electric representative

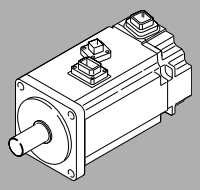
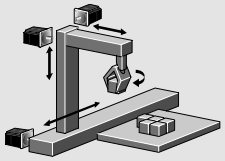
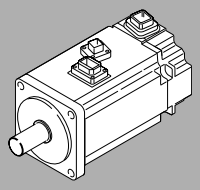
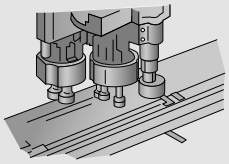
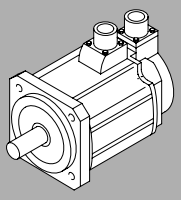
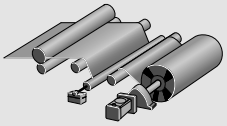
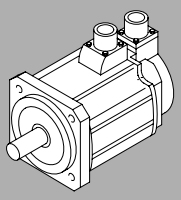
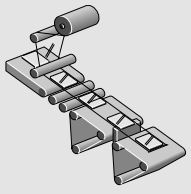
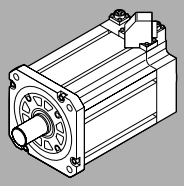
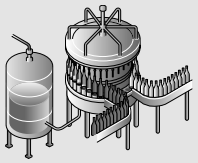
Servo motor features and typical applications



Absolute high-resolution encoder as standard equipment

Inclusion of an absolute position detection system eliminates the need for a homing sequence, approximate DOG and other sensors, helping to reduce time and enhance reliability. With these motors high performance and safety at low speed is ensured.

With Mitsubishi Electric original absolute mode, an absolute system can be configured using conventional I/O even with pulse-train control.

Model designation	Features	Application example	
K 	**Low inertia** Larger motor inertia moment makes this unit well suited for machines with fluctuating load inertia moment or machines with low rigidity such as conveyors.	● Conveyors ● Food preparation machinery ● Printers ● Small loaders and unloaders ● Small robots and component assembly devices ● Small X-Y tables ● Small press feeders	 Handling systems
M 	**Ultra low inertia** Small motor inertia moment makes this unit well suited for high-dynamic positioning operations with extra small cycle times.	● Inserters, mounters, bonders ● Printed board hole openers ● In-circuit testers ● Label printers ● Knitting and embroidery machinery ● Ultra-small robots and robot tips	 Inserters, mounters, bonders
S 	**Medium inertia** Stable control is performed from low to high-speeds, enabling this unit to handle a wide range of applications (e.g. direct connection to ball screw components).	● Conveyor machinery ● Specialised machinery ● Robots ● Loaders and unloaders ● Winders and tension devices ● Turrets ● X-Y tables ● Test devices	 Winders and tension devices
R 	**Low inertia** A compact sized low inertia moment model with medium capacity. Well suited for high-frequency operation.	● Roll feeders ● Loaders and unloaders ● high-frequency conveyor machinery	
J 	**Low inertia (400 V)** A 400 V servo motor for the MELSERVO-J4 series for a power range up to 55 kW with low inertia and high speed. It has a compact size, is equipped with high resolution encoder and is compatible to global standards.	● Food and packaging ● Printing machine ● Pick up robot for injection molding machine ● Palletizing machine ● General machine which require high-speed and high-frequency	 Wrapping machinery

Note: Other types of motors are available on request.

Servo motor specifications and matching amplifiers

Motors for MR-J4 (200 V) series servo amplifiers

Motor series 200 V	Rated speed [r/min]	Maximum rotation speed [r/min]	Rated torque [Nm]	Peak running range [Nm]	Moment of inertia J [x10^{-4} kg m^2]	Rated output capacity [kW]	Servo motor model	Servo motor type		Amplifier pairing MR-J4														Art. no.
								Voltage	Protective structure	10	20	40	60	70	100	200	350	500	700	11K	15K	22K		
HG-MR M	3000	6000	0.16	0.48	0.0162	0.05	HG-MR053	200 V AC	IP65	●														248661
			0.32	0.95	0.0300	0.10	HG-MR13			●														248662
			0.64	1.9	0.0865	0.20	HG-MR23				●													248663
			1.3	3.8	0.142	0.40	HG-MR43					●												248664
			2.4	7.2	0.586	0.75	HG-MR73							●										248665
HG-KR K	3000	6000	0.16	0.56	0.0450	0.05	HG-KR053	200 V AC	IP65	●														248651
			0.32	1.1	0.0777	0.10	HG-KR13			●														248652
			0.64	2.2	0.221	0.20	HG-KR23				●													248653
			1.3	4.5	0.371	0.40	HG-KR43					●												248654
			2.4	8.4	1.26	0.75	HG-KR73							●										248655
HG-SR S	2000	3000	2.4	7.2	7.26	0.50	HG-SR52	200 V AC	IP67				●											248671
			4.8	14.3	11.6	1.00	HG-SR102								●									248672
			7.2	21.5	16.0	1.50	HG-SR152									●								248673
			9.5	28.6	46.8	2.00	HG-SR202									●								248674
			16.7	50.1	78.6	3.50	HG-SR352										●							248675
			23.9	71,6	99.7	5.00	HG-SR502											●						248676
			33.4	100	151	7.00	HG-SR702												●					248677
HG-JR J	3000	6000	1,6	4.8 <6.4> ①	1.52	0.5	HG-JR53	200 V AC	IP67④				●		●②									261539
			2.4	7.2 <9.6> ①	2.09	0.75	HG-JR73							●		●②								261540
			3.2	9.6 <12.7> ①	2.65	1.0	HG-JR103								●	●②								261541
			4.8	14.3 <19.1> ①	3.79	1.5	HG-JR153									●	●②							261542
			6.4	19.1 <25.5> ①	4.92	2.0	HG-JR203									●	●②							261543
			10.5 <11.1> ③	32.0 <44.6> ①	13.2	3.3 <3,5> ③	HG-JR353										●	●②③						261544
			15.9	47.7 <63.7> ①	19.0	5.0	HG-JR503											●	●②					261545
		5000	22.3	66.8	43.3	7.0	HG-JR703												●					261546
			28.6	85.8	55.8	9.0	HG-JR903													●				261547
	1500	3000	70.0	210	220	11	HG-JR11K1M													●				261557
			95.5	286	315	15	HG-JR15K1M														●			261558
		2500	140	420	489	22	HG-JR22K1M															●		261559
HG-RR R	3000	4500	3.2	8.0	1.50	1.0	HG-RR103	200 V AC	IP65							●								262896
			4.8	11.9	1.90	1.5	HG-RR153									●								262897
			6.4	15.9	2.30	2.0	HG-RR203										●							262898
			11.1	27.9	8.30	3.5	HG-RR353											●						262899
			15.9	39.8	12.0	5.0	HG-RR503											●						262900

① The value in angle brackets is applicable when the maximum torque is increased. The maximum torque will be increased by changing the servo amplifier to be combined (see ②).

② This combination of the HG-JR servo motor and the servo amplifier increases the maximum torque from 300 % to 400 % of the rated torque.

③ The value in angle brackets is applicable when the servo motor is used with MR-J4-500B or MR-J4-500A.

④ 22 kW of HG-JR series is rated IP44

Motors for MR-J4 (400 V) series servo amplifiers

Motor series 400 V	Rated speed [r/min]	Maximum rotation speed [r/min]	Rated torque [Nm]	Peak running range [Nm]	Moment of inertia J [x10^{-4} kg m^2]	Rated output capacity [kW]	Servo motor model	Servo motor type: Voltage	Servo motor type: Protective structure	Amplifier pairing MR-J4: 60	100	200	350	500	700	11K	15K	22K	Art. no.
HG-SR S	2000	3000	2.4	7.2	7.26	0.5	HG-SR524	400 V AC	IP67	●									261431
			4.8	14.3	11.6	1.0	HG-SR1024				●								261432
			7.2	21.5	16.0	1.5	HG-SR1524					●							261433
			9.5	28.6	46.8	2.0	HG-SR2024					●							261434
			16.7	50.1	78.6	3.5	HG-SR3524						●						261435
			23.9	71.6	99.7	5.0	HG-SR5024							●					261436
			33.4	100	151	7.0	HG-SR7024								●				261437
HG-JR J	3000	6000	1.6	4.8 <6.4> ①	1.52	0.5	HG-JR534	400 V AC	IP67 ④	●	●②								261445
			2.4	7.2 <9.6> ①	2.09	0.75	HG-JR734				●	●②							261446
			3.2	9.6 <12.7> ①	2.65	1.0	HG-JR1034				●	●②							261447
			4.8	14.3 <19.1> ①	3.79	1.5	HG-JR1534					●	●②						261448
			6.4	19.1 <25.5> ①	4.92	2.0	HG-JR2034					●	●②						261449
			10.5 <11.1> ③	32.0 <44.6> ①	13.2	3.3 <3.5> ③	HG-JR3534						●	●②③					261450
			15.9	47.7 <63.7> ①	19.0	5.0	HG-JR5034							●	●②				261451
		5000	22.3	66.8	43.3	7.0	HG-JR7034								●				261452
			28.6	85.8	55.8	9.0	HG-JR9034									●			261453
	1500	3000	70.0	210	220	11	HG-JR11K1M4									●			261384
			95.5	286	315	15	HG-JR15K1M4										●		261535
		2500	140	420	489	22	HG-JR22K1M4											●	261536

① The value in angle brackets is applicable when the maximum torque is increased. The maximum torque will be increased by changing the servo amplifier to be combined (see ②).

② This combination of the HG-JR servo motor and the servo amplifier increases the maximum torque from 300 % to 400 % of the rated torque.

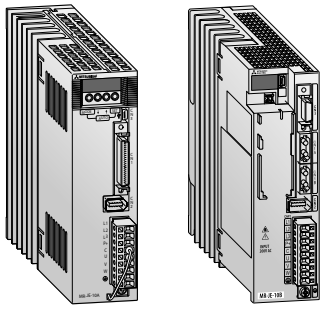
③ The value in angle brackets is applicable when the servo motor is used with MR-J4-500B or MR-J4-500A.

④ 22 kW of HG-JR series is rated IP44

Motors for MR-JE-A/BF/C series servo amplifiers

Motor series 200 V	Rated speed [r/min]	Maximum rotation speed [r/min]	Rated torque [Nm]	Peak running range [Nm]	Moment of inertia J [x10^{-4} kg m^2]	Rated output capacity [kW]	Servo motor model	Servo motor type: Voltage	Servo motor type: Protective structure	Amplifier pairing MR-JE: 10	20	40	70	100	200	300	Art. no.
HG-KN K	3000	4500	0,32	0,95	0,088	0,1	HG-KN13	200 V AC	IP65	●							282631
			0,64	1,9	0,24	0,2	HG-KN23K				●						282633
			1,3	3,8	0,42	0,4	HG-KN43K					●					282635
			2,4	7,2	1,43	0,75	HG-KN73JK						●				282637
HG-SN S	2000	3000	2,39	7,16	6,1	0,5	HG-SN52JK	200 V AC	IP67				●				282639
			4,77	14,3	11,9	1,0	HG-SN102JK							●			282641
			7,16	21,5	17,8	1,5	HG-SN152JK								●		282643
			9,55	28,6	38,3	2,0	HG-SN202JK								●		282645
			14,3	42,9	58,5	3,0	HG-SN302JK									●	282647

MR-JE servo amplifier specifications



The MR-JE was designed to reach high performance and to get an easy-to-use servo system for all kind of machines. Proven reliability with a 2.0 kHz high-frequency response, an energy-saving design and the easy setup with Advanced One-Touch Tuning can be offered by MR-JE.

The servo motors are equipped with 131,072 pulses/rev (17-bit) incremental encoder for achieving high-accuracy positioning and smooth rotation for applications from 100 W to 3 kW. In combination with the MR Configurator2 software package the servo system is easy to start-up, to adjust and to analyze.

Specifications MR-JE-□A			10A	20A	40A	70A	100A	200A	300A
Power supply			3-phase or 1-phase 200–240 V AC, 50/60 Hz				3-phase or 1-phase 200–240 V AC, 50/60 Hz *		3-phase 200–240 V AC, 50/60 Hz
Control system			Sinusoidal PWM control/current control system						
Dynamic brake			Built-in						
Protective functions			Overcurrent shutdown, regeneration overvoltage shutdown, overload shutdown (electronic thermal), encoder fault protection, regeneration fault protection, undervoltage/sudden power outage protection, overspeed protection, excess error protection						
Structure/protection			Self-cooling, open (IP20)					Fan-cooling, open (IP20)	
Environment	ambient temperature		Operation: 0–55 °C (no freezing); storage: -20–65 °C (no freezing)						
	ambient humidity		Operation: 90 % RH max. (no condensation); storage: 90 % RH max. (no condensation)						
	others		Elevation: 1000 m or less above sea level; oscillation: 5.9 m/s² (0.6 G) max.						
Position control mode	max. input pulse frequency		4 Mpps (differential receiver), 200 kpps (open collector)						
	positioning feedback pulse		131072 pulses per servo motor rotation						
	torque limit		Set by parameters or external analog input (0–+ 10 V DC/maximum torque)						
Speed control mode	control range		Analog speed command 1:2000, internal speed command 1:5000						
	fluctuation rate		±0.01 % max. (load fluctuation 0–100 %)						
	torque limit		Set by parameters or external analog input (0–+10 V DC/maximum torque)						
Torque control mode	command input		0–±8 V DC/maximum torque						
	speed limit		Set by parameters or external analog input (0–±10 V DC, rated speed)						
Weight		kg	0.8	0.8	0.8	1.5	1.5	2.1	2.1
Dimensions (WxHxD)		mm	50x168x135	50x168x135	50x168x135	70x168x185	70x168x185	90x168x195	90x168x195
Order information		Art. no.	268792	268793	268794	268795	268796	268797	268798

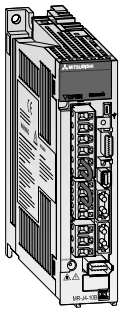
Specifications MR-JE-□BF			10BF	20BF	40BF	70BF	100BF	200BF	300BF
Power supply			3-phase or 1-phase 200–240 V AC, 50/60 Hz				3-phase or 1-phase 200–240 V AC, 50/60 Hz *		3-phase 200–240 V AC, 50/60 Hz
Control system			Sinusoidal PWM control/current control system						
Dynamic brake			Built-in						
Protective functions			Overcurrent shutdown, regeneration overvoltage shutdown, overload shutdown (electronic thermal), encoder fault protection, regeneration fault protection, undervoltage/sudden power outage protection, overspeed protection, excess error protection						
Safety function			STO (IEC/EN 61800-5-2); (SS1 function is available by using the safety option card MR-J3-D05)						
Structure/protection			Self-cooling, open (IP20)					Fan-cooling, open (IP20)	
Environment	ambient temperature		Operation: 0–55 °C (no freezing); storage: -20–65 °C (no freezing)						
	ambient humidity		Operation: 90 % RH max. (no condensation); storage: 90 % RH max. (no condensation)						
	others		Elevation: 1000 m or less above sea level; oscillation: 5.9 m/s² (0.6 G) max.						
Position/speed/torque control mode			Control via SSCNET III/H						
Communication speed			150 Mbps						
Weight		kg	0.8	0.8	0.8	1.5	1.5	2.1	2.1
Dimensions (WxHxD)		mm	50x168x135	50x168x135	50x168x135	70x168x185	70x168x185	90x168x195	90x168x195
Order information		Art. no.	312937	312938	312939	312940	312941	312942	312943

* When 1-phase 200 V AC to 240 V AC power supply is used, use them with 75 % or less of the effective load ratio.

