MITSUBISHI ELECTRIC

The
MELSEC
PLC Family

Our Automation Solutions
Are the Key to Your Success

Mitsubishi Electric is an international company with 106 subsidiaries and 63 manufacturing facilities worldwide. Over 110,000 employees produce and market electrical and electronic products and components for countless applications. The spectrum ranges from semiconductors, consumer electronics, PCs and mobile phones to air conditioning equipment, elevators, colour displays for stadiums and even satellite technology.

MITSUBISHI ELECTRIC –
Worldwide Leader in Industrial Automation

All over the world state-of-the-art automation technology from Mitsubishi Electric is one of the driving forces behind both technological progress and commercial success. Day in, day out, over six million Mitsubishi PLC systems demonstrate their superlative quality a huge variety of demanding industrial applications.

Our experience and expertise have made us one of the biggest international suppliers of PLC systems and the market leader in micro PLCs. In Asia we are the unchallenged number one in the industrial automation sector. Customers and users alike profit from our profound knowledge of the market, and this has made Mitsubishi Electric a sought-after partner among industrial users all over the world.

High Quality

Our PLC systems are the technology leaders, high-end products that deliver truly outstanding reliability and performance. They don't just meet the requirements of all international quality standards, they exceed them – something that is confirmed by the certifications and approvals. The mature, reliable technology of our PLC systems makes them a safe investment that will continue to pay off for years to come.

Just in time

Our comprehensive network of manufacturing facilities and distributors ensures that our products are always available quickly, both worldwide and in Europe. The stocking of our large central warehouse near Düsseldorf is updated on an ongoing basis to meet current market needs. Our efficient logistics system interacts with a network of local distribution warehouses to ensure that you always get your products delivered when and where you need them.

Worldwide Service

Our experienced service staff provide advice, planning, installation, setup, training and support for all your automation needs. Our central service department is always there to help if you experience technical problems. If you have a particularly complex application we can even provide you with your own project team of application technicians and engineers to help and support you. At Mitsubishi, service means we are always there when you need us. Comprehensive production information and examples of successful applications are also available online at *www.mitsubishi-automation.com*.

Total Quality Management

Our uncompromising commitment to quality does not end with our products and services; it encompasses all our activities, and this also includes our responsibility for the environment and our employees. These high standards of comprehensive quality control have been confirmed with the award of ISO 9000 quality certification from TÜV-CERT in Cologne. All our products also meet the CE requirements, just as you would expect from an international company in Europe.

The World of MELSEC PLCs

The growing complexity of modern industrial automation applications is making integrated, one-stop solutions look more and more attractive. If you want to control demanding applications efficiently then you need technology that is both the most advanced available and easy to use – and this is something that applies to all Mitsubishi Electric products.

*Mitsubishi Electric's families of MELSEC PLCs provide a comprehensive range of products covering all your automation needs. All the controllers can be operated with control units.
MELSECNET and open networks guarantee fast communications and a wide range of connection options.*
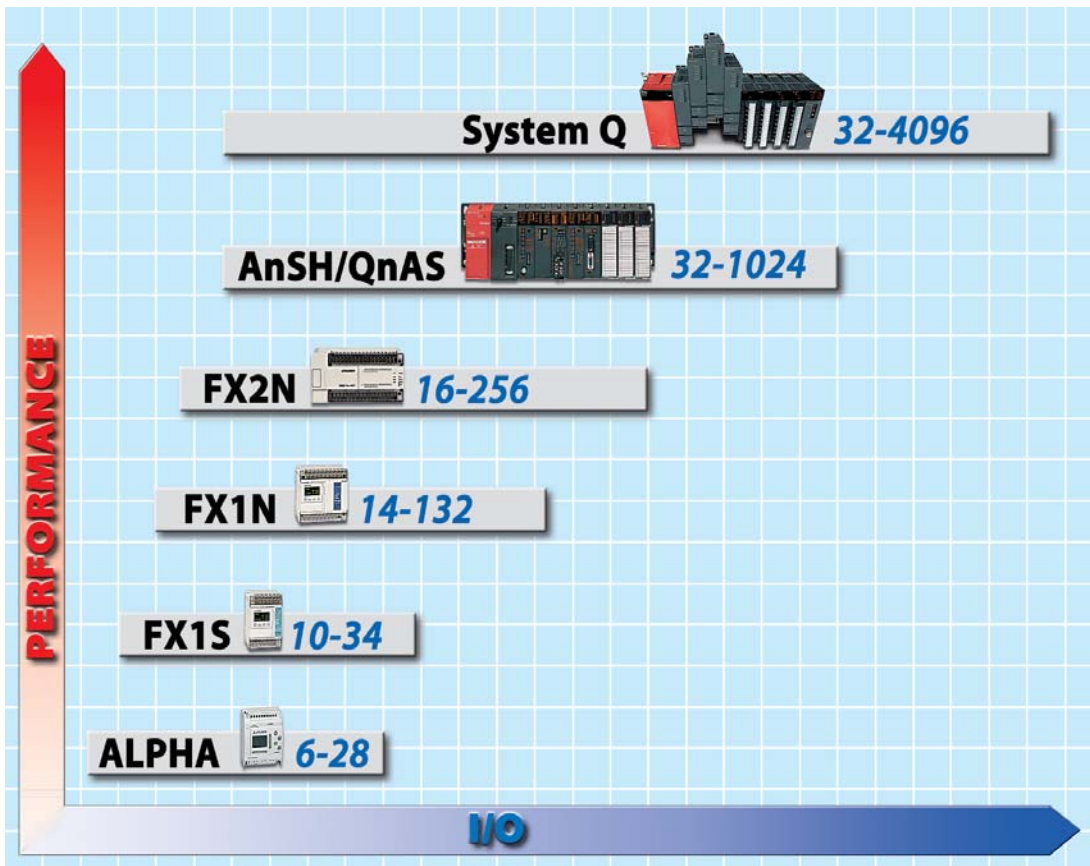

Model	ALPHA/ALPHA XL	MELSEC FX1S/FX1N	MELSEC FX2N	MELSEC AnSH/QnAS	MELSEC System Q
Power supply	100-240V AC, 24V DC	100-240V AC, 24V DC	100-240V AC, 24V DC	100-240V AC, 24V DC	100-240V AC, 24V DC
Inputs	4-19	6-20 / 8-88	8-248	32-1,024	32-4,096
Outputs	2-13	4-16 / 6-66	8 -248	32-1,024	32-4,096
Digital outputs	Relay/Transistor	Relay/Transistor	Relay/Transistor	Relay/Transistor	Relay/Transistor/Triac
Cycle period/log. instr.	Depends on program	0.55 µs	0.08 µs	0.25-0.33 µs	0.034-0.2 µs
PLC program memory	200 function blocks	2 K steps / 8 K steps	8-16 K steps	8-60 K steps	8-252 K steps

MELSEC PLCs are ready for the demands of tomorrow's markets today, guaranteeing reliability and a safe investment now and in the future. Among other things, this is confirmed by the high level of customer satisfaction among the many companies that are still working with older MELSEC PLC systems. In 1981 Mitsubishi Electric introduced the very first compact controller system in Europe, the MELSEC F series with its innovative "everything in a single unit" concept. Since then we have continually developed and improved this technology, to the benefit of all our integrated MELSEC PLC systems. Just one year later we then presented Europe's first modular PLC system, and in the years that followed we also continued the refinement of our modular technology. Our latest achievement, and the pinnacle of this development to date, is the new MELSEC System Q, whose name is already synonymous with advanced technology and reliability. All our automation products also embody our rigorous philosophy of comprehensive system compatibility. For example, standard products like control units and process visualisation software can easily be used with all MELSEC controller systems. This transparency throughout the entire product range makes it possible to configure optimally economical and efficient solutions for all automation tasks.
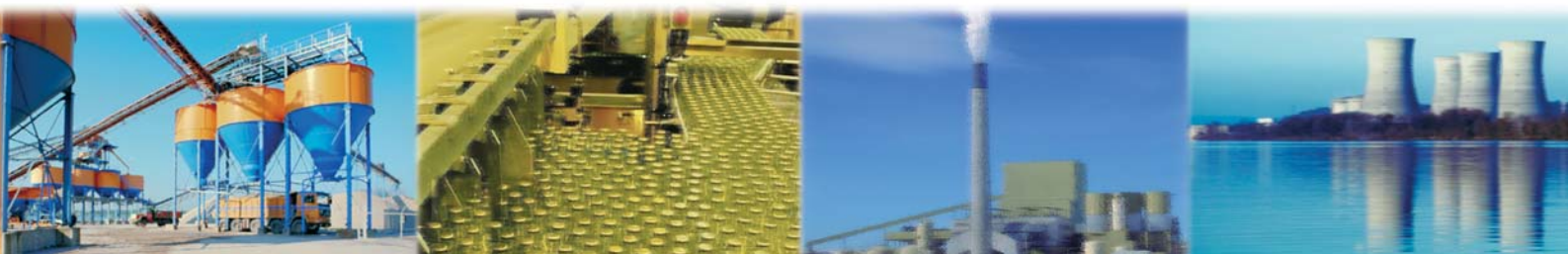
The ALPHA Family –
Versatility for Simple Applications

The integrated products of the ALPHA family replace many of the discrete components used in conventional systems, opening up a whole new range of possibilities for economical solutions.

The following units are currently available:

● *ALPHA 6 with 4I/2O*

● *ALPHA 10 with 6I/4O*

● *ALPHA 20 with 12I/8O*

● *ALPHA XL 14 with 8I/6O*

● *ALPHA XL 24 with 15I/9O*

The ALPHA is ideal for the following types of applications:

● *Greenhouses and agricultural machinery*

● *Pump controllers*

● *Handling systems*

● *Door, gate and win- dow blind controllers*

● *Special-purpose vehicles*

● *Heating, air-conditioning and ventilation*

● *Lighting systems*

● *Alarm and security systems*

● *Outdoor applications*

The ALPHA family defines a new class of performance in the micro-controller category. With their superlative capabilities the ALPHAs are the dominant players in this class, predestined for applications in mechanical engineering, instrumentation and building services automation.

Practical control centre

The units of the ALPHA family have an LCD screen and 8 function keys for direct programming and for entering, editing and displaying process data and system messages. In addition to this the ALPHA XL also features HMI functions and a backlit display.

Integrated analog inputs

In the 24V DC versions you can switch up to 8 digital inputs to analog input mode (0-10V).

Comprehensive instruction set

The ALPHA instruction set was designed by professionals for the daily requirements of automation systems. It combines outstanding
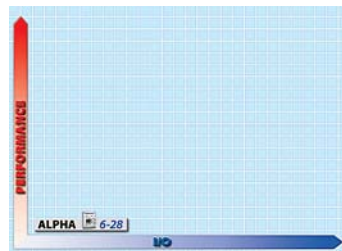
practicality with unparalleled performance, including 38 pre-programmed functions, analog signal processing commands, Boolean opera-tions, set/reset, remote control switches, timer functions, counters and more – the ALPHA XL also features math operations, PWM and PID.

Full-featured calendar and clock functions

All ALPHA controllers come with an integrated real-time clock and calendar with an automatic summer/winter time switching function.

