Changes for the Better

MITSUBISHI ELECTRIC

PROGRAMMABLE CONTROLLERS

MELSEC-Q

MELSEC Process Control

— Combining DCS functions with PLC operability into one compact module. —

Mitsubishi Electric Nagoya Works is a factory certified for ISO14001 (Standards for environmental management systems) and ISO9001 (Standards for quality assurance management systems).

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ISO 14001 JACO — UKAS ENVIRONMENTAL MANAGEMENT 051

BVQI ISO 9001 — UKAS QUALITY MANAGEMENT 008

Easily design systems and reduce costs with MELSEC's reliability and proven achievements.

MELSEC enables downsizing.

With previous DCS systems, the vender was involved with designing the system from the initial stages. However, with the MELSEC process CPU, design of the system is more flexible, allowing the user to reduce initial and implementation costs.

MELSEC realizes advanced process control.

The MELSEC process CPU realizes detailed process control matching the state of the process from simple loop control to complicated loop control.

MELSEC Process Control

1 High-performance process control realized by "process CPU"

① Process instructions for advanced loop control such as two degree of freedom PID, sample PI and auto-tuning instructions.

② High-speed PID operation realizing an increase in the number of control loops.

■Design of a system with outstanding cost performance is realized, providing an alternative to a conventional DCS system.

2 Process control realized by PLC together with "Channel Isolated, high resolution analog module"

With included features such as, channel isolation, high accuracy, high resolution, range of alarm and input signal detection functions, the scope of application processes are increased.

3 Simple engineering environment provided by process control software package "PX Developer"

① Loop control programs can be created easily by pasting and connecting process control operation FB (function blocks) and setting parameters (PID constants, upper/lower limit values, etc.).

② Programs created with FBD share data with the ladder program (created with GX Developer) using logical names (labels) instead of device memory addresses. The ladder program can easily change over the loop control tag definition and change the SV value, etc.
* This is only applicable to GX Developer projects that are created and viewed from within PX Developer.

③ FBD is an IEC61131-3 compliant programming language.

■Process control systems, which conventionally required a high level of expertise, can now be created easily by designers familiar with industrial automation products.

4 Improved maintainability and reliability

① The process CPU does not need to be stopped nor the power turned OFF when the analog module, I/O module or temperature control module fail. In addition, these modules can now be replaced while the system is online. (Operations from the GX Developer are required.)

② The multiplex remote I/O network improves the remote I/O system's reliability.

■A flexible maintenance environment is realized with "MELSEC Process Control".

(Note 1) Refer to the "Mitsubishi Programmable Controllers "MELSEC QnA/A" brochure for details on the Q4ARCPU.

Question
Can I design a process system inexpensively with general-purpose parts?

- Design a process control system using DCS with PLCs.
  (The PLC requires sufficient loop control and analog processes for the process application.)
- Easily create loop control programs.

Answer
The Q Series realizes loop control, analog processing and simple engineering functions required for the process control system.

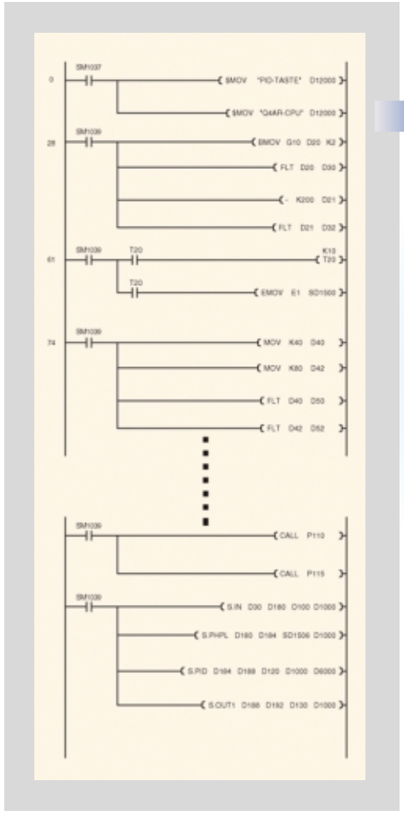
Loop control
The process CPU realizes high-speed loop control and high-speed sequence control functions, with a high level of reliability.

Analog process
The high-speed analog module includes channel isolation, high accuracy, high resolution and wire break detection function.

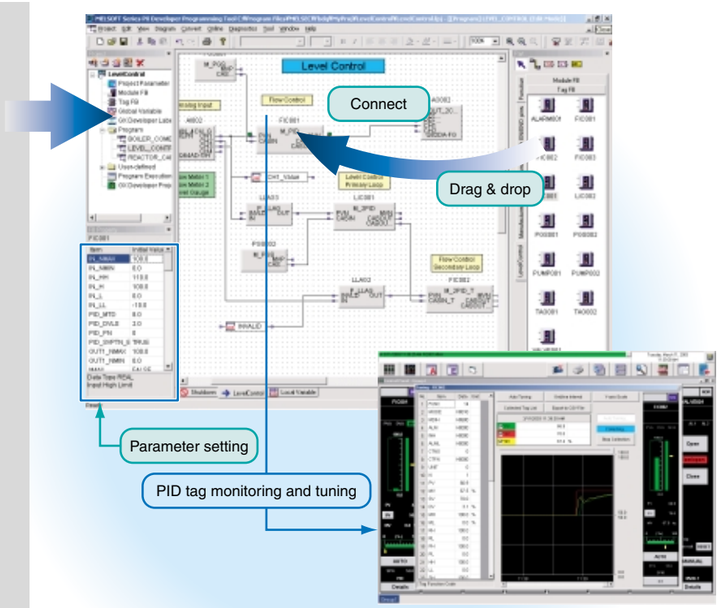
Simple engineering function
PX Developer makes it easy to create loop control programs by pasting and connecting FB by drag & drop (No need for ladder programming). Tuning and monitoring for the loop control is easy from the standard screen with tags.

Maintenance
The analog module, I/O module and temperature control module, etc., can be replaced while the control system is online. Therefore, the CPU does not need to be stopped, or the power turned off.

In the past ... Loop control program using ladder



From now on ... Simple engineering with MELSEC process control (Loop control program using PX Developer)



Question
Can I integrate loop control and sequence control?

- Easily design modify and maintain a system containing both loop control and sequence control.
  Conventional process control systems were designed using separate controllers for loop control and sequence control.
  - Software for each controller is different.
  - Program for data transmission between controllers is complicated.

  → Design, modify, and maintenance of programs was time consuming.
- Expand to other applications such as motion control and information control is required.

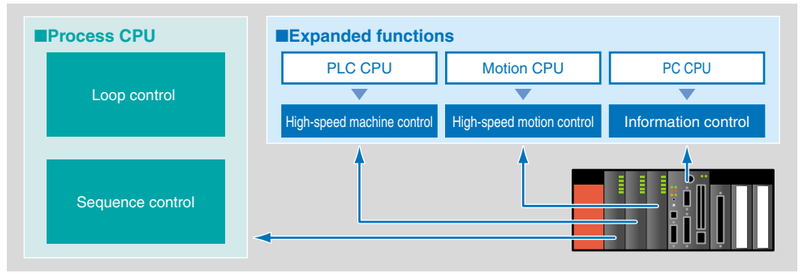
Answer
One process CPU is capable of executing both loop control and sequence control. Also, using multiple CPU system expands the possibilities even further.

The process CPU can execute multiple programs, so both loop control and sequence control can be executed simultaneously at a high speed.

Programs created with PX developer and those created with GX Developer can be managed in one project.

The data for loop control programs and sequence control programs are shared using label and tag names. The memory address no longer needs to be considered. (Data exchange using label names and tag names)

The multiple PLC function expands applications of high-speed motion control (motion CPU) and information control (PC CPU), etc. All Q Series modules can be used in addition to the CPU, so a high expandability, usability and maintainability are realized.



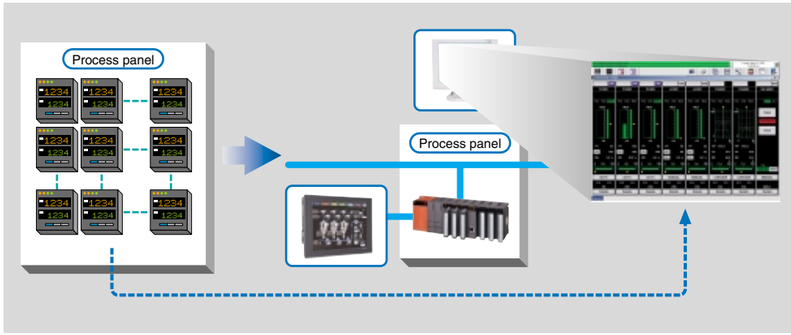
Question
Can multiple one-loop controllers or temperature controllers be combined?

- If multiple one-loop controllers and temperature controllers are used. Can these be combined with the PLC to reduce control panel and installation space, improve operability and reduce maintenance costs?

Answer
Multiple one-loop controllers and temperature controllers can be combined. In addition, operability can be improved by using the monitoring tool.

By combining with the ultra-compact Q Series, the control panel area, installation space, and maintenance costs are significantly reduced.

The loops can be easily adjusted and operability improved with the PX Developer monitor tool.



