MITSUBISHI

Mitsubishi Programmable Logic Controller

MELSEC-Q DATA BOOK

MELSEC-

EVOLUTION

MELSEC has gone through new evolution.

Opening up new possibilities for Factory Automation
with more compact, faster and easier to use PLCs.

INHERITANCE

MELSEC inherits functions.

The assets accumulated for the A and QnA series
can be utilized effectively for the Q series.

Q series

INDEX

Providing Individual Solutions

SPACE EFFICIENT

Having about 60% of the conventional AnS series mounting area, the ultracompact Q series contributes to equipment space saving.·····Refer to P. 1-1.

OPTIMIZED CONFIGURATION

Program capacity Max. 252k steps, 8192 points of I/O control,allowing optimal configuration of small to large scale systems.·····Refer to P. 1-3.

HIGH PERFORMANCE

1ms processing of 12k steps opens up possibilities for high performance and precision control.·····Refer to P. 1-2.

Improved debugging

A wide variety of functions designed for program design and debugging efficiency.·····Refer to P. 1-8.

USER FRIENDLY

Development and maintenance efficiency is improved with a user-friendly, comfortable Windows comprehensive environment.·····Refer to P. 1-7.

Providing Total Solutions

INFORMATION CONSOLIDATION

Easy network configuration and high-performance networking in response to computerization of production facilities.·····Refer to P. 1-5.

RELIABILITY

Reliable products and easy troubleshooting functions for decreased downtime.·····Refer to P. 1-4.

UTILIZATION

Ease of developing Q programs using the existing A/QnA programs. Use of the A mode facilitates enhanced performance of the AnS system.·····Refer to P. 1-9.

The Q series is available in two different modes of operation: the Q mode which uses the Q series' inherent functions and performance capabilities; and the A mode which uses the conventional AnS series' programs and hardware and is significantly enhanced in CPU processing capabilities. (Refer to P. 1-9.)
Unless otherwise specified, this data book introduces the Q mode features, which applicable may not be for A mode use.

Features
Q mode
A mode
PC-related
GOT-A900
Appendices

STRONG FEATURES POINT

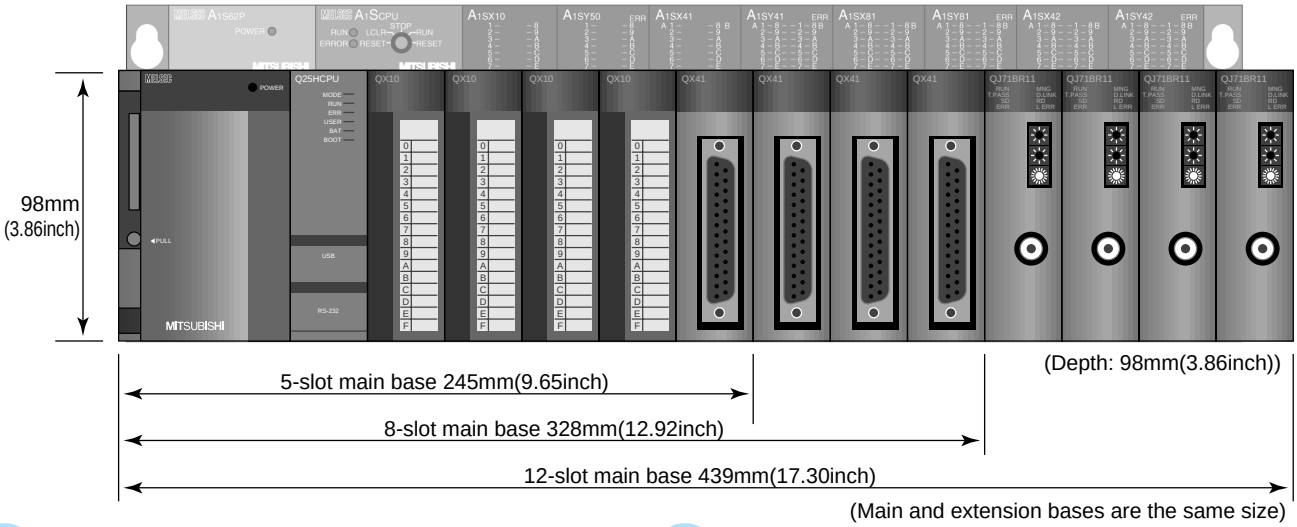
SPACE SAVING AND WIRING SAVING

To save machinery and equipment space and to reduce costs by decreased wiring processes, the Q series is smaller in its mounting area and has higher freedom of installation. It also has increased affinity with CC-Link, for easier use.

Mounting Area

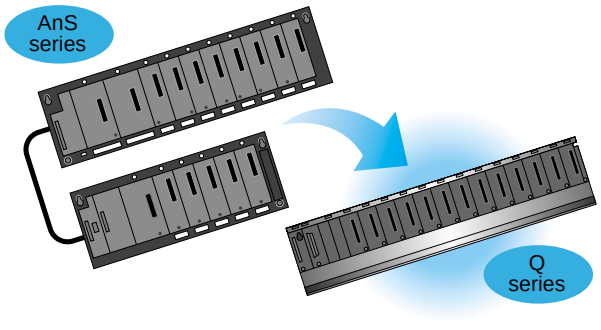
The mounting area of the Q series is 60% smaller than that of the conventional compact model (AnS series).

■ Mounting area comparison



Mounting Freedom

The Q series has a wide assortment of 5-, 8- and 12-slot bases. The freedom of mounting space allows reduction in the number of required bases.



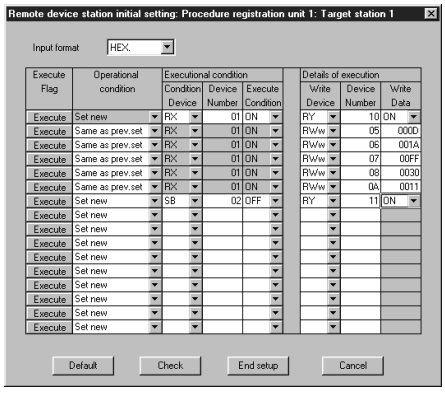
■ Base unit types

Number of I/O Slots	Main Base	Extension Base	Mounting Size (mm(inch))
5	Q35B	Q65B	245(9.65)X98(3.86)
8	Q38B	Q68B	328(12.92)X98(3.86)
12	Q312B	Q612B	439(17.30)X98(3.86)

Note 1: The base units are designed for the Q series I/O, intelligent function and network modules. The AnS series modules cannot be loaded on the base units given in the above table.

CC-Link

The Q series has increased affinity with CC-Link, for easier use. Using the GPPW network setting screen, you can set the network parameters and the automatic refresh of the remote I/O signals to the CPU internal memory. In addition, you can make automatic setting of initial setting data to remote device stations, such as the analog-to-digital converter and high-speed counter, so that you can carry out programming without needing to be aware of the network.



STRONG POINT FEATURES

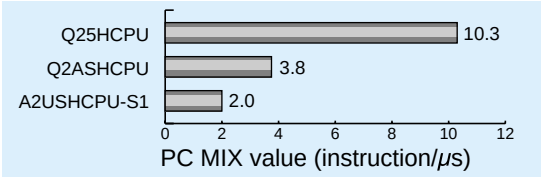
INCREASED PERFORMANCE AND ACCURACY OF FACILITIES

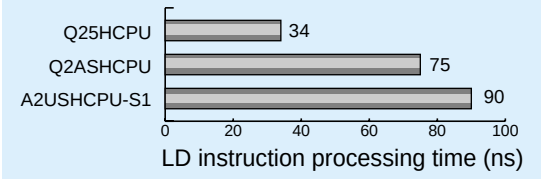
The Q series has significantly improved CPU operation processing speeds, e.g. achieved a scan time of 0.5ms in programs of approx. 4k steps and 1ms in programs of approx. 12k steps (Note 2). Also, with the addition of a cyclic execution program run system and a program start interrupt function from network/intelligent function module, the Q series has opened up possibilities for shortened machinery/equipment tact time and increased machining accuracy.

Operation Processing Speeds

The Q series high-speed type CPU has realized speeds as high as 34ns for basic instruction processing time of and a PC MIX value of 10.3 (Note 3). It is about 5 times faster in performance than the conventional model A2USHCPU-S1 and about 2.7 times faster than the Q2ASHCPU. In addition, it has dramatically increased floating-point operation speeds for PID and other arithmetic functions.