Extended communications functions

The ALPHA XL features a second communications port

that supports remote maintenance via (GSM) modem and programmed transmission of messages, alarms and process data via SMS mobile phone text messaging, e-mail and fax. Of course you can also integrate

the ALPHA/ALPHA XL controllers in an AS-Interface network.

Each of the four ALPHA XL base unit models can be expanded for up to 28 I/Os with any of the five I/O expansion adapters currently available:
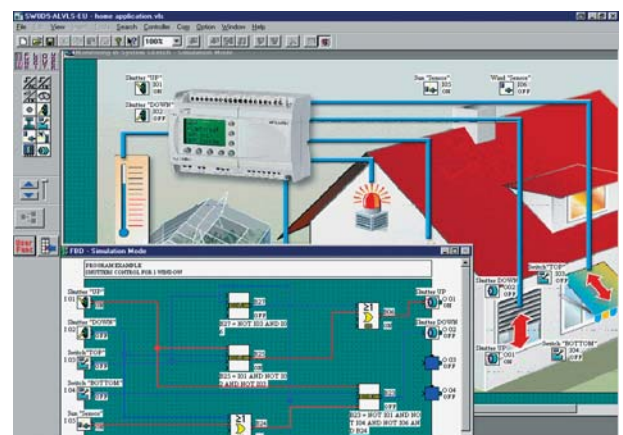
- ● *4 digital 24V DC inputs with integrated 1KHz counters*
- ● *4 digital 240V AC/DC inputs*
- ● *4 relay outputs*
- ● *4 transistor outputs*
- ● *2 analog outputs (0-10V/4-20mA)*

Other highlights of the ALPHA family:

- ● *Large program memory for up to 200 function blocks*
- ● *Menu system in 6 languages (D/GB/F/I/E/S)*
- ● *ALPHA XL supports outdoor applications down to -25°C*

I/O range
ALPHA 6-20 I/Os, ALPHA XL 14-28 I/Os
Memory/function blocks
ALPHA 64 FBs, ALPHA XL 200 FBs
Analog signal processing
Up to 8 integrated inputs, 2 outputs and temperature/voltage converter with ALPHA XL
Resolution
ALPHA 8 bits, ALPHA XL 9 bits
Time switch commands
ALPHA 350, ALPHA XL 1,200
Communications ALPHA
1 x RS-232C
Remote maintenance via modem
Communications ALPHA XL
2 x RS-232C
Remote maintenance via (GSM) modem
E-mail/SMS text messaging support
PC connection protocol
Network technology
AS interface
Power supply
100-240V AC, 24V DC
Dimensions/mm (W x H x D)
71.2/124.6 x 90 x 52/55

The graphical AL-PCS/WIN software package makes programming the controllers of the ALPHA family very simple. It is both powerful and very user-friendly – no special skills or knowledge are required. The package includes programming, simulation and visualisation tools for projects of all types.
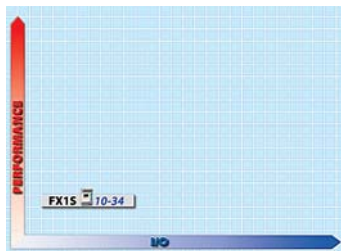
- *Basic units with 10,
  14, 20 and 30 I/Os*
- *Transistor or relay
  outputs*

Original size

*The outstanding
features of the FX1S
make it the ideal
choice for all the
following applications:*

- *Wood working*
- *Packaging and
  wrapping*
- *Custom-built
  machines*
- *Handling systems*
- *Motor industry*
- *Environmental
  systems*

MELSEC FX1S – The Inex-
pensive Entry-level PLC

In recent years PLC systems have undergone radical miniaturisation. At the same time as becoming smaller their performance has also increased. Now Mitsubishi Electric presents the PLC generation of the future: The new FX1S.

The stand-alone FX1S unit comes with 10-34 I/Os, 2K steps of program memory, a maintenance-free EEPROM and a real-time clock.

Compared to its predecessors this innovative controller has significantly greater functionality, much more power, enhanced memory capacity and more comprehensive network support than its predecessors in the FX0S series.

- Fast cycle period of just 0.55µs per logical instruction
- Improved high-speed counter inputs and output signals

Programmable Logic Controllers

- Memory cassettes for easy program exchange
- New comparison and positioning instructions
- 6 interrupt intputs for fast, event-triggered responses

All these features are standard equipment in the PLC generation of the future:

- Serial RS-422 programming port
- Two analog potentiometers
- Interface for optional additional modules

Full information at a glance

In addition to the standard hardware and the optional interfaces you can also add a display with the following features:

- Monitor for bit and word devices
- Ability to edit device values
- Display of the internal real-time clock
- Backlight
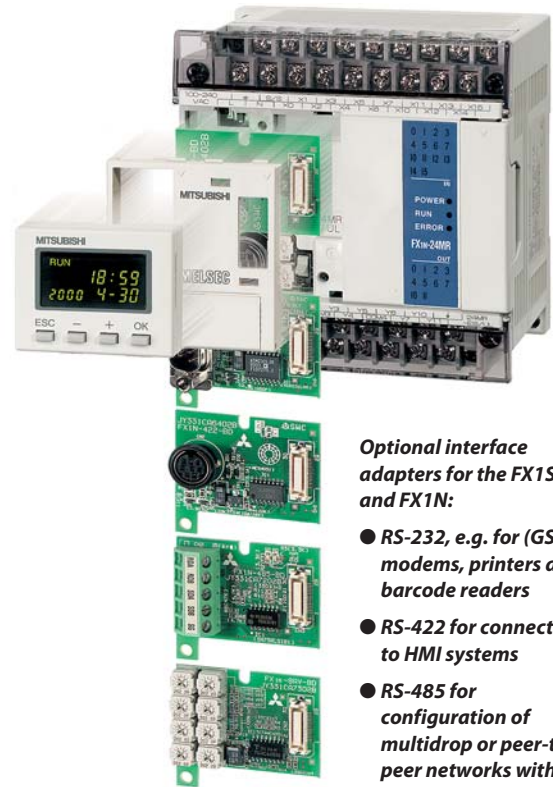
Optional interface adapters for the FX1S and FX1N:

- *RS-232, e.g. for (GSM) modems, printers and barcode readers*
- *RS-422 for connection to HMI systems*
- *RS-485 for configuration of multidrop or peer-to-peer networks with up to 8 stations*
- *An optional module with eight analog setpoint potentiometers is also available*
- *I/O adapter modules are also available, with 4 digital inputs, 2 digital outputs, 2 analog inputs and 1 analog output*

I/O range
10-34 I/Os
Program memory
2,000 steps
Cycle period
0.55µs/log. instr.
Positioning
6 high-speed counters (max. 60kHz)
2 impulse outputs (100kHz)
Network support
Ethernet
CANopen
Power supply
100-240V AC, 24V DC
Dimensions/mm (W x H x D)
60/75/100 x 90 x 75/49

The new FX1S/FX1N can combine controller and drive control functionality, illustrated here with MELSERVO.

INPUT ≤60 kHz
OUTPUT ≤100 kHz

8

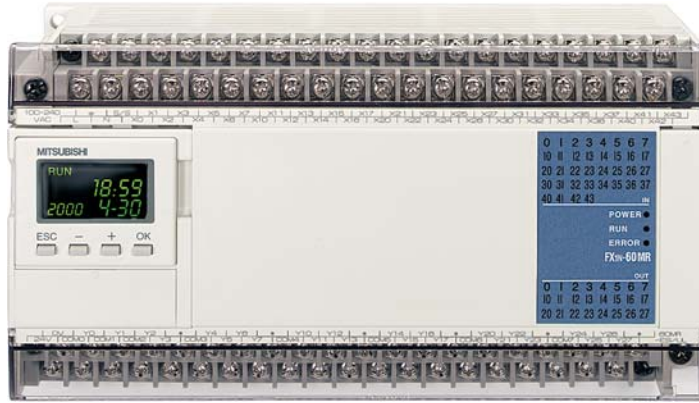# MELSEC FX1N – Comprehensive Functionality and Expansion Options
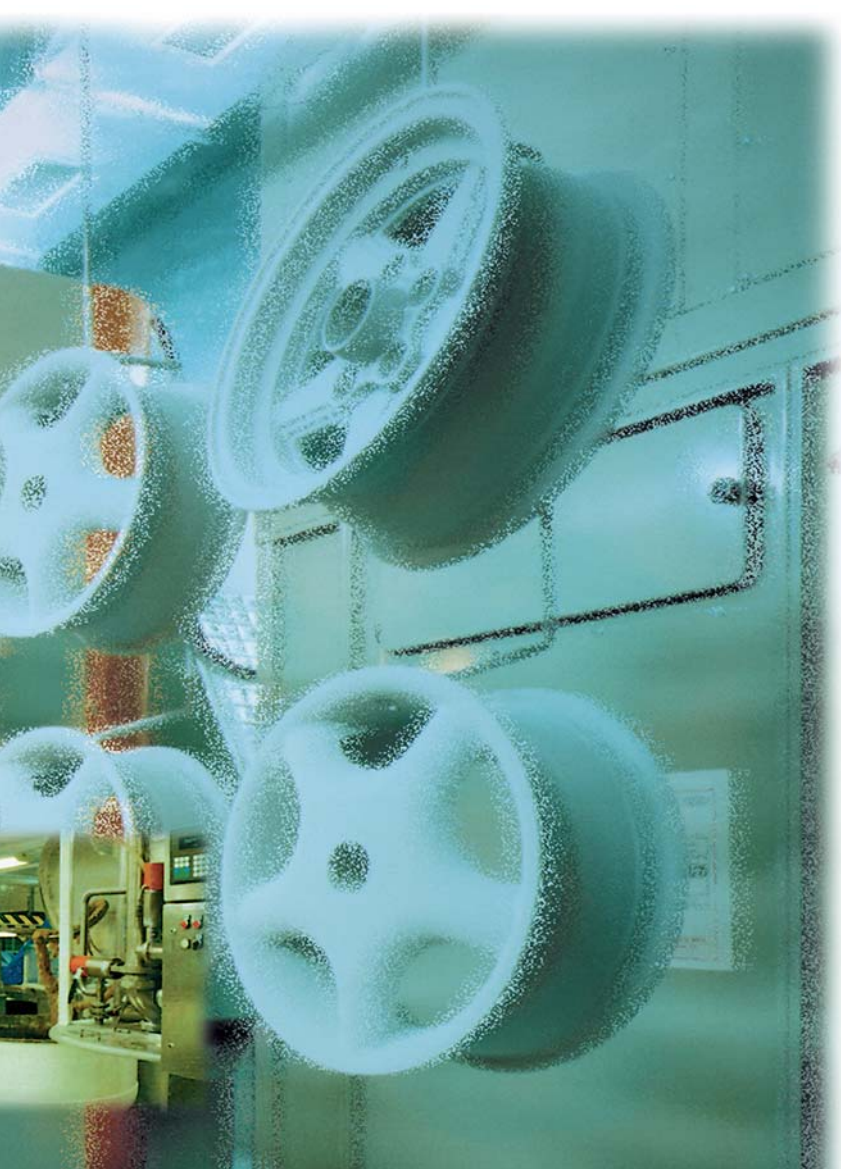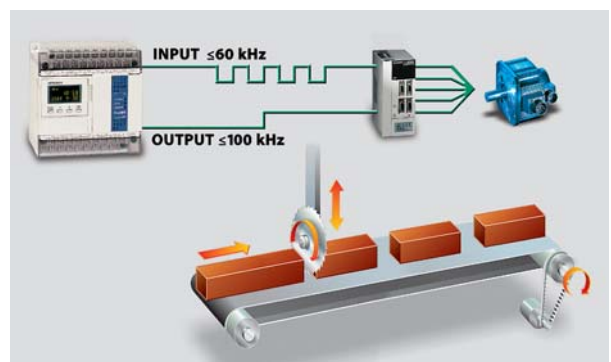
The MELSEC FX1N series includes the following products:

● *Basic controller units with 14, 24, 40 and 60 I/Os*

● *Expansion units 8-48 I/Os*

● *Special function modules for analog value processing, temperature measurement and communications*

The controllers of the MELSEC FX1N series are particularly well suited for the following applications:

● *Wood working*

● *Weighing systems*

● *Revolving doors, door control systems*

● *Motor vehicle industry*

● *Elevator control systems*

● *Sewage and effluent systems*

● *Greenhouse climate control*

● *Bakery machines*

● *Textiles machines*

Network capability and powerful performance

Support for the digital expansion and special function modules of the existing FX2N enables expansion of the FX1N for processing analog signals, temperature data etc. Together with a variety of interface modules this makes it possible to configure this controller precisely for specific application profiles. Support for variable power supplies from 12-24V DC makes it

FX1N 14-132
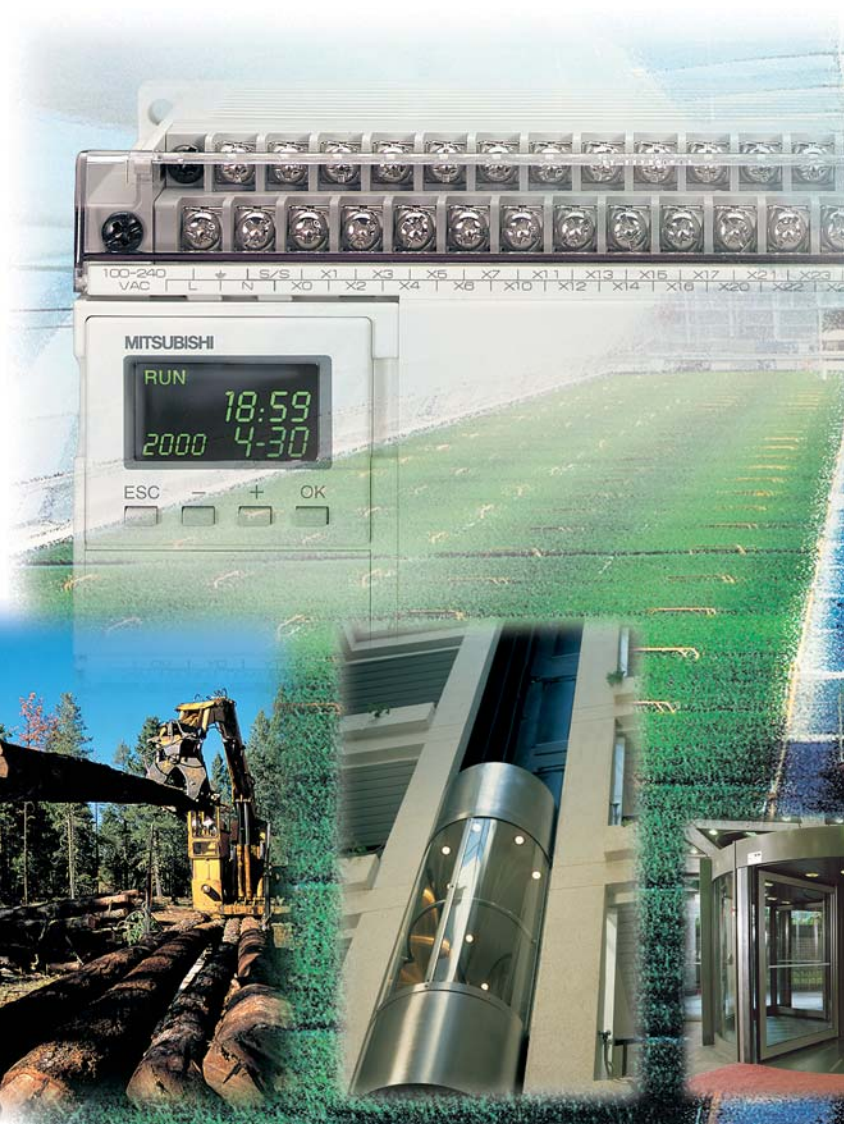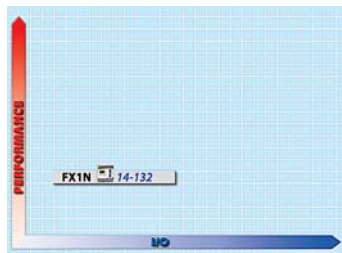
possible to use the FX1N in motor vehicles and similar applications.

Compatibility cuts costs

Making the switch is easy because existing FX0S and FX0N applications are terminal- and program-compatible to the FX1S/FX1N. The integrated two-point DIN rail adapter enables single-handed installation and removal. Support for remote programming and debugging via modem links makes application program maintenance extremely simple.

All controllers from the smallest FX1S to the biggest FX2N can now communicate directly via network links, making restrictive island solutions a thing of the past.

Positioning control has a big future

The FX1S/FX1N can handle both control and drive applications. New positioning instructions, integrated counter inputs with frequencies of up to 60kHz, digital signal outputs with frequencies of up to 100kHz and user-defined acceleration and deceleration ramps enable independent control of up to two stepping or servo motors. This means that you can dispense with specialised modules and positioning units for simple positioning tasks with up to two independent axes.

The FX1S/FX1N is compatible to its predecessor.

The following expansion modules are available for the FX1N:

- *RS-232 for peripherals, e.g. (GSM) modems, printers or barcode readers*
- *RS-422 for the connection of MMI systems*
- *RS-485 for the configuration of multidrop or peer-to-peer networks with up to 8 stations*
- *FX0N-232ADP and FX0N-485ADP communications modules*
- *All expansion modules and devices of FX0N and FX2N*
- *An expansion module with 8 analog setpoint potentiometers*
- *I/O adapters with 4 digital inputs, 2 digital outputs, 2 analog inputs and 1 analog output*

I/O range
14-132 I/Os
Program memory
8,000 steps
Cycle period
0.55µs/log. instr.
Positioning
6 high-speed counters (max. 60kHz)
2 impulse outputs (100kHz)
2 ext. high-speed counters (50kHz)
2 positioning modules
Analog signal processing
Up to 16 I/Os
Resolution
8, 12 or 16 bits
Network support
Ethernet
Profibus/DP
CC-Link
CANopen
DeviceNet
AS-Interface
MELSEC I/O-Link
MELSEC FX Peer-to-Peer (PPN)
Power supply
100-240V AC, 12-24V DC
Dimensions/mm (W x H x D)
90/130/175 x 90 x 75

Can be connected to a variety of networks.
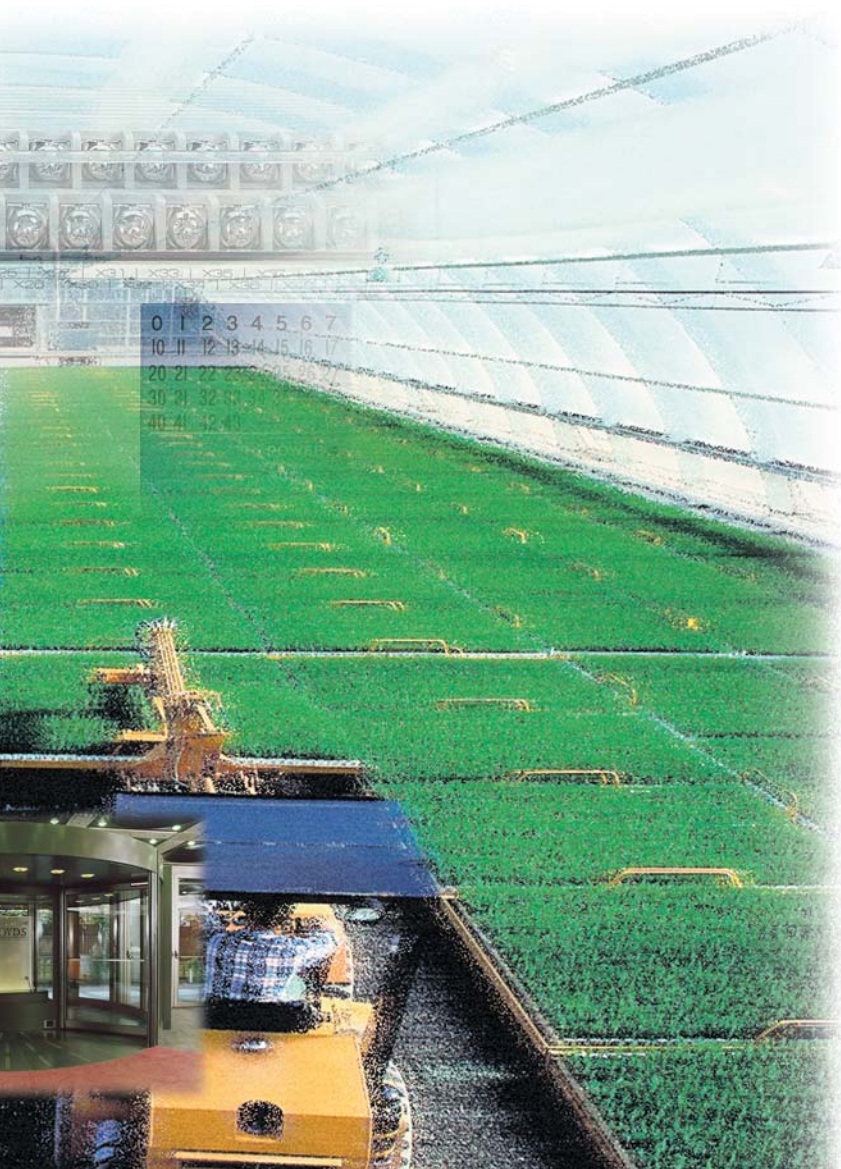
MELSEC FX2N –
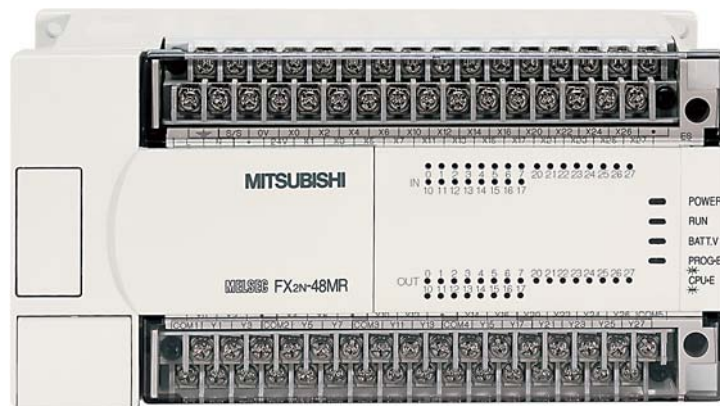# Maximum Performance, Minimum Dimensions

*The MELSEC FX2N
series includes the
following products:*

● *Basic controllers
with 16, 32, 48, 64,
80 and 128 I/Os*

● *Expansion units with
from 8-48 I/Os*

● *Special function
modules for analog
signal processing,
temperature
measurement and
communications*

A Big Performer in a
Compact Package

The MELSEC FX2N brings the
performance of big PLC
systems to the world of mini
controllers. It combines all the
features of the FX1N with the
power and speed of much
larger PLC systems. With a
cycle period of just 0.08µs per
logical instruction it's one of
the fastest PLC systems
available in the range up to
256 I/Os, even putting some
bigger modular controller
systems in the shade.