System configuration

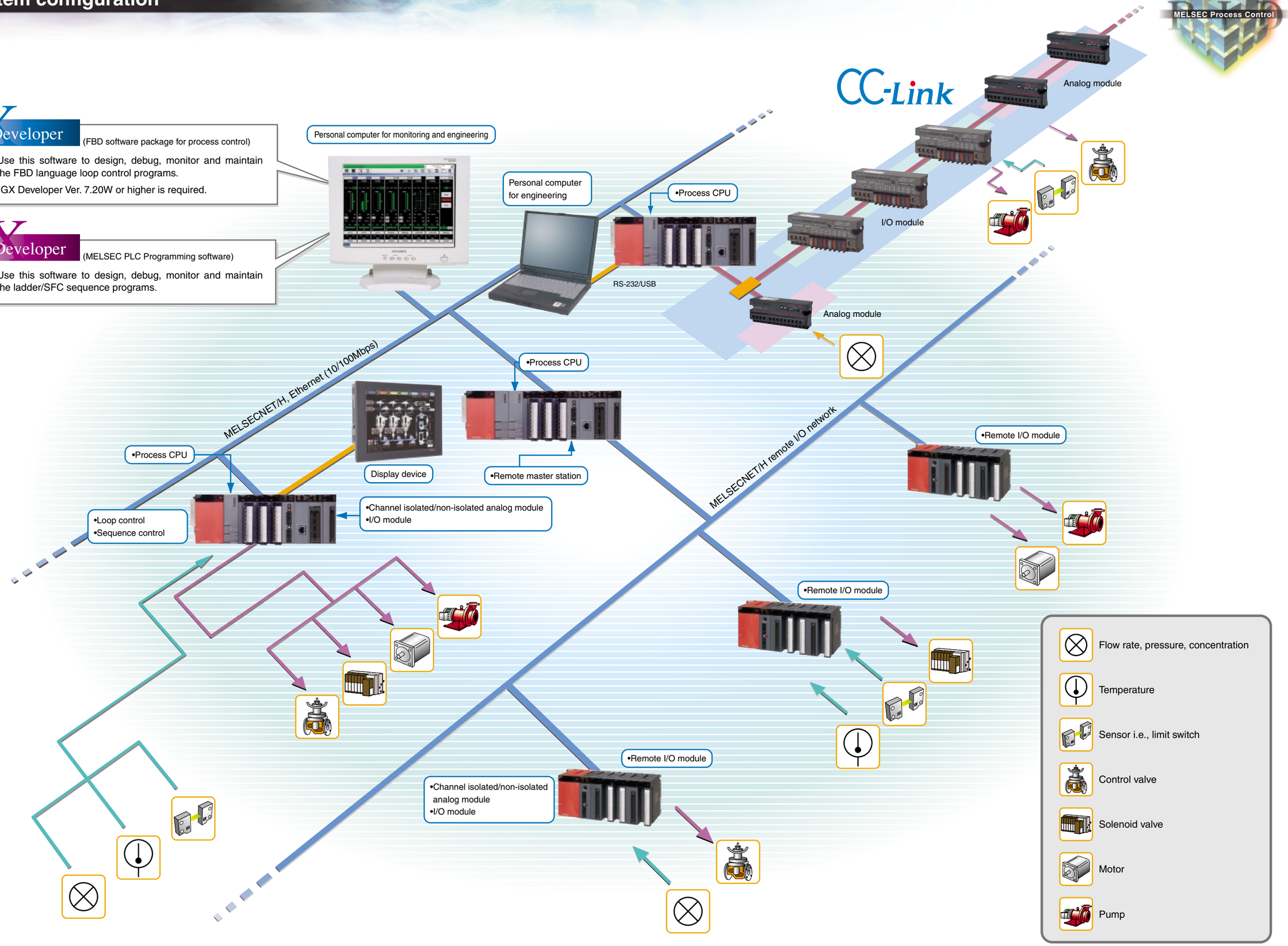
PX Developer (FBD software package for process control)

■Use this software to design, debug, monitor and maintain the FBD language loop control programs.

*GX Developer Ver. 7.20W or higher is required.

GX Developer (MELSEC PLC Programming software)

■Use this software to design, debug, monitor and maintain the ladder/SFC sequence programs.



Application examples and features (1)

MELSEC Process Control

• Level Control

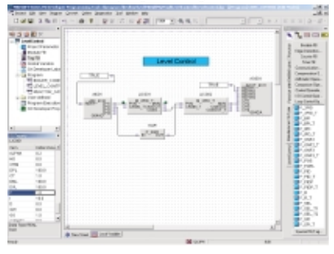
Application

The MELSEC process control system is best suited for food manufacturing and chemical plant applications, where liquid, solid materials, etc. are stored in a tank which the level must be maintained to a specific range.

Control outline

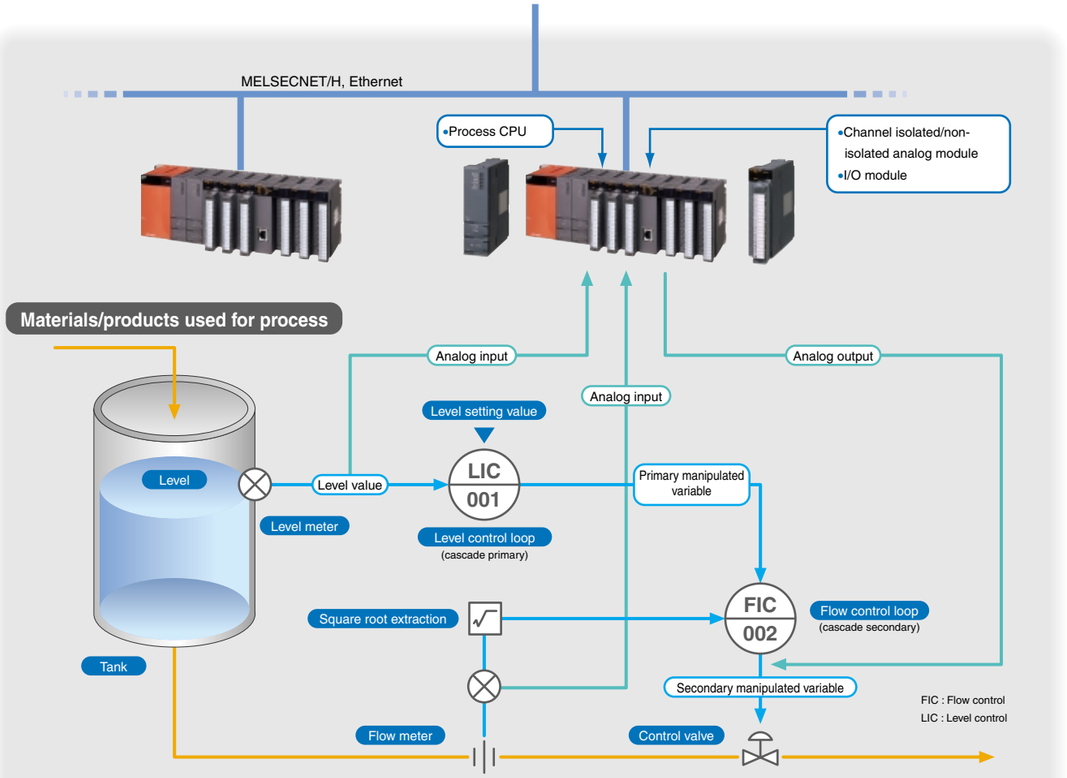
The level control loop (cascade primary) executes PI operation of the tank level (analog value) from the level meter to achieve the set level value.
The flow control loop (cascade secondary) executes PI operation of the level value from the control loop operation result and the flow value from the flow meter. The result is then output as an analog value to the control valve, which is the secondary operation value (control valve open).

FBD programming screen



Industrial PC for monitoring

Monitor screen



Features

1 High-speed loop control

The process CPU enables high-speed processing of the PID loop operation. (High-speed 10ms control cycle) This results in fast control of the flow rate and pressure, etc.

2 Analog module ideal for process control

The channel isolated analog module can be directly connected with devices, such as sensors i.e., flow meter, pressure gauge, etc. (detection) and control valves etc. (operation) without having the need for an external isolation amplifier. Therefore, a reduction in total hardware and installation costs is realized.

3 Smoothed analog input value

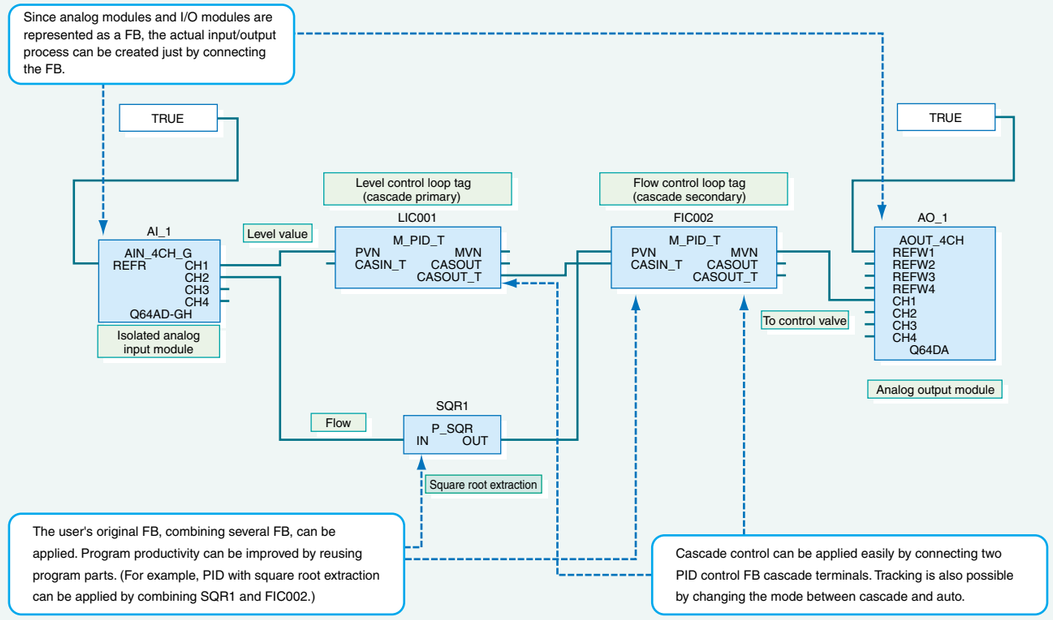
If the input value is small in amplitude but the level changes frequently, a filter function must be applied in order to smooth the value. However, in the MELSEC process control system, this requirement is provided by the first-order lag and moving average filter functions, which are included in the `channel isolated analog input module`or by the dedicated process instruction for the process CPU.