■ PC MIX values and LD instruction processing times





■ CPU operation processing speeds

Instruction	Q02CPU	Q02HCPU Q06HCPU Q12HCPU Q25HCPU
LD (LD X0)	79ns	34ns
OUT (OUT Y0)	158ns	68ns
Timer (OUT T0 K5)	632ns	272ns
Transfer (MOV D0 D1)	237ns	102ns
Addition (+ D0 D1)	395ns	170ns
Floating-point addition (E+)	1815ns	782ns
PC MIX value	4.4	10.3

Also, the END instruction processing time has been reduced greatly by the use of a multi-processor configuration which is made up of the control processor for program execution and the information processing processor for communication processing, etc.

Note 2: Scan time varies with the program contents and system configuration. The scan times given are values that can be achieved under given conditions.

Note 3: The PC MIX value is the average number of instructions such as the basic and data processing instructions executed in 1μs. A larger value indicates a higher processing speed.

Adoption of High-Speed System Bus

The Q series high-speed system bus is 4 to 8 times faster than that of the conventional series, giving rapid I/O refresh and network data refresh. (Refer to P. 9.)

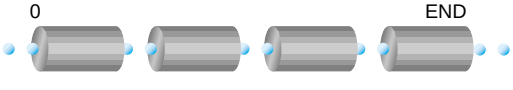
Variable Time Constant of Input Module

The DC input modules input response time can be changed. The response time can be chosen from among 1, 5, 10, 20 and 70ms according to your application.

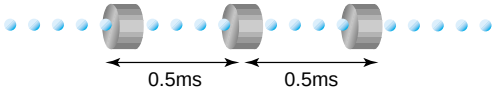
Cyclic Execution Program

A cyclic execution program is started and run at predetermined time intervals. High accuracy can be provided if you use this program in the processing of areas which will particularly influence machining accuracy. The cyclic time intervals can be set to 0.5ms-60s.

■ Ordinary scan execution program

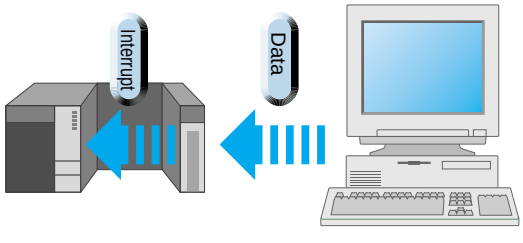


■ Cyclic execution program



Event Interrupt

A CPU interrupt program can be started from a network or intelligent function module. Using this function, fast response can be made to an event which occurs asynchronously with the program scan of the PLC, e.g. data receiving from a network or count value match of high-speed counter.



STRONG POINT
FEATURES

OPTIMUM SYSTEM CONFIGURATION

Production facility control grows more and more sophisticated. Also, it is necessary to process large volumes of production data, e.g. more precision production control, quality control, and recently, resources/energy control in consideration of global environment. To meet such needs, the Q series is designed to handle large volumes of programs and data.

Program Capacities

The Q series has a wide assortment of CPU modules having 28k-, 60k-, 124k- and 252k-step program capacities, enabling a selection of the CPU module which matches the machinery/equipment control capacity.

■CPU program capacities (steps)

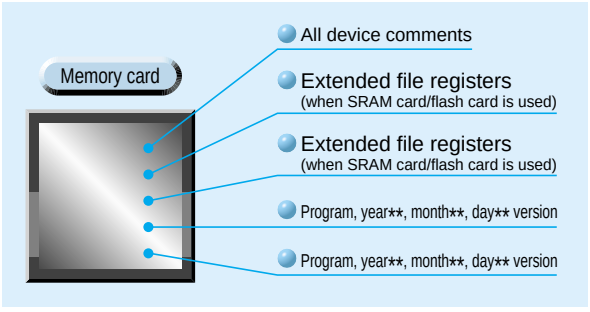
Q02CPU Q02HCPU	28k
Q06HCPU	60k
Q12HCPU	124k
Q25HCPU	252k

Number of Control I/O Points and Number of I/O Modules

The Q series can control a maximum of I/O. 4096 points (max. 8192 points when used with a remote I/O network such as CC-Link)regardless of the CPU module type.

Extended Memory

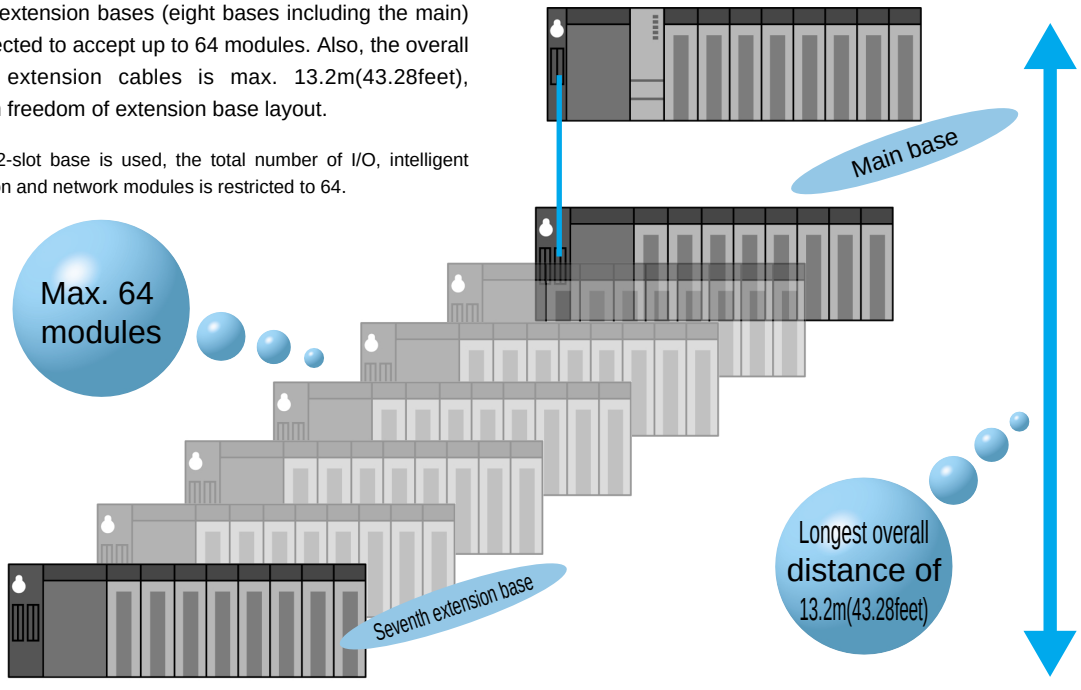
Each CPU module is equipped with a small PC card slot to accept extended memory of up to 32MB (when using the ATA card). By loading large-capacity extended memory, you can perform large-capacity file management, and comment settings for all data devices and past programs can be stored in memory as a correction history.



Up to 7 Extension Bases Connectable

Up to seven extension bases (eight bases including the main) can be connected to accept up to 64 modules. Also, the overall distance of extension cables is max. 13.2m(43.28feet), enabling high freedom of extension base layout.

Note 1: If a 12-slot base is used, the total number of I/O, intelligent function and network modules is restricted to 64.



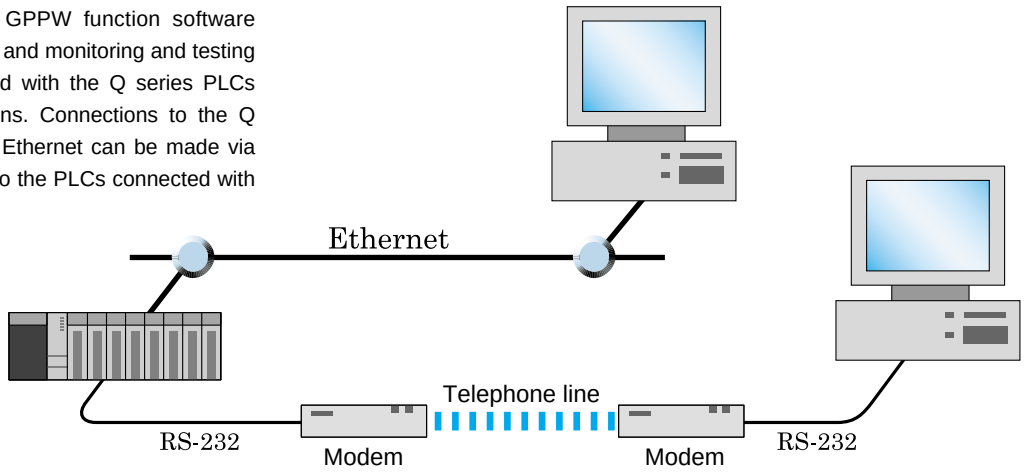
STRONG POINT
FEATURES

EASE OF MAINTENANCE

Needless to say, maintenance is essential to exhibit the inherent performance of machinery and equipment. However, as business areas increase and machinery and equipment are installed all over the world, it will be important to smoothly carry out on-the-spot maintenance. The Q series has functions to minimize this maintenance-related problem.