*The controllers of the
MELSEC FX2N series are
particularly well suited
for the following
applications:*

● *Paint-spraying systems*

● *Bakery machines*

● *Automobile
manufacturing*

● *Custom-built
machines*

● *Packaging machines*

● *Water resources and
environmental
systems*

● *Textiles machines*

● *Ship equipment*

● *Harvesting machines*
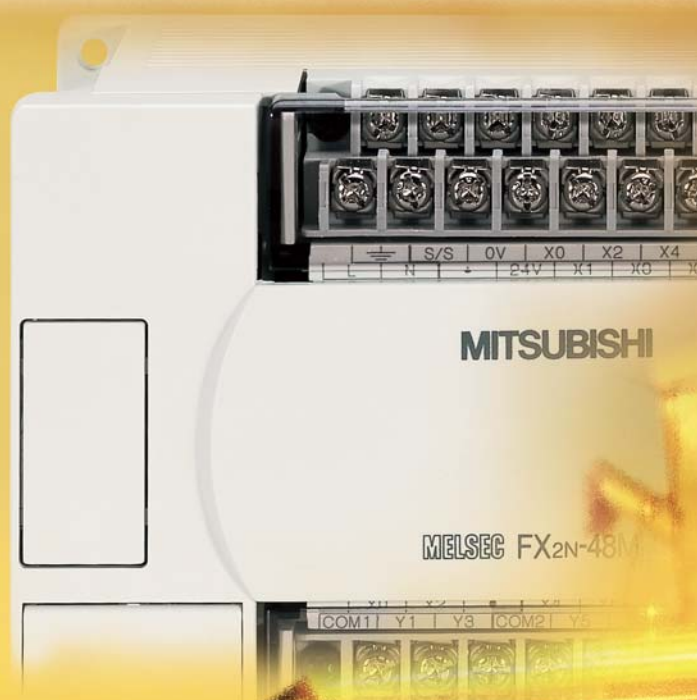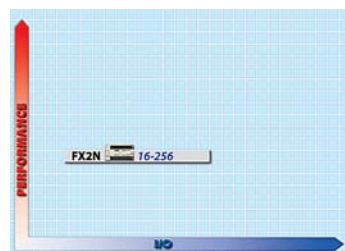
● *Handling systems*

Power reserves for every situation

The MELSEC FX2N is an uncompromising development and improvement of the design concept of the FX1N. It features integrated high-speed counters supporting input frequencies of up to 60kHz. The standard 8,000 PLC program step internal memory with backup battery can be expanded to 16,000 steps. A significantly enlarged instruction and device set makes the controller even more effective and easier to use. The standard equipment of the MELSEC FX2N also includes a PID controller with autotuning functionality, floating-point math, trig functions and an integrated real-time clock.

Comprehensive connectivity

A wide range of optional interfaces are available to complement the controller's standard RS-422 port. You can install additional RS-232/422 or RS-485 active programming interfaces. Add-on RS-232 interfaces provide broad communications functionality and enable connection of serial peripherals like printers and barcode readers. An optional RS-485 interface can be used to configure a peer-to-peer network with up to eight PLC systems from the FX family: The FX2N functions as the master with up to seven FX1S/1N, FX2N or FX2NC controllers configured as slaves.
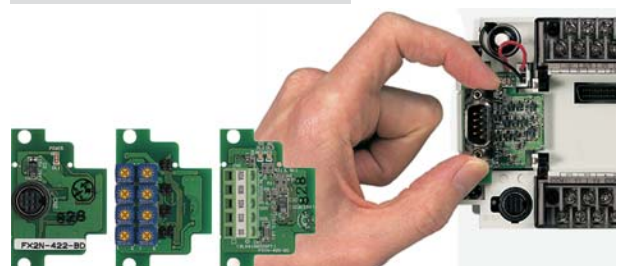

MELSEC Networks — Open Networks
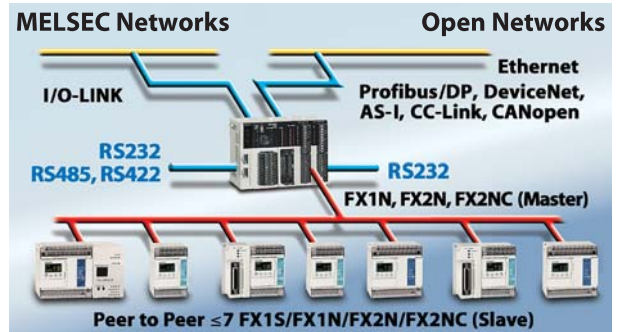
Remote I/Os are supported both by the open AS-Interface and the MELSEC I/O-Link networks. CC-Link, Profibus/DP and DeviceNet interfaces are also available for the FX1N/FX2N controllers, enabling connection to a wide variety of host controller systems.

I/O range	
16-256 I/Os	
Program memory	
Up to 16,000 steps	
Cycle period	
0.08µs/log. instr.	
Analog signal processing	
Up to 64 I/Os	
Resolution	
8, 12 or 16 bits	
Positioning	
4 high-speed counters (60kHz)	
2 impulse outputs (20kHz)	
8 ext. high-speed counters (50kHz)	
8 positioning modules	
Network support	
Ethernet	
Profibus/DP	
CC-Link	
CANopen	
DeviceNet	
AS-Interface	
MELSEC I/O-Link	
MELSEC FX Peer-to-Peer (PPN)	
Power supply	
100-240V AC, 24V DC	
Dimensions/mm (W x H x D)	
130-350 x 90 x 87	

The range of serial interfaces available for all basic controller units can be replaced quickly and easily.

MELSEC AnSH/QnAS –
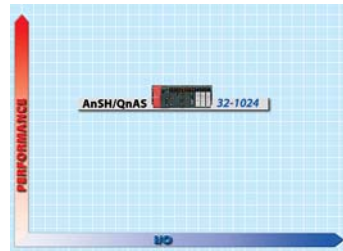# High-End Power in a Compact Format

The modular AnSH/QnAS models can be configured precisely for a wide range of different control tasks. You can choose from a range of finely-graduated CPUs and over 60 different application modules. Despite this power and versatility, the AnSH/QnAS system takes up very little cabinet space. It can pack a full 160 I/Os into an area measuring just 32.5 x 13cm, guaranteeing extremely cost-effective automation solutions.

Comprehensive communication and networking

The network capabilities of the AnSH/QnAS are equally impressive. Support for Profibus, Ethernet, DeviceNet and CC-Link are standard, as is support for the Mitsubishi networks MELSECNET/B and MELSECNET/10. The AnSH/QnAS series is a universal controller for a very broad range of applications and needs.

Flexible memory expansion options

Extremely short response times predestine the QnAS for complex automation solutions. Program memory for up to 60K of PLC program steps is standard and a PCMCIA slot can accommodate up to 2MB of additional RAM, providing the capacity needed by demanding applications, including extensive recipe management systems.

Performance spectrum

You can configure complex positioning applications controlling up to 32 axes per module with linear or circular interpolation. S-shaped acceleration and deceleration ramps go easy on your valuable machines. The AnSH can also control up to 96 stepping motors. That's the kind of all-round flexibility that modern factories need.

Communications performance

The high-speed module rack of the QnAS system makes it possible for the network modules to provide extremely fast data transfer rates between the controller and the network. It takes less than 1 second to transfer a 50KB recipe from the host computer to the controller via an Ethernet link – the PLC program execution cycle continues normally during the transfer, of course.
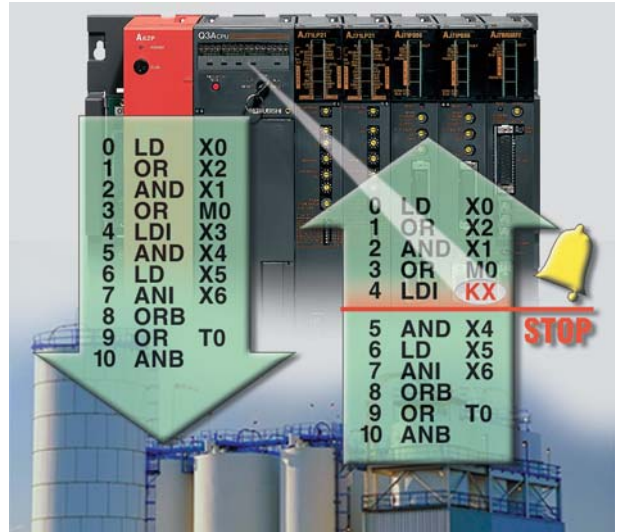
A comprehensive range of marine approvals also makes this controller an excellent choice for ship automation and offshore applications.

2,048 relays and data registers are reserved for diagnostics functions.

Digital I/Os	
1,024 local, 8,192 remote	
Analog I/Os	
256, resolution max. 14 bits	
Program memory	
60K steps	
1,018,000 file registers	
Cycle period	
Binary: min. 0.25/0.075µs	
Word: min. 9.0/0.25µs	
Positioning	
Max. 96 stepping motors	
Max. 32 servo motors	
Max. 64 high-speed counters	
Network support	
Comprehensive network support	
Power supply	
100-240V AC, 24V DC	
Dimensions/mm (W x H x D)	
220-430 x 130 x 94/110	

Over 60 different application modules are available for a wide variety of functions.

MELSEC System Q –
The System Platform for Automation

Multiprocessor Power for Tomorrow's Challenges

Ever more demanding manufacturing systems, new forms of communication and the need to integrate new technologies are pushing the performance limits of conventional PLC systems. Mitsubishi Electric's response to these growing challenges is a new high-end controller with advanced multi-processor technology: MELSEC System Q!
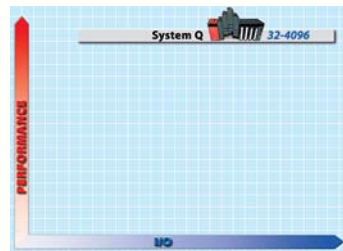
In each system up to four separate CPUs share the processing load of control, motion control, PC and communications tasks. This brilliantly simple solution, introducing the concept of teamwork to controllers, brings a drastic boost in system availability and performance.

Fast, flexible and service-friendly

With its unique design concept and outstanding features MELSEC System Q can rightfully claim to be the controller platform of the future.