4 Simple control

PX Developer used together with the process CPU makes cascade control easier. Tracking control between the cascade primary loop and secondary loop, and bumpless control when switching operation modes in each loop are provided as standard.

Examples of describing application's loop control with PX Developer

[Level Control]



• Heat exchanger temperature control

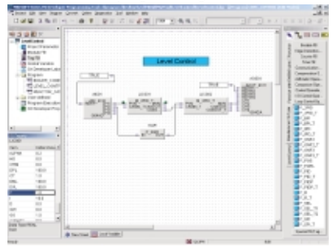
Application

In food manufacture, pharmaceutical or chemical plant applications where the supplied raw material is heated, the MELSEC process control system is perfect for controlling the temperature of the heat exchanger used to attain the set temperature. (The system controls the heat exchanger's outlet temperature to the set temperature.)

Outline of control

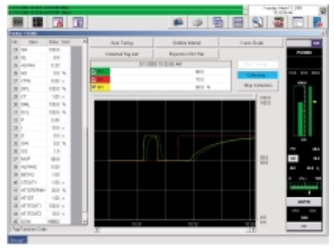
The MELSEC process control system inputs the heat exchanger outlet temperature measured with the temperature detector. Then, PID operation is executed with the outlet temperature control loop (cascade primary loop) to attain the set outlet temperature. At the same time, the heat exchanger's inlet flow rate and temperature are input from each detector. The values obtained with multiplication, rate operation and lead/lag operation are added to the output temperature control loop's operation amount as a feed forward element, and are set in the hot fluid flow control loop (cascade secondary loop). This value is used as the thermal control loop's setting value, and is PI operated with the hot fluid flow value imported from the flow meter. These results are analog output to the control valve as the secondary operation amount (control valve opening).

FBD programming screen



Industrial PC for monitoring

Monitor screen



Features

1

Powerful analog input/output and temperature input

The channel isolated analog module and temperature input module are suitable for process control requiring high accuracy and high resolution.

2

Diverse control

The process CPU and PX Developer easily realize PID control and feed forward control.

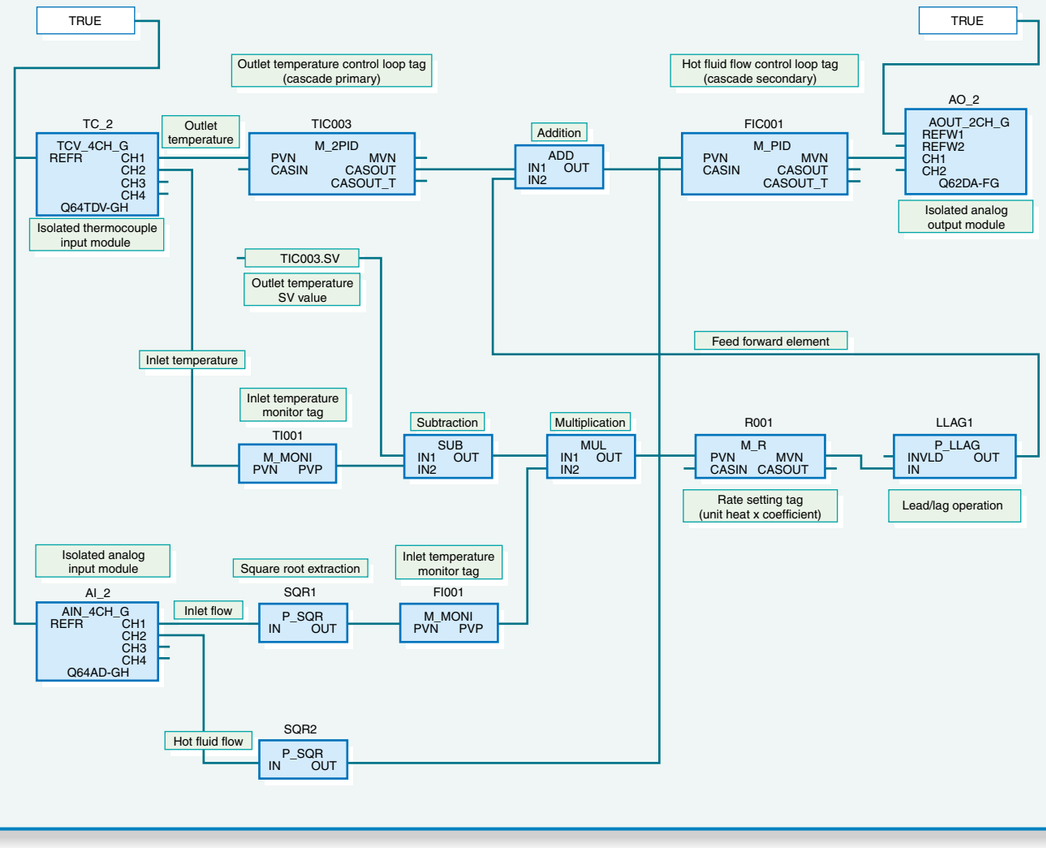
3

Easy control with PX Developer

The process CPU and PX Developer have PID control FB. In addition, various functions are included, such as compensation FB, PV monitor FB, arithmetic operation FB, and logical operation FB, therefore realizing complex controls.

Examples of describing application's loop control with PX Developer

[Heat exchanger temperature control]



Process CPU features and specifications

• Process CPU

Features

1 Extensive loop control

The process CPU has a variety of instructions (52 types), including 2 degree of freedom PID, sample PI and auto-tuning instructions to sufficiently handle loop control.

2 High-speed loop control

One loop (for a 2 degree of freedom PID loop) can be processed at a high speed of approx. 400µs. A control cycle of up to 10ms is applicable.
It realizes various simultaneous control loops.
Processes requiring high-speed control cycle are realized.

3 Improved reliability and serviceability

- If the analog module or I/O module fails, the disabled module can be replaced (Note 1) while the control system is online, without stopping the CPU or turning the power OFF. (GX developer operations are required.)
- Holding output values at stop error can be set for each module with the parameters.

4 Simple engineering

The FBD software package (PX Developer) for process control easily realizes loop control.

5 MELSECNET/H
a multiplex remote I/O system.

A multiplex master system is available with the MELSECNET/H remote I/O system.

6 Loop control and sequence control
with one CPU.

- The process CPU can execute multiple programs to merge process control with sequence control. It executes sequence controls simultaneously with loop control at high speed.
- The multiple CPU function expands the applications of high-speed motion control (motion CPU) and information

7 Utilization and expandability

The process CPU has a high utilization and expandability rate as all Q Series modules is available with the process CPU.

Note 1) Online module change function
① The following modules under QnPHCPU control can be changed in the online state.

Product name	Required function version
Input module	No limits
Output module	
I/O combined module	
Channel isolated analog module	C
Channel isolated temperature input module	
Analog module	
Temperature input module	
Temperature control module	

② The following CPU modules are required for Online change. MELSEC process control CPU (QnPHCPU is not shown)

Product name	Model	Upper five digits of version/serial No.
High-performance model QCPU	Q02(H)CPU	Upper five digits of serial No. "04012" or higher
	Q06HCPU	
	Q12HCPU	
	Q25HCPU	
Motion CPU	Q172CPU	Version P or higher
	Q173CPU	Version N or higher
	Q172CPUN	No limits
	Q173CPUN	
Personal computer CPU	PPC-CPU686(MS)-64	Bus interface driver (PPC-DRV-01) version 1.05 or higher
	PPC-CPU686(MS)-128	

Note 2) Multiple CPU system
PLC CPU version B or higher is required for the multiple CPU system.

• MELSECNET/H duplex remote I/O system

Use a MELSECNET/H module with the following version or higher to structure the MELSECNET/H duplex remote I/O system.

Product name		Model	Upper five digits of serial No.
MELSECNET/H module	Master station module	QJ71BR11	"04012" or higher
		QJ71LP21-25	
		QJ71LP21G	
		QJ71LP21GE	
	Remote I/O module	QJ72BR15	No limits
		QJ72LP25-25	
		QJ72LP25G	

Specifications

Item			Q12PHCPU	Q25PHCPU
Control method			Sequence program control method	
I/O control			Refresh method	
Program language			Ladder, list, SFC, FBD (Note 1)	
Process speed	Sequence instruction	LD instruction	34ns	
		MOV instruction	102ns	
		Floating point addition	782ns	
		Index qualification	No delay time	
	Process instruction (loop process time)	Basic PID	350µs	
		2 degree of freedom PID	400µs	
Number of I/O device points (Note 2)			8192 points	
Number of I/O points (Note 3)			4096 points	
Program capacity	Number of steps		124k steps	252k steps
	Number of programs		124 (programs)	252 (programs) (Note 4)
Data memory (Note 5)	Bit device (point)		Internal relay M : 8k Latch relay L : 8k Step relay S : 8k Link relay B : 8k	Edge relay V : 2k Annunciator F : 2k Special relay SM : 2k Special link relay SB : 2k
	Timer counter (point)		Timer (low-speed, high-speed) T : 2k (low-speed/high-speed process unit is set with parameters.) Accumulating counter ST : 0 Counter C : 1k	
	Word device (point)		Data register D : 12k Link register W : 8k Index register Z : 16	File register (built-in) R : 128k Special register SD : 2k Special link register SW : 2k
File register R, ZR (point)	When using built-in memory (standard RAM)		128k maximum	
	When using memory card	SRAM card	1017k maximum (Note 8)	
		Flash card (Note 7)	1018k maximum	
Pointer (point)			Pointer P : 4096, Interrupt pointer I : 256	
Applicable constants			16-bit integer, 32-bit integer, single precision real number, character string	
Loop control specifications	Process control instructions		52 types	
	Number of control loops		No limit (Note 6)	
	Control cycle		10ms and higher/control loops Variable per loop	
	Main functions		2 degree of freedom PID control, cascade control, auto-tuning function, feed forward control	
Communication port			RS-232 : 115.2kbps (maximum), USB : 12Mbps	
Maximum number of I/O slots			64k maximum	
Maximum number of mountable CPUs in multiple PLC system			4 units maximum	
Allowable instantaneous power failure period			Depending on power supply module	
5VDC internal current consumption			0.64A	
Weight			0.20kg	
External dimensions			98mm(H) x 27.4mm(W) x 89.3mm(D)	