Remote Programming

The Q series-compatible GPPW function software allows online programming and monitoring and testing operations to be performed with the Q series PLCs installed at remote locations. Connections to the Q series PLCs connected to Ethernet can be made via Ethernet and connections to the PLCs connected with modems can be made via telephone line/ISDN line and modems.

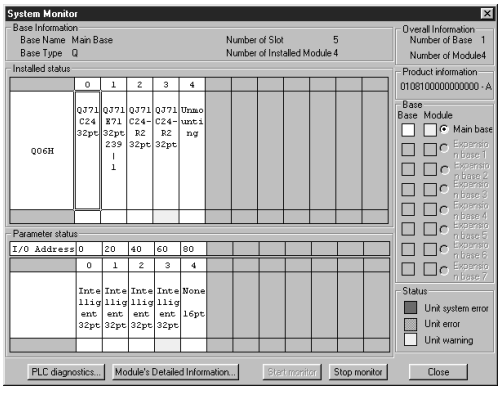


Built-In ROM

To reduce the possibility of program data erasure due to battery failure, built-in flash ROMs are included in all CPU types so there is no need to add a memory card to store programs onto ROM.

System Monitoring

System monitoring gives you an at-a-glance error detection condition of each module in a PLC system. It supports restoration at occurrence of trouble.

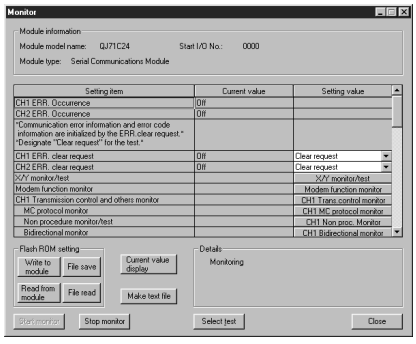


Output Modules Provided with Short-Circuit Protection

Some transistor output modules use transistors provided with short-circuit protection to protect output modules from being burnt out due to a wiring mistake or external device failure.

Intelligent Function Module Monitoring

You can confirm the operating status and error detection condition of an intelligent function module (Note 2) on a monitor screen. In addition, the intelligent function module is monitored via a CPU module, eliminating the need for separate cable connection.



Note 2: An intelligent function module is a generic term for special modules other than digital I/O such as analog-to-digital converter and high-speed counter.
Note 3: The utility package corresponding to the intelligent function module is needed.

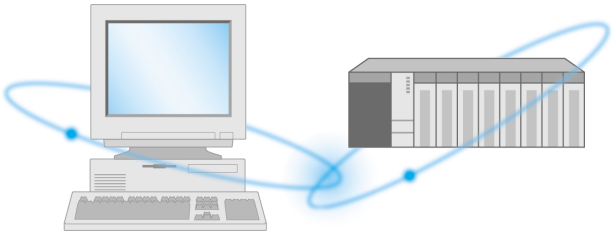
STRONG POINT
FEATURES

COMPUTERIZATION

With the increase of demands for production control, quality control and resources/energy control, to say nothing of control data, there is a demand for rapid transmission of production information data between PLCs and between PLC and host monitoring/controlling system. The Q series has increased network data transmission speed and reinforced its tools to configure a network system more easily.

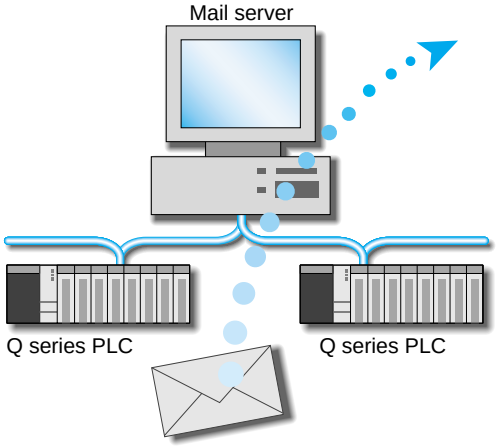
Communication Support Software Package

The communication support software package is a software tool for Windows for easy connection of a host monitoring/controlling Windows personal computer to the Q series (connection to QnA, A or FX series also possible). You can easily create a monitoring/control application in Visual Basic, Visual C++ or Excel, without being conscious of the different complicated communication protocols of Ethernet, MELSECNET/10, CC-Link, RS-232 serial communication or CPU programming port (RS-232 or USB).



Utilization of the Internet

The Q series Ethernet module has an e-mail communication function which utilizes the Internet. You can transfer production control information to/from anywhere in the world and configure a remote monitoring/control system easily.

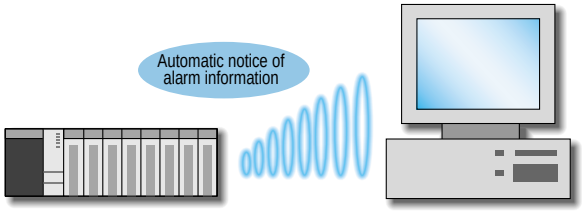


GOT Connection

The GOT-A900 series graphic operation terminal can be connected using a CPU RS-232 port or serial communication module. By connection to the Q series high-speed bus, you can achieve a much, faster-response graphic operation terminal.

Automatic Notice from PLC

A serial communication module (RS-232/422) connected to a personal computer has a function to automatically send data from the PLC to the personal computer when a given condition holds. Also, on Ethernet, this function can be used for e-mail transmission. Use of this function permits rapid transmission of alarm occurrence information or the like without waiting for polling from the personal computer.



Network Parameter Setting

In the Q series, the network parameter setting screens for Ethernet, MELSECNET/10(H) and CC-Link are included in the GPP function software. Ethernet, CC-Link or other network setting which had to be made in sequence programs can be made on the screen, reducing programs and improving viewability of settings.

	Protocol	Open system	Fixed buffer	Fixed buffer communication	Pairing open	Existence confirmation	Self station Board No.	Destination IP address	Dest. Board No.
1	TCP	Active	Send	No procedure	No pairs	No confirm	0000	No Settings	
2	TCP	Unpassive	Receive	Procedure exist	No pairs	Confirm		150. 0. 0. 15	
3	TCP	Fullpassive	Receive	Procedure exist	No pairs	No confirm		No Settings	1000
4	UDP		Send	No procedure	No pairs	No confirm		No Settings	
5	UDP		Receive	Procedure exist	No pairs	Confirm	2000	10. 99. 25.170	3000
6									
7									
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15									
16									