● All program cycle periods continuously adjustable from 0.5-2.000ms in 0.5ms steps

● Self-diagnostics with error history stored in the CPU

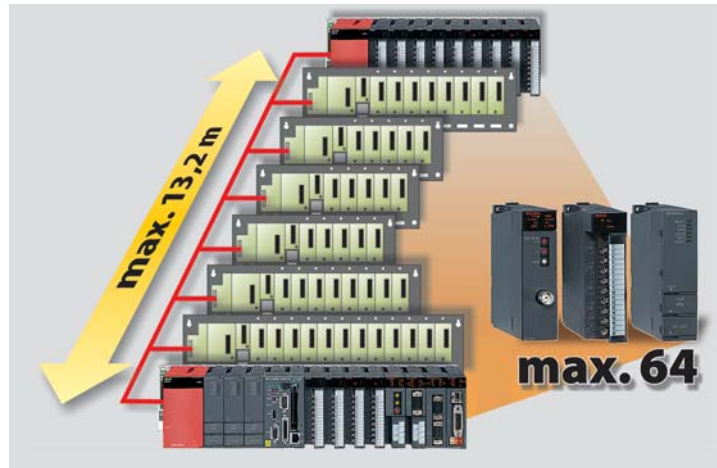● Memory expansion options up to 32MB

- ● Support for remote diagnostics and programming (modem, Internet, intranet)
- ● Monitoring of special function modules, online system analysis on screen
- ● All CPUs fitted with integrated Flash ROM
- ● Utility tools enable simple configuration and functional tests of analog and special function modules
- ● Programmable with IEC 1131.3/EN 61131-3 compatible software or (via a PC CPU) in high-level languages like C++ or Visual Basic
- ● Soft PLC available for the PC CPUs

The extremely compact design of the MELSEC System Q saves valuable space in your switchgear cabinet. The wide choice of CPU units makes it possible to configure your systems precisely for your application needs. And thanks to the platform-based architecture you can reconfigure at any time without changing the remaining components. All in all a very solid investment with great potential.

*The following modules
are available for the
MELSEC System Q:*
- ● *A selection of PLC CPUs*
- ● *A selection of motion controller CPUs*
- ● *Complete, full-function PC module*
- ● *Digital I/O modules*
- ● *Analog I/O modules*
- ● *Communications modules for Ethernet, MELSECNET10/H, serial ports, Profibus/DP, CC-Link, DeviceNet and AS-I*
- ● *Special-function modules for interrupt processing, temperature acquisition, temperature control, positioning and high-speed counters*

Digital I/Os
Q00J 256 local, 2,048 total
Q00/01 1,024 local, 2,048 total
Q02-25H 4,096, 8,192 total
Analog I/Os
Resolution 16 bits (15 bits + sign)
Conversion time 80µs/channel
Precision ±0.1% of measurement range
Auto temperature drift compensation
Program memory Single PLC CPU models
Q00JCPU 8K steps
Q00CPU 8K steps
Q01CPU 14K steps
Program memory Multiprocessor PLC CPU models
Q02CPU 28 K steps
Q02HCPU 28K steps
Q06HCPU 60K steps
Q12HCPU 124K steps
Q25HCPU 252K steps
Memory PC CPU models
64/128MB RAM
32MB – 1GB silicon drive
Up to 2 x 5GB UDMA hard disks
Operating systems
Windows® NT 4.0/NT/2000 Prof.
Cycle periods
200ns/log. instruction (Q00JCPU)
160 ns/log. instruction (Q00CPU)
100 ns/log. instruction (Q01CPU)
79 ns/log. instruction (Q02CPU)
34 ns/log. instruction (H models)
Positioning
1, 2 and 4 axis positioning modules
Motion control
8 or 32 axes per Motion CPU
Motion CPU models
Q172CPU 8 axes
Q173CPU 32 axes
Network technology
Complete network support
Power supply
100-240V AC, 24V DC
Dimensions/mm (WxHxD)
189-439 x 98 x 98
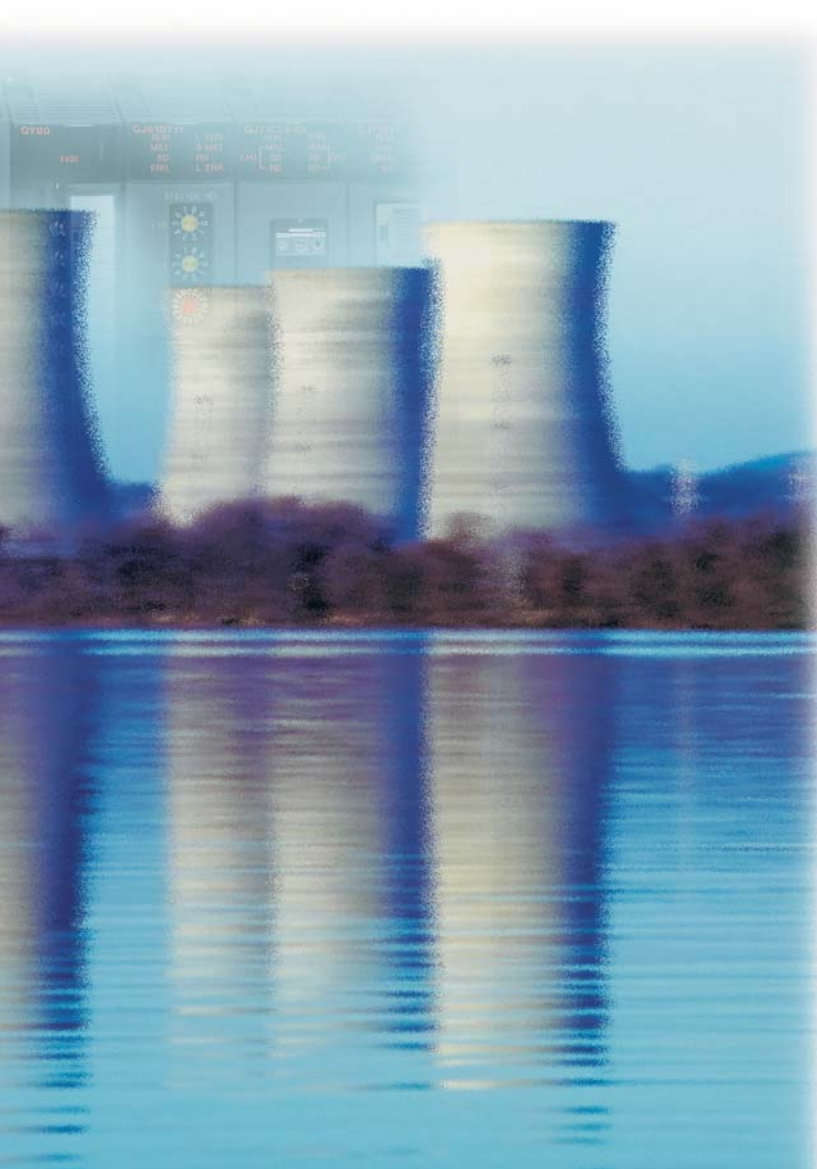
MELSEC System Q –
The High-Performance System

There's no more need to install multiple PLCs and a network to connect them.

● *Now you can control multiple applications within a single system using MELSEC System Q's powerful multiprocessor functionality.*

Mitsubishi Electric has once again set unique new standards in the industrial automation industry: The new MELSEC System Q features advanced multiprocessor technology, with support for up to four CPUs in a single controller.

Integrated motion controller for universal functionality

Equally unique is MELSEC System Q's ability to seamlessly integrate PLC and drive applications (see the Motion Controllers catalogue for details). You can install PLC CPUs, motion controller CPUs and PC CPUs together on a single platform. Motion controllers with up to 32 axes per Motion CPU are available, and you can install up to four PLC CPUs, one PC CPU or three

Motion Controller CPUs per system – allowing you to control up to 96 servo axes simultaneously.

Full-featured slot PC for open-platform functionality

MELSEC System Q's ability to integrate a full-featured PC module opens up a whole range of new possibilities. The combination of the MS Windows® world with traditional PLC technology and/or drive systems technology on a single platform makes MELSEC System Q a really safe investment in the future.

Online Change for maximum efficiency

The Online Change function makes it possible to implement PLC program modifications while the system is actually running. New programming interfaces and a new operating system guarantee that the Online Change functionality is fast, efficient and safe. The Q CPUs have two programming interfaces:

● RS-232 (115.2Kbps)

● USB (12Mbaud, for H-CPU models)

In addition to faster program transfers and editing, these high-speed interfaces also improve the performance of the monitoring and diagnostics functions.

IT technology for worldwide connectivity

The e-mail function can be used to automatically send alarms generated by system components to up to sixteen recipients. You can also send files with the FTP function (service requests, reports etc).

Programming with high-level languages

The PC CPU can handle control tasks on its own, without any additional CPUs. Using C++ or Visual Basic you can control all or part of your system with a high-level language. Or you can use Mitsubishi Electric's Soft PLC, the SX Controller. It really would be very difficult to create a more open and versatile system than this one.

With its integrated IT technology the new MELSEC System Q opens up a wide range of options for worldwide communication, including all the following functions:

● *Remote maintenance and diagnostics via the Internet*

● *Automated reports via e-mail*

● *Automated alarm messages via SMS*

● *FTP file transfer*

● *Storage of and access to HTML pages in the PLC*

● *Integration of a full-function slot-in PC*

The 3 in 1 benefit factor: PLC, motion controller and PC

● *The MELSEC Q enables you to execute controller, PC and drive system applications simultaneously with a single system.*

17
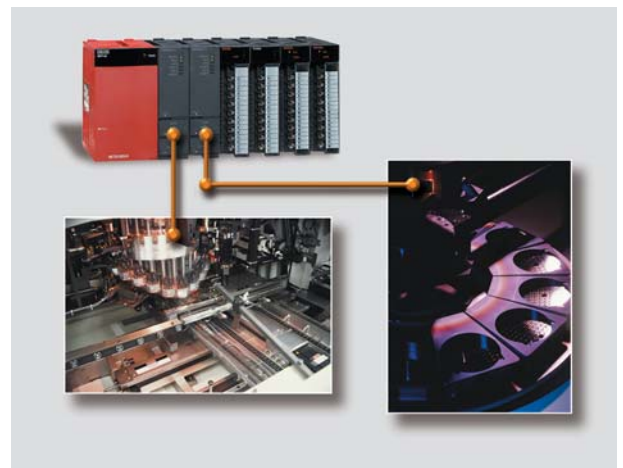
The MELSEC ST –
Configurable for Maximum Flexibility

The MELSEC ST has a practical modular architecture that includes the following electronics and base modules:

● *Digital inputs with adjustable reaction time*

● *Short-proof transistor outputs*

● *Analog input and output modules using current or voltage signals*

● *16-point block modules as inputs or outputs*

● *Power supply modules*

The MELSEC ST delivers great benefits for applications in all the following fields:

● *Textiles industry*

● *Paper processing*

● *Cardboard boxes and packaging*

● *Water treatment*

● *Motor industry*

● *Standard machines*

● *Plant engineering*

Forward-looking modular architecture

Growing demands on decentralised automation systems call for new, high-performance designs that facilitate system development and implementation. The MELSEC ST is the synthesis of all the key factors needed for success:

● Extremely simple handling combined with high-tech functions.

● Outstanding availability, service life and performance under heavy-duty conditions.

● Efficient and trouble-free, from initial project planning to ongoing maintenance.

● Uses tried-and-tested, well-established terminal technology.

● Enables cost-effective implementation of features and functions.