Note 1) PX Developer is required to program with FBD. When using process CPU, the process control programs can be created with ladder, list, or SFC using GX Developer.
Note 2) Indicates the total of the number of I/O points on the main and expansion base directly controlled by the CPU module and the number of I/O points controlled as remote I/O by the remote I/O network.
Note 3) Indicates the number of I/O points on the main and expansion base directly controlled by the CPU unit.
Note 4) Up to 124 files can be executed. Files exceeding the 125th file cannot be executed.
Note 5) The number of device points in the data memory can be randomly changed within a range of 29k words using parameters.
Note 6) The number of control loops is limited by the device memory capacity (using 128 words/loop) and control cycle combination.
Note 7) The file registers are read-only when using a Flash card.
Note 8) When using Q2MEM-2MBS

• Channel Isolated high-resolution analog to digital converter modules: Q64AD-GH, Q62AD-DGH (with signal conditioner function)

Features

1 High dielectric withstand voltage

Withstand voltage between input channels, analog input section and PLC base : 1780VACrms/3 cycles (altitude 2000m)

2 High accuracy

Reference accuracy ±0.05% (temperature coefficient ±71.4ppm/°C)

3 Fast conversion

10ms regardless of number of channels

4 Online module change

If the analog module fails, it can be replaced while the control system is online without stopping the CPU or turning the power OFF.

5 Powerful analog input filter functions

Primary delay, movement averaging

6 Warning and error detection functions

Input signal error, process alarm (with hysteresis), rate alarm

7 Controlling the power of signal conditioner (only Q62AD-DGH)

This module can control the power of signal conditioners; such as flow monitor, etc. for each channel.

Specifications

Item			Q64AD-GH	Q62AD-DGH
Connecting with 2-wire transmitter	Input specifications	Number of input points (number of units connected to 2-wire transmitter)	4 points (4 channels)	2 points (2 channels)
		Input signals	0 to 5VDC, 1 to 5V, 0 to 10V, -10 to 10V, user range	4 to 20mADC (Input resistance value 250Ω), user rang
			0 to 20mADC, 4 to 20mA, user range	
		Absolute maximum output	±15V, ±30mA	—
	Supply power specifications	Supply voltage	—	26±2V
		Maximum supply current	—	24mA
		Short protection	—	Provided Limit current : 25 to 35mA
		Check terminal	—	Provided (voltage output) Input signal (A) x (250Ω±0.25%)
Digital output		32-bit	0 to 64000 (0 to 5VDC, 1 to 5V, 0 to 10V, 0 to 20mADC, 4 to 20mA) -64000 to 64000 (-10 to 10VDC)	0~64000
		16-bit	0 to 32000 (0 to 5VDC, 1 to 5V, 0 to 10V, 0 to 20mADC, 4 to 20mA) -32000 to 32000 (-10 to 10VDC)	0~32000
Accuracy (accuracy to full scale)		Reference accuracy	Within ±0.05% (±32 digits (±16 digits))	
		Temperature coefficient	±71.4ppm/°C	
Conversion speed			10ms/all channels	
Maximum number of writes for E²PROM			100,000 times	
Insulation method			Between I/O terminal and PLC: Photocoupler insulation Between channels: Transformer insulation	Between input terminals (each channel's input and external power supply) and PLC base: Photocoupler insulation Between channels: External transformer insulation Between supply power and channel: Transformer insulation
Number of occupied points			16 points	
Connection terminal			18-point terminal block	
Applicable wire size			0.3~0.75mm²	
Applicable solderless terminal			R 1.25-3 (Solderless terminal with sleeve is not available.)	

• Channel Isolated digital to analog Converter module: Q62DA-FG

Features

1 High dielectric withstand voltage

Withstand voltage between output channels, between analog output and PLC bus, between external power supply and output channel: 1780VACrms/3 cycles (2000m altitude)

2 High accuracy

High accuracy within ±0.1% (Voltage : ±10mV, current : ±20μA, temperature coefficient : ±80ppm/°C)

3 Fast conversion

10ms regardless of number of channels

4 Online module change

If the analog module fails, it can be replaced while the control system is online without stopping the CPU or turning the power OFF.

5 Wide user range settings

The user range can be set within a wide range of -12 to 12VDC, 0 to 22mA, allowing the control valve to be restricted easily.

6 Warning and error detection functions

Disconnection detection (4 to 20mA range), high/low limit alarm detection, rate of change detection, output monitor (output read back)

7 Analog output hold/clear

This function is set to either retain or clear the analog output value when an error that causes the CPU to stop occurs.

Specifications

Item		Q62DA-FG
Number of analog output points		2 points (2 channels)
Resolution		14-bit signed binary (Current : -12288 to 12287, voltage : -16384 to 16383)
Analog output	Voltage	-12 to 12VDC (External load resistance value 1k to 1MΩ)
	Current	0 to 22mA (External load resistance value 0 to 600Ω)
Output range		Voltage range 1 to 5V, 0 to 5V, -10 to 10V User range setting 2 User range setting 3 / Current range 4 to 20mA, 0 to 20mA User range setting 1
Accuracy (Accuracy to maximum analog output value)	Reference accuracy	Within ±0.1% (voltage : ±10mV, current : ±20μA)
	Temperature coefficient	±80ppm/°C
Conversion speed		10ms/all channels
Absolute maximum output	Voltage	±13V
	Current	23mA
Output monitor	Resolution	12bit
	Reference accuracy	±0.2%
	Temperature drift	±160ppm/°C
	When noise is applied	±1.0%
Maximum number of writes for E²PROM		100,000 times
Output short protection		Provided
Insulation method		Between output terminal (each channel's output and external power) and PLC base : Photocoupler insulation Between output channels : Transformer insulation Between external supply power and channel : Transformer insulation
Number of occupied points		16 points
Connection terminal		18-point terminal block
Applicable wire size		0.3~0.75mm²
Applicable solderless terminal		R 1.25-3 (Solderless terminal with sleeve is not available.)

• Channel Isolated thermocouple/micro voltage input module: Q64TDV-GH, Thermocouple input module: Q64TD

Features

1 Micro voltage input (Q64TDV-GH)

Micro voltage conversion function converts a -100mV to +100mV micro voltage into a 16-bit signed binary. This module is suitable for applications for direct micro voltage, such as direct strain gauge input, direct thermocouple input, etc.

2 High dielectric withstand voltage

Withstand voltage between input channels, and between thermocouple input and PLC bus : 1780VACrms/3 cycles (2000m altitude).

3 High-speed sampling cycle (Q64TDV-GH)

20ms/channel

4 Online module change

If the thermocouple module fails, the module can be replaced while the control system is online without stopping the CPU or turning the power OFF. (GX Developer operations are required.)

5 Warning and error detection functions

Wire break detection, upper/lower limit alarm detection (with hysteresis)

Specifications

Item		Q64TDV-GH	Q64TD
Number of channels		4 channels	
Output	Temperature measurement value	16-bit signed binary (-2700 to 18200 : value up to first decimal point x 10)	
Scaling value		16-bit signed binary (-32768 to 32767)	
Thermocouple compliance standards		IEC 60554 (1982)	
Applicable thermocouple		B thermocouple 0~ 1820°C E thermocouple -270~ 1000°C R thermocouple -50~ 1760°C J thermocouple -210~ 1200°C S thermocouple -50~ 1760°C T thermocouple -270~ 400°C K thermocouple -270~ 1370°C N thermocouple -270~ 1300°C	
Voltage input range		-100mV ~ +100mV	–
Input impedance		2MΩ or more	
Guaranteed accuracy		Guaranteed accuracy range : Follows list of resolutions (Refer to Q64TD Manual)	
Cold contact compensation accuracy		±1°C	
Conversion speed		Sampling cycle x 3	40ms/channel
Sampling cycle		20ms/channel	—
Number of analog input points		4 channels (+Pt100 connection channel/unit)	
Insulation method		Between thermocouple input and PLC base : Transformer insulation Between channels : Transformer insulation Between cold contact compensation input (pt100) and PLC base : Not insulated	
Wire break detection		Provided (independent for each channel)	
Maximum number of writes for E²PROM		100,000 times	
Number of occupied I/O points		16 points	
Connection terminal		18-point terminal block	
External power supply		Not required	
Applicable wire size		0.3mm~0.75mm²	
Applicable crimping terminal		1.25-3 R1.25-3 (Solderless terminal with sleeve is not available.)	

• Temperature control module (Q64TCTT (BW), Q64TCRT (BW))

Features

1 Optimum temperature adjustment and control

These provide temperature control automatically by merely setting the PID constants and SV value. Autotuning function adjusts PID constants automatically.

2 Thermocouple, platinum temperature sensor

Standard thermocouples are available with Q64TCTT(BW).
Platinum temperature-Measuring register: Pt100, JPt100 is available with Q64TCRT(BW).