Specifications MR-JE-□C			10C	20C	40C	70C	100C	200C	300C
Power supply			3-phase or 1-phase 200–240 V AC, 50/60 Hz				3-phase or 1-phase 200–240 V AC, 50/60 Hz *		3-phase 200–240 V AC, 50/60 Hz
Control system			Sinusoidal PWM control/current control system						
Dynamic brake			Built-in						
Protective functions			Overcurrent shutdown, regeneration overvoltage shutdown, overload shutdown (electronic thermal), encoder fault protection, regeneration fault protection, undervoltage/sudden power outage protection, overspeed protection, excess error protection						
Environment	ambient temperature		Operation: 0–55 °C (no freezing); storage: -20–65 °C (no freezing)						
	ambient humidity		Operation: 90 % RH max. (no condensation); storage: 90 % RH max. (no condensation)						
	others		Elevation: 1000 m or less above sea level; oscillation: 5.9 m/s² (0.6 G) max.						
Position/speed/torque control mode			Control via CC-Link IE Field Basic						
Weight		kg	0.8	0.8	0.8	1.5	1.5	2.1	2.1
Dimensions (WxHxD)		mm	50x168x135	50x168x135	50x168x135	70x168x185	70x168x185	90x168x195	90x168x195
Order information		Art. no.	312314	312335	312336	312337	312338	316778	316779

* When 1-phase 200 V AC to 240 V AC power supply is used, use them with 75 % or less of the effective load ratio.

MR-J4 servo amplifier specifications



The MELSERVO MR-J4 series is designed for ease of use and setup, safety, energy-efficiency and user friendly handling. With additional functions like "One-touch Tuning" and "Advanced Vibration Suppression Control" the servo performance achieves industry-leading level.The range covers 200 V amplifiers from 0.1 to 37 kW and 400 V amplifiers from 0.6 to 55 kW.

- Processing of encoder signals with 22 bit resolution (4,194,304 pulses/rev.)
- Speed frequency response is increased to 2.5 kHz
- Operating of rotary, linear and direct drive motors as standard
- Compatible with safety functions STO (Safe Torque Off) and SS1 (Safe Stop 1) corresponding EN 61800-5-2 as standard.

The MR-J4-B servo amplifier receives a command signal from a control system via high speed motion network SSCNET III/H with a communication speed of 150 Mbps and a cycle time of 0.22 ms. This optical network is very reliable in operation because it is not affected by EMC.

For control, the MR-J4-A servo amplifier has a pulse train input and two analog inputs for current or voltage. Possible modes of the MR-J4-A are torque, speed or position control.

Specifications MR-J4-□A/B(-RJ)	10A 10B	20A 20B	40A 40B	60A 60B	70A 70B	100A 100B	200A 200B	350A 350B	500A 500B	700A 700B	11KA 11KB	15KA 15KB	22KA 22KB
Power supply	3-phase or 1-phase 200–240 V AC, 50/60 Hz					1-phase or 3-phase 200–240 V AC, 50/60 Hz *		3-phase 200–240 V AC, 50/60 Hz					
Control system	Sinusoidal PWM control/current control system												
Dynamic brake	Built-in										External option		
Speed frequency response	2500 Hz												
Protective functions	Overcurrent shutdown, regeneration overvoltage shutdown, overload shutdown (electronic thermal), servomotor overheat protection, encoder fault protection, regeneration fault protection, undervoltage/sudden power outage protection, overspeed protection, excess error protection.												
Safety function	STO (IEC/EN 61800-5-2); (The functions SS1, SS2, SOS, SBC, SLS and SSM are available in combination with the optional functional safety unit MR-D30.)												
Structure	Self-cooling, open (IP20)				Fan cooling, open (IP20)								
Order information													
A-RJ type Art. no.	269247	269248	269249	269250	269251	269252	269253	269254	269265	269266	269267	269268	269269
B-RJ type Art. no.	269279	269280	269281	269282	269283	269284	269285	269286	269287	269288	269289	269290	269291

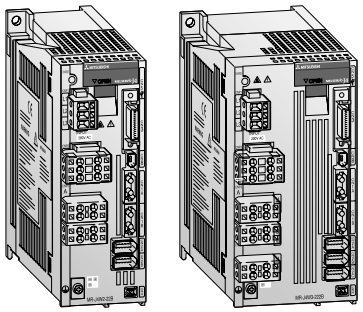
* When 1-phase 200 V AC to 240 V AC power supply is used, use them with 75 % or less of the effective load ratio.

Specifications MR-J4-□A4/B4(-RJ)	60A4 60B4	100A4 100B4	200A4 200B4	350A4 350B4	500A4 500B4	700A4 700B4	11KA4 11KB4	15KA4 15KB4	22KA4 22KB4
Power supply	3-phase 380–480 V AC, 50/60 Hz								
Control system	Sinusoidal PWM control/current control system								
Dynamic brake	Built-in						External option		
Speed frequency response	2500 Hz								
Protective functions	Overcurrent shutdown, regeneration overvoltage shutdown, overload shutdown (electronic thermal), servomotor overheat protection, encoder fault protection, regeneration fault protection, undervoltage/sudden power outage protection, overspeed protection, excess error protection.								
Safety function	STO (IEC/EN 61800-5-2); (The functions SS1, SS2, SOS, SBC, SLS and SSM are available in combination with the optional functional safety unit MR-D30.)								
Structure	Self-cooling, open (IP20)				Fan cooling, open (IP20)				
Order information									
A-RJ type Art. no.	269270	269271	269272	269273	269274	269275	269276	269277	269278
B-RJ type Art. no.	269292	269293	269294	269295	269296	269297	269298	269299	269300

Common specifications MR-J4-□A/A4(-RJ)		10A	20A	40A	60A(4)	70A	100A(4)	200A(4)	350A(4)	500A(4)	700A(4)	11KA(4)	15KA(4)	22KA(4)
Position control mode	maximum input pulse frequency	4 Mpps (when using differential receiver), 200 kpps (when using open collector)												
	positioning feedback pulse	Resolution per encoder/servo motor rotation: 4194304 pulses/revolution (22 Bit)												
	command pulse multiple	A/B multiple; A: 1–16777215, B: 1–16777215, 1/10 <A/B <4000												
	torque limit input	Set by parameters or external analog input (0–± 10 V DC/maximum torque)												
Speed control mode	speed control range	Analog speed command 1:2000, internal speed command 1:5000												
	analog speed command input	0–± 10 V DC/rated speed (The speed at 10 V can be changed by parameter.)												
	speed fluctuation rate	±0.01 % max. (load fluctuation 0–100 %); 0 % (power fluctuation ±10 %) ±0.2 % max. (ambient temperature 25 °C ±10 °C), when using external analog speed command												
	torque limit	Set by parameters or external analog input (0–± 10 V DC/maximum torque)												
Torque control specifications	torque command input	0–±8 V DC/maximum torque (input impedance 10–12 kΩ)												
	speed limit	Set by parameters or external analog input (0–± 10 V DC, rated speed)												
Integrated positioning	position tables	255 table entries for target position, set speed value, acceleration/deceleration time, braking												
	programming style	256 programs, 640 program steps, 25 commands												
	indexing function	255 stations, rotational direction tightly adjustable or automatically shortest path												

Common specifications MR-J4-□B/B4(-RJ) (SSCNET III/H)	10B	20B	40B	60B(4)	70B-RJ	100B(4)	200B(4)	350B(4)	500B(4)	700B(4)	11KB(4)	15KB(4)	22KB(4)
Position/speed control mode, torque control specifications	Control via SSCNET III/H												
Communication speed	150 Mbps												

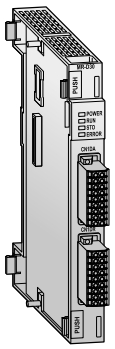
MR-J4W2-B/MR-J4W3-B servo amplifier specifications



Additional to the standard version of the MR-J4 amplifiers (SSCNET III/H Motion Network) for one servo motor Mitsubishi Electric now offers also servo amplifiers for two or three servo motors. The amplifiers for two (MR-J4W2-B) and three axes (MR-J4W3-B) are space and wiring saving and more efficient than two or three single amplifiers. Therefore the engineer saves not only space inside the cabinet and costs due to less wires, but also valuable energy what reduces the pollution of CO_2 at the same time. The range of output power for the amplifier for two axes is from 0.2 to 1 kW, for three axes from 0.2 to 0.4 kW per axis. All other specification items are identical with the standard version of the MR-J4-B for one axis.

Specifications MR-J4W2-□B/MR-J4W3-□B	W2-22B	W2-44B	W2-77B	W2-1010B	W3-222B	W3-444B
Power supply	1-phase or 3-phase 200–240 V AC, 50/60 Hz			3-phase 200–240 V AC, 50/60 Hz	1-phase or 3-phase 200–240 V AC, 50/60 Hz	
Control system	Sinusoidal PWM control/current control system					
Dynamic brake	Built-in	Built-in	Built-in	Built-in	Built-in	Built-in
Speed frequency response	2500 Hz	2500 Hz	2500 Hz	2500 Hz	2500 Hz	2500 Hz
Protective functions	Overcurrent shutdown, regeneration overvoltage shutdown, overload shutdown (electronic thermal), servomotor overheat protection, encoder fault protection, regeneration fault protection, undervoltage/sudden power outage protection, overspeed protection, excess error protection.					
Safety function	STO (IEC/EN 61800-5-2); (SS1 function is available by using the safety option card MR-J3-D05)					
Order information Art. no.	248645	248646	248647	248648	248649	248650

MR-D30 functional safety unit



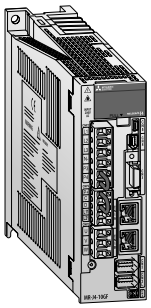
In combination with the optional MR-D30 functional safety unit, additional safety functions according to EN IEC 61800-5-2 can be realized. By combining the MR-D30 functional safety unit with a MR-J4 servo amplifier, safety functions "Safe Stop 1" (SS1), "Safe Brake Control" (SBC), "Safely Limited Speed" (SLS) and "Safe Speed Monitor" (SSM) according to EN IEC 61800-5-2 are available.

If additionally a servo motor with functional saftey encoder is used, "Safe Stop 2" (SS2) and "Safe Operating Stop" (SOS) are supported.

The activation is possible by wiring the signals directly to the MR-D30 or in combination with the Motion Controller via a safe SSCNET III/H communication. Additionally the wiring will be reduced by activating via network.

Specifications		MR-D30
Control power supply	voltage /frequency	24 V DC
	permissible voltage fluctuation	24 V DC ±10 %
	power supply capacity	800 mA
Supported amplifiers		MR-J4-□A-RJ/B-RJ/GF-RJ/TM
Shut-off input (Safety devices)		6 redundant input points, source or sink logic
Shut-off release input (restart devices)		3 redundant output points, source logic
Response time		15 ms or less for Safe Torque Off (STO)
Environment	ambient temperature	Operation: 0–55 °C (no freezing), storage: -20–65 °C (no freezing)
	ambient humidity	Operation: 90 % RH or less (no condensation), storage: 90 % RH or less (no condensation)
	atmosphere	Inside control panel; no corrossive gas, no flammable gas, no oil mist, no dust
	elevation	1000 m or less above sea level
	oscillation	5.9 m/s^2 or less at 10 to 57 Hz (directions of X, Y and Z axes)
Order information Art. no.		275670

MR-J4-GF servo amplifier specifications



Compatible with CC-Link IE Field and CC-Link IE Field Basic Network

CC-Link IE Field Network compatible servo amplifier MR-J4-GF executes positioning of one or multiple axes, synchronous control, and speed-torque control by being connected to the various master modules compatible with CC-Link IE Field Network, including the Simple Motion module, and CC-Link IE embedded CPU module, etc.

The CC-Link IE Field Basic offers a cost effective network integration by direct control from the integrated Ethernet Port of MELSEC iQ-F, MELSEC iQ-R, MELSEC System Q and the MELSEC L series

In combination with the Simple Motion Module RD77GF, that can be used in the CC-Link IE Field network, the system offers extraordinary speed and performance, excellent flexibility, reduced wiring and simple programming.

Specifications MR-J4-□(-RJ) (200 V-Type)			10GF	20GF	40GF	60GF	70GF	100GF	200GF	350GF	500GF	700GF	11KGF	15KGF	22KGF
Power supply	voltage /frequency ①	AC input	1-phase or 3-phase 200–240 V AC, 50/60 Hz					1-phase or 3-phase 200–240 V AC, 50/60 Hz ③		3-phase 200–240 V AC, 50/60 Hz					
		DC input ②	283–340 V DC												
	permissible voltage fluctuation	AC input	1-phase or 3-phase 170–264 V AC					1-phase or 3-phase 170–264 V AC ③		3-phase 170–264 V AC					
		DC input ②	241–374 V DC												
Dynamic brake			Built-in										External option		
Weight		kg	1.0	1.0	1.0	1.0	1.4	1.4	2.1	2.3	4.0	6.2	13.4	13.4	18.2
Dimensions (WxHxD)		mm	50x168x 155	50x168x 155	50x168x 155	50x168x 155	60x168x 185	60x168x 185	90x168x 195	90x168x 195	105x250x 200	172x300x 200	220x400x 260	220x400x 260	260x400x 260
Order information		Art. no.	295435	295436	295437	295438	295439	295440	295441	295442	295443	295444	306875	306876	306877

Specifications MR-J4-□(-RJ) (400 V-Type)			60GF4	100GF4	200GF4	350GF4	500GF4	700GF4	11KGF4	15KGF4	22KGF4
Power supply	voltage /frequency ①		3-phase 380–480 V AC, 50/60 Hz								
	permissible voltage fluctuation		3-phase 323–528 V AC								
Dynamic brake			Built-in						External option		
Weight		kg	1.7	1.7	2.1	3.6	4.3	6.5	13.4	13.4	18.2
Dimensions (WxHxD)		mm	60x168x195	60x168x195	90x168x195	105x250x200	130x250x200	172x300x200	220x400x260	220x400x260	260x400x260
Order information		Art. no.	295445	295446	295447	295448	295449	295450	306878	305879	306880

Common specifications	
Control system	Sinusoidal PWM control/current control system
Protective functions	Overcurrent shutdown, regeneration overvoltage shutdown, overload shutdown (electronic thermal), servomotor overheat protection, encoder fault protection, regeneration fault protection, undervoltage/sudden power outage protection, overspeed protection, excess error protection.
Safety function	STO (IEC/EN 61800-5-2); (The functions SS1, SS2, SOS, SBC, SLS and SSM are available in combination with the optional functional safety unit MR-D30.)

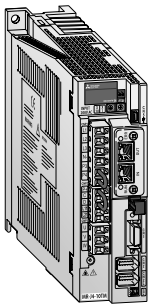
① Rated output capacity and rated rotation speed of the servo motor used in combination with the servo amplifier are as indicated when using the power voltage and frequency listed. Output and speed cannot be guaranteed when the power supply voltage is less than specified.