High-precision granularity

Other key strengths of the MELSEC ST series include:

● 2-point granularity

● 16 I/O block modules

● Permanent wiring

● Hot-swap module replacement during operation

● Additional terminals are no longer required

Improvements for many applications

With its many benefits the MELSEC ST guarantees a high level of efficiency combined with lower costs, both for simple tasks and in highly-complex applications such as those in the textiles industry, paper processing, cardboard box and packaging technology, water treatment and many other fields. All the required tools are already integrated in the GX Configurator DP package (V6 and above). That means: No additional costs. The software package includes a lot of functions:

● Comprehensive plain text diagnostics for every component in the System Monitor

● Printouts of realistic system layout images and the system configuration

Remote IOs

Remote I/Os are the key to success in today's automation technology. In this important product group Mitsubishi Electric offers sliced I/Os plus a compact block configuration with an IP20 protection rating.

In addition to this Mitsubishi also produces a large range of waterproof IP67 class products along with a comprehensive selection of accessories, such as M12 connection cable.

Depending on their types the devices can be used with the networks CC-Link, Profibus, AS-Interface and MELSECNET with its remote stations.

IP20 **IP67**

The following remote function modules are currently available:

● *Digital I/Os*
● *Analog I/Os*
● *High-speed counters*
● *Positioning modules*
● *Standard interfaces*
● *PC module cards*
● *Data photoelectric barriers*
● *Optical converters*
● *Repeaters*

● Monitoring of the incoming and outgoing parameter messages from the Profibus Master

● Parameter configuration, documentation and project backups of the entire system and all settings

● Plausibility checks and help with project planning and calculation of the power modules required

● Useful setup support tools in online mode, e.g. forcing spectific status conditions

● Complete operation functions including user parameters, resets, alarm settings and more

The powerful GX Configurator DP software package includes all the tools you need for everything from project planning to maintenance.

Configuration
Two-component system
Max. 256 I/Os, 63 slices
Digital inputs
Slice module 2 points
Block module 16 points
Digital outputs
Slice module 2/4 points
Block module 16 points
Short-proof as an option
Analog I/Os
Resolution 12 bits + sign
Current/voltage signal
Extended functionality
Head station
Profibus/DP
Base modules
Spring/screw terminals
Terminal level with power supply
Automatic PE connection
Power supply
24V DC
Dimensions
Slice modules 12.6mm wide
Block module 100.8mm wide
Max. expansion width 850mm
Height from 117.6 - 154.4mm

MELSEC Network Technology –
The Right Connection for Every Application
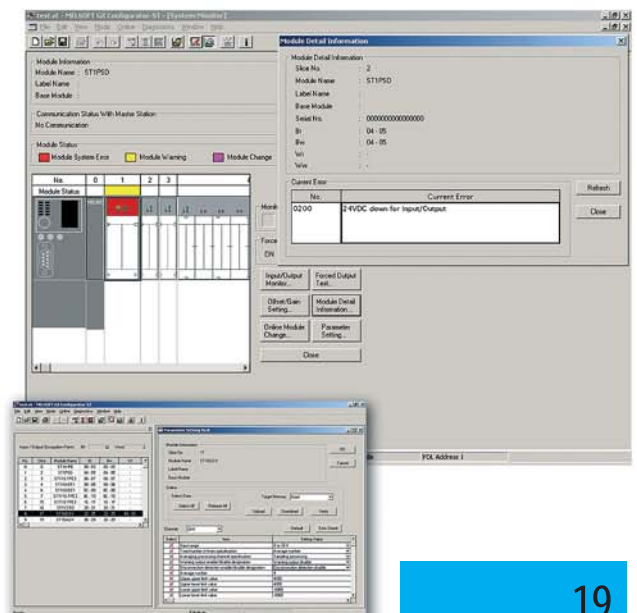
MELSEC networks are available for all manufacturing technology levels

Production facilities without data exchange and communication technologies are unthinkable in today's world. More and more manufacturers are now implementing ISO 9000 systems in response to growing consumer quality awareness. This makes production data logging essential, either as paper printouts or as trend records in a control computer. At the same time, the costs pressure exerted by the global market is forcing companies to find new ways to reduce the prices of complex machines. All this quickly leads to demands for remote I/Os – and no matter how unusual or complex the application, Mitsubishi always has the perfect network solution.

First example:

A customer wants to automate a production system with a large number of machines, using sensor and actuator hardware from a number of different manufacturers. The customer also wants to be able to use a control unit to display the status of all the machines. The ideal solution here is PROFIBUS/DP, a non-proprietary network supported by over 1,500 products available worldwide. A MELSEC PLC can easily be configured to control this network. You can also integrate the powerful GOT900 or MAC E control units and the very flexible, modular remote O/I units of the ST and MC series in the PROFIBUS/DP network. Networks like these are now often used in the car, food and wood working industries.

MELSEC NETWORKS

MELSECNET/10/H and (II)
Unbeatably simple configuration and maximum availability thanks to redundant architecture and Floating Master. Maximum extent 30km with up to 255 segments.

MELSECNET/B, MELSEC PPN
These two networks provide inexpensive solutions within the production level. They enable distributed intelligence that simplifies the implementation of complex applications.

MELSEC I/O-LINK
Network that enables remote installation of modules on the individual machines. Uses twisted-pair cabling and a user-definable tree structure.
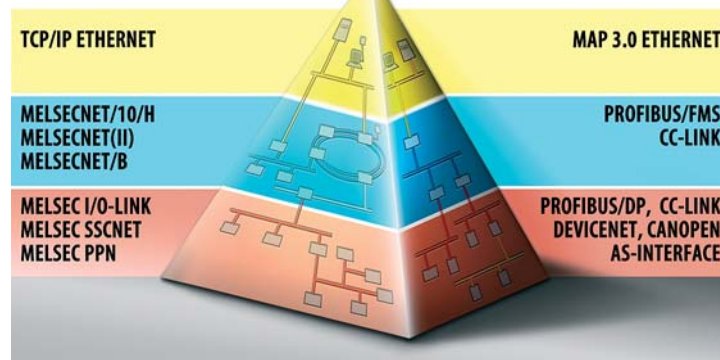
MELSEC SSCNET
Synchronous high-speed network for servo and motion applications. Extremely reliable performance. Very simple cabling and connection.

MELSECNET/B

MELSECNET/10
MELSECNET(II)

TCP/IP

PROFIBUS

MELSEC I/O LINK

MELSEC SSCNET

PPN

AS INTERFACE
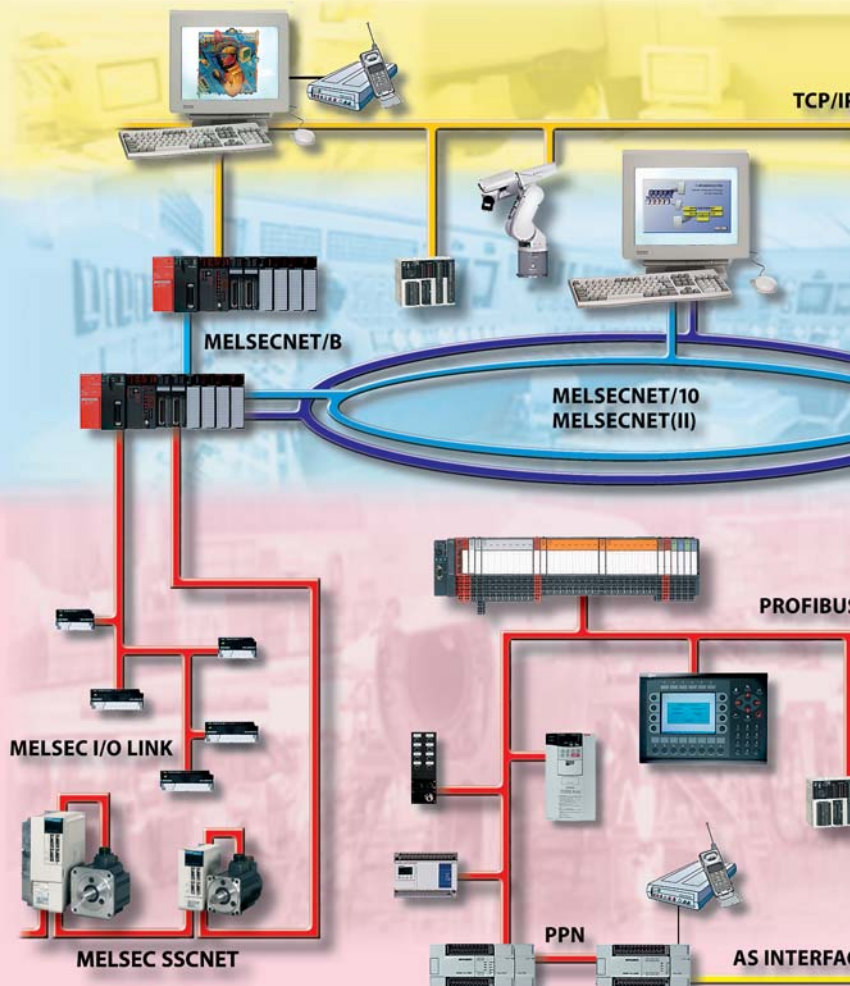
Second example:

A customer needs to transfer large amounts of data between several controllers over large distances. Requirements include very high data rates plus outstanding reliability and failsafe performance.
The best network solution for this application is MELSECNET/10/H. Personal computers can easily be integrated in this network, which uses a redundant ring topology, an architecture that guarantees maximum availability. In addition to this MELSECNET/10/H uses a floating master, which ensures that power failures at individual stations have no effects on the other network stations. Data is transferred at

MELSEC Networks   **Open Networks**

MELSEC Networks	Open Networks
TCP/IP ETHERNET	MAP 3.0 ETHERNET
MELSECNET/10/H MELSECNET(II) MELSECNET/B	PROFIBUS/FMS CC-LINK
MELSEC I/O-LINK MELSEC SSCNET MELSEC PPN	PROFIBUS/DP, CC-LINK DEVICENET, CANOPEN AS-INTERFACE

extremely high speeds – you can choose between 10 and 25Mbaud – with a maximum network extent of 30km. Furthermore, up to 255 of these network segments can be linked, enabling the configuration of network structures with almost unlimited complexity. Networks like these are

needed in power stations, airports and all other big installations where maximum performance and reliability are required.

Whatever your application, you can always be sure that Mitsubishi Electric has the right MELSEC network for the job!