STRONG POINT FEATURES

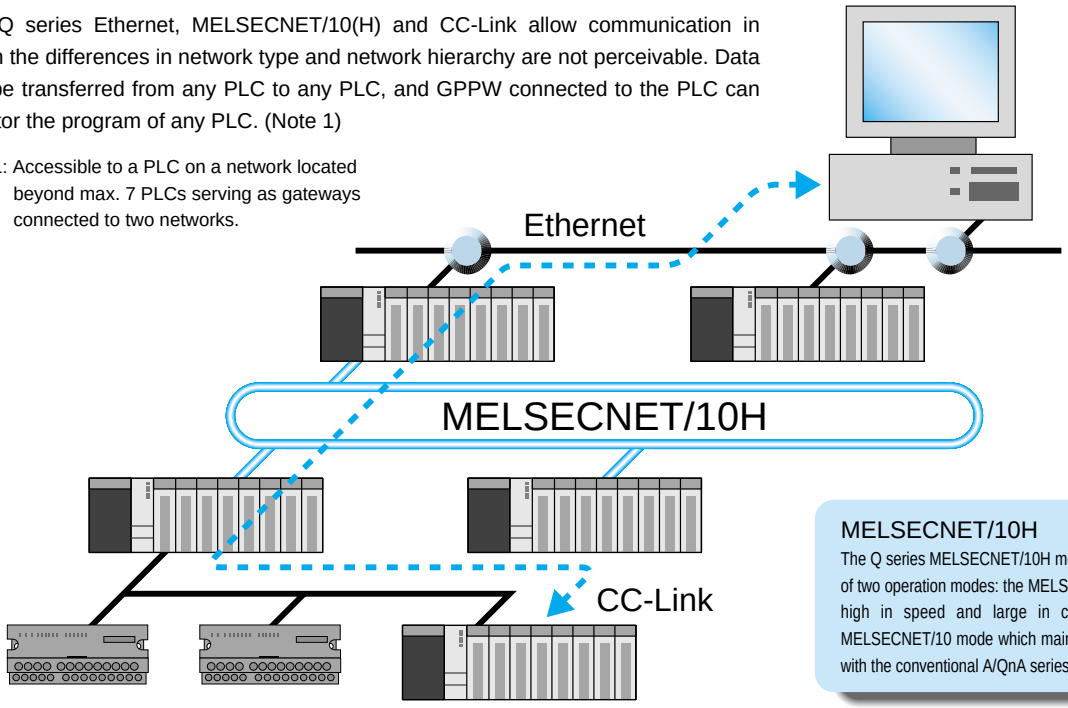
COMPUTERIZATION

In the Q series, Ethernet, MELSECNET/10(H) and CC-Link are placed as open networks having performance capabilities and functions required for information network, controller network and field network, respectively, to meet the needs requested for facility control and production control networks.

Seamless Communication

The Q series Ethernet, MELSECNET/10(H) and CC-Link allow communication in which the differences in network type and network hierarchy are not perceivable. Data can be transferred from any PLC to any PLC, and GPPW connected to the PLC can monitor the program of any PLC. (Note 1)

Note 1: Accessible to a PLC on a network located beyond max. 7 PLCs serving as gateways connected to two networks.



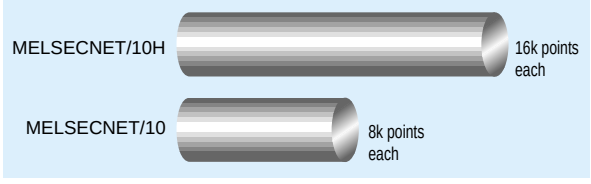
MELSECNET/10H

The Q series MELSECNET/10H module has a choice of two operation modes: the MELSECNET/10H mode high in speed and large in capacity; and the MELSECNET/10 mode which maintains compatibility with the conventional A/QnA series.

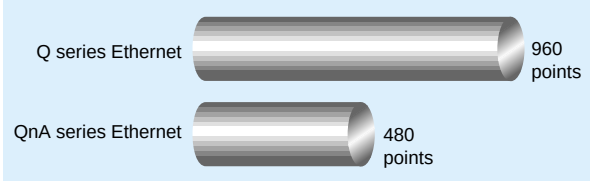
Increased Communication Data Capacities

To respond to increasing information volumes, the Q series network has been increased in the volume of data that can be read/written by one time of communication.

■ Number of link relays (LB)/link registers (LW) points per network

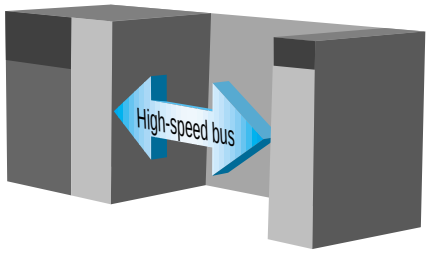


■ Number of word device points read/written by one time of MELSEC communication protocol communication



Increased Data Communication Speed

The system bus has been increased in speed to shorten the total transmission time if communication data capacity increases. The data transfer speed between CPU module and network module is about 4 to 8 times higher than that of the conventional QnA series. This increased speed can minimize the influence of large-capacity data communication on the CPU scan time. However, communication speed of Ethernet, MELSECNET/10H and CC-Link have not been changed to maintain communication compatibility with the conventional series.



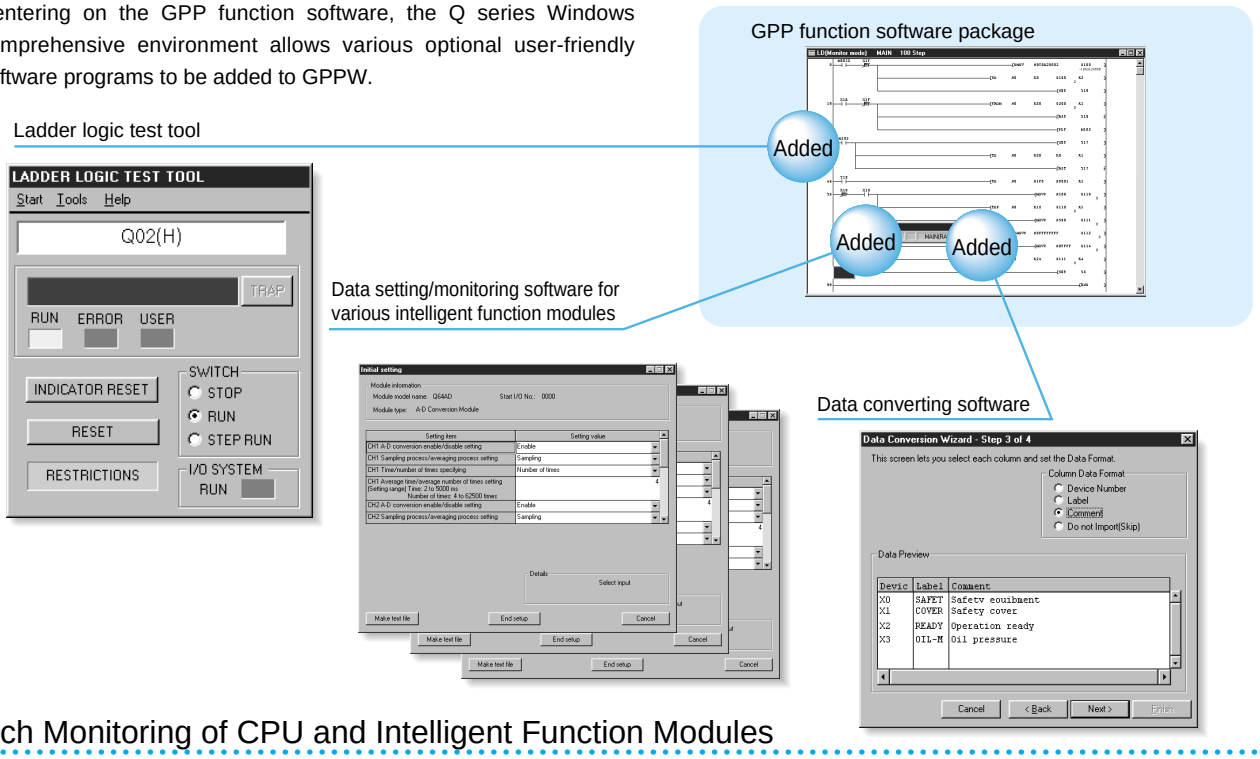
STRONG POINT
FEATURES

EASE OF PLC USE

Enhanced functions of PLCs tend to make them less user-friendly. The Q series offers easier-to-use PLCs with Windows comprehensive environment.

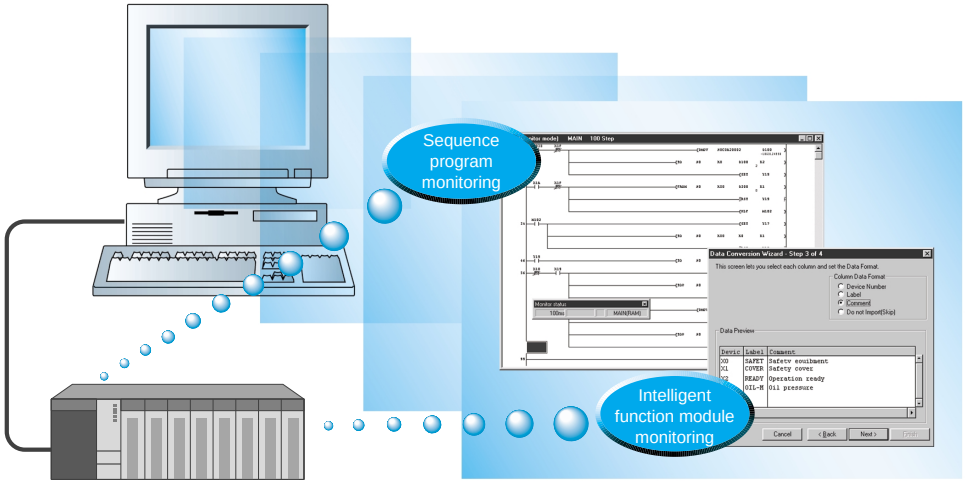
Added-In Functions

Centering on the GPP function software, the Q series Windows comprehensive environment allows various optional user-friendly software programs to be added to GPPW.