② The DC power supply iput is available only with MR-J4-□GF-RJ servo amplifiers.

③ When 1-phase 200–240 V AC power supply is used, use them with 75 % or less effective load ratio.

④ The communication cycle depends on the controller specifications and the number of axes connected.

MR-J4-TM-ECT/MR-J4-TM-PNT/MR-J4-TM-EIP servo amplifier specifications



With the MR-J4-TM servo amplifier the industry leading performance, features and reliability of the MR-J4 series servo system is combined with Ethernet based open network interface.

Dedicated Servo amplifier control loops by Mitsubishi Electric developed components like One-Touch-Tuning, Vibration suppression control, Adaptive Real-Time Autotuning.

High resolution 4,194,304 pulse/rev absolute encoders for high-accuracy positioning and smooth rotation

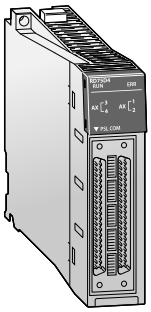
Specifications MR-J4-☐TM (200 V Type)			10TM	20TM	40TM	60TM	70TM	100TM	200TM	350TM	500TM	700TM
Power supply	voltage /frequency		1-phase or 3-phase 200–240 V AC, 50/60 Hz					1-phase or 3-phase 200–240 V AC, 50/60 Hz ①		3-phase 200–240 V AC, 50/60 Hz		
Weight		kg	1.0	1.0	1.0	1.0	1.4	1.4	2.1	2.3	4.0	6.2
Dimensions (WxHxD)		mm	50x168x161	50x168x161	50x168x161	50x168x161	60x168x191	60x168x191	90x168x201	90x168x201	105x250x206	172x300x206
Order information	MR-J4-☐TM-ECT	Art. no.	290156	290157	290158	290159	290160	290161	290162	290263	290164	290205
	MR-J4-☐TM-PNT		298566	298567	298568	298569	298570	298571	298572	298573	298574	298695
	MR-J4-☐TM-EIP		298708	298709	298710	298711	298712	298713	298714	298715	298716	298717

Specifications MR-J4-☐TM4 (400 V Type)			60TM4	100TM4	200TM4	350TM4	500TM4	700TM4	11KTM4	15KTM4	22KTM4
Power supply	voltage /frequency ①		3-phase 380–480 V AC, 50 Hz/60 Hz								
Weight		kg	1.7	1.7	2.1	3.6	4.3	6.5	13.4	13.4	18.2
Dimensions (WxHxD)		mm	60x168x201	60x168x201	90x168x201	105x250x206	130x250x206	172x300x206	220x400x266	220x400x266	260x400x266
Order information	MR-J4-☐TM4-ECT	Art. no.	290206	290207	290208	290209	290210	290211	294050	294051	294052
	MR-J4-☐TM4-PNT		298696	298697	298698	298699	298700	298701	298705	298706	298707
	MR-J4-☐TM4-EIP		298718	298719	298720	298721	298722	298723	298727	298728	298729

① When 1-phase 200–240 V AC power supply is used, use them with 75 % or less effective load ratio.

Common specifications	MR-J4-TM-ECT	MR-J4-TM-PNT	MR-J4-TM-EIP
Safety function	STO (IEC/EN 61800-5-2)		
Ethernet Interfaces	2 ports RJ45 100 BASE-TX		
Communication protocol	IEC61158 Type12 CAN application protocol over EtherCAT (CoE), IEC61800-7 CiA402 Drive Profile	PROFINET IO, Real Time (RT) communication, PROFIdrive v4.1	THE CIP NETWORKS LIBRARY Volume 2, EtherNet/IP Adaptation of CIP

Positioning modules MELSEC iQ-R

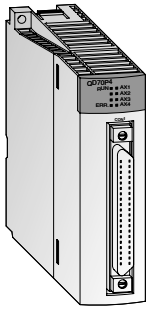


The MELSEC iQ-R series offers a choice of two positioning modules, transistor output or differential drive output, depending on the connected amplifier. The modules are capable of transmission speeds up to 5M pulses/s, and the differential driver output module supports wiring up to a distance of 10 m.

It can be used in positional control or speed control, and features include linear, circular, and helical interpolation, which is a complex control required for deep-thread milling applications.

Specifications		RD75D2	RD75D4	RD75P2	RD75P4
Number of control axes		2	4	2	4
Interpolation	pulse/s	2-axis linear interpolation, 2-axis circular interpolation	2-/3-/4-axis linear interpolation, 2-axis circular interpolation, 3-axis helical interpolation	2-axis linear interpolation, 2-axis circular interpolation	2-/3-/4-axis linear interpolation, 2-axis circular interpolation, 3-axis helical interpolation
Positioning data items		600	600	600	600
Output type		Differential driver	Differential driver	Open collector	Open collector
Output signal		Pulse chain	Pulse chain	Pulse chain	Pulse chain
Order information	Art. no.	279564	279565	279562	279563

Positioning modules MELSEC System Q

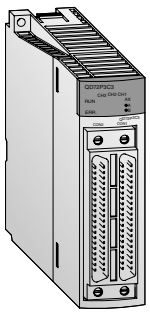


Multi-axis positioning

The modules are especially designed for systems including multiple axes that do not require any extensive control. The QD70P4 controls up to 4 axes and the QD70P8 up to 8 axes.

Since any number of positioning modules can be used the number of axes to be controlled as well is unlimited.

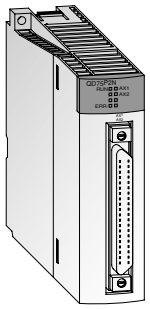
Specifications		QD70P4	QD70P8
Number of control axes		4	8
Interpolation		—	
Points per axis		10 (by PLC program or with the positioning software GX Configurator PT)	
Output signal		Pulse chain	
Output frequency	kHz	1–200 000	
Positioning method		PTP positioning; speed/locus positioning; path control	
Pulse output type		Open collector output	
Order information	Art. no.	138328	138329



Space efficient positioning

The QD72P3C3 and QD73A1 realize positioning applications with less space requirements.

Specifications			QD72P3C3	QD73A1
Number of control axes			3	1
Interpolation			—	—
Positioning	data items		1 per axis	1
	start time		Positioning control, speed control: 1 ms	1.2 ms
	pulse output method		Open collector output	Analog output (0–±10 V DC, adjustable to ±5–±10 V DC)
	max. output pulse	kpps	100	—
Counter function	count input signal		1-phase input, 2-phase input; 5–24 V DC	2-phase input
	counting speed	kpps	100	1000
External connection			40-pin connector	15-pin and 9-pin connector
Order information		Art. no.	213230	257759

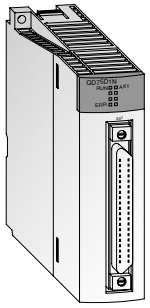


Positioning with an open control loop

The modules generate the travel command via a pulse chain.

The speed is proportional to the pulse frequency and the distance travelled is proportional to the pulse length.

Specifications		QD75P1N	QD75P2N	QD75P4N
Number of control axes		1	2	4
Interpolation		—	2 axis linear and circular interpolation	2, 3, or 4 axis linear and 2 axis circular interpolation
Points per axis		600 pieces of data with PLC program, 100 pieces of data with GX Configurator QP		
Output type		Open collector	Open collector	Open collector
Output signal		Pulse chain	Pulse chain	Pulse chain
Output frequency	kHz	max. 4000	max. 4000	max. 4000
Order information	Art. no.	248389	248390	248391



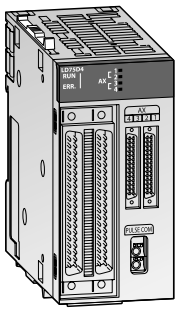
Long distance positioning

The modules of the QD75 series are suitable for bridging long distances between module and drive system.

The modules QD75D provide differential outputs.

Specifications		QD75D1N	QD75D2N	QD75D4N
Number of control axes		1	2	4
Interpolation		—	2 axis linear and circular interpolation	2, 3, or 4 axis linear and 2 axis circular interpolation
Points per axis		600 pieces of data with PLC program, 100 pieces of data with GX Configurator QP		
Output type		Differential driver	Differential driver	Differential driver
Output signal		Pulse chain	Pulse chain	Pulse chain
Output frequency	kHz	max. 4000	max. 4000	max. 4000
Order information	Art. no.	248392	248393	248394

Positioning modules MELSEC L series



The MELSEC L series offers six different positioning modules for control of up to four axes.

- Differential output type (LD75D☐)
- Open-collector output type (LD75P☐)

These positioning modules can be used with standard type servo amplifiers (Mitsubishi Electric MR-JE-A, MR-J4-A).

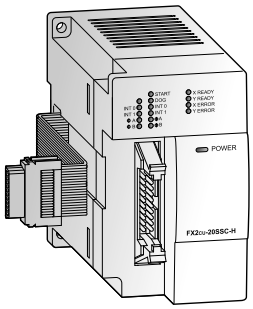
All MELSEC L series positioning modules can provide functionality such as interpolation, speed positioning operation etc.

The open-collector output type module provides positioning with open loop control. The module generates the travel command via the pulse chain. The speed is proportional to the pulse frequency and the distance travelled is proportional to the pulse length.

The differential output type module is suitable for bridging long distances between the module and the drive system due to the fact that the output allows large cable lengths.

Specifications		LD75D1	LD75D2	LD75D4	LD75P1	LD75P2	LD75P4
Accessible axes		1	2	4	1	2	4
Output frequency	pulse/s	—	2-axis linear interpolation, 2-axis circular interpolation	2-/3-/4-axis linear interpolation, 2-axis circular interpolation	—	2-axis linear interpolation, 2-axis circular interpolation	2-/3-/4-axis linear interpolation, 2-axis circular interpolation
Positioning data items per axis		600	600	600	600	600	600
Output type		Differential driver	Differential driver	Differential driver	Open collector	Open collector	Open collector
Output signal		Pulse chain	Pulse chain	Pulse chain	Pulse chain	Pulse chain	Pulse chain
Order information	Art. no.	251448	251449	238095	251446	251447	238096

Positioning module MELSEC FX series



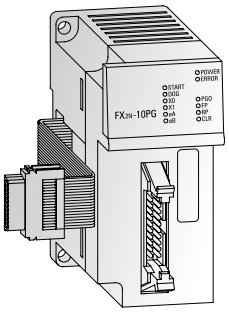
The SSCNET III module FX3U-20SSC-H can be used in combination with a FX3U or FX3UC programmable controller to achieve a cost effective solution for high precision, high speed positioning. The plug-and-play fiber optic SSCNET III cabling reduces setup time and increases control distance for positioning operations in a wide range of applications.

Servo parameters and positioning information for the FX3U-20SSC-H are easily set up with an FX3U/FX3UC base unit and a personal computer. For parameter setting, monitoring and testing the easy programming software FX Configurator-FP is available.

Specifications		FX3U-20SSC-H
Accessible axes		2 (independent or interpolation)
Output frequency		1 Hz to 50 MHz
Servo amplifier network		SSCNET III
Communications speed		50 Mbps
Starting time	ms	1.6 (+1.7 SSCNET III 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	100 mA
	24 V DC	—
Related I/O points		8
Weight	kg	0.3
Dimensions (WxHxD)	mm	55x90x87
Order information	Art. no.	231512

Notes: 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.

Single-axis positioning modules FX, iQ-F



The positioning modules FX3U-1PG, FX2N-10PG and FX5-20PG-P are extremely efficient 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			FX3U-1PG	FX2N-10PG	FX5-20PG-P
Applicable for			Base units FX3U/FX3UC/FX5U/FX5UC	Base units FX3U/FX3UC	Base units FX5U/FX5UC
Accessible axes			1	1	2
Output frequency		pulses/s	10–200 000	1–1 000 000	1–200 000
Signal level for digital inputs			24 V DC/40 mA	5 V DC/100 mA; 24 V DC/70 mA	24 V DC/5 mA
Power supply	5 V DC		150 mA (from base unit)	120 mA (from base unit)	—
	24 V DC		—	—	120 mA (from base unit)
Related I/O points			8	8	8
Weight		kg	0.3	0.2	0.2
Dimensions (WxHxD)		mm	43x90x87	43x90x87	50x90x83
Order information		Art. no.	259298	140113	312301

Note: For the connection of a FX3U-1PG to a FX5U/FX5UC base unit, a bus conversion module FX5-CNV-BUSC resp. FX5-CNV-BUS is required.

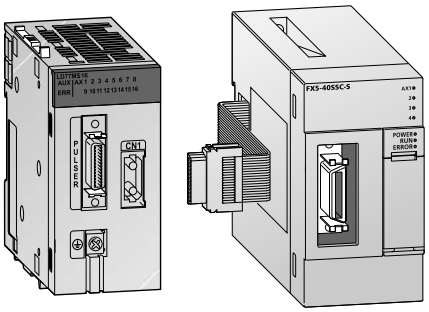
Single axis Motion Controller MR-MQ100

The MR-MQ100 allows a single axis to be completely controlled and synchronised to a separate encoder or virtual axis with no additional controller hardware like a PLC. Applications such as rotary cutters, flying saws and labelling can be realized cost-effectively.

A complete range of essential functions are available, including encoder and virtual axis synchronization, registration, point to point positioning and user defined cam profiles.

Specifications		MR-MQ100
Power supply		24 V DC ±10 % (required current capacity: 400 mA)
Digital inputs (mark sensors)		4 inputs (24 V DC)
Digital outputs		2 outputs (24 V DC)
Synchronous encoder	signal type	A/B phase pulse train input
	voltage input/open-collector type (5 V DC)	Up to 800 kpps (after magnification by 4), up to 10 m
	differential input type	Up to 4 Mpps (after magnification by 4), up to 30 m
Peripheral interface		100 Mbps/10 Mbps Ethernet (for programming and additional options)
Positioning	method	(PTP (Point To Point) control, speed control/speed-position control, fixed-pitch feed, constant speed control, position follow-up control, speed control with fixed position stop, speed switching control, high-speed oscillation control, synchronous control (SV22))
	acceleration/deceleration control	Automatic trapezoidal acceleration/deceleration, S-curve acceleration/deceleration
	compensation	Backlash compensation, Electronic gear, Phase compensation
Order information	Art. no.	217705

MELSEC Simple Motion modules



The MELSEC iQ-F, the iQ-R, System Q and the MELSEC L series lineup includes Simple Motion modules in addition to the regular positioning modules. Various control functions previously only possible with Motion Controllers, such as speed control, torque control, synchronous control and cam control, are now available with the Simple Motion modules.

These functions can be realized with simple parameter adjustments and via the PLC program.