3 Disconnection detection function

The Q64TCTTBW and Q64TCRTBW can detect disconnection of a heater.

Specifications

Model	Q64TCTT	Q64TCRT	Q64TCTTBW	Q64TCRTBW
Control output	Transistor output			
Number of temperature input points	4 channels/unit			
Accuracy	Ambient temperature : 25°C±5°C input range width x (±0.3%)			
	Ambient temperature : 0 to 55°C input range width x (±0.7%)			
Sampling cycle	0.5s/4 channels			
PID constant range	Proportional band (P) 0.0 to 1000.0% Integral time (I) 1 to 3600s Differential time (D) 0 to 3600s			
Insulation method	Between input and ground : Transformer insulation Between input and channel : Transformer insulation			
Number of occupied I/O points	16 points/1 slot		32 points/2 slots	

• Pulse input module (QD60P8-G)

Features

1 Variable maximum counting speed

The maximum counting speed range is 30K, 10K, 1K, 100, 10, 1 and 0.1.

2 Online module change

If the pulse input module fails, the module can be changed without the system being stopped. (GX Developer operations are required.)

Specifications

Item		QD60P8-G						
Counting speed changeover setting		30K	10K	1K	100	10	1	0.1
Number of channels		8 channels						
Count input signal	Phase	1-phase input						
	Signal level	5VDC/12 to 24VDC						
Counter	Counting speed (max.)	50KPPS	10KPPS	1KPPS	100PPS	10PPS	1PPS	0.1PPS
	Counting range	Sampling counter : 16-bit binary (0 to 65535) Accumulating counter : 32-bit binary (0 to 2147483647)						
	Type	Up counter with ring counter function						
Number of occupied I/O points		32 points						

• PX Developer

Features

1 Sufficient FB (function blocks) and functions for loop control

In addition to the process CPU's loop control instruction function blocks, the PX Developer has combined function blocks that are easy to use. Basic FB/functions (logical operation, arithmetic operation, etc.) that comply with IEC61131-3 are also provided allowing simple sequence control to be described in the FBD.

2 Easy programming with FB, programming with process tag names

The loop control program can be created easily by selecting the required FB from the PX Developer's standard loop control FB or compensation FB, pasting and connecting these on the FB screens, and then setting the parameters such as the PID constants or high/low limits (items configuring tags). When programming with tag names, the parameters in the tag are described as "tag name.parameter name" (FIC001.PV, etc.). The user does not need to be aware of the device memory addresses using these methods.

3 Analog/digital I/O FB

FBs for executing I/O processes to the analog module and I/O module used by the process CPU are provided. Ladder programms to operate I/O are no longer required.

4 Automatic assignment of device memory address

PX Developer automatically assigns the device memory addresses for the created loop control program in the process CPU. This eliminates the complicated manual assignment and management of device memory addresses. (Manual assignment is also possible.)

5 Easy program standardization and reusability

PX Developer complies with the IEC61131-3 Standards. The programs can be hierachically arranged as components (User's original FB can be created.) It is easily available to standardize and reuse them.

6 Program event execution

Programs created with FBD are executed periodically, and it can also respond to events, (The event conditions can be described without a program.) PX Developer easily realizes the starting process for nonstationary, error and exceptional processes.

7 Easily working with digital control/sequence control

1) Process digital control FBs
Popular digital control processes, such as motor reversible/irreversible, ON/OFF motorized valve control, etc., are provided as a standard as FBs, so ladder program is not created.

2) Easy data exchange with ladder programs
Programs created with FBD share data with the ladder program (created with GX Developer) using logical names (labels) instead of device memory addresses. The ladder program can easily change constants of loop control, SV values, etc.

8 Powerful tuning and monitor functions

The PX Developer has various screens (face plate, tuning trend, alarm, event list, etc.) used to tune, monitor and operate the created control loop. Tuning and monitoring are available after creating the program.

Specifications

Programming tools

Item		Specifications
Target CPU		Process CPU (Q12PHCPU/Q25PHCPU)
Target network		MELSECNET/H, 10, Ethernet (10/100Mbps) RS-232 (process CPU's RS-232 port), USB (process CPU's USB port)
Target personal computer		PC/AT compatible personal computer running Windows 98, ME, NT4.0 or 2000. Display resolution 800 x 600 or higher. GX Developer Ver. 7.20W or higher must be installed in the same personal computer. (Since PX Developer runs in coordination with GX Developer.)
Programming languages		IEC61131-3 compliant FBD language
Number of programs		Maximum 200 programs (Maximum 32 sheets/program)
Number of tags		Maximum 480 tags/process CPU (Maximum number of executable tag FBs)
FB/function types	Process functions	Five types (corresponding to process CPU process instructions) High selector, low selector, intermediate value selection, average value, absolute value
	Process FB	47 types (corresponding to process CPU process instructions) ① Seven types of compensation operators (polygon, inverted polygon, moving average, engineering value conversion, engineering value reverse conversion, temperature pressure compensation, retentive) ② Five types of arithmetic operators (addition, subtraction, multiplication, division, extraction for process control) ③ Five types of comparison operators (comparison>/</=/≥/≤ for process control) ④ Ten types of control operators (lead/lag, integral, derivative, dead time, high/low limiter, rate of change limiter 1, rate of change limiter 2, dead band, bumpless transfer, analog memory) ⑤ Seven types of I/O control (analog input, output 1 with mode change, output 2 with mode change, manual output, time rate output, pulse integration, batch counter) ⑥ 13 types of loop operators (rate control, velocity type PID control, position type PID control, sample PI control, I-PD control, blend PI control, 2-degree-of-freedom PID control, high/low limit alarm check, 2-position ON/OFF, 3-position ON/OFF, program setting device, loop selector, control mode change)
	Tag FBs	28 types (process FB function combination and high function FBs) ① 18 types of loop control tags (velocity type PID control, velocity type PID control and DUTY output, position type PID control, sample PI control, I-PD control, Blend PI control, 2-degree-of-freedom PID control, 2-degree-of-freedom PID control and DUTY output, rate control, 2-position ON/OFF control, 3-position ON/OFF control, monitor, manual output with monitor, batch preparation, program setting device, manual output, loop selector, pulse integrator) ② Eight types of digital control tags (motor irreversible, motor reversible, ON/OFF operation 1, ON/OFF operation 2, timer 1, timer 2, counter 1, counter 2) ③ One type of alarm tag (alarm) ④ One type of message tag (message)
	I/O module FB	25 types (FBs corresponding to Q Series analog module and I/O module types)
	General functions	90 types (Basic functions such as logical operators, bit shift, comparison, and character string operation, etc. IEC61131-3 compliant)
	General FB	20 types (Basic FBs such as flip-flop, latch and edge detection. IEC61131-3 compliant)

Item	Specifications
Program execution methods	• Timer execution type ··· High speed (200ms cycle), normal speed (200/400/600/800ms/1sec cycle), low speed (1/2/4/5/10sec cycle), scan execution • Interrupt execution type ... Set cycle interrupt (1 to 999ms), random interrupt (interrupt with interrupt pointers I0 to I255) (In practical use, 10ms and higher/control loop)
Tool functions	• Project creation (1 project/process CPU) • Project parameter setting, tag registration, I/O module registration, global variable registration (maximum 32,000) • GX Developer label assignment • FBD program creation and editing (FBD program, user defined FB, user defined tag FB, structure creation and editing) • Program execution setting • GX Developer project startup • Compile, download, online change (Note 1) • Online monitor (online monitor, and change of various variables including tags, tag face plate display, etc.) • Debugging, diagnostics (Start/resume in FB units, display of error code and corresponding FB name when fault occurs) • Printing (printing of setting and registration data, and FBD data)

Note 1) • Process CPU (upper five digits of serial No. "04042" or higher)
• Free program memory equivalent to the compiled program size is required. An SRAM memory card is required when there is not enough open program memory.