Reliable and versatile – MELSECNET/10/H:

● *Redundant network manager for maximum communications reliability and availability*

● *Flexible structure with bus or ring topology*

● *Virtually unlimited expansion – up to 255 networks with 64 stations per network*

● *Also supports star configurations*

● *Direct network access from every connected station*

Central monitoring of all network stations

OPEN NETWORKS
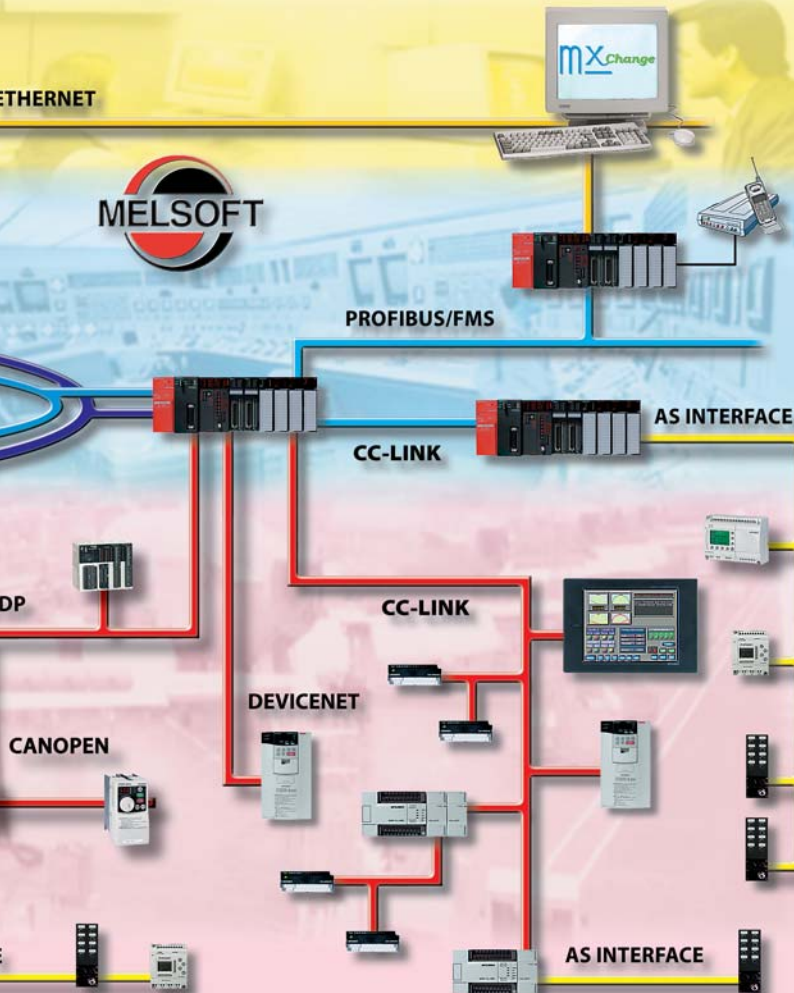
TCP/IP ETHERNET
The worldwide TCP/IP standard gets you up and running without delays. Ethernet gives connected PCs access to all PLCs in the entire MELSECNET configuration, all the way down to the individual I/Os on the production level.

PROFIBUS/DP
*Communication with third-party systems.
Data transparency with MELSEC networks. Simple handling of large data volumes with complex sensors and good diagnostics capabilities. High speed and secure communications technology.*

CC-LINK
Network for the control and I/O level with real-time processing and distributed intelligence. Supports connection of third-party hardware.

CANopen
Cost-effective communications network in interference tolerant network structure. Components of different manufacturers can be integrated easily and quick.

DeviceNet
CAN-based communications network. An error-tolerant network that allows fast and easy connection of components from a wide variety of manufacturers.

AS-Interface
Inexpensive field bus solution with user-definable tree structure. Single line for data and power. Very short cycle periods combined with outstanding reliability.

MELSOFT – The Progressive Software Concept from MITSUBISHI ELECTRIC

Around the globe, state-of-the-art automation systems from Mitsubishi Electric are contributing to technological progress and economic success. The legendary reliability and user-friendly operation of Mitsubishi Electric's hardware components are also key features of the integrated Mitsubishi ELectric SOFTware concept MELSOFT.
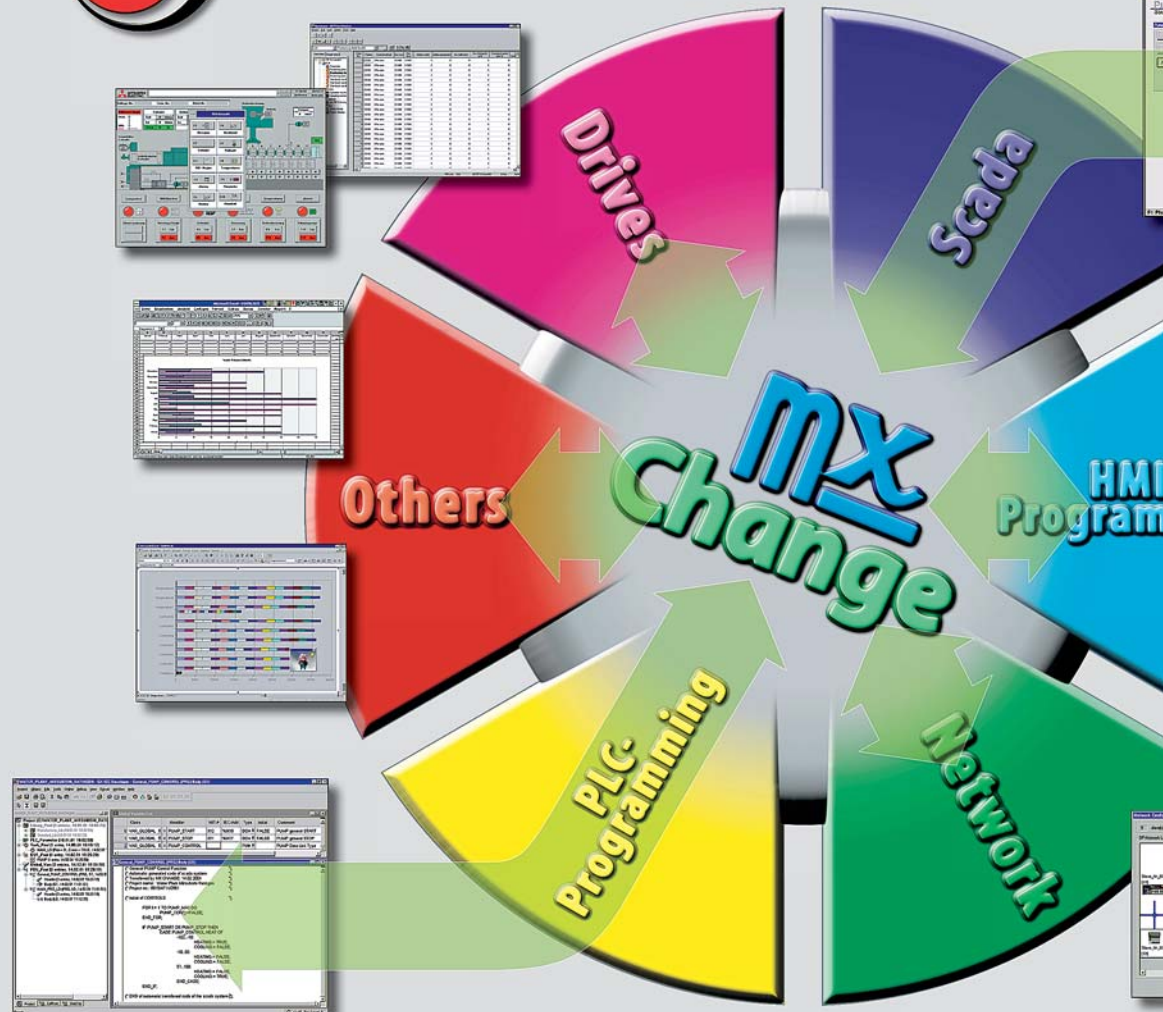
Data and programs are fully compatible and portable between all the many software packages within the MELSOFT system. The foundation for this transparent data exchange is the MX Change package.

In recent years growing requirements and new specifications have almost doubled automation development costs. Networks, positioning, analog signal processing, open bus systems, control units and complete process visualisation links are now all standard components of automation systems. Many projects have become so complex that the project teams must now include a large number of skilled workers to write the PLC programs, program the control units and create the visualisation applications. MX Change helps to keep development and maintenance overheads, and

The MELSOFT concept encompasses the following software packages:
- *GX IEC Developer*
- *GX Developer*
- *GX Configurator DP*
- *E Designer*
- *GT Works*
- *GT SoftGOT*
- *E-View*
- *MX Components*
- *MX Sheet*
- *MX OPC Server*
- *MX SCADA*

thus the system price, within reasonable limits. It does this by handling the entire data management within your project team, co-ordinating the transparent exchange of data and code between the individual MELSOFT programs. It even supports links to other systems, such as CAD systems.

MX Change's efficient performance is achieved with several different program modules. The foundation is the MX Change server, which is a database that can be accessed by all programs integrated in the system. It is used both as a local server and

The GX IEC Developer is more than an IEC 1131.3/EN 61131-3 programming and documentation system.
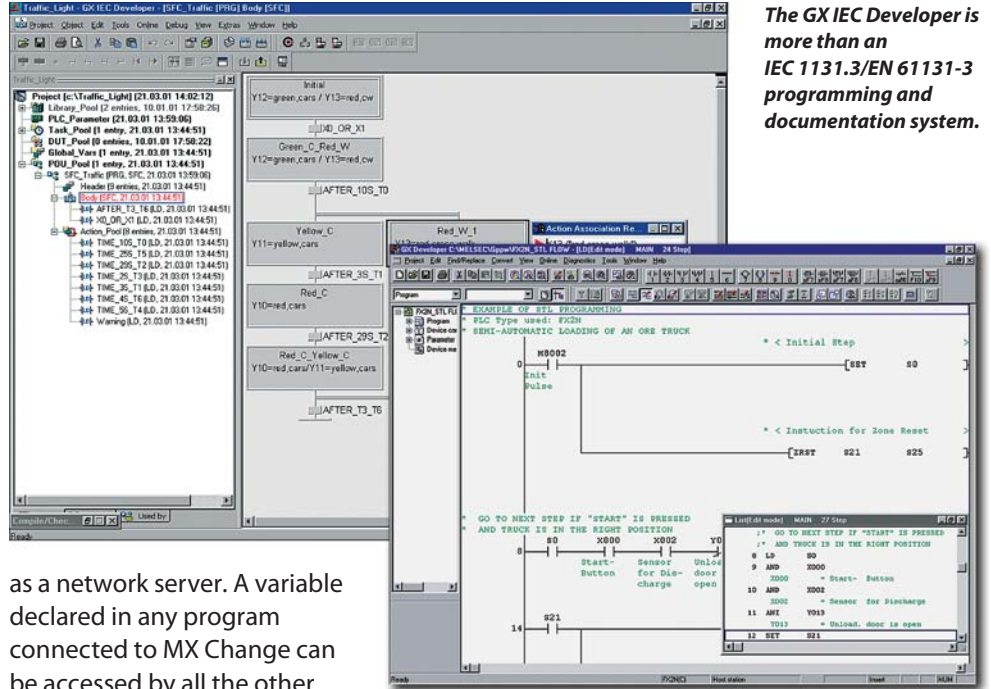
as a network server. A variable declared in any program connected to MX Change can be accessed by all the other programs in the system. If the declaration causes a data conflict all the programmers are informed automatically, eliminating the time-consuming search for the problem during the system commissioning phase.

The second MX Change program module is the project manager with integrated tag editor. This module is a powerful project navigator that gives the user full project transparency and consistency. It can display all variables in the entire project and its component programs. The user can copy any variable from one part of the project to another by drag & drop. A single click on a project button in the tag editor is all it takes to make a variable available to the associated program. The variable editing capabilities of the project manager and tag editor opens up hitherto undreamed-of possibilities for programmers, combined with maximum flexibility.

MX Change also helps to cut costs in the system commissioning stage. For example, if an error is encountered you can use the appropriate strings in your visualisation system to open the GX IEC Developer to immediately start monitoring your program at the right point.