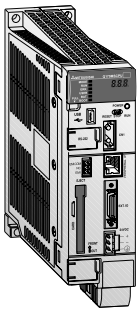
Specifications		FX5-40SSC-S	FX5-80SSC-S
Number of controllable axes		4	8
Interpolation functions		Linear interpolation for up to 4 axes, circular interpolation for 2 axes	
Servo amplifier network		SSCNET III/H	SSCNET III/H
Servo amplifier		MR-JE-BF/MR-J4-B/MR-J4W2-B/MR-J4W3-B	
Positioning	method	PTP (Point To Point) control, path control (linear and arc), speed control, speed-position switching control, position-speed switching control, torque control	
	acceleration/deceleration control	Trapezoidal acceleration/deceleration, S-curve acceleration/deceleration	
	compensation	Backlash compensation, electronic gear, near pass function	
Number of positioning points		600 per axis (can be set with GX Works2/GX Works3 or PLC program)	
External input signals		1 encoder, A/B phase; 4 digital inputs [DI1–DI4]	
Cam function		256 kBytes, max. 256 (depends on resolution)	
Order information	Art. no.	281405	304187

Specifications		RD77GF4	RD77GF8	RD77GF16	RD77GF32	RD77MS2	RD77MS4	RD77MS8	RD77MS16
Number of controllable axes		4	8	16	32	2	4	8	16
Interpolation functions		Linear interpolation for up to 4 axes, circular interpolation for 2 axes, helical interpolation for 3 axes				2 axes linear and circular interpolation	Linear interpolation for up to 4 axes, circular interpolation for 2 axes		
Servo amplifier network		CC-Link IE Field	CC-Link IE Field	CC-Link IE Field	CC-Link IE Field	SSCNET III/H	SSCNET III/H	SSCNET III/H	SSCNET III/H
Servo amplifier		MR-J4-GF(-RJ)				MR-JE-BF/MR-J4(W2/W3)-B			
Positioning	method	PTP (Point To Point) control, path control (linear and arc), speed control, speed-position switching control, position-speed switching control, speed-torque control, advanced synchronous control							
	acceleration/deceleration control	Trapezoidal acceleration/deceleration, S-curve acceleration/deceleration							
	compensation	Backlash compensation, electronic gear, near pass function							
Number of positioning points		600 data/axis (All the data points can be set with the buffer memory.)				600 per axis (can be set with GX Works3 or PLC program)			
External input signals		External devices, like encoder or remote I/O are connected via CC-Link IE Field				1 encoder, A/B phase; 4 digital inputs [DI1–DI4]			
Cam function		3 MBytes, max. 1024 (depends on resolution)				256 kBytes, max. 256 (depends on resolution)			
Order information	Art. no.	295077	295078	295079	304200	280229	280230	280231	280232

Specifications		QD77GF4	QD77GF8	QD77GF16	QD77MS2	QD77MS4	QD77MS16
Number of controllable axes		4	8	16	2	4	16
Interpolation functions		Linear interpolation for up to 4 axes, circular interpolation for 2 axes			2 axes linear and circular interpolation	Linear interpolation for up to 4 axes, circular interpolation for 2 axes	
Servo amplifier network		CC-Link IE Field	CC-Link IE Field	CC-Link IE Field	SSCNET III/H	SSCNET III/H	SSCNET III/H
Servo amplifier		MR-J4-GF(-RJ)			MR-JE-BF/MR-J4(W2/W3)-B		
Positioning	method	PTP (Point To Point) control, path control (linear and arc), speed control, speed-position switching control, position-speed switching control, synchronous control, cam control					
	acceleration/deceleration control	Trapezoidal acceleration/deceleration, S-curve acceleration/deceleration					
	compensation	Backlash compensation, electronic gear, near pass function					
Number of positioning points		600 data/axis (All the data points can be set with the buffer memory.)			600 per axis (can be set with GX Works3 or PLC program)		
External input signals		External devices, like encoder or remote I/O are connected via CC-Link IE Field			1 encoder, A/B phase; 4 digital inputs [DI1–DI4]		
Cam function	storage area cam data	256 kBytes, max. 256 (depends on resolution)					
Order information	Art. no.	297645	297646	269032	248702	248703	248704

Specifications		LD77MS2	LD77MS4	LD77MS16
Number of controllable axes		2	4	16
Interpolation functions		2 axes linear and circular interpolation	Linear interpolation for up to 4 axes, circular interpolation for 2 axes	Linear interpolation for up to 4 axes, 2 axes linear and circular interpolation
Servo amplifier network		SSCNET III/H	SSCNET III/H	SSCNET III/H
Servo amplifier		MR-JE-BF/MR-J4(W2/W3)-B		
Positioning	method	PTP (Point To Point) control, path control (linear and arc), speed control, speed-position switching control, position-speed switching control, torque control		
	acceleration/deceleration control	Trapezoidal acceleration/deceleration, S-curve acceleration/deceleration		
	compensation	Backlash compensation, electronic gear, near pass function		
Number of positioning points		600 per axis (can be set with GX Works2/GX Works3 or PLC program)		
External input signals		1 encoder, A/B phase; 4 digital inputs [DI1–DI4]		
Cam function		256 kBytes, max. 256 (depends on resolution)		
Order information	Art. no.	268199	268200	268201

Stand-alone Motion Controller Q170MSCPU/Q170MSCPU-S1

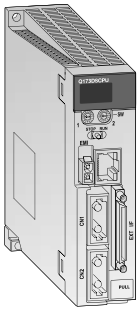


The Q170MSCPU/Q170MSCPU-S1 combines a PLC CPU, a Motion CPU and a power supply module into one compact unit. No base unit is required, although an extension base unit with standard PLC modules can be connected if required.

An encoder interface is included as standard, enabling multiple axes synchronization with an external encoder.

Specifications		Q170MSCPU	Q170MSCPU-S1
Motion-CPU	number of controllable axes	16	
	operation cycle	0.22 ms, 0.44 ms, 0.88 ms, 1.77 ms, 3.55 ms, 7.11 ms	
	programming languages	Motion SFC, dedicated instruction, mechanical support language (SV22)	
	servo program capacity	16 k steps	
	servo amplifier	MR-J4-B over SSCNET III/H	
Interpolation functions		Linear interpolation for up to 4 axes, circular interpolation for 2 axes, helical interpolation for 3 axes	
PLC CPU	number of I/O points	4096 points	
	programming languages	Ladder, instruction list, SFC, structured text	
	program capacity	30 k steps (120 k bytes)	60 k steps (240 k bytes)
	processing speed	20 ns (LD instruction); 40 ns (MOV instruction)	9.5 ns (LD instruction); 19 ns (MOV instruction)
	total number of instructions	858 (including real number operation instruction)	
Positioning	method	(PTP (Point To Point) control, speed control/speed-position control, fixed-pitch feed, constant speed control, position follow-up control, speed control with fixed position stop, speed switching control, high-speed oscillation control, synchronous control (SV22))	
	acceleration/deceleration control	Automatic trapezoidal acceleration/deceleration, S-curve acceleration/deceleration	
	compensation	Backlash compensation, electronic gear, phase compensation	
Order information	Art. no.	266524	266535

Motion Controller CPUs of MELSEC System Q and iQ-R series



The Q-Motion Controller CPU controls and synchronises the connected servo amplifiers and servo motors. A motion system besides the controller CPU, also includes a PLC CPU. Only after combining a highly dynamic positioning control CPU and a PLC, an innovative Motion Control system is created.

Specifications		Q172DSCPU	Q173DSCPU	R16MTCPU	R32MTCPU
Type		Motion CPU	Motion CPU	Motion CPU	Motion CPU
I/O points		8192	8192	8192	8192
No. of control axes		16	32	16	32
Interpolation functions		Linear interpolation for up to 4 axes, circular interpolation for 2 axes, helical interpolation for 3 axes			
Positioning	method	PTP (point to point), speed control/speed-position control, fixed pitch feed, constant speed control, position follow-up control, speed switching control, high-speed oscillation control, synchronous control (SV22)			
	acceleration/deceleration control	Automatic trapezoidal acceleration/deceleration, S-curve acceleration/deceleration			
	compensation	Backlash compensation, electronic gear			
Servo program capacity		16 k steps, 3200 positioning points		32 k steps, 6400 positioning points	
Interfaces		SSCNET III/H (USB, RS232C via PLC CPU)			
Servo amplifier		MR-J4-B over SSCNET III/H			
Order information	Art. no.	248700	248701	280227	280228

MELSEC System Q-Motion system modules

Type	Description	Art. no.
Q172DLX	Servo external signals interface module	213894
Q172DEX	Serial absolute synchronous encoder interface module	213895
Q173DPX	Manual pulse generator interface module	213896
Q173DSXY	Safety signal module	251051

For detailed information, please refer to the family catalogues.

MELFA robot systems

Large range of robot models makes selection easy

Mitsubishi Electric produces a comprehensive range of robot models to cater to the full spectrum of modern needs.

All Mitsubishi Electric robots are powerful, fast and compact – that goes almost without saying.

The product range includes the almost universal **articulated-arm robots** with 6 degrees of freedom and payloads of 2 kg to 70 kg and **SCARA robots** with 4 degrees of freedom and payloads of 3 kg to 20 kg for assembly and palletising tasks.

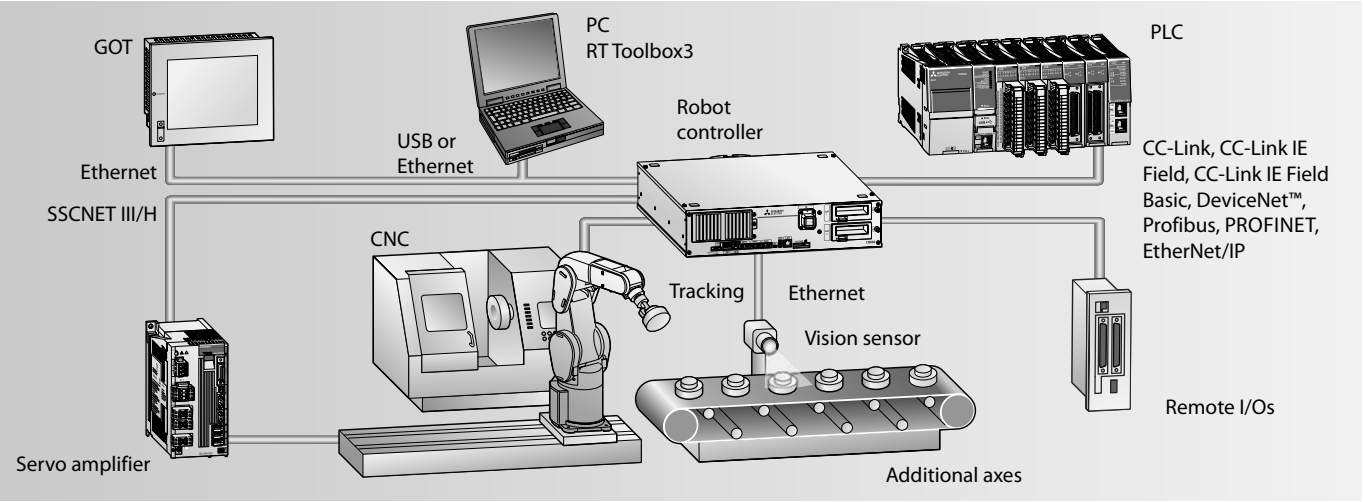
Two special models are the unique high-precision robots with their parallel arm structure for very fast micro handling tasks with payloads of 1 kg to 5 kg as well as the flexible high-speed SCARA robot for ceiling mounting.

Advanced intelligence, safety and integration

The concept of FR robots offers a simple approach to advanced and flexible production to handle all automation needs. This concept is based on 3 key features

- Intelligence: "MELFA Smart Plus" offers greater accuracy and shorter startup times, making installation simpler and more advanced tasks possible.
- Safety: A comprehensive range of safety functions, including position and speed monitoring, allow work to be conducted in cooperation with people
- Integration: MELSEC iQ-R compatible robot controller and the e-F@ctory integrated FA solution offers seamless integration of robots and IT systems.

Example of a robot system configuration



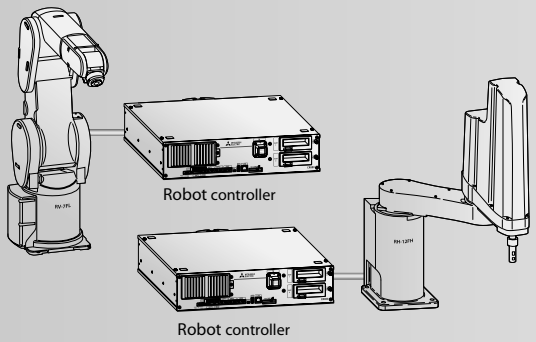
D type and R type controller

Mitsubishi Electric offers two basic robot families that meet all requirements - no matter how complex or demanding an application is. Advantages of the FR series are high performance and maximum productivity. Additional feature of the FR series with R type controller is the high integration potential, which is unique compared with other robot systems.

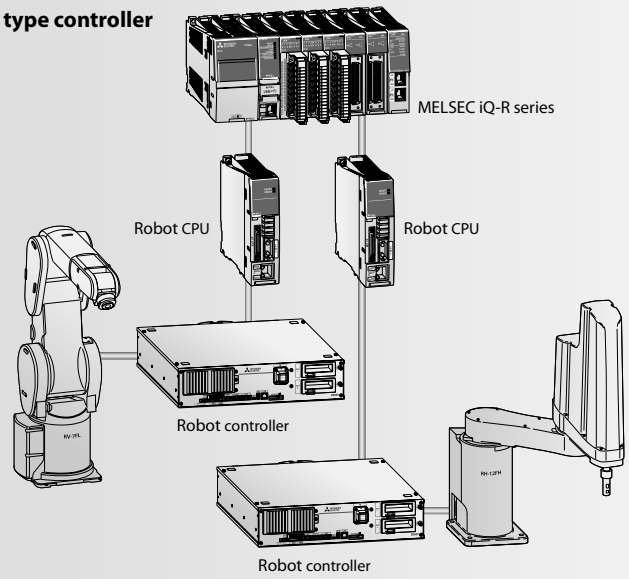
Full production line integration can easily be realised with R type controller robot systems. This is an iQ Platform based robot controller which directly communicates with the iQ-R PLC CPU and the complete range of iQ system modules (I/O, networking, special function, etc.).

Powerful features like fully integrated HMI terminal application monitoring, communication on most of the widely used networks and high performance MES functionality for 100 % data logging are just some of the features of this system.

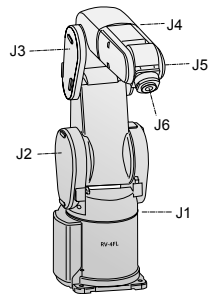
D type controller



R type controller



Articulated robot for 2 kg and 4 kg payload



RV-4FRL

The compact and light RV-2FR(B)/RV-2FRL(B) can be seamless integrated into different automation systems. Flexibility and the wide range of motion permits acting in applications with limited space.

The RV-4FR series of robots have been designed to be very simple to integrate into an existing automation cell. Features such as the direct control over local I/Os allows the robot to interact directly with sensors and actuators.

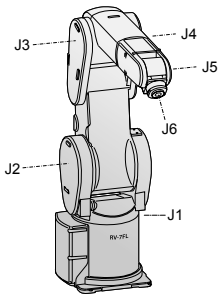
The RV-4FR series has been optimised with a choice of major networking technologies: Ethernet, EtherNet/IP, DeviceNet™, Profibus DP, PROFINET and CC-Link, CC-Link IE Field, CC-Link IE Field Basic.

For complex automation cells where movement is restricted, or there is a large distance between working points, the RV-4FR robots can control up to 8 additional axes to its standard robot arm configuration.

In addition, a clean room model is available that conforms to ISO Level III.