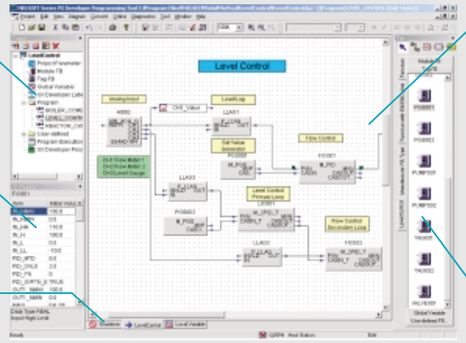
Monitor tools

Item		Specifications
Target CPU and network		Same as programming tool
Target personal computer		PC/AT compatible personal computer running Windows NT4.0 or 2000. Display resolution 800 x 600 or higher.
Number of monitor CPU modules and tags		• Number of process CPU modules under monitor: Maximum 8 CPU modules (up to eight process CPU modules under monitor from one personal computer.) • Number of monitor tags : Maximum 3,840
Monitor functions	Control panel	A faceplate modeling on process regulator is displayed to monitor and adjust (change the operation mode, SV/MV values, etc.) the loop control tags and digital tags. The pop-up tuning screen can be opened from this screen. • 8 faceplates/screen (one group) x maximum 500 screens = 4,000 face plates • In addition to the normal monitor (automatic, manual, cascade), monitoring and operations are available for the override mode and simulation mode. The override mode functions is suitable for keeping the operation when a sensor fails or a wire break to put desired value into PV. In the simulation mode, the MV values are forcibly returned to PV values so the loop operation can be confirmed, etc. • Tagging available for faceplate units.
	Trend graph	The time series transition of the detailed value of each tag data item value is displayed as a historical/real time trend graph. • 8 items/screen (one group) x Maximum 125 screens = 1,000 items • Collection cycle : 1 sec./10 sec./1 min./5 min./10 min. Recordable time : (Collection cycle / Recordable time: 1 sec. 2.77 hours; 10 sec. 27.7 hours; 1 min. 6.9 days; 5 min. 34.7 days; 10 min. 69.4 days) • It is possible to export alarm history in CSV format.
	Alarm list display	The history of the past 2,000 alarms (alarms determined for each loop control tag, and alarm tag alarm messages) is displayed. • The faceplate of the tag displayed in the alarm can be displayed. • The alarm list can be manually output as a CVS format text file.
	Event list display	The history of the past 2,000 events (user operation history, event messages determined for each digital tag, event message for message tag) is displayed. • It is possible to export event history in CSV format.
	User-created screen	It is possible to start up the user-created screens.
	Pop-up faceplate, pop-up tuning screen	The pop-up faceplate has pop-up style appearance. It appears when pressing "Detail" button. Pop-up tuning screen has same functions as faceplate, tuning trend graph and tag monitor. • The tuning trend displays the PV, MV and SV values of that tag (loop) as a real time/historical trend. • The real time trend's collection cycle is fixed to two seconds. The historical trend can record up to 10,000 points (5.5 hours). It is possible to export trend data in CSV format. • Up to 16 tags can be simultaneously monitored with the pop-up faceplate and tuning screen, but only up to two screens can be opened (tag number). (The remaining 14 tags are monitored in the background.) • The tag monitor monitors the details of that tag's items in the online state. The details of each item can be changed online. • Auto tuning is available for loop tags from the pop-up tuning screen.
	Tag data external I/F	• The button ActiveX control to display faceplate is available. By pasting these on an ActiveX control support tool of VB, and setting the properties, the faceplate can be displayed, monitored and operated with an external application. (The PX Developer's monitor tool must be in the executable state.) • Using the VB program, the tag data can be read with the tag name ("FIC001.PV", etc.), but it is not applicable to write data with tag name.
	Miscellaneous	• Buzzer stop, screen hard copy, screen arrangement, search (face plate search with tag name, group name), operation mode control (lock, operator, engineer). • A graphic screen creation function is not available. Use the tools recommended below. • SoftGOT screen creation software • EZSocket partner SCADA/monitoring product (InTouch, ASTMAC, etc.)

• PX Developer screen configuration and screen examples

Programming tool

Screen configuration



Project window
The project parameters, applicable modules, tags, program names and execution cycle, etc., are set in this window.

FB property window
The initial values of the data in the FB are set in this window.

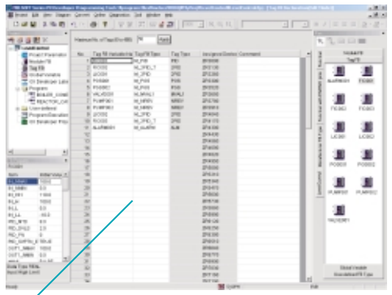
Sheet
Maximum 32 sheets/program

Program/FB definition window
The programs and user defined FBs are created in this window.

A program is a unit in which the process is described. Up to 200 programs can be created. One program contains up to 32 sheets.
A sheet is a form used to paste FB/functions or connector lines, and describe the process. The method of executing the program, such as the execution cycle, is set in the sheet.

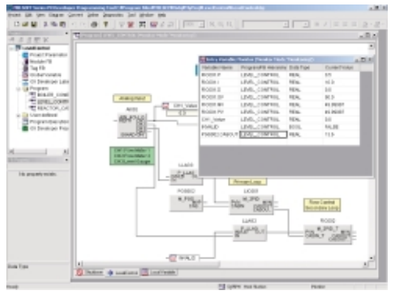
FB/function part window
The FB/function parts pasted in the program and user defined FB are displayed in this window.

Tag settings

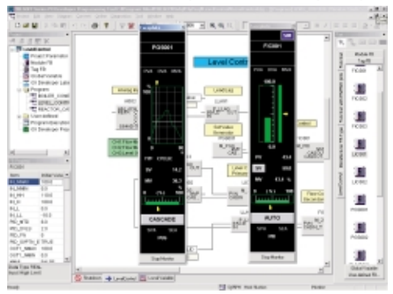


- Tags are the names assigned to the process device (regulator, indicator, etc.). The devices are operated and monitored with tags.
- Tags contain various data (set values, current values, manipulated variables rates, PID constants, etc.)
- Up to 480 tags can be registered and used in one process CPU.
- The tag name and tag processing method (PID control, PV monitor, etc.) are registered on the tag setting screen. When a tag is registered, the corresponding FB (tag FB) is automatically created in the FB/function part window. The process device operation and monitoring are enabled by pasting these FBs on the sheet.

Online monitor 1 (variable entry monitor)

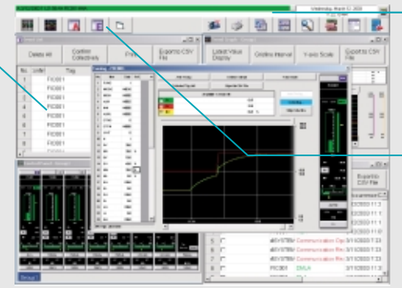


Online monitor 2 (Monitor with faceplates)



Monitor tool

Screen configuration



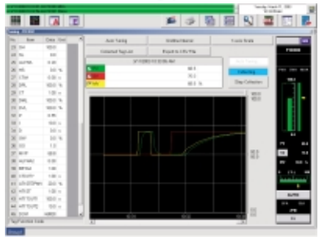
Monitor function display area
Each monitor function (control panel, trend graph, faceplate, tuning panel, alarm list, event list screen) is displayed in this area.

Alarm/event display area
The latest two alarms or event messages are displayed.

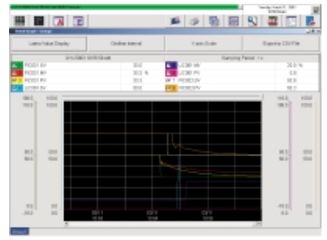
Tool bar
These icons call out each monitor function.

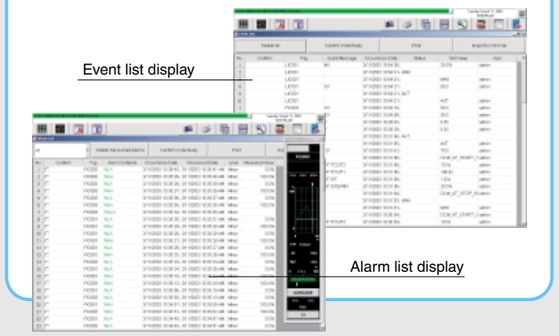
Control panel (group screen)

Tuning panel



Historical trend graph





Adding graphic functions to the monitor screen Optional

The PX Developer monitor tool does not contain functions to create graphic screens. An optional tool is required to add the graphic functions. The monitor function is created by combining this tool with the monitor tool.

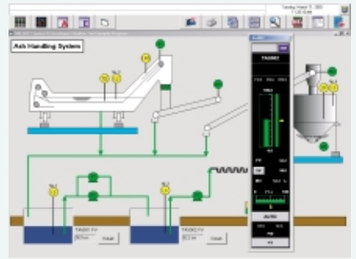
PX Developer monitor tool

SoftGOT screen creation tool
GOT catalog

Graphic screens can be created inexpensively using the SoftGOT screen creation tool.

MX Component with VB language
MELSOFT catalog

Graphic screens with a high degree of freedom can be created with VB language. Communication with the process CPU can be realized easily with MX Component.