Batch Monitoring of CPU and Intelligent Function Modules

The Q series has utility packages available for intelligent function modules such as analog-to-digital conversion units. Using the utility packages allows you to make function setting needed to use the functions of intelligent function modules on the screen, e.g. make analog-to-digital conversion enable/disable setting and the automatic refresh setting of analog-to-digital conversion data to CPU internal memory in an analog-to-digital converter module, thus removing the need for programs. Also, sequence programs and various intelligent function modules can be monitored/tested at the same time to improve the debugging of programs related to the intelligent function modules.



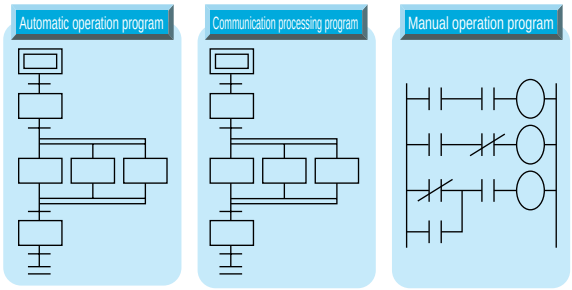
STRONG POINT FEATURES

PROGRAM DEVELOPMENT/DEBUGGING EFFICIENCY IMPROVEMENT

Sophisticated machinery and equipment and increased program scale result in the increased number of program development processes. The Q series has inherited and developed the program structuring and standardizing techniques achieved by the QnA series, and has functions to suppress and further reduce the increase in the number of program development processes. Also, debugging-related functional performance has been improved to increase the debugging efficiency in the stage of adjusting machinery and equipment.

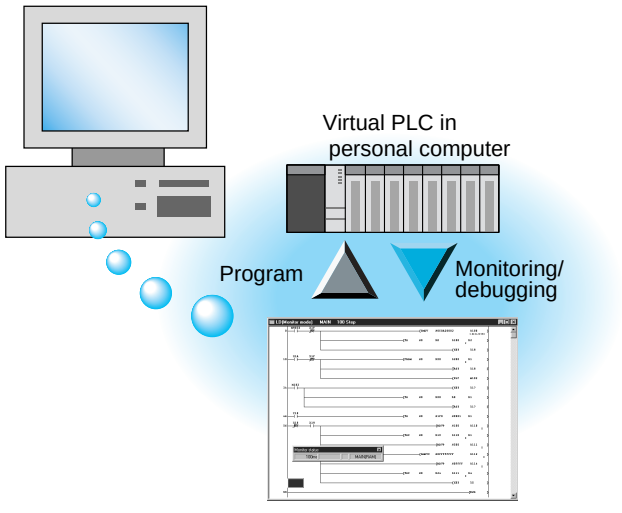
Program Structuring/Standardization

The Q series allows multiple programs made on a machinery/equipment operating function basis to be created and executed. The programs divided function-by-function can increase program utilizability and viewability. The Q series-compatible GPPW function software enables SFC programming which is more suitable for structuring and standardization, in addition to ladder and list programming.



Offline debugging (simulation)

The LLT (ladder logic test tool) is a personal computer software tool designed to start a virtual PLC on a simulate PLC operations and debug sequence programs. You can debug programs on a personal computer right after designing, without waiting for the completion of PLC I/O wiring.



Online Program Correction

During adjustment of machinery/equipment, partial correction to a program may sometimes be made without stopping PLC processing. The Q series enables online correction to a program (write during RUN) and there are no restrictions on the corrected program capacity. Online rewriting of a program file is also possible, exhibiting the high performance of program correction during adjustment.

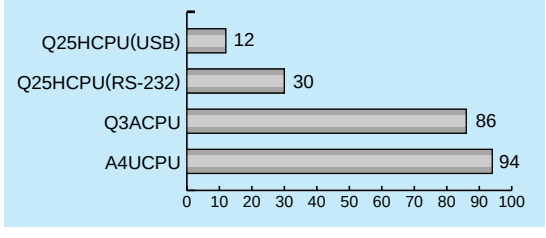
Creation of User-Defined Instructions

The Q series allows a given program block to be defined and registered as a single instruction (macro instruction function). Definition/registration of an frequently used program block as a macro instruction increases program utilization efficiency. In addition, viewability is improved since the program read from the PLC is displayed as-in the defined macro instruction format.

Increased Speeds of Programming Ports

The Q series CPU modules are standard-equipped with a RS-232 port operable at max. 115.2kbps and a 12Mbps USB port installed in recent personal computers (Q02CPU is equipped with RS-232 only). These high-speed programming ports have achieved much shorter program transfer time and faster monitoring, increasing the efficiency of machinery/equipment adjustment.

■ 26k-step program and parameter write time (s)



Note: The time may be longer than above depending on the performance of the personal computer and the conditions of communication with other devices.

Password Function

Programs and data within the Q series CPU module can be protected by a password. This function is effective for prevention of program damage due to accidental operation or copying of specifically developed programming techniques included in the programs and data.

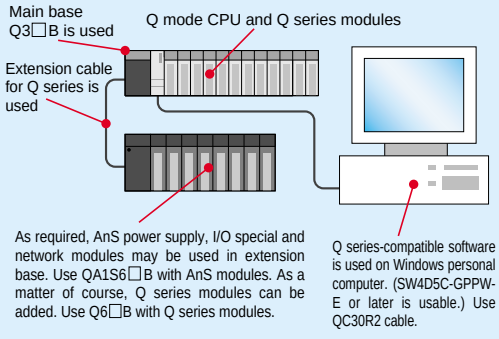
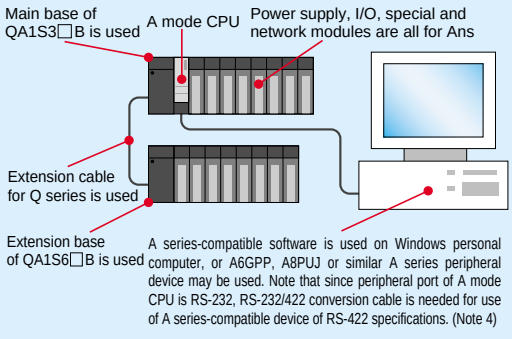
STRONG FEATURES POINT

UTILIZATION OF EXISTING ASSETS (COMPATIBILITY MAINTAINED)

We offer the customers who already use the A/QnA series PLCs with the means to utilize the assets of the A/QnA series and use the excellent functions and performance capabilities of the Q series.

Mode Selection

The Q series CPU is available in two different CPUs: one for Q mode and the other for A mode. Use the Q mode CPU to make the most of the performance capabilities and functions of the Q series, or the A mode CPU to use the hardware configuration of the conventional AnS series as-is and improve the performance of the CPU only.