Modell		RV-2FR-D/ RV-2FR-R	RV-2FRB-D-S25/ RV-2FRB-R-S25	RV-2FRL-D-S25/ RV-2FRL-R-S25	RV-2FRLB-D-S25/ RV-2FRLB-R-S25	RV-4FRLM-D	RV-4FRLM-R
Degrees of freedom		6	6	6	6	6	6
Maximum payload	kg	2	2	2	2	4	4
Gripper flange reach	mm	504	504	649	649	649	649
Repeatability	mm	±0.02	±0.02	±0.02	±0.02	±0.02	±0.02
Max. speed	mm/s	4955	4955	4955	4955	9048	9048
Controller type		CR800-D/CR800-R + R16RTCPU				CR800-D	CR800-R + R16RTCPU
Operating range (deg.)	J1	480 (-240–240)	480 (-240–240)	480 (-240–240)	480 (-240–240)	480 (±240)	480 (±240)
	J2	240 (-120–120)	240 (-120–120)	237 (-117–120)	237 (-117–120)	240 (-120–120)	240 (-120–120)
	J3	160 (0–160)	160 (0–160)	160 (0–160)	160 (0–160)	164 (0–164)	164 (0–164)
	J4	400 (-200–200)	400 (-200–200)	400 (-200–200)	400 (-200–200)	400 (±200)	400 (±200)
	J5	240 (-120–120)	240 (-120–120)	240 (-120–120)	240 (-120–120)	240 (-120–120)	240 (-120–120)
	J6	720 (-360–360)	720 (-360–360)	720 (-360–360)	720 (-360–360)	720 (±360)	720 (±360)
Robot weight	kg	19	19	21	21	41	41
Protection		IP30	IP30	IP30	IP30	IP67	IP67
Order information	Art. no.	313052/ 314029	313053/ 314030	313054/ 314031	313085/ 314032	313089	314056

Articulated robot for 7 kg to 20 kg payload



RV-7FRL

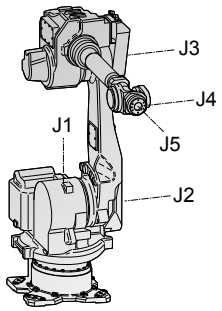
The RV-7FR with a nominal and maximum payload of 7 kg sets new benchmark standards for speed, flexibility, ease of integration and simplicity of programming. For an optimum work radius the robot is available in three versions with ranges from 713 mm to 1503 mm. Ethernet, USB, tracking, camera connection and additional axis connections are standard in all MELFA Robot Series.

The high-performance robots RV-13FR and RV-20FR are specially suited for handling heavy loads. Due to the compact body and slim arm design, the robots can operate in a large work area. The anti-collision function of the iQ Platform models prevents collisions between robots which are working close together.

There's also a clean room model available that conforms to ISO Level III.

Modell		RV-7FRM-D/ RV-7FRM-R	RV-7FRLM-D/ RV-7FRLM-R	RV-7FRLLM-D/ RV-7FRLLM-R	RV-13FRM-D/ RV-13FRM-R	RV-13FRLM-D/ RV-13FRLM-R	RV-20FRM-D/ RV-20FRM-R
Degrees of freedom		6	6	6 (super long arm)	6	6	6
Maximum payloadt	kg	7	7	7	13	13	20
Gripper flange reach	mm	713	908	1503	1094	1388	1094
Repeatability	mm	±0.02	±0.02	±0.06	±0.05	±0,05	±0,05
Max. speed	mm/s	11064	10977	15300	10450	9700	4200
Controller type		CR800-D/ CR800-R + R16RTCPU	CR800-D/ CR800-R + R16RTCPU	CR800-D/ CR800-R + R16RTCPU	CR800-D/ CR800-R + R16RTCPU	CR800-D/ CR800-R + R16RTCPU	CR800-D/ CR800-R + R16RTCPU
Operating range (deg.)	J1	480 (±240)	480 (±240)	380 (±190)	380 (±190)	380 (±190)	380 (±190)
	J2	240 (-115–125)	240 (-110–130)	240 (-90–150)	240 (-90–150)	240 (-90–150)	240 (-90–150)
	J3	156 (-0–156)	162 (-0–162)	167.5 (-10–157.5)	167.5 (-10–157.5)	167.5 (-10–157.5)	167.5 (-10–157.5)
	J4	400 (±200)	400 (±200)	400 (±200)	400 (±200)	400 (±200)	400 (±200)
	J5	240 (-120–120)	240 (-120–120)	240 (-120–120)	240 (-120–120)	240 (-120–120)	240 (-120–120)
	J6	720 (±360)	720 (±360)	720 (±360)	720 (±360)	720 (±360)	720 (±360)
Robot weight	kg	65	67	130	120	130	120
Protection		IP67	IP67	IP67	IP67	IP67	IP67
Order information	Art. no.	313091/ 314058	313093/ 314060	313095/ 314062	313097/ 314064	313099/ 314066	312663/ 314068

Articulated robot for 35 kg to 70 kg payload



RV-35F/RV-50F/RV-70F

High capacity robots RV-35F/RV-50F/RV-70F

These robots with payload from 35 kg up to 70 kg are addressing applications that require higher payloads and longer reaches, including CNC machine tending, large material handling, palletizing and end of line packaging.

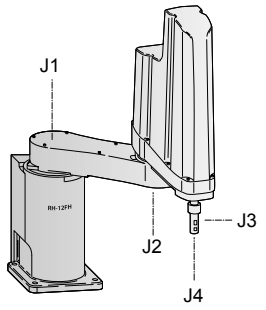
Highlights:

- Long reach arm up to 2050 mm for tasks can be spread farther apart and can accommodate larger parts and processes
- Multiple environmental protection ratings – available in IP40 and IP67 protection ratings for various application requirements
- Seamless integration in the Mitsubishi Electric Automation world

Modell		RV-35F ①	RV-50F ①	RV-70F ①
Degrees of freedom		6	6	6
Maximum payload	kg	35	50	70
Gripper flange reach	mm	2050	2050	2050
Repeatability	mm	±0.07	±0.07	±0.07
Max. speed	mm/s	13450	13000	11500
Controller type		CR760 ①		
Operating range (deg.)	J1	330(±165)	330(±165)	330(±165)
	J2	215 (-80–135)	215 (-80–135)	215 (-80–135)
	J3	261(-90–171)	261(-90–171)	261(-90–171)
	J4	720 (±360)	720 (±360)	720 (±360)
	J5	250 (±125)	250 (±125)	250 (±125)
	J6	900 (±450)	900 (±450)	900 (±450)
Robot weight	kg	640	640	640
Protection		IP67	IP67	IP67
Order information	Art. no.	On request	On request	On request

① Please contact your Mitsubishi Electric representative for more details.

SCARA robot for 1 kg to 20 kg payload



RH-12FRH

SCARA robots are ideal for sorting, palletizing and component installation.

This combination of compact dimensions and great precision predestine the RP robots for micro-handling tasks.

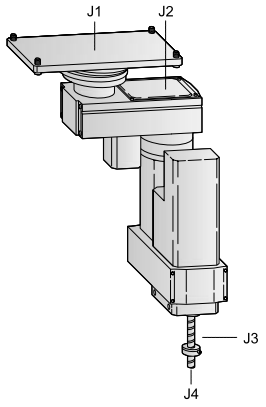
With a resulting reduced cycle time of only 0.29 seconds for a 12" cycle the robots of the RH-FRH series achieve the highest speeds in their class thanks to the new motors developed by Mitsubishi Electric, high arm rigidity and unique control technology.

Straight from the factory, the RH-FRH series offers many features, such as connections for pneumatic grippers, Ethernet, USB, tracking functions, camera interface, hand I/O, additional axis controller and an interface for GOT HMIs with freely programmable user interfaces. For pharmaceutical and micro electronic applications there is a clean room model available that conforms to ISO Level III.

Modell		RP-1ADH-S15	RP-3ADH-S15	RP-5ADH-S15
Degrees of freedom		4	4	4
Maximum payload	kg	1	3	5
Controller type		CR1DA	CR1DA	CR1DA
Operating range	WxD (mm)	150x105 (A6 size)	210x148 (A5 size)	297x210 (A4 size)
	J3 vertikal motion (mm)	30	50	50
	J4 (deg.)	±200	±200	±200
Repeat position accuracy	X-Y surface (mm)	±0.005	±0.008	±0.01
	J3 vertikal motion (mm)	±0.01	±0.01	±0.01
	J4 (deg.)	±0.02	±0.03	±0.03
Robot weight	kg	12	24	25
Order information	Art. no.	252843	252844	252885

Modell		RH-3FRH3515-D/ RH-3FRH5515-R	RH-6FRH5520N-D/ RH-6FRH5520N-R	RH-12FRH8535N-D/ RH-12FRH8535N-R	RH-20FRH10035N-D/ RH-20FRH10035N-R
Degrees of freedom		4	4	4	4
Maximum payload	kg	3	6	12	20
Controller type		CR800-D/ CR800-R + R16RTCPU	CR800-D/ CR800-R + R16RTCPU	CR800-D/ CR800-R + R16RTCPU	CR800-D/ CR800-R + R16RTCPU
Gripper flange reach	mm	550	550	850	1000
Operating range	J1 (deg.)	340 (±170)	340 (±170)	340 (±170)	340 (±170)
	J2 (deg.)	290 (±145)	290 (±145)	306 (±153)	306 (±153)
	J3 (Z) (mm)	150	200	350	350
	J4 (θ axis) (deg.)	720 (±360)	720 (±360)	720 (±360)	720 (±360)
Repeatability X-Y direction	mm	±0.012	±0.012	±0.015	±0.015
Max. speed	mm/s	8300	8300	11350	13283
Robot weight	kg	32	37	69	77
Protection		IP20	IP54 (IP65 optional)	IP54 (IP65 optional)	IP54 (IP65 optional)
Order information	Art. no.	312930/ 313651	312985/ 313666	312991/ 313672	312995/ 313676

SCARA robot for overhead installation



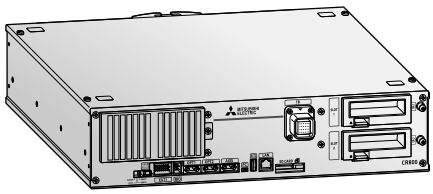
RH-3FRHR

RWith its special compact design and support for overhead installation above the application, the robot RH-3FRHR3515 doesn't take up any valuable space in the work area next to the installation location, enabling even smaller work cell dimensions.

The RH-1FRHR5515 is a high-speed robot dedicated for handling of small parts up to 1 kg. Up to 150 picks/min with conveyer tracking including hand open/close are possible.

Modell		RH-1FRHR5515-D	RH-1FRHR5515-R	RH-3FRHR3515-D-S25	RH-3FRHR3515-R-S25
Degrees of freedom		4		4	
Maximum payload	kg	3		3	
Controller type		CR800-D	CR800-R + R16RTCPU	CR800-D	CR800-R + R16RTCPU
Gripper flange reach	mm	550		350	
Operating range	J1 (deg.)	354 (±177)		450 (±225)	
	J2 (deg.)	290 (±145)		450 (±225)	
	J3 (Z) (mm)	150		150	
	J4 (θ axis) (deg.)	720 (±360)		1440 (±720)	
Repeatability X-Y direction	mm	±0.012		±0.01	
Max. speed	mm/s	6000		6267 (J1, J2)	
Robot weight	kg	49		24	
Protection		IP20 (IP65 optional)		IP20 (IP65 optional)	
Order information	Art. no.	312997	313661	312998	314028

Powerful controller



Every robot system has its own compact, modular robot controller, which contains the CPU and the power electronics for controlling the robot.

No matter which Mitsubishi robot you use the programming language and options are always the same. You can add special application functions by inserting expansion option cards in the slots in the controllers. Therefore it is possible, to integrate the controller into different types of networks.

The CR800 Controller has already implemented functions like Ethernet- and USB-Connection, Additional Axes Control over SSCNET III/H and Tracking Encoder interface as a standard.

Characteristics/Functions		CR1DA
Shipped with robot		RP-1ADH/3ADH/5ADH
Number of controllable axes		6 robot axes + 2 interpolation axes + 6 independent axes
Interfaces		USB, Ethernet, RS232 (all integrated)
Memory capacity	no. of teaching points	Max. 13000
	no. program steps	Max. 26000
	no. of programs	256
External inputs/ outputs	general purpose I/Os	Optional
	hand open/close	8
	emergency stop I/Os	1
	door switch input	1

Characteristics/Functions		CR800-D	CR800-R
Shipped with robot		RV-2FR/2FRL/4FR/4FRL/7FR/7FRL/7FRLL/13FR/13FRL/20FR RH-1FRHR/3FRHR/3FRH/6FRH/12FRH/20FRH	
Number of controllable axes		6 robot axes + 2 interpolation axes + 6 independent axes	
Interfaces		Ethernet, USB, SSCNET III/H	
Memory capacity	no. of teaching points	39000	
	no. program steps	78000	
	no. of programs	512	
External inputs/ outputs	general purpose I/Os	up to 256 optional	up to 8192 shared with PLC CPU
	hand open/close	8 inputs/8 outputs	
	emergency stop I/Os	1 (redundant)	
	door switch input	1 (redundant)	

Robots teach panel

R32TB

R56TB

The R56TB teach panel is a multifunctional control and programming terminal for all Mitsubishi Electric FR series and F series, SD/SQ series and ADH series robots. Its intuitive user interface makes it easy to control robot movements and perform extensive diagnostics and monitoring functions for users of all levels. All safety-critical functions such as robot movements are assigned to keys.

Programming and monitoring functions are accessed and adjusted quickly and easily via the bright 6.5" touchscreen display.

Specifications		R56TB	R32TB
Compatibility		All Mitsubishi Electric FR series and F series, SD/SQ series and ADH series robots	
Functions		Operation, programming and monitoring of all robot functions	
Programming and monitoring		Read out information, also during operation; program editing with virtual keyboard; display up to 14 lines of program code; I/O monitoring for up to 256 inputs and 256 outputs; service display with information on maintenance intervals; error display with details of the last 128 alarms	Read out information, also during operation, program editing with T9-Key standard, supervising of I/Os, display of error alarms, Right-/Left-Hand usage, 36 keys for operation selection
Software		Integrated operating system software with menu-based user interface	
Menu navigation (language)		German, English, French, Italian	English, Japanese
Display	type/dimensions	6.5" TFT display (640x480 pixels)	Monochrome LCD graphic display (24 characters x 8 lines
	technology	Touchscreen with backlight	LCD with backlight
Interfaces		USB, Ethernet for connection to the robot controller	RS422 for connection to the robot controller
Connection		Direct connection to the robot controller, cable length 7m	
Protection rating		IP65	IP65
Weight	kg	1.25	0.9
Order information	Art. no.	218854	214968

For detailed information, please refer to the family catalogues.

Low voltage switch gears and energy monitoring

The complete solution for line and load side

Mitsubishi Electric offers the whole line from Air Circuit Breakers over Low Voltage Switchgear to Magnetic Contactors and Thermal Overload Relays.

A complete breaker program for complete, all-round protection.

SUPER AE series air circuit breakers

The SUPER AE air circuit breaker family consists of models from 1000 to 6300 A with a broad range of adjustable breaking capacities.

At the lower end of the scale the smallest current setting I_r is 125 A, with the AE1000 model. With the AE6300, the maximum possible setting is a full 6300 A.