Example of graphic screen creation tool

List of Q Series models

Product name		Model	Overview	Protection degree
CPU module	Basic model	Q00JCPU	Program steps : 8k step power supply, base integrated CPU	IP1X
		Q00CPU	Program steps : 8k step	IP2X
		Q01CPU	Program steps : 14k step	IP2X
	High performance model	Q02CPU	Program steps : 28k step	IP2X
		Q02HCPU	Program steps : 28k step	IP2X
		Q06HCPU	Program steps : 60k step	IP2X
		Q12HCPU	Program steps: 124k step	IP2X
		Q25HCPU	Program steps: 252k step	IP2X
Process CPU module		Q12PHCPU	Program steps: 124k step	IP2X
		Q25PHCPU	Program steps: 252k step	IP2X
Motion CPU module		Q172CPU	For 8-axis control	–
		Q173CPU	For 32-axis control	–
Battery		Q6BAT	Replacement battery for Q00J, Q00, Q01, Q02, Q02H, Q06H, Q12H, Q25HCPU	–
Memory card		Q2MEM-1MBS	SRAM card: 1MB	–
		Q2MEM-2MBS	SRAM card: 2MB	–
		Q2MEM-2MBF	Flash card: 2MB (Flash ROM)	–
		Q2MEM-4MBF	Flash card: 4MB (Flash ROM)	–
		Q2MEM-8MBA	ATA card: 8MB (ATA Flash ROM)	–
		Q2MEM-16MBA	ATA card: 16MB (ATA Flash ROM)	–
		Q2MEM-32MBA	ATA card: 32MB (ATA Flash ROM)	–
SRAM card battery		Q2MEM-BAT	Replacement battery for Q2MEM-1MBS	–
Base unit	Main	Q33B	Power supply + CPU + 3 I/O slots for mounting Q Series modules	IP0X
		Q35B	Power supply + CPU + 5 I/O slots for mounting Q Series modules	IP0X
		Q38B	Power supply + CPU + 8 I/O slots for mounting Q Series modules	IP0X
		Q312B	Power supply + CPU + 12 I/O slots for mounting Q Series modules	IP0X
		Q32SB	Slim type power supply + CPU + 2 I/O slots for mounting Q Series modules	IP0X
		Q33SB	Slim type power supply + CPU + 3 I/O slots for mounting Q Series modules	IP0X
		Q35SB	Slim type power supply + CPU + 5 I/O slots for mounting Q Series modules	IP0X
	Extension	Q63B	Power supply + 3 I/O slots for mounting Q Series modules	IP0X
		Q65B	Power supply + 5 I/O slots for mounting Q Series modules	IP0X
		Q68B	Power supply + 8 I/O slots for mounting Q Series modules	IP0X
		Q612B	Power supply + 12 I/O slots for mounting Q Series modules	IP0X
		Q52B	2 I/O slots for mounting Q series modules (Power supply module not required.)	IP0X
		Q55B	5 I/O slots for mounting Q series modules (Power supply module not required.)	IP0X
	Adapter	Q6DIN1	DIN rail mounting adapter for Q38B, Q312B, Q68B, Q612B	–
		Q6DIN2	DIN rail mounting adapter for Q35B, Q65B	–
		Q6DIN3	DIN rail mounting adapter for Q33B, Q63B, Q52B, Q55B	–
Extension cable		QC05B	0.45m	–
		QC06B	0.6m	–
		QC12B	1.2m	–
		QC30B	3m	–
		QC50B	5m	–
		QC100B	10m	–
Power supply module		Q00JCPU (Power supply section)	100 - 240VAC input/5VDC3A output (CPU, power supply, base integrated)	–
		Q61P-A1	100 - 120VAC input/5VDC6A output	IP1X
		Q61P-A2	200 - 240VAC input/5VDC6A output	IP1X
		Q61SP	Slim type, 100 - 240V input/5VDC2A output (Q3□SB base compatible)	IP1X
		Q62P	100 - 240VAC input/5VDC3A, 24VDC/0.6A output	IP1X
		Q63P	24VDC input/5VDC6A output	IP2X
		Q64P	100 - 120/200 to 240 VAC input, 5VDC8.5A output	IP1X
Input module	AC	QX10	100 to 120VAC/7 to 8mA, 16 points, response time: 20ms, terminal block	IP1X
		QX28	240VAC, 8 points, terminal block	IP1X
	DC (Note 1)	QX40	24VDC/4mA, plus common, 16 points, response time: 1/5/10/20/70ms, terminal block	IP2X
		QX40-S1	24VDC plus common input 16 points, terminal block for high-speed input (Response time can be specified to 0.1ms.)	IP2X
		QX41	24VDC/4mA, plus common, 32 points, response time 1/5/10/20/70ms, connector (Note 3)	IP2X
		QX41-S1	24VDC/4mA, plus common, 32 points, high-speed response: 0.1/0.2/0.4/0.6/1ms, connector (Note 3)	IP2X
		QX42	24VDC/4mA, plus common, 64 points, response time 1/5/10/20/70ms, connector (Note 3)	IP2X
		QX42-S1	24VDC/4mA, plus common, 64 points, high-speed response: 0.1/0.2/0.4/0.6/1ms, connector (Note 3)	IP2X
	DC sensor (Note 1)	QX70	5-12VDC plus common/minus common shared input, 16-point terminal block	IP2X
		QX71	5-12VDC plus common/minus common shared input, 32-point connector (Note 3)	IP2X
		QX72	5-12VDC plus common/minus common shared input, 64-point connector (Note 3)	IP2X
	DC (Note 1)	QX80	24VDC/4mA, minus common, 16 points, response time: 1/5/10/20/70ms, terminal block	IP2X
		QX81	24VDC/4mA, minus common 32 points, response time 1/5/10/20/70ms, connector (Note 4)	IP2X
Output module	Contact	QY10	240VAC/24VDC, 2A/point, 8A/common, 16 points (16 points/common), output delay: 12ms, no fuse, terminal block	IP1X
		QY18A	240VAC/24VDC, 2A, 8 independent contact output points, terminal block, no fuse	IP1X
	AC Triac	QY22	240VAC/0.6A, 16 points, terminal block, no fuse	IP1X
	Transistor (sink)	QY40P	12/24VDC, 0.1A/point, 1.6A/common, 16 points (16 points/common), output delay: 1ms, terminal block, with short protection function	IP2X
		QY41P	12/24VDC, 0.1A/point, 2A/common, 32 points (32 points/common), output delay: 1ms, connector, with short protection function (Note 3)	IP2X
		QY42P	12/24VDC, 0.1A/point, 2A/common, 64 points (32 points/common), output delay: 1ms, connector, with short protection function (Note 3)	IP2X
		QY50	12/24VDC, 0.5A/point, 4A/common, 16 points (16 points/common), output delay: 1ms, with fuse, terminal block	IP2X
	Transistor	QY68A	5-24VDC, 2A/point, 8A/module, 8 points, all points independent, sink/source, terminal block, no fuse	IP2X
	TTL/CMOS (sink)	QY70	5/12VDC, 16mA/point, 16 points (16 points/common), output delay: 0.3ms, with fuse, terminal block	IP2X
		QY71	5/12VDC, 16mA/point, 32 points (32 points/common), output delay: 0.3ms, with fuse, connector (Note 3)	IP2X
	Transistor (source)	QY80	12/24VDC, 0.5A/point, 4A/common, 16 points (16 points/common), output delay: 1ms, with fuse, terminal block	IP2X
		QY81P	12/24VDC, 0.1A/point, 2A/common, 32 points (32 points/common), output delay: 1ms, connector, with short protection function (Note 4)	IP2X

Product name		Model	Overview	Protection degree
I/O combined module	DC input/ transistor output	QH42P	24VDC plus common input: 32 points (response time:1/5/10/20/70ms) 12-24VDC, 0.1A sink output: 32 points, connector with short protection function	IP2X
		QX48Y57	24VDC plus common input: 8 points 12-24VDC, 0.5A sink output: 7 points, with fuse, terminal block	IP2X
I/O module connector		A6CON1	32-point connector for soldering (For QX41/42, QX71/72, QY41P/42P, QY71)	—
		A6CON2	32-point connector for solderless terminal connection (For QX41/42, QX71/72, QY41P/42P, QY71)	—
		A6CON3	32-point connector for flat cable pressure welding (For QX41/42, QX71/72, QY41P/42P, QY71)	—
		A6CON4	32-point connector for soldering cable led in horizontal/inclined direction	—
		A6CON1E	32-point connector for soldering (For QX81, QY81P)	—
		A6CON2E	32-point connector for solderless terminal connection (For QX81, QY81P)	—
		A6CON3E	32-point connector for flat cable pressure welding (For QX81, QY81P)	—
Terminal block adapter		Q6TE-18S	0.3 to 1.5mm^2 (AWG22 to 16) for 16-point I/O	IP2X
		Q6TA32	0.5mm^2 (AWG20) for 32-point I/O	IP2X
Terminal block adapter dedicated tool		Q6TA32-TOL	Q6TRA32 dedicated tool	—
Interrupt module (Note 7)		QI60	16-point, response time: 0.1/0.2/0.4/0.6/1ms	IP2X
Blank cover		QG60	Blank cover for I/O slot	—
Channel isolated analog module		Q64AD-GH	4ch, A/D conversion: voltage, current input	IP2X
		Q62AD-DGH	2ch, distributor module	IP2X
		Q62DA-FG	2ch, D/A conversion, voltage, current output (with output monitor)	IP2X
Channel isolated temperature input module		Q64TDV-GH	4ch, thermocouple input, fine voltage input	IP2X
		Q64TD	4ch, thermocouple input	IP2X
Analog module (Note 6)		Q64AD	4ch, A/D conversion: voltage, current input	IP2X
		Q68ADV	8ch, A/D conversion: voltage input	IP2X
		Q68ADI	8ch, A/D conversion: current input	IP2X
		Q62DA	2ch, D/A conversion: voltage, current output	IP2X
		Q64DA	4ch, D/A conversion: voltage, current output	IP2X
		Q68DAV	8ch, D/A conversion: voltage output	IP2X
		Q68DAI	8ch, D/A conversion: current output	IP2X
Temperature input module		Q64RD	4ch, platinum temperature sensor input (3/4-wire type)	IP2X
Temperature control module (Note 6)		Q64TCTT	Thermocouple input-transistor output	IP2X
		Q64TCTTBW	Thermocouple input-transistor output with wire break detection,	IP2X
		Q64TCRT	platinum temperature sensor input-transistor output	IP2X
		Q64TCRTBW	platinum temperature sensor input-transistor output with wire break detection	IP2X
Channel isolated pulse input module		QD60P8-G	8ch, 5/12 to 24VDC input, input filter setting, with pre-scale function	IP2X
High-speed counter		QD62	2ch, 200kpps, 5/12/24VDC input, sink Tr output (Note 2)	IP2X
		QD62D	2ch, 500kpps, differential input, sink Tr output (Note 2)	IP2X
		QD62E	2ch, 200kpps, 5/12/24 VDC input, source Tr output (Note 2)	IP2X
Positioning module (Note 6)		QD75P1	1-axis, open collector output (Note 2)	IP2X
		QD75P2	2-axis, open collector output (Note 2)	IP2X
		QD75P4	4-axis, open collector output (Note 2)	IP2X
		QD75D1	1-axis, differential output (Note 2)	IP2X
		QD75D2	2-axis, differential output (Note 2)	IP2X
		QD75D4	4-axis, differential output (Note 2)	IP2X
		QD75M1	1-axis, SSCNET compatible (Note 3)	—
		QD75M2	2-axis, SSCNET compatible (Note 3)	—
		QD75M4	4-axis, SSCNET compatible (Note 3)	—
		QD70P4	4-axis, pulse output (servomotor, stepping motor compatible) (Note 2)	IP2X
		QD70P8	8-axis, pulse output (servomotor, stepping motor compatible) (Note 2)	IP2X
Ethernet module		QJ71E71	For 10 BASE-5/10 BASE-T	IP2X
		QJ71E71-B2	For 10 BASE-2	IP2X
		QJ71E71-100	For 10 BASE-T/100 BASE-TX	IP2X
MELSECNET/H module		QJ71LP21-25	SI/QSI/H-PCF optical cable for duplex loop, control station, normal station, master station	IP1XB
		QJ71LP21S-25	SI/QSI/H-PCF optical cable with external power supply function for duplex loop, control station, normal station, master station	IP1XB
		QJ71LP21G	GI optical cable for duplex loop, control station, normal station, master station	IP1XB
		QJ72LP25-25	SI/QSI/H-PCF optical cable for duplex loop, remote I/O station	IP1XB
		QJ72LP25G	GI optical cable for duplex loop, remote I/O station	IP1XB
		QJ71BR11	Coaxial 75Ω cable for single bus, control station, normal station, master station	IP1XB
		QJ72BR15	Coaxial 75Ω cable for single bus, remote I/O station	IP1XB
		Q80BD-J71LP21-25	MELSECNET/H board for personal computer, SI/QSI/H-PCF optical cable specifications for control station, normal station	—
		Q80BD-J71LP21G	MELSECNET/H board for personal computer, GI optical cable specifications for control station, normal station	—
		Q80BD-J71BR11	MELSECNET/H board for personal computer, coaxial cable specifications for control station, normal station	—
CC-Link module (Note 6)		QJ61BT11	For master/local	IP1XB
Serial communication module		QJ71C24N	RS-232 1ch, RS-422/485 2ch	
		QJ71C24N-R2	RS-232 1ch, 2ch	
		QJ71C24N-4	RS-422/485 1ch, 2ch	
		QJ71C24 (Note 6)	RS-232 1ch, RS-422 1ch	IP2X
		QJ71C24-R2 (Note 6)	RS-232 2ch	IP2X
Intelligent communication module		QD51	RS232 2ch	IP2X
		QD51-R24	RS232 1ch, RS422/485 1ch	IP2X
		SW1IVD-AD51HP (Note 5)	QD51 software package (for DOS/V personal computer, AD51H-S3/A1SD51S)	—
		SW1NX-AD51HP (Note 5)	QD51 software package (for NEC PC9800 Series, AD51H-S3/A1SD51S)	—
FL-net (OPCN-2) module (Note 6)		QJ71FL71	FL-net (OPCN-2) Version 1.00 specifications, 10BASE5/10BASE-T compatible	IP2X
		QJ71FL71-B2	FL-net (OPCN-2) Version 1.00 specifications, 10BASE2 compatible	IP2X
		QJ71FL71-F01	FL-net (OPCN-2) Version 2.00 specifications, 10BASE5/10BASE-T compatible	IP2X
		QJ71FL71-B2-F01	FL-net (OPCN-2) Version 2.00 specifications, 10BASE2 compatible	IP2X
AS-i master module		QJ71AS92	AS-i Standard Ver. 2.11 compatible master	IP2X