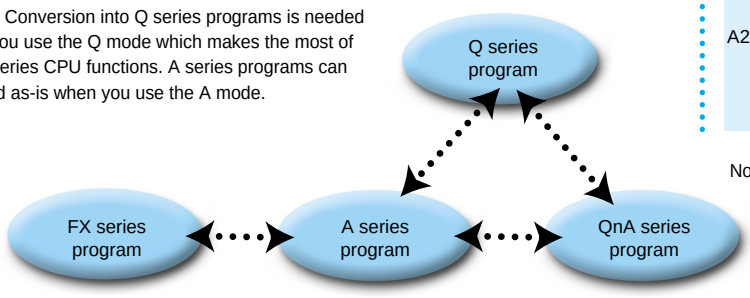
	Q Mode	A Mode
Features	Designed to make the most of the inherent functions and performance capabilities of the Q series by combining the Q series CPU and other Q series modules. If the appropriate module is not available from the Q series, you can use the AnS series module.	Designed for the customer who is using the AnS series to improve only the processing performance of the CPU without changing its programs and hardware. Among the current AnS series hardware, you only need to change the CPU module, bases and extension cables to increase the processing speed.
CPU type	Q02CPU, Q02HCPU, Q06HCPU, Q12HCPU, Q25HCPU	Q02CPU-A, Q02HCPU-A, Q06HCPU-A
Usable programs	Q series programs	A series programs
Usable functions	Various functions introduced in this data book are all usable.	Only the functions usable in the A series can be used, and various functions introduced in this data book are not usable with the exception of some functions.
Usable base units	For Q series modules: Q3☐B, Q6☐B, for A series modules: QA1S6☐B	QA1S3☐B, QA1S6☐B
Usable power supply modules	For Q series modules: Q6☐P-A1/A2, for A series modules: A1S6☐P	A1S6☐P
Usable I/O, special, network and other modules	For Q series and AnS series (Note 1)	For AnS series
Usable GOT	A900GOT. Connection method: CPU RS-232, serial communication module, MELSECNET/10, CC-Link, bus	A800/900GOT. Connection method: CPU RS-232, computer link module, MELSECNET/II/10/B, CC-Link (bus not connectable)
Usable peripheral devices	For Q series	For A series
System configuration example		

Note 1: Some modules for the AnS series, e.g. MELSECNET/II and MELSECNET/B, are not usable or have operating restrictions.

When Using Q Mode CPU

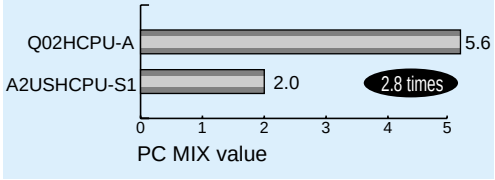
The Q mode CPU requires Q series (Q mode) programs. As a conversion tool is available to convert A/QnA series programs into Q series (Q mode) programs, transition to the Q series can be made easily without wasting your program assets. (Note 2)

Note 2: Conversion into Q series programs is needed when you use the Q mode which makes the most of the Q series CPU functions. A series programs can be used as-is when you use the A mode.



When Using A Mode CPU

Using the A mode CPU in the your current system, you can enhance the CPU performance easily.



Note 4: The RS-232/422 conversion cable FA-CNV2402CBL (0.2m(0.66feet)) or FA-CNV2405CBL (0.5m(1.64feet)) is available from Mitsubishi Electric Engineering Co., Ltd.

2. Q MODE

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Overview of Q Mode

The Q series CPU modules are available in either Q mode and A mode products, which offers a wide selection of products for different purposes.
The Q series has been developed to be higher in performance and easier to use while simultaneously having the heritage of MELSEC's programming capabilities, network capabilities, various functions and operation procedures. The Q mode is designed to exhibit the inherent functions and performance capabilities of the Q series. It can improve functions and performance capabilities in the whole PLC system including not only the CPU but also the I/O and network modules and various intelligent function modules.
The A mode is designed to merely improve the performance capabilities of the CPU for users with AnS PLC. With the A mode, only the CPU modules, base units and extension base cables need to be changed in a current AnS series system. The other modules and programs can be used as they are, the new CPU brings about an increase in the CPU processing speed and program capacity.

Comparison between Q Mode and A Mode

Comparison between Q Mode and A Mode

	Q Mode		A Mode	
CPU type	Q02CPU, Q02HCPU,Q06HCPU, Q12HCPU,Q25HCPU		Q02CPU-A, Q02HCPU-A, Q06HCPU-A	
Available functions, modules, etc.				
Program	Inherits the basic programming and instruction representing methods of MELSEC. However, because of different internal codes, A/AnS/QnA/Q2AS programs must be used after conversion into Q mode.		Programs for the current AnS series	
Function	Functions given in the "Features" Chapter of this data book are usable.		Basically, there are only functions that are usable with the AnS series though some specifications have been expanded in performance. For expanded specifications, refer to the Chapter for the A mode.	
I/O, special modules	For Q series and AnS series A6SIM-X64Y64 cannot be used.		For AnS series A6SIM-X64Y64 cannot be used.	
Base unit	For loading Q series modules: Q3 B, Q6 B For loading AnS series modules: QA1S6 B		For loading AnS series modules: QA1S3 B, QA1S6 B	
Extension cable	QC B		QC B	
Power supply module	For loading into Q series base unit: Q6 P-A1/A2 For loading into AnS series base unit: A1S6 P		A1S6 P	
Connectable networks				
Ethernet	Allowed		Allowed	
MELSECNET/10H (Inter-PC network)	Allowed		Disallowed	
MELSECNET/10 (Inter-PC network)	Allowed		Allowed	
MELSECNET/10 (Remote I/O network)	Disallowed		Allowed	
MELSECNET/II MELSECNET/B	Disallowed		Allowed	
CC-Link	Allowed (with automatic refresh parameter setting)		Allowed (without automatic refresh parameter setting)	
MELSECNET/MINI-S3	Allowed (without automatic refresh parameter setting)		Allowed (with automatic refresh parameter setting)	
RS-232/422/485	Allowed		Allowed	
Other networks	Same as the networks compatible with AnS series		Same as the networks compatible with AnS series	
Usable peripheral devices and software				
Windows personal computer	Allowed	SW4D5C-GPPW-E or later	Allowed	SW2D5C/F-GPPW-E or later (Note 1)
DOS/V (DOS)	Disallowed		Allowed	SW2IVD-GPPA-E or later (Note 1)
A6GPP/HGP/PHP	Disallowed		Allowed	SW3GP-GPPAEE or later (Note 1)
Usable GOTs and connection method				
Usable GOT	GOT-A900		GOT-A900/800	
Software	SW2D5C-GOTRE-PACK version C or later		SW1D5C-GOTRE-PACK or later, SW0NIW-A8GOTP or later	
Bus connection	Allowed		Disallowed	
CPU RS-232 port connection	Allowed (ladder monitor will be supported soon)		Allowed (ladder monitor possible)	
CPU USB port connection	Allowed		Disallowed	
Serial communication (RS-232/422)	Allowed (ladder monitor will be supported soon)		Allowed (ladder monitor possible)	
MELSECNET/10	Allowed (ladder monitor will be supported soon)		Allowed (ladder monitor possible)	
MELSECNET/II	Disallowed		Allowed (ladder monitor possible)	
MELSECNET/B	Disallowed		Allowed (ladder monitor possible)	
CC-Link	Allowed (ladder monitor will be supported soon)		Allowed (ladder monitor possible)	

Note 1: Depending on the software version, there are restrictions on the program capacities, CPU internal device capacities, etc. For details, refer to Programming, A MODE.

Note 2: The above table gives general usability and connectability for comparison of the Q mode and A mode. Since there may be restrictions on usable/connectable products, always check details in the applicable model list and corresponding model explanation sections.

Compatibility of Q Mode PLC with AnS/Q2AS

Compatibility of Q Mode PLC with AnS/Q2AS

The following table indicates the compatibility between Q mode PLC programs and AnS/Q2AS series programs. Note that the following table gives general information only and details should be checked in the corresponding module explanation sections.

Item		Compatibility with AnS	Compatibility with Q2AS
General program		Programs upwardly compatible with AnS. Can be used after conversion into Q program by GPPW software.	Programs upwardly compatible with Q2AS. Can be used after conversion into Q program by GPPW software.
Ethernet	Host system side program	Compatible. Note that sequence program accessing programs need corrections.	Compatible. Note that sequence programs and other file accessing programs need corrections.
	PLC side	Incompatible.	Compatible.
MELSECNET/10		Compatible in LB/LW/LX/LY/SB/SW assignment. Compatible in MELSECNET/10 dedicated instructions.	Compatible in LB/LW/LX/LY/SB/SW assignment. Compatible in MELSECNET/10 dedicated instructions.
CC-Link		Compatible in sequence programs.	Compatible in sequence programs.
Serial communication	Host system side program	Compatible. Note that sequence program accessing programs need corrections.	Compatible. Note that sequence programs and other file accessing programs need corrections.
	PLC side	Incompatible.	Compatible.

Note: If there is program compatibility, some of the instructions, e.g. special and network module dedicated instructions, have been deleted in Q or changed in specifications. For full information, refer to the "Programming" section.

General Specifications

General Specifications

General specifications indicate the specifications of the environment where these products can be installed and operated. Unless otherwise exceptional specifications are indicated, the general specifications apply to all Q series products. Install and operate the Q series products in the environment given in the general specifications.