Features include:

- Complete breaker program
- Frame size from 1000 A to 6300 A
- Wide performance range
- Breaking capacity up to 130 kA
- Growing power demands
- Optimum overload tripping system
- Additional disconnectors available

WSS series moulded case circuit breakers

The MCCBs of the Mitsubishi Electric breaker series are amongst the smallest compact circuit breakers in the world with electronic overload indication. The system is based, among other things, on the well-known and proven microprocessor technology. The WSS breaker series meets national and international protection ratings according to VDE, EN, and IEC standards for industrial applications as well as for extended shipping demands. The innovative tripping technology guarantees a high reliability and highest protection.

The highlights are

- 3 A to 1600 A rated capacity (3- and 4-pole)
- Interchangeable relay unit (thermal type or electronic type)
- Available in fixed and slot-in versions
- Breaking capacity up to 200 kA
- Additional disconnectors available

Miniature circuit breakers (MCB)

- Trip free mechanism
- During fault MCB trips even if handle is held in ON position.
- Low watt loss
- Power loss values are much lesser than IEC specified values; making it one of the most energy efficient MCB.
- Energy limiting class: 3
- High current limiting performance under fault conditions achieved due to ultra fast contact opening and rapid quenching of arc.
- Circuit identification
- Legend plates for circuit identifications and hence enhanced safet

MS series magnetic contactors and thermal overload relays

Compact, modular extensions and an energy-saving design – these are the main requirements set by users of contactors and auxiliary contactors.

MS meets these requirement plus:

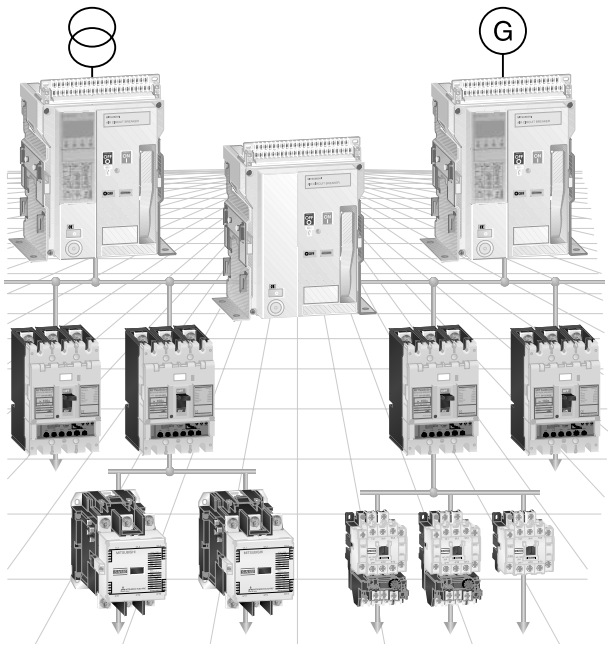
- Easy mounting and wiring
- Easy inspection
- Built-in surge absorber (from S-T65)
- Safety terminal functions
- Improvement of electromagnet
- International standard models

Motor circuit breaker (MMP)

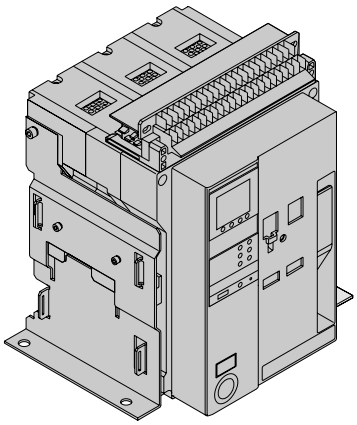
- Self-protected manual motor controller
- Reliable protection and superior performance
- Compact design
- Smart wiring
- Safety & quality
- Global standards

Energy monitoring (ME96 and EMU4)

- Multi-measuring instrument Super-S series (**ME96)**
  Mitsubishi Electric multi-measuring instrument SS series features high performance and crystal clear display. With simple operating functions, SS series is the best support to your measuring and monitoring systems.
- Energy measuring unit EcoMonitorLight (**EMU4)**
  Simple & easier providing energy visualization. Introducing the EcoMonitorLight, an energy measuring unit with an integrated display that provides easy energy visualization in order to provide ways to save energy and to comply with the Energy Saving Act in response to the need for a simple manner to figure out energy consumption.



SUPER AE series air circuit breakers (AE-SW series)



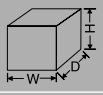
Built for the global demands of the 21st century

Mitsubishi Electric offers a really complete range of circuit breakers.

The World Super AE-SW air circuit family consist of models from 1000 to 6300 A and are available in both 3 and 4 pole versions with fixed or drawout configurations to suit your individual requirements. There are only 3 standard sizes, making planning much easier.

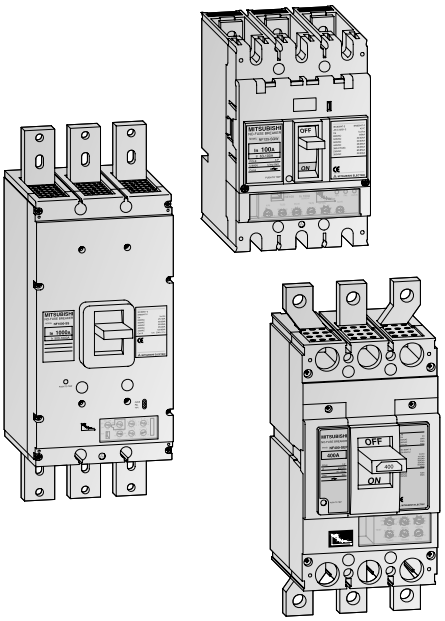
The development target was based on the features:

- Simple operation for maximum user-friendliness
- Flexible installation and customised protection for your systems
- Class leading performance range and extended service life
- Enhanced network support for comprehensive monitoring and control

Type		AE1000-SW		AE1250-SW		AE1600-SW		AE2000-SWA		AE2000-SW		AE2500-SW		AE3200-SW		AE4000-SWA		AE4000-SW		AE5000-SW		AE6300-SW	
Frame type		1								2								3					
Rated current I_n (A) 40 °C		1000		1250		1600		2000		2000		2500		3200		4000		4000		5000		6000	
Max. rated operational voltage U_e (V)		690								690								690					
Rated insulation voltage U_i (V)		1000								1000								1000					
Rated impulse withstand voltage U_{imp} (kV)		12								12								12					
Suitable for isolation		●								●								●					
Category		B								B								B					
Pollution degree		3								3								3					
Number of poles		3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4
Rated current I_r (A) adjustment range at 40 °C		500–1000		625–1250		800–1600		1000–2000		625–2000		1250–2500		1600–3200		2000–4000		2000–4000		2500–5000		3150–6300	
Rated current of neutral pole (A)		1000		1250		1600		2000		2000		2500		3200		4000		2000		2500		3150	
Rated service short-circuit breaking capacity ① I_{cu} (kA, rms) $I_{cs} = I_{cu} = 100$ %	690 V AC	65								75								85					
	400 V AC	65								85								130					
Rated short-time withstand current (kA rms) I_{cw}	1 s	65								75								100					
Operating cycles ② (ON/OFF)	without rated current	25000								20000								10000 (3P)/5000 (4P)					
Connecting terminal	horizontal	●						—		●						—				—			
	vertical	●③						●		●③						●				●			
	frontal	●③						—		●③						—				—			
Outline dimensions (mm) WxHxD 	fixed type	3-pole: 410x340x290 4-pole: 410x425x290								3-pole: 410x475x290 4-pole: 410x605x290								3-pole: 414x873x290 4-pole: 414x1003x290					
	draw-out type	3-pole: 430x300x368 4-pole: 430x385x368								3-pole: 430x435x368 4-pole: 430x565x368						3-pole: 430x439x368 4-pole: 430x569x368		3-pole: 480x875x368 4-pole: 480x1005x368					
Weight (kg)	fixed type	41	51	41	51	42	52	47	57	60	72	61	73	63	75	81	99	160	180	160	180	160	180
	draw-out type	64	78	64	78	65	79	70	84	92	113	93	114	95	116	108	136	233	256	233	256	240	263
	cradle only	26	30	26	30	26	30	31	35	35	43	35	43	36	44	49	61	118	133	118	133	125	140

① Conforms to IEC60947-2, EN60947-2
② Number of mechanical operating cycles (on/off).
③ Optional

WS series moulded-case circuit breakers



The moulded-case circuit breakers of the Mitsubishi Electric breaker series are amongst the smallest compact circuit breakers in the world with electronic overload indication of this kind. The system is based, among other things, on the well-known and proven microprocessor technology.

WSS – World Super Series

The WSS breaker series meets national and international protection ratings according to VDE, EN, and IEC standards for industrial applications as well as for extended shipping demands.

The tripping technology guarantees a high reliability and highest protection.

- 16 A to 250 A in one model size (3- and 4-pole)
- Overcurrent tripping relay unit (thermal type or electronic type)
- Available in fixed and plug-in versions
- Breaking capacity up to 200 kA

Specifications

Specifications				NF32-SV	NF63-SV	NF63-HV	NF125-SV	NF125-SGV	NF125-SEV	NF125-LGV
Rated current $I_{n\,max.}$ [A]				32	63	63	125	125	125	125
Rated insulation voltage U_i [V]			AC	600	600	690	690	690	690	690
Number of poles				3	3/4	3/4	3/4	3/4	3/4	3/4
Rated breaking capacity [kA] (I_{cu}/I_{cs})	IEC 947-2 EN 60 947-2 VDE 0660	AC (50/60 Hz)	690 V	—	—	2.5/2.5	8/8	8/8	8/8	8/8
			440 V	2.5/2.5	7.5/7.5	10/8	25/25	36/36	36/36	50/50
			400 V	5/5	7.5/7.5	10/8	30/30	36/36	36/36	50/50
Dimensions (WxHxD)			mm	75x130x68	75/100x130x68	75/100x130x68	90/120/x130x68	105/140x165x68	105/140x165x68	105/140x165x68

Specifications				NF125-HGV	NF125-HEV	NF125-RGV	NF125-UV	NF160-SGV	NF160-LGV	NF160-HGV
Rated current $I_{n\,max.}$ [A]				125	125	125	125	160	160	160
Rated insulation voltage U_i [V]			AC	690	690	690	690	690	690	690
Number of poles				3/4	3/4	3	3/4	3/4	3/4	3/4
Rated breaking capacity [kA] (I_{cu}/I_{cs})	IEC 947-2 EN 60 947-2 VDE 0660	AC (50/60 Hz)	690 V	10/8	10/8	—	10/10	8/8	8/8	10/8
			440 V	65/65	65/65	125/125	200/200	36/36	50/50	65/65
			400 V	75/75	75/75	150/150	200/200	36/36	50/50	75/75
Dimensions (WxHxD)			mm	105/140x165x68	105/140x165x68	105x165x68	105/140x240x68	105/140x165x68	105/140x165x68	105/140x165x68

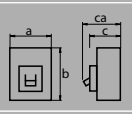
Specifications				NF250-SV	NF250-SGV	NF250-SEV	NF250-LGV	NF250-HGV	NF250-HEV	NF250-RGV	NF250-UV
Rated current $I_{n\,max.}$ [A]				250	250	250	250	250	250	250	250
Rated insulation voltage U_i [V]			AC	690	690	690	690	690	690	690	690
Number of poles				3/4	3/4	3/4	3/4	3/4	3/4	3	3/4
Rated breaking capacity [kA] (I_{cu}/I_{cs})	IEC 947-2 EN 60 947-2 VDE 0660	AC (50/60 Hz)	690 V	8/8	8/8	8/8	8/8	10/8	10/8	—	15/15
			440 V	36/36	36/36	36/36	50/50	65/65	65/65	125/125	200/200
			400 V	36/36	36/36	36/36	50/50	75/75	75/75	150/150	200/200
Dimensions (WxHxD)			mm	105/140x165x68	105/140x165x68	105/140x165x68	105/140x165x68	105/140x165x68	105/140x165x68	105x165x68	105/140x240x68

Specifications				NF400-SEW	NF400-HEW	NF400-REW	NF400-UEW	NF630-SEW	NF630-HEW	NF630-REW
Rated current $I_{n\,max.}$ [A]				400	400	400	400	630	630	630
Rated insulation voltage U_i [V]			AC	690	690	690	690	690	690	690
Number of poles				3/4	3/4	3	3/4	3/4	3/4	3
Rated breaking capacity [kA] (I_{cu}/I_{cs})	IEC 947-2 EN 60 947-2 VDE 0660	AC (50/60 Hz)	690 V	10/10	35/18	—	35/35	10/10	15/15	—
			440 V	42/42	65/65	125/63	200/200	42/42	65/65	125/63
			400 V	50/50	70/70	125/63	200/200	50/50	70/70	125/63
Dimensions (WxHxD)			mm	140/185x257x103	140/185x257x103	140x257x103	140/280x297/322x200	140/185x257x103	140/185x257x103	140x257x103

Specifications				NF800-SEW	NF800-HEW	NF800-REW	NF800-UEW	NF1000-SEW	NF1250-SEW	NF1600-SEW
Rated current $I_{n\,max.}$ [A]				800	800	800	800	1000	1250	1600
Rated insulation voltage U_i [V]			AC	690	690	690	690	690	690	690
Number of poles				3/4	3/4	3	3/4	3/4	3/4	3/4
Rated breaking capacity [kA] (I_{cu}/I_{cs})	IEC 947-2 EN 60 947-2 VDE 0660	AC (50/60 Hz)	690 V	10/10	15/15	—	35/35	25/13	25/13	25/13
			440 V	42/42	65/65	125/63	200/200	85/43	85/43	85/43
			400 V	50/50	70/70	125/63	200/200	85/43	85/43	85/43
Dimensions (WxHxD)			mm	210/280x275x103	210/280x275x103	210x275x103	210/280x322x200	210/280x406x140	210/280x406x140	210/280x406x140

Magnetothermic and earth leakage protection

Earth leakage circuit breakers ELCB and residual current circuit breakers with overcurrent protection RCBO

Type			BV-DN	NV125-CV	NV250-CV
Rated current I_n [A]			10, 16, 20, 25, 32, 40	80, 100, 125	150, 175, 200, 225, 250
Number of poles			2 (1+N)	3	3
Rated voltage [V AC]			230	100–440	100–440
Rated current sensitivity [mA]			30	100/200/500 selectable	100/200/500 selectable
Max. operating time [s]			0.04	0.45/1.0/2.0 selectable	0.45/1.0/2.0 selectable
Pulsating current sensitivity			AC	A (Harmonic Surge Ready)	A (Harmonic Surge Ready)
Rated breaking capacity [kA]		230 V AC	4.5	30	36
		440 V AC	—	10	15
Number of operating cycles	without current		20000	10000	8000
	with current		20000 (I_n 10, 16,20 A) 15000 (I_n 25 A) 10000 (I_n 32, 40 A)	6000	4000
Dimensions [mm] 		a	36	90	105
		b	88	130	165
		c	44	68	68
		ca	70	90	92
Mass [kg]			0.19	1	1.7
Automatic tripping device			Thermal-magnetic	Thermal-magnetic	Thermal-magnetic
Based on standard			IEC61009-1	IEC60947-2	IEC60947-2
Breaker type			MCB	MCCB	MCCB
CE marking			Self-declaration	Self-declaration	TÜV approval

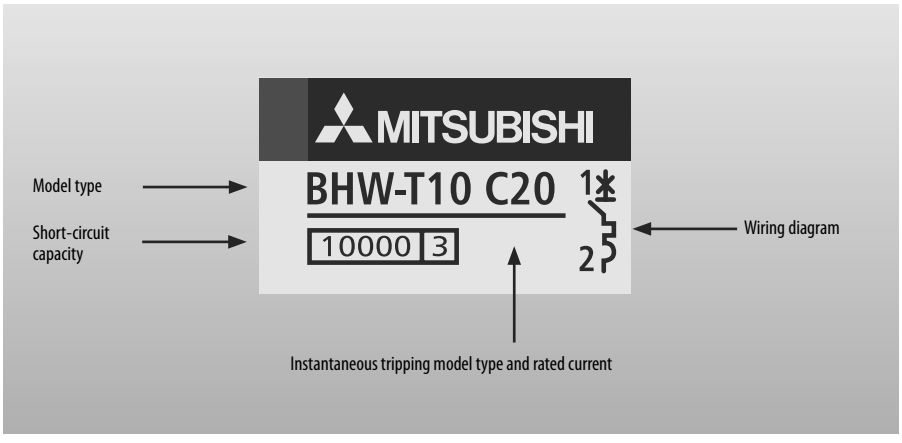
* All the accessories and dimensions of the NF125-SV are compatible with the NV125-CV. All the accessories and dimensions of the NF250-SGV are compatible with the NV250-CV. For internal accessories only is possible to fit it on the left side.