See our MELSOFT catalogue for full details of all our many other software packages.

GX Developer supports all MELSEC controllers, from the MELSEC FX series to MELSEC System Q.

The Project Manager generates a comprehensive report of all the variables used in the project.
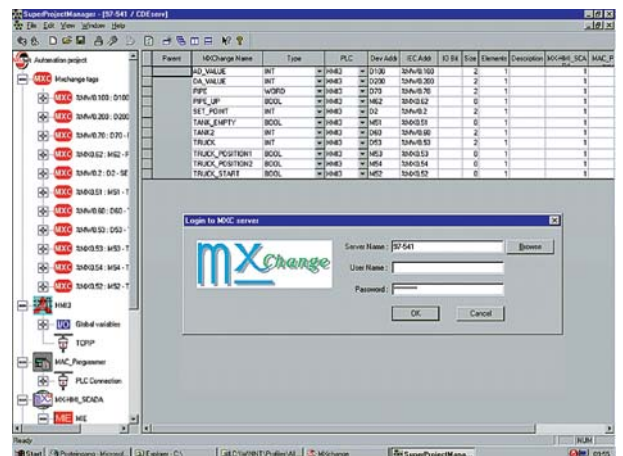
HMI – Human-Machine Interface for Graphical and Text Dialog

Today's industrial users want greater access to the processes of their plant and machinery. HMI control units are the ideal complement to your MELSEC PLC systems, providing the facilities for a meaningful dialogue between operator and machine. With the functionality to replace entire control consoles in any modern application, Mitsubishi Electric's enormously flexible HMI systems are quite simply the

better and more cost-effective solution. Their superior practicality and performance brings benefits to all aspects of your application and installation.

Communication Between Operator and Machine

HMI control units bring transparency to the operations of the controlled system and enable a process-oriented dialog between operator and machine. With the help of these units you can monitor and edit a wide range of process data parameters quickly and easily.

Simple Installation

HMI units are installed directly on the machine, and no additional modules are required for connection to the PLC system.

Versatility and Flexibility

All the information and process data required by the user are directly accessible, providing maximum process transparency. And thanks to their IP65 rating the HMI units are always completely reliable, even under the toughest production conditions.

User-Friendliness

HMI units are available with a choice of text or graphics displays. Their programmable, display-oriented function keys can be labelled by the user.

Worldwide Compatibility

Like all other products in the MELSEC family, the HMI units have CE certification. And the MAC units even conform to the international IEC 801.4.4 standard. Networking support is also an integral part of the HMI concept. Nowadays networks are simply essential, for example for central monitoring and surveillance, making process data available to host systems and enabling the configuration of multi-user systems using the same data accounts. The link capabilities range from the standard serial connection to Ethernet communications.
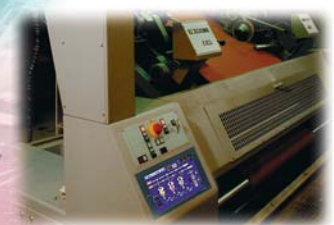
MX4 SCADA and HMI –
Scalable, Flexible, Reliable

Increase your return on assets (ROA) with MX4 SCADA, delivering scalable, flexible and reliable control and monitoring systems that reduce your operating costs and improve productivity. A fully integrated package, MX4 SCADA's easy-to use configuration tools and powerful features enable you to quickly develop and deploy solutions which can handle the most complex requirements for any size enterprise.

Tailored solutions

MX4 SCADA 's exceptional flexibility maximizes your productivity by allowing optimal system architecture in the way that best suits you - giving you access to powerful, dynamic features for both centralised and distributed processing.

Scalable solutions

Based on Microsoft technologies, MX4 SCADA has been designed with an innovative, scalable architecture. This preserves your initial investment by allowing your system to grow with your requirements, without modifying system hardware or software.

Reliable and redundant solutions

MX4 SCADA minimizes down-time by offering unrivalled reliability. It utilizes DCS style, built-in, redundancy that can tolerate system failures anywhere with no loss of functionality or performance.

Applications

Naturally, MX4 is a powerful tool for visualisation and control, specifically in the area of interfacing with PLCs (with integrated FastLinx communication). Furthermore, MX4 can be used in applications as diverse as manufacturing machinery, material handling control and discrete continuous manufacturing.

Business benefits

 Integrating MX4 with business systems lets users maximise productivity, improve product quality and reduce both maintenance and operating costs.

Features

MX4 is available as a free development package, which helps to reduce the cost of usage. Key features include graphical process visualisation, historical/real time trending and advanced alarming and reporting.

The installation procedure is customisable and totally scal-able - simply upgraded with a new software key. It is also fully compatible with MX4 HMI. FastLinx, is included with MX4 to allow fast and simple interfacing to MELSEC PLCs.

Simple to configure

A full set of user expandable libraries with graphics symbols and templates are included. There are also other time saving features such as "Fill in the forms " configuration, express Wizards for PLC communications,
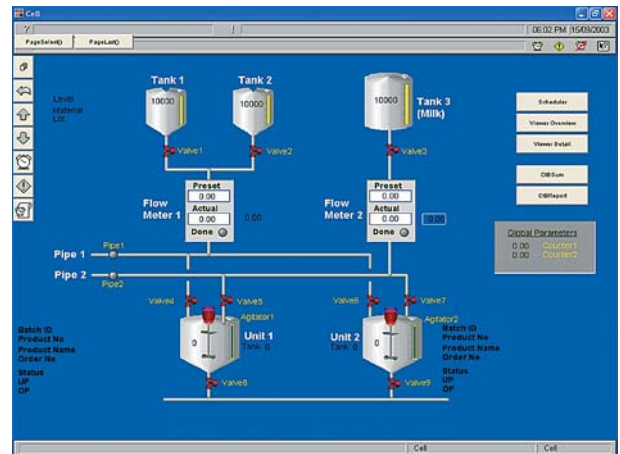

Genies for configuration of complex animation objects and Super Genies for repetitive plant processes.

Configuration time can be further reduced by importing and synchronizing tag definitions direct from PLC packages to MX4 SCADA.

There are a host of other functions included to reduce set up costs and time, and MX4 even allows system functionality to be further expanded with off-the-shelf third party applications using ActiveX objects. This gives the maximum flexibility while using proven tools to minimize implementation problems.

MX4 SCADA is the system of choice of succesful global manufacturers:
- ● *Simple configuration*
- ● *Graphic display*
- ● *Multiple security areas and levels for different users*
- ● *Time stamped alarms to 1ms*
- ● *True trend printouts*
- ● *Report with full access to all MX4 data*
- ● *Genies and supergenies reduce screen creation tasks*
- ● *Integrates with MELSOFT suite*
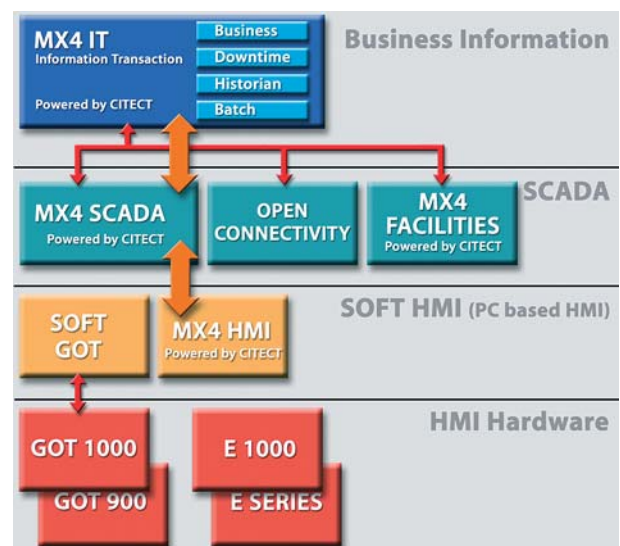
Our aim is to give you optimum service everywhere. Mitsubishi Electric is one of the world's biggest electronics companies, and our entire experience and expertise are available to you all over the globe. A worldwide network of service points, sales offices and system partners provides a comprehensive spectrum of on-the-spot services, advice and support, precisely geared to the needs of your local market. No matter where you are, in New York, Singapore or Shanghai you can always be sure of getting competent advice on your application problems and practical help to get your systems up and running faster.

International Expertise for Global Markets

The global approach comes naturally to a world market leader - it's part of our daily business, and this is reflected in the design of our products: They conform to many national standards, can operate with a wide range of voltages and support interfaces in a large choice of local languages. All this is a great boon in international projects, enabling you to eliminate many technical problems before they even have a chance to occur.

Specialised Know-how

In all projects we listen to our users to find out what they want from our products. Over the years we have collected a pool of specialised knowledge and optimised hardware and software solutions for a number of individual industries and applications. Solutions geared to the needs of specific industries often bring additional benefits by enhancing system power, simplifying operation and making the deployment of hardware and software more efficient. Pro-

jects conducted in the sectors listed below have provided us with concrete information on the special benefits of our products in these applications. We are able to provide you with the ideal automation and drive system solutions for these applications, as well as the hardware.

We'll Get You Into Asia

With an over 40-percent share of the market for automation components Mitsubishi Electric is the unchallenged leader in the Asian market. Our important economic role and extensive business connections in the region provide incalculable advantages for European enterprises. Nobody knows the conditions in the Asian markets better than we do, and nobody else has such a comprehensive range of products, precisely geared to the technical requirements and national standards of these markets. Our enormous base of Asian know-how is available to you when you need it – from the acquisition to planning and implementation.

Strength in Unity

In cooperation with selected system partners we have formed the "Automation Network", an association of companies with specialised applications expertise in a wide range of industries and applications. The network makes a very broad range of products and services available, enabling you to order both complete customised automation systems and smaller packages for individual applications. This efficient concept is geared to the realities of the market; it enables the members to cater directly to your requirements without an oversized administration system and a large pool of internal project teams. Instead, this lean "knowledge association", which renews and updates itself automatically, guarantees cost-effective solutions.

Our Industrial Automation Product Range

SUPER AE
Low-voltage circuit
breakers

Moulded-case circuit
breakers and contactors

Frequency Inverters

MELSERVO

MELSEC ST
and Remote IOs

The MELSEC series and
ALPHA family of
compact controllers

The MELSEC Modular
Programmable Logic
Controllers

MELFA
Industrial robots

HMI Human-Machine
Interface

The MELSOFT
Software Concept

MITSUBISHI ELECTRIC

ONLINE---ONLINE---ONLINE---ONLIN

www.mitsubishi-automation.com

| ALPHA Family |
| MELSEC FX Family |
| MELSEC AnSH Family |
| MELSEC System Q |
| MELSEC ST and Remote IOs |
| Programming |
| HMI Control Units |
| Process Visualisation |
| Frequency Inverters |
| Servo/Motion Controller |
| Robots |
| Circuit Breakers and Contactors |

For us, service means being there for you when you need us. Literally round the clock - Mitsubishi Electric is now also accessible via the Internet.
At you will find the latest information on our products and interesting examples of successful applications.
If you don't find what you need just send us an e-mail at *megfamail@meg.mee.com*

and we'll respond immediately. Or contact your local Mitsubishi sales representative in your country (you'll find an address list on the back cover of this brochure).
And if you need on-the-spot service quickly just call our central hotline at 0180/5000765.