Item	Specifications				
Operating ambient temperature	0 to 55 °C				
Storage ambient temperature	-25 to 75 °C (Note 5)				
Operating ambient humidity	5 to 95%RH, non-condensing (Note 4)				
Storage ambient humidity	5 to 95%RH, non-condensing (Note 4)				
Vibration resistance	Conforming to JIS B 3502, IEC 61131-2	Under intermittent vibration			Sweep count
		Frequency	Acceleration	Amplitude	10 times each in X, Y, Z directions (for 80 min.)
		10 to 57Hz	—	—	
		57 to 150Hz	9.8m/s^2	—	
		Under continuous vibration			
		Frequency	Acceleration	Amplitude	
		10 to 57Hz	—	0.035mm (0.001inch)	
		57 to 150Hz	4.9m/s^2	—	
Shock resistance	Conforming to JIS B 3502, IEC 61131-2 147 m/s^2, 3 times in each of 3 directions X, Y, Z				
Operating atmosphere	No corrosive gases				
Operating altitude	2000m (6557.38ft.) max. (Note 3)				
Installation location	Inside control panel				
Overvoltage category (Note 1)	II or less				
Pollution level (Note 2)	2 or less				

Note 1: This indicates the section of the power supply to which the equipment is assumed to be connected between the public electrical power distribution network and the machinery within premises. Category II applies to equipment for which electrical power is supplied from fixed facilities. The surge voltage withstand level for up to the rated voltage of 300 V is 2500 V.

Note 2: This index indicates the degree to which conductive material is generated in the environment where the equipment is used. In pollution level 2, only non-conductive pollution occurs but temporary conductivity may be produced due to condensation.

Note 3: The PLC cannot be used under pressure higher than the atmospheric pressure of altitude 0m (0ft.). Doing so may cause a failure.

Note 4: When used with the AnS series modules, the Q series PLC should be operated within 10 to 90%RH.

Note 5: When used with the AnS series modules, the Q series PLC should be stored at -20 to 75 °C.

Applicable Model List

Overview

The following applicable model list gives models usable with the Q mode. Note that the AnS series modules are also available for the Q mode but there may be functional restrictions. Also, among Q series network-related modules, there may be restrictions on the number of modules loaded.

Whether the modules are restricted or not is indicated in the table. For details of restrictions, refer to the corresponding module specification explanation sections. The following applicable model list provides only the modules loaded to base units. Accessories and others which are not directly connected to the base units, e.g. optional connectors, are given in the model list at the end of this manual.

Applicable Model List

Product	Type	Description	Number of Points Occupied [I/O Allocation]	Current Consumption (A)		Remarks
				5VDC	24VDC	
CPU module	Q02CPU	Program capacity: 28k steps, number of I/O points: 4096 points, basic instruction processing speed: 79ns	—	0.60	—	
	Q02HCPU	Program capacity: 28k steps, number of I/O points: 4096 points, basic instruction processing speed: 34ns	—	0.64	—	
	Q06HCPU	Program capacity: 60k steps, number of I/O points: 4096 points, basic instruction processing speed: 34ns	—	0.64	—	
	Q12HCPU	Program capacity: 124k steps, number of I/O points: 4096 points, basic instruction processing speed: 34ns	—	0.64	—	
	Q25HCPU	Program capacity: 252k steps, number of I/O points: 4096 points, basic instruction processing speed: 34ns	—	0.64	—	
Memory card	Q2MEM-1MBS	SRAM card: 1M bytes	—	0.150	—	
	Q2MEM-2MBF	Flash card: 2M bytes	—	0.130	—	
	Q2MEM-4MBF	Flash card: 4M bytes	—	0.130	—	
	Q2MEM-8MBA	ATA card: 8M bytes	—	0.054	—	
	Q2MEM-16MBA	ATA card: 16M bytes	—	0.054	—	
	Q2MEM-32MBA	ATA card: 32M bytes	—	0.054	—	
Battery	Q6BAT	Battery for program memory, standard RAM	—	—	—	

■ When using Q3□B, Q6□B base unit (For details of whether there are restrictions or not, refer to the next section "System Configuration".)

Product	Type	Description	Number of Points Occupied [I/O Allocation]	Current Consumption (A)		Restrictions
				5VDC	24VDC	
Main base unit	Q33B	Q series module loading base For power supply + CPU + 3 slots	—	0.105	—	No
	Q35B	Q series module loading base For power supply + CPU + 5 slots	—	0.110	—	No
	Q38B	Q series module loading base For power supply + CPU + 8 slots	—	0.114	—	No
	Q312B	Q series module loading base For power supply + CPU + 12 slots	—	0.121	—	No

Applicable Model List

■ When using Q3 □ B, Q6 □ B base unit (For details of whether there are restrictions or not, refer to the next section "System Configuration".)

Product	Type	Description	Number of Points Occupied [I/O Allocation]	Current Consumption (A)		Restrictions
				5VDC	24VDC	
Extension base unit	Q63B	Q series module loading base For power supply + 5 slots	—	0.105	—	No
	Q65B	Q series module loading base For power supply + 5 slots	—	0.110	—	No
	Q68B	Q series module loading base For power supply + 8 slots	—	0.114	—	No
	Q612B	Q series module loading base For power supply + 12 slots	—	0.121	—	No
Extension cable	QC06B	0.6m (1.97ft.) cable for extension base	—	—	—	No
	QC12B	1.2m (3.93 ft.) cable for extension base	—	—	—	No
	QC30B	3m (9.84 ft.) cable for extension base	—	—	—	No
	QC50B	5m (16.39 ft.) cable for extension bas	—	—	—	No
	QC100B	10m (32.79 ft.) cable for extension base	—	—	—	No
Power supply module	Q61P-A1	Power supply for Q3 □ B/Q6 □ B, 100-120VAC, 5VDC 6A output	—	—	—	No
	Q61P-A2	Power supply for Q3 □ B/Q6 □ B, 200-240VAC, 5VDC 6A output	—	—	—	No
Input module	QX10	16-point 120VAC input module	16 [16pt X]	0.050	—	No
	QX40	16-point 24VDC positive common	16 [16pt X]	0.050	—	No
	QX41	32-point 24VDC positive common	32 [32pt X]	0.075	—	No
	QX42	64-point 24VDC positive common	64 [64pt X]	0.090	—	No
	QX80	16-point 24VDC negative common	16 [16pt X]	0.050	—	No
	QX81	32-point 24VDC negative common	32 [32pt X]	0.075	—	No
Output module	QY10	16-point relay contact output module	16 [16pt Y]	0.430	—	No
	QY40P	16-point 12/24VDC transistor (sink)	16 [16pt Y]	0.065	0.010	No
	QY41P	32-point 12/24VDC transistor (sink)	32 [32pt Y]	0.105	0.020	No
	QY42P	64-point 12/24VDC transistor (sink)	64 [64pt Y]	0.150	0.040	No
	QY50	16-point 12/24VDC transistor (sink)	16 [16pt Y]	0.080	0.020	No
	QY80	16-point 12/24VDC transistor (source)	16 [16pt Y]	0.080	0.020	No
	QY81P	32-point 12/24VDC transistor (source)	32 [32pt Y]	0.095	0.040	No
Blank module	QG60	Dustproof module for unused slot	16 [16pt S]	—	—	No
MELSECNET/10H module	QJ71LP21	Duplex optical loop (control station, normal station)	32 [32pt F]	0.55	—	Yes
	QJ71BR11	Coaxial bus (control station, normal station)	32 [32pt F]	0.75	—	Yes
Ethernet module	QJ71E71	Ethernet interface module (10BASE-T, 10BASE5)	32 [32pt F]	0.80	—	Yes
	QJ71E71-B2	Ethernet interface module (10BASE2)	32 [32pt F]	0.80	—	Yes
Serial communication	QJ71C24	RS-232, RS-422/485, 1 channel each	32 [32pt F]	0.28	—	No
	QJ71C24-R2	RS-232, 2 channels	32 [32pt F]	0.24	—	No
CC-Link module	QJ61BT11	Master station, local station	32 [32pt F]	0.46	—	Yes
Analog/digital conversion module	Q64AD	Analog input (voltage, current), 4 channels	16 [16pt F]	0.630	—	No
	Q68ADV	Analog input (voltage), 8 channels	16 [16pt F]	0.640	—	No
	Q68ADI	Analog input (current), 8 channels	16 [16pt F]	0.640	—	No
Digital/analog conversion module	Q62DA	Analog output, 2 channels (voltage, current)	16 [16pt F]	0.330	0.125	No
	Q64DA	Analog output, 4 channels (voltage, current)	16 [16pt F]	0.345	0.180	No
High-speed counter module	QD62	DC input sink output	16 [16pt F]	0.30	—	No
	QD62E	DC input source output	16 [16pt F]	0.33	—	No
	QD62D	Differential input sink output	16 [16pt F]	0.38	—	No
Positioning module	QD75P1	Pulse train open collector output, 1 axis	32 [32pt F]	0.40	—	No
	QD75P2	Pulse train open collector output, 2 axes	32 [32pt F]	0.46	—	No
	QD75P4	Pulse train open collector output, 4 axes	32 [32pt F]	0.58	—	No
	QD75D1	Pulse train differential output, 1 axis	32 [32pt F]	0.52	—	No
	QD75D2	Pulse train differential output, 2 axes	32 [32pt F]	0.56	—	No
	QD75D4	Pulse train differential output, 4 axes	32 [32pt F]	0.82	—	No