DIN series

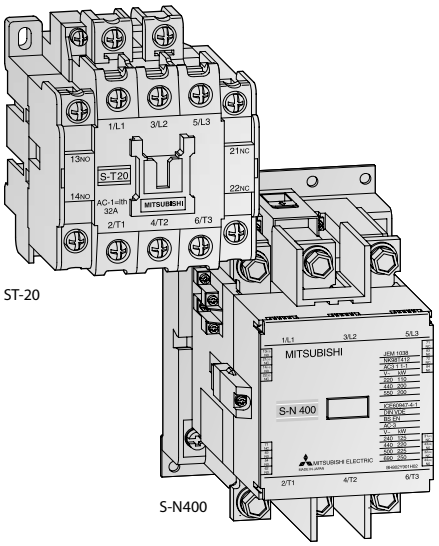
Miniature circuit breakers and residual current circuit breakers

Model type		No. of poles [P]	Rating	Instantaneous tripping	Voltage [V]	Short-circuit capacity [kA]	Compliance standard
MCB	BHW-T10	1, 2, 3, 4	6 to 63 A 0.5 to 63 A	Type B Type C, D	240/415 AC	10	IEC 60898-1
RCCB	BVW-T	2 (1+N), 4 (3+N)	16 to 63A	—	240/415 AC	—	IEC 61008-1

Explanation of markings (example model type: BHW-T10)



General purpose contactors



ST-20

S-N400

Compact, modular extensions and an energy-saving design – these are the main requirements set by users of contactors and auxiliary contactors.

Requirements that the MS-N/T series from Mitsubishi Electric fulfill.

Special features:

- Easy mounting and wiring
- Easy inspection
- Built-in surge absorber (from S-N50)
- Safety and speedy terminal functions
- Thermo-plastic improves the barrier strength
- Coil boasts lower coil consumption
- Improvement of Electromagnet (DC electromagnet with AC operation)
- Less noise nor surge from coil
- Conform to IEC947-4-1, EN-Standards
- Wide range for rated continuous current I_{th} from 20 A to 1000 A

Handling of the contactors

S-T10 to S-N65 units can all be mounted on DIN rail (35 mm wide).

A variety of auxiliary blocks and optional features are available including:

- Standard front clip-on auxiliary contact blocks (4-pole-type and 2-pole-type)
- Low-level signal front-clip-on auxiliary contact blocks
- Side clip-on auxiliary contact blocks
- Surge absorbers (varistor and CR models)
- Surge absorbers with LED operating indicators
- Mechanical interlocks

Compact arc quenching and magnet layout greatly reduces installation space.

The coil rating is displayed in a location readily visible even after the unit is installed onto the panel.

Contacts are visible when the cover is removed, allowing them to be checked easily.

Three-phase motor ratings IEC category AC3 for contactors

Contactor	AC-operated	S-T10	S-T12	S-T20	S-T21	S-T25	S-T32	S-T35	S-T50	S-T65
	DC-operated	—	SD-T12	SD-T20	SD-T21	SD-T25	SD-T32	SD-T35	SD-T50	SD-T65
AC 380–440 V	kW	4	5.5	7.5	11	15	15	18.5	22	30
Rated continuous current I_{th}	A	20	20	20	32	32	32	60	80	100
Auxiliary contacts (standard)		1 NO or 1 NC	1 NO + 1 NC or 2 NO or 2 NC	1 NO + 1 NC or 2 NO	2 NO + 2 NC	2 NO + 2 NC	—	2 NO + 2 NC	2 NO + 2 NC	2 NO + 2 NC

Thermal overload relays

Type		**TH-T18KP**		**TH-T25KP**	**TH-T25KP/TH-T50KP**	**TH-T65KP**
Setting range	A	0.1–18		0.24–26	0.24–34 A	0.24–50	12–65

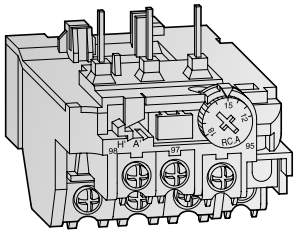
Three-phase motor ratings IEC category AC3 for contactors

Contactor	AC-operated	S-T80	S-T100	S-N125	S-N150	S-N180	S-N220	S-N300	S-N400	S-N600	S-N800
	DC-operated	SD-T80	SD-T100	SD-N125	SD-N150	—	SD-N220	SD-N300	SD-N400	SD-N600	SD-N800
AC 380–440 V	kW	45	55	60	75	90	132	160	220	330	440
Rated continuous current I_{th}	A	120	150	150	200	260	260	350	450	800	1000
Auxiliary contacts (standard)		2 NO + 2 NC	2 NO + 2 NC	2 NO + 2 NC	2 NO + 2 NC	2 NO + 2 NC	2 NO + 2 NC	2 NO + 2 NC	2 NO + 2 NC	2 NO + 2 NC	2 NO + 2 NC

Thermal overload relays

Type		**TH-T65KP/TH-T100KP**		**TH-N120KP**	**TH-N120TAKP**	**TH-N220RHKP**	**TH-N400RHKP**	**TH-N600KP**
Setting range	A	12–80	12–100	34–100	85–150	65–250	85–400	200–800

Thermal overload relays



TH-T18KP

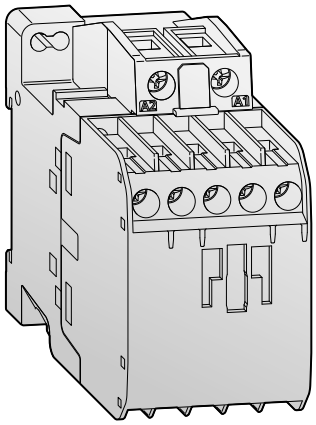
A selection of relays for optimum motor protection characteristics

The thermal relay line-up includes the phase failure protection type models (three-element relays).

This array of protection characteristics allows you to choose the units suited to your motor protection needs.

- An operation indicator makes maintenance and inspection easy.
- 1 NO and 1 NC contact
- Rated current can be set easily
- Finger protection up to TH-N60KPCX
- Trip-free reset bar
- Convenient reset release (optional)

Contactor relays



SR-T5

Contactor relays are designed for use in low voltage control circuit applications.

Our standard contactor relay version is with 5 auxiliary contacts.

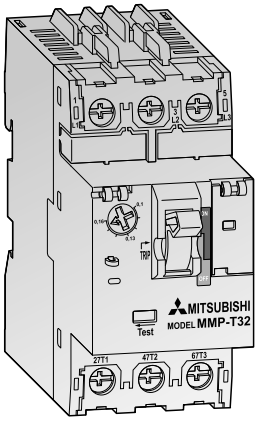
With side clip-on and front clip-on configurations available, a maximum of 4 auxiliary contacts are possible.

- High reliability: By adopting bifurcated moving contacts and by improving the shape of the contacts, contact performance has been made more reliable than ever.
- Different types: Standard, large capacity, overlap contact
- Various contact arrangement and long life
- Mountable on 35 mm DIN rails
- Dust-proof construction
- Easily visible coil ratings
- Easy wiring (self-rising terminal screws)
- Various accessories common with the series S-N contactors (front and side clip-on type additional auxiliary contact blocks, surge absorbers)
- Finger protected types are available (DIN 57106/VDE 0106 Part 100) (Suffix "CX")

Contactor relays				
DC-operated type		SRD-N4CX 4A	SRD-N4CX 3A1B	SRD-N4CX 2A2B
Auxiliary contacts		4 NO	3 NO, 1 NC	2 NO, 2 NC

Contactor relays RS-T series				
Contactor	AC-operated	SR-T5 5A	SR-T5 4A1B	SR-T5 3A2B
	DC-operated	SRD-T5 5A	SRD-T5 4A1B	SRD-T5 3A2B
Auxiliary contacts (standard)		5 NO	4 NO + 1 NC	3 NO + 2 NC

Motor circuit breaker

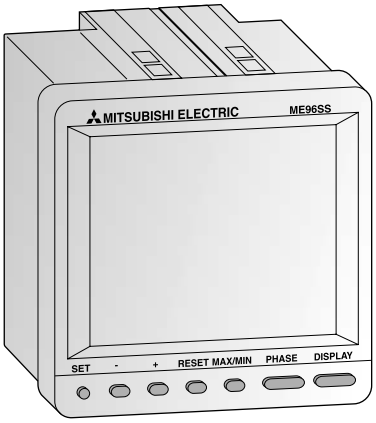


MMP-T32 integrates low voltage circuit breakers and thermal overload relay functions. This device is capable of protecting the motor branch circuits from overload, phase-loss and short-circuit occurrences. The MMP-T32 enables more secure wiring and motor protection than standard open type starters.

In addition to motor protection, integrating the Mitsubishi MS-T series contactor provides a smaller footprint, and the combination motor controller will help

- Self-protected manual motor controller
- Reliable protection and superior performance
- Compact design
- Smart wiring
- Safety & quality
- Global standards

Frame A			32						32					
Type name			MMP-T32						MMP-T32LF					
Standard			JIS C8201-2-1 Ann.1, JIS 8201-4-1, EN60947-2, EN60947-4-1, IEC60947-2, IEC60947-4-1, GB14048.2, UL60947-4-1A, CSAC22.2N0.60947-4-1						EN60947-2, EN60947-4-1, IEC60947-2, IEC60947-4-1, GB14048.2					
Number of poles			3											
Handle shape			Tumbler handle											
Rated current I_n [A]			0.1 to 32											
Rated operational voltage U_e [V]			200 to 690											
Rated frequency [Hz]			50/60											
Rated insulation voltage U_i [V]			690											
Rated impulse withstand voltage U_{imp} [kV]			6											
Rated short-circuit breaking capacity [kA] JIS C8201-2-1 Ann.1 IEC60947-2	rated current I_e [A]		200/240 V		400/415 V		440/460 V		200/240 V		400/415 V		440/460 V	
	heater designation	current setting range	I_{cu}	I_{cs}	I_{cu}	I_{cs}	I_{cu}	I_{cs}	I_{cu}	I_{cs}	I_{cu}	I_{cs}	I_{cu}	I_{cs}
	0.16	0.1–0.16	100		100		100		100		100		100	
	0.25	0.16–0.25	100		100		100		100		100		100	
	0.4	0.25–0.4	100		100		100		100		100		100	
	0.63	0.4–0.63	100		100		100		100		100		100	
	1	0.63–1	100		100		100		100		100		100	
	1.6	1–1.6	100		100		100		100		100		100	
	2.5	1.6–2.5	100		100		100		100		100		100	
	4	2.5–4	100		100		100		100		100		100	
	6.3	4–6.3	100		100		100		100		100		50	50
	8	5.5–8	100		100		50	38	100		100		15	15
	10	7–10	100		100		50	38	100		100		15	15
	13	9–13	100		100		50	38	100		15	7.5	8	4
	18	12–18	100		50	38	35	27	100		15	7.5	8	4
	25	18–25	100		50	38	35	27	50		15	6	6	3
	32	24–32	100		50	38	35	27	50		10	5	6	3
Selectivity category	JIS C8201-2-1 Ann.1 IEC60947-2		Cat.A											
Utilization category	JIS C8201-4-1 IEC60947-4-1		AC-3											
Trip class (JIS C8201-4-1, IEC60947-4-1)			10											
Instantaneous release current			13 x Maximum I_e											
Durability	mechanical [times]		100,000											
	electrical [times]		100,000											
Phase loss sensitive			Yes											
Trip display			Yes											
Test trip function			Yes											
Auxiliary contact unit			UT-MAX (1a or 1b) AC-12: 125 V/5 A, 250 V/3 A											
Alarm contact unit			UT-MAL (1a or 1b) DC-12: 125 V/0.4 A, 250 V/0.2 A											
Short-circuit indicator unit			UT-TU											
Weight [g]			330											



Electronic multi-measuring instruments

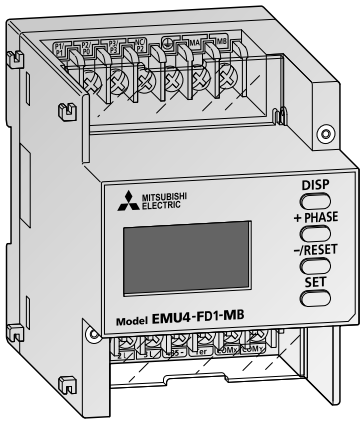
The ME96SS measures and displays all important values of a low voltage/medium voltage power distribution system. By optional plug-in modules, remote I/O's and open network communication can be added. The remote I/O will be used for monitoring the MCCB or ACB status or can be used for energy counters.

The ME96SS provides full integration in a CC-Link or Modbus® network and allows therefore energy reduction and optimization controlled by our well-known PLC series.

Compact sizes according to DIN

- Easy to read display and simple to learn operation
- Flexible to use and modular expandable
- Conforms to CE standard

Specifications	ME96SSHA-MB	ME96SSRA-MB	ME96SSEA-MB
Display	LCD, monochrome	LCD, monochrome	LCD, monochrome
Function keys	7	7	7
Memory for	Measurements and settings		
Network connection	Modbus®/RTU communication		
Expandability	CC-Link, digital or analogue I/Os via plug-in module		
External power supply	AC 100–240 V (±15 %), DC 100–240 V (-30 % +15 %)		
Operating conditions	-5 to +55 °C (average temperature: 35 °C or less per day), 0 to 85 % RH, non-condensing		
Storage conditions	-25 to +75 °C (average temperature: 35 °C or less per day), 0 to 85 % RH, non-condensing		
Standards	EMC: EN61326-1:2006 safety standard: EN61010-1:2001		
Order information Art. no.	297417	297418	297419



Energy measuring unit EcoMonitorLight

Introducing the EcoMonitorLight, an energy measuring unit with an integrated display that provides easy energy visualization in order to provide ways to save energy and to comply with the Energy Saving Act in response to the need for a simple manner to figure out energy consumption.