Note 1) "Plus common" refers to using the sensor with the positive DC power connected to the common terminal. "Minus common" refers to using the sensor with the negative DC power connected to the common terminal.
Note 2) The connector is not enclosed. Prepare the A6CON1, A6CON2 or A6CON4 connector.
Note 3) The connector is not enclosed. Prepare the A6CON1, A6CON2, A6CON3 or A6CON4 connector.
Note 4) The connector is not enclosed. Prepare the A6CON1E, A6CON2E or A6CON3E connector.
Note 5) This software package is dedicated for the MS-DOS mode.
Note 6) When using this module with the multiple PLC, the last digit of the serial No. indicated on the rated plate must be B or higher. Refer to the Q Series data book for details.
Note 7) The CPU module product information "0211220000000000-BJ, GX Developer Version 6 or higher" are required to set the response time with this module.
* 1. The AnS Series module can be mounted on the QA1S65B/68B and the A Series module on the Q65B in addition to this module. Check the Q Series data book for the applicable modules as some may not be usable or may have limitations applied.

Software and peripheral devices

Product name	Model	Overview	Applicable A	Applicable Q
PX Developer (Note 8)	SW□D5C-FBDQ-E	Process control FBD software package	_	○
	SW□D5C-FBDQ-EA	Process control FBD software package (Volume license product)	_	○
GX Developer (Note 3)	SW□D5C-GPPW-E	MELSEC PLC programming software	○	○
	SW□D5C-GPPW-EV	MELSEC PLC programming software (Upgrade product)	○	○
	SW□D5C-GPPW-EA	MELSEC PLC programming software (Volume license product)	○	○
	SW□D5C-GPPW-EVA	MELSEC PLC programming software (Volume license upgrade)	○	○
	SW□D5C-GPPW-EAZ	MELSEC PLC programming software (Additional license product)	○	○
GX Convertor (Note 6)	SW□D5C-CNVW-E	Excel text data converter	○	○
GX Configurator-AD (Note 6)	SW□D5C-QADU-E	MELSEC-Q dedicated A/D module setting and monitor tool	_	○
GX Configurator-DA (Note 6)	SW□D5C-QDAU-E	MELSEC-Q dedicated D/A module setting and monitor tool	_	○
GX Configurator-SC (Note 6)	SW□D5C-QSCU-E	MELSEC-Q dedicated serial communication module setting and monitor tool	_	○
GX Configurator-CT (Note 6)	SW□D5C-QCTU-E	MELSEC-Q dedicated high-speed counter module setting and monitor tool	_	○
GX Configurator-TI (Note 6)	SW□D5C-QTIU-E	MELSEC-Q dedicated temperature input module setting and monitor tool	_	○
GX Configurator-TC (Note 6)	SW□D5C-QTCU-E	MELSEC-Q dedicated temperature control module setting and monitor tool	_	○
GX Configurator-FL (Note 6)	SW□D5C-QFLU-E	MELSEC-Q dedicated FL-NET module setting and monitor tool	_	○
GX Configurator-PT (Note 6)	SW□D5C-QPTU-E	QD70P positioning module setting and monitor tool	_	○
GX Configurator-QP (Note 6)	SW□D5C-QD75P-E	QD75P/D/M positioning module setting and monitor tool	_	○
	SW□D5C-QD75P-EV	QD75P/D/M positioning module setting and monitor tool (Upgrade product)	_	○
GX Configurator-AS	SW□D5C-QASU-E	QJ71AS92 type AS-i master module setting and monitor tool	_	○
GX Simulator	SW□D5C-LLT-E	MELSEC PLC simulation software	○	○
	SW□D5C-LLT-EV	MELSEC PLC simulation software (Upgrade product)	○	○
	SW□D5C-LLT-EA	MELSEC PLC simulation software (Volume license product)	○	○
	SW□D5C-LLT-EAZ	MELSEC PLC simulation software (Additional license product)	○	○
GX Explorer	SW□D5C-EXP-E	MELSEC PLC project management software	○	○
	SW□D5C-EXP-EA	MELSEC PLC project management software (Volume license product)	○	○
	SW□D5C-EXP-EAZ	MELSEC PLC project management software (Additional license product)	○	○
GX RemoteService-I	SW□D5C-RAS-E	Remote maintenance tool	○	○
	SW□D5C-RAS-EA	Remote maintenance tool (Volume license product)	○	○
MX Component	SW□D5C-ACT-E	ActiveX library for communication	○	○
	SW□D5C-ACT-EA	ActiveX library for communication (Volume license product)	○	○
	SW□D5C-ACT-EAZ	ActiveX library for communication (Additional license product)	○	○
MX Sheet	SW□D5C-SHEET-E	Excel communication support tool	○	○
	SW□D5C-SHEET-EA	Excel communication support tool (Volume license product)	○	○
	SW□D5C-SHEET-EAZ	Excel communication support tool (Additional license product)	○	○
PX Works	SW□D5C-FBDGPP-E	PX Developer and GX Developer set package	○ (Note 9)	○
GX Works	SW□D5C-QSET-E	GX Developer, GX Simulator, GX Explorer, GX Configurator AD, DA, SC and CT set package	(Note 2)	○
	SW□D5C-GPPLLT-E	GX Developer, GX Simulator and GX Explorer set package	○	○
MX Works	SW□5C-SHEETSET-E	MX Sheet and MX Component set package	○	○
Connection cable	QC30R2	RS-232 cable for personal computer to CPU connection, 3m (mini DIN 6P, D-sub 9P)	○	○
Peripheral device connection unit	AJ65BT-G4-S3	Unit for connection with CC-Link system's master station and local station CPU	○	○
PC card adapter	Q2MEM-ADP	Standard PCMCIA slot adapter for Q2MEM memory card	○	○
Cable disconnection prevention holder	Q6HLD-R2	RS-232 cable disconnection prevention holder	○	○

Note 1) Contact your local dealer for details on the volume license products, additional license products and volume license upgrade products.
Note 2) GX Configurator-** cannot be used with mode A.
Note 3) Compatible with SW4 or higher. Multiple PLC system is compatible with SW6 or higher. Q00J/Q00/Q01CPU are compatible with SW7 or higher.
Note 4) Compatible with SW3 or higher.
Note 5) Not compatible with basic model.
Note 6) The -EA (Volume license product) and -EAZ (Additional license product) are available for the GX Converter and GX Configurator-**.
Note 7) Visit the MELFANSweb site or contact your local Mitsubishi office for details on the latest software versions.
Note 8) GX Developer Ver. 7.20W or higher must be installed in the same personal computer.
Note 9) PX Developer cannot be used with mode A.

*The GX Series and MX component are compatible with Windows® 95, Windows® 98, Windows® Me, Windows NT® 4.0 and Windows® 2000 Professional. PX Developer's programming tool is compatible with Windows® 98, Windows® Me, Windows NT® and Windows® 2000 Professional. PX Developer's monitor tool is compatible with Windows NT® and Windows® 2000 Professional. All other software is compatible with Windows® 95, Windows® 98 and Windows NT® 4.0.

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