Type		EMU4-FD1-MB
Phase wire system		3-phase 4-wire, 3-phase 3-wire (3 CT, 2 CT), 1-phase 3-wire, 1-phase 2-wire
Rating	current	AC 5 A, AC 1 A
	voltage	3-phase 4-wire: max. AC 277/480 V; 3-phase 3-wire: (DELTA) max. AC 220 V, (STAR) max. AC 440 V 1-phase 3-wire: max. AC 220/440 V; 1-phase 2-wire: (DELTA) max. AC 220 V, (STAR) max. AC 440 V
	frequency	50–60 Hz (common)
Communication specification		Modbus®/RTU communication
External input	input signal	Non-voltage form A contact, 1 input (choose the function from below)
	function	Setting to "pulse input": Pulse count (0–999,999 counts)
		Setting to "contact input": Contact monitoring only Contact monitoring and energy measuring at work (when contact is on)
External output	output signal	Non-voltage Form A contact, 1 output (choose the function from below)
	function	Upper limit monitoring of current demand, Lower limit monitoring of current demand, Upper/lower limit monitoring of voltage, Upper limit monitoring of power demand, Lower limit monitoring of power demand, Upper/lower limit monitoring of power factor, Upper limit monitoring of pulse count, Lower limit monitoring of pulse count
		Pulse output, Output item: Energy use
Accessible optional plug-in module	EMU4-CM-C	CC-Link communication
	EMU4-LM	Logging module (SD CARD)
	EMU4-CM-MT	Modbus®/TCP communication
Auxiliary power		AC 100–240 V (+10 %,-15 %) 50/60 Hz
Attachment method		IEC rail mounting
Operating temperature/humidity		-5 to +55 °C (average temperature: 35 °C or less per day), 0 to 85 % RH, non-condensing
Storage temperature/humidity		-10 to +60 °C (average temperature: 35 °C or less per day), 0 to 85 % RH, non-condensing
Optional part (For EMU4-LM)		SD memory card (EMU4-SD2GB) ①

① Make sure to use the SD memory card manufactured by Mitsubishi Electric Corporation (Model EMU4-SD2GB). Using other types of the SD memory cards may cause trouble such as data destruction of the memory card or system failure.

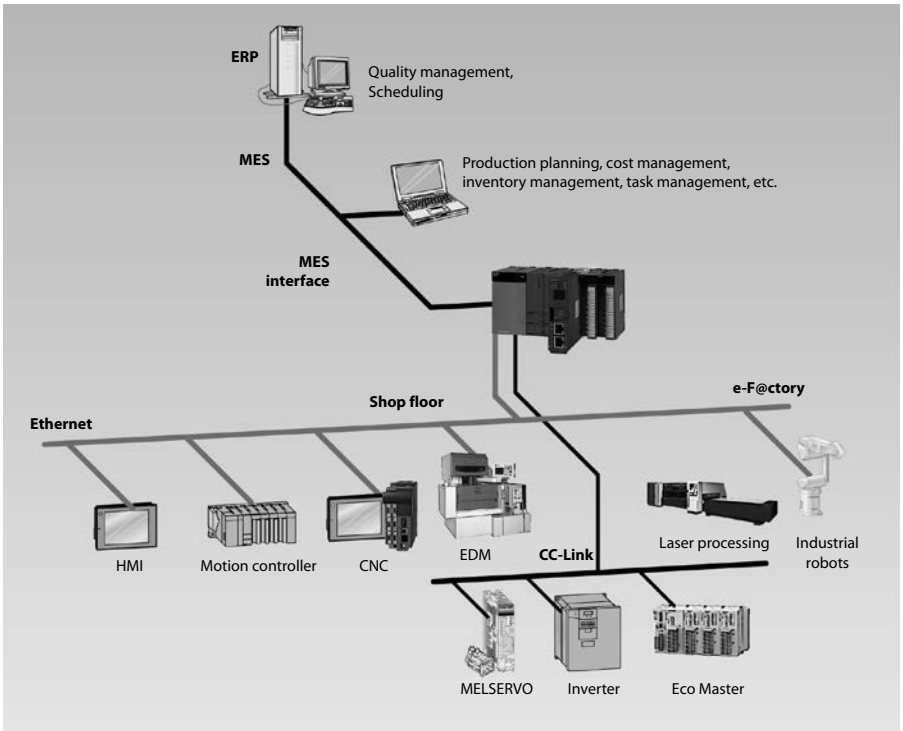
MES solutions

Effectively optimizing production by directly connecting enterprise systems with the shop floor.

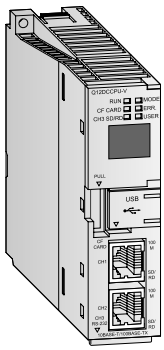
MES Solutions The MES interface product group enables direct connection between the MES (Manufacturing Execution System) database and shop floor equipment, without a communication gateway such as a PC.

The MES benefits are:

- accurate information in real-time through direct utilization of internal device information
- simple system implementation by direct connecting to database(s)
- no need for PCs and programs, which greatly reduces costs
- improved reliability by changing the gateway PC to a PLC
- no specialists and expensive interfacing software needed
- reduced installation costs
- reduced network load because of trigger executed database communication and not polling data



MELSEC System Q MES interface IT module



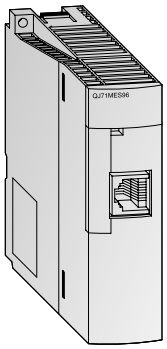
The MES Interface IT module provides a direct link from the iQ Platform to enterprise IT systems. Hence any shop floor system using the iQ Platform can communicate directly with high level IT systems.

This allows the removal of the usual intermediate layer of PC infrastructure required to process shop floor data. This saves cost, increases security and reduces maintenance requirements.

Specifications		MESIT
Module type		MES interface IT modul
Communications method		Ethernet
Interface	type	10BASE-T/100BASE-TX
DB interface function	general	Interacts with databases via user-defined jobs (Windows, Linux, Unix ect)
	databases	Oracle®/SAP, Microsoft® SQL, DB2, DB2/400
	SQL commands	Insert, batch insert, update, select, select with delete, select with update, stored procedure and count rows delete
	messaging	Http, E-mail, TCP, IBM WebSphere MQ, MQTT, JBOSS
	trigger buffering function	The MES module buffers the data and trigger time to internal memory.
	arithmetic processing	Formulas can be applied to data before sending from the MES interface module.
	program execution function	Executes programs in the application server computer
Memory capacity		1 CompactFlash card can be installed
Internal power consumption (5 V DC)	mA	0.93
Dimensions (WxHxD)	mm	27.4x98x115

Order information	Art. no.	
		MES-IT module Hardware: 134930
		Core software incl. Mitsubishi Electric driver and 5 connections to PLC 227387
		Database connection for SQL 227390
		Database connection for Oracle 227391
		Database connection for DB2 227392
		Additional 5 PLC connections 227388
		Siemens driver for S7-200, 300, 400, 12000 229481
		Mitsubishi Electric MC protocol driver 231543
		Modbus driver 231544
		Rockwell driver 227395
		Omron driver 227397

MELSEC System Q MES interface module



QJ71MES96

The MELSEC System Q MES module allows users to interface their production control systems directly to a MES database based on Windows technology.

Specifications			QJ71MES96
Module type			MES interface module
Communications method			Ethernet
Interface		type	10BASE-T/100BASE-TX
DB interface function	general		Interacts with databases via user-defined jobs
	tag function		Collects device data of the PLCs CPU on the network in units of tags.
	trigger monitor function		Monitors the status of conditions (time, tag values, etc.)
	trigger buffering function		The MES module buffers the data and trigger time to internal memory.
	SQL text transmission		Automatically generates the correct SQL message according to requirements.
	arithmetic processing		Formulas can be applied to data before sending from the MES interface module.
	program execution function		Executes programs in the application server computer
Memory capacity			1 CompactFlash card can be installed
I/O points			32
Internal power consumption (5 V DC)		mA	650
Dimensions (WxHxD)		mm	27.5x98x90
Order information		Art. no.	200698

MES option board for GOT (GT15 and GT16 series)

GT15-MESB-48M and GT16M-MESB

By using an MES option card the GT15 and GT16 are able to communicate directly with Windows databases without needing a Gateway-PC.

The information collected on the MELSEC System Q PLC is linked by the PLC MES interface module, and the information from existing equipment and 3rd party controllers is linked by the GOT1000 MES interface function.

The MES interface product series links shop floor equipment and MES information simply, with minimum cost.

Specifications			GT15-MESB48M	GT16M-MESB
Module type			GT15 option card with 48 MB expansion memory and MES functionality (for direct database connection)	GT16 option card with MES functionality (for direct database connection)
DB interface function	general		Interacts with databases via user-defined jobs	
	tag function		Collects device data of the PLCs CPU on the network in units of tags.	
	trigger monitor function		Monitors the status of conditions (time, tag values, etc.)	
	trigger buffering function		The MES module buffers the data and trigger time to internal memory.	
	SQL text transmission		Automatically generates the correct SQL message according to requirements.	
	arithmetic processing		Formulas can be applied to data before sending from the MES interface module.	
	program execution function		Executes programs in the application server computer	
Order information		Art. no.	203473	221369

For GT15 the additional Ethernet communication module GT15-J71E71-100 is required.
For GT15 and GT16 a standard CF card up to 2 GB is required

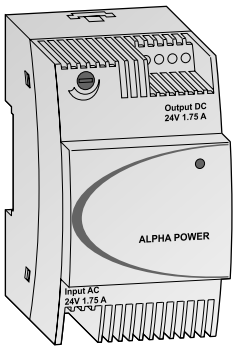
MES interface function for GOT (GT27 and GT25 series)

GT25-MESIFKEY-1

The MES interface function allows SQL text transmission from a GOT to a database in the server computer connected via the Ethernet, enabling writing GOT's device values to the database and reading database values to set them to GOT's devices. This direct communication with the server computer eliminates the need for gateway equipment.

Specifications			GT25-MESIFKEY-1
MES interface function			1 license
DB interface function	general		Interacts with databases via user-defined jobs
	tag function		Collects device data of the PLCs CPU on the network in units of tags.
	trigger monitor function		Monitors the status of conditions (time, tag values, etc.)
	trigger buffering function		The SD memory card in the GOT stores the data and trigger time.
	SQL text transmission		Automatically generates the correct SQL message according to requirements.
	arithmetic processing		Formulas can be applied to data before sending via the MES function.
	program execution function		Executes programs in the application server computer
Order information		Art. no.	274946

Power supplies

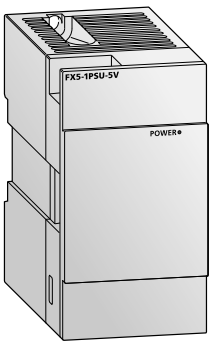


The ALPHA POWERs are convenient power supplies for the 24 V units and other external devices. They are applicable for wall or DIN rail mounting and their dimensions are matched to those of the ALPHA family.

Up to 5 ALPHA power 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 the 24 V ALPHA base units and external devices		
Nominal input voltage		100–240 V AC (45–65 Hz)		
Output voltage		24 V DC (+/-1 %)		
Max. output current		0.75 A	1.75 A	2.5 A
Protection		IP20		
Dimensions (WxHxD)	mm	36x90x61	54x90x61	72x90x61
Order information	Art. no.	209029	209030	209031

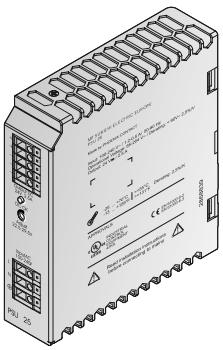


The power supply modules FX3U-1PSU-5V, FX3UC-1PS-5V, FX5-1PSU-5V and FX5-C1PS-5V are required when the built-in power supply of a PLC base unit is insufficient.

They reinforce the build-in 5 V DC and 24 V DC power supply of a FX3 resp. FX5 base unit. They do not occupy any I/O points and deliver up to 1.2 A for the 5 V system bus (for special function modules).

Specifications		FX3U-1PSU-5V ①	FX3UC-1PS-5V	FX5-1PSU-5V	FX5-C1PS-5V
Application		Power supply for the FX3U system bus	Power supply for the FX3UC system bus	Power supply for FX5U (AC power supply type)	Power supply for FX5U (DC power supply type) and FX5UC
Nominal input voltage		100–240 V AC (50/60 Hz)	24 V DC (+20 %/-15 %)	100–240 V AC (50/60 Hz)	24 V DC
Output voltage		5 V DC/24 V DC	5 V DC	5 V DC/24 V DC	5 V DC/24 V DC
Max. output current	5 V DC	1 A at 40 °C; 0.8 A at 55 °C	1 A	1.2 A at 40 °C; 0.8 A at 55 °C	1.2 A at 40 °C; 0.8 A at 55 °C
	24 V DC	0.3 A at 40 °C; 0.2 A at 55 °C	—	0.3 A at 40 °C; 0.2 A at 55 °C	0.625 A at 40 °C; 0.4 A at 55 °C
Dimensions (WxHxD)	mm	55x90x87	24x90x74	50x90x83	20.1x90x74
Order information	Art. no.	169507	210086	280509	294586

① The FX3U-1PSU-5V can't be used with a 24 V base unit!
When connecting an input extension module (e.g. 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.



The primary switched-mode power supply units PSU are especially applicable for universal usage in batch mechanical engineering. The wide range input and the UL, cUL certifications allow a worldwide application. The 3-phase units supply the full permanent output power at breakdown of one phase.

The power supply units can be installed in parallel for more power or for redundant mode operation.

The units dispose of an adjustable output voltage, a thermal overload protection circuit and a POWER LED.

Specifications		PSU 25	PSU 50	PSU 100	PSU 200	PSU 200-3
Application		Power supply for all peripheral devices				
Nominal input voltage		100–240 V AC (45–65 Hz)				380–400 V AC
Output voltage		24 V DC				
Max. output current		2.5 A	5 A	10 A	20 A	20 A
Protection		IP20				
Dimensions (WxHxD)	mm	32x130x115	40x130x115	60x130x152.5	115x130x152.5	115x130x152.5
Order information	Art. no.	206147	206148	206149	208850	208851
Accessories (PSU 100 or larger)		Wall mounting adapter PSU-UWA, art. no.: 208853				

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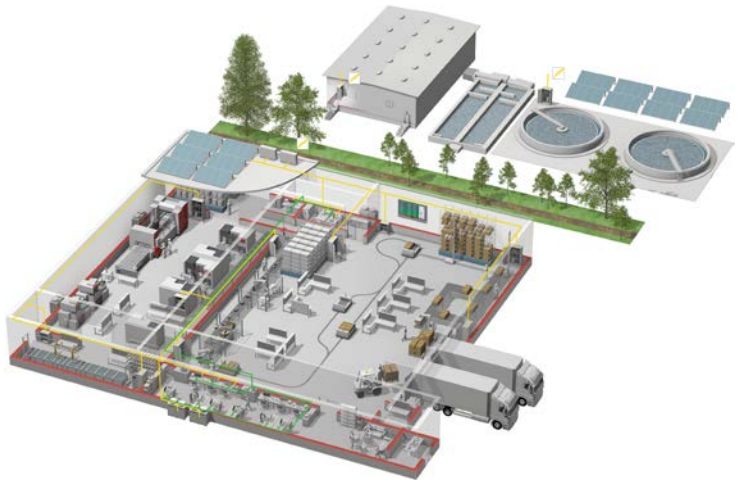
Notes

Your solution partner



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