Note: The "positive common" input module is used by applying a positive ⊕ voltage to the common terminal, and the "negative common" input module is used by applying a negative ⊖ voltage to the common terminal.

■ When using QA1S6 □ B base unit (For details of whether there are restrictions or not, refer to the next section "System Configuration".)

Product	Type	Description	Number of Points Occupied [I/O Allocation]	Current Consumption (A)		Restrictions
				5VDC	24VDC	
Extension base	QA1S65B	AnS series module loading base, for power supply + 5 slots	—	0.117	—	No
	QA1S68B	AnS series module loading base, for power supply + 8 slots	—	0.118	—	No
Extension cable	QC06B	0.6m (1.97ft.) cable for extension base	—	—	—	No
	QC12B	1.2m (3.93 ft.) cable for extension base	—	—	—	No
	QC30B	3m (9.84 ft.) cable for extension base	—	—	—	No
	QC50B	5m (16.39 ft.) cable for extension bas	—	—	—	No
	QC100B	10m (32.79 ft.) cable for extension base	—	—	—	No
Power supply module	A1S61PN	Power supply for QA1S6 □ B, 100-240VAC, 5VDC 5A output	—	—	—	No
	A1S62PN	Power supply for QA1S6 □ B, 100-200VAC, 5VDC 3A/24VDC 0.6A output	—	—	—	No
	A1S63P	Power supply for QA1S6 □ B, 24VDC, 5VDC 5A output	—	—	—	No
AC input module	A1SX10	100-120VAC, 16 input points, terminal block	16 [16pt X]	0.050	—	No
	A1SX10EU	100-120VAC, 16 input points, terminal block	16 [16pt X]	0.050	—	No
	A1SX20	200-240VAC, 16 input points, terminal block	16 [16pt X]	0.050	—	No
	A1SX20EU	200-240VAC, 16 input points, terminal block	16 [16pt X]	0.050	—	No
DC/AC input module	A1SX30	12/24VDC, 12/24VAC, 16 input points, terminal block	16 [16pt X]	0.050	—	No
DC input module	A1SX40	12/24VDC, 16 input points, terminal block (sink)	16 [16pt X]	0.050	—	No
	A1SX40-S1	24VDC, 16 input points, terminal block, for high-speed input (sink)	16 [16pt X]	0.050	—	No
	A1SX40-S2	24VDC, 16 input points, terminal block, for high leakage current sensor (sink)	16 [16pt X]	0.050	—	No
	A1SX41	12/24VDC, 32 input points, connector (sink)	32 [32pt X]	0.080	—	No
	A1SX41-S1	24VDC, 32 input points, connector, for high-speed input (sink)	32 [32pt X]	0.120	—	No
	A1SX41-S2	24VDC, 32 input points, connector, for high leakage current sensor (sink)	32 [32pt X]	0.080	—	No
	A1SX42	12/24VDC, 64 input points, connector (sink)	64 [64pt X]	0.090	—	No
	A1SX42-S1	24VDC, 64 input points, connector, for high-speed input (sink)	64 [64pt X]	0.160	—	No
	A1SX42-S2	24VDC, 64 input points, connector, for high leakage current sensor (sink)	64 [64pt X]	0.090	—	No
	A1SX42X	12/24VDC dynamic, 64 input points, connector (sink)	64 [64pt X]	0.080	—	No
	A1SX71	5/12VDC, 32 input points, connector (sink)	32 [32pt X]	0.075	—	No
	A1SX80	24VDC, 16 input points, terminal block, for high-speed input (sink/source)	16 [16pt X]	0.050	—	No
	A1SX80-S1	24VDC, 16 input points, terminal block, for high-speed input (sink/source)	16 [16pt X]	0.050	—	No
	A1SX80-S2	24VDC, 16 input points, terminal block, for high leakage current sensor (sink/source)	16 [16pt X]	0.050	—	No
	A1SX81	12/24VDC, 32 input points, connector (sink/source)	32 [32pt X]	0.080	—	No
	A1SX81-S2	24VDC, 32 input points, connector, for high leakage current sensor (sink/source)	32 [32pt X]	0.080	—	No
	A1SX81-S1	24VDC, 64 input points, connector (sink/source)	64 [64pt X]	0.16	—	No

Applicable Model List

■ When using QA1S6 □ B base unit (For details of whether there are restrictions or not, refer to the next section "System Configuration".)

Product	Type	Description	Number of Points Occupied [I/O Allocation]	Current Consumption (A)		Restrictions
				5VDC	24VDC	
Contact output module	A1SY10	240VAC/24VDC 2A, 16 output points, terminal block	16 [16pt Y]	0.120	0.090	No
	A1SY10EU	240VAC/24VDC 2A, 16 output points, terminal block	16 [16pt Y]	0.120	0.090	No
	A1SY14EU	240VAC/24VDC 2A, 12 output points, terminal block	12 [16pt Y]	0.120	0.100	No
	A1SY18A	240VAC/24VDC 2A, 8 independent contact output points, terminal block	8 [16pt Y]	0.240	0.075	No
	A1SY18EU	240VAC/24VDC 2A, 8 output points, terminal block	8 [16pt Y]	0.240	0.075	No
Triac output module	A1SY22	100-240VAC 0.6A, 16 output points	16 [16pt Y]	0.270	0.002	No
	A1SY28A	100-240VAC 1A, 8 output points, all points independent	8 [16pt Y]	0.130	—	No
	A1SY28EU	100-240VAC 0.6A, 8 output points, all points independent	8 [16pt Y]	0.270	—	No
Transistor output module	A1SY40	12/24VDC 0.1A, 16 output points, terminal block, with fuse (sink)	16 [16pt Y]	0.270	0.016	No
	A1SY41	12/24VDC 0.1A, 32 output points, terminal block, with fuse (sink)	32 [32pt Y]	0.500	0.008	No
	A1SY42	12/24VDC 0.1A, 64 output points, terminal block, with fuse (sink)	64 [64pt Y]	0.930	0.016	No
	A1S42Y	12/24VDC dynamic, 64 output points, connector, with fuse (sink)	64 [64pt Y]	0.100	0.008	No
	A1SY50	12/24VDC 0.5A, 16 output points, terminal block, with fuse (sink)	16 [16pt Y]	0.120	0.120	No
	A1SY60	24VDC 2A, 16 output points, terminal block, with fuse (sink)	16 [16pt Y]	0.120	0.030	No
	A1SY60E	5/12/24VDC 2A, 16 output points, terminal block, with fuse (sink)	16 [16pt Y]	0.200	0.020	No
	A1SY68A	5/12/24/48VDC 2A, 8 output points (independent common), terminal block	16 [16pt Y]	0.11	—	No
	A1SY71	5/12VDC, 32 output points, 16mA, connector, with fuse	32 [32pt Y]	0.400	—	No
	A1SY80	12/24VDC 0.8A, 16 output points, terminal block, with fuse (source)	16 [16pt Y]	0.120	0.040	No
	A1SY81	12/24VDC 0.1A, 32 output points, connector, with fuse (source)	32 [32pt Y]	0.500	0.008	No
	A1SY81EP	12/24VDC 0.1A, 32 output points, connector (with short-circuit protection)	32 [32pt Y]	0.500	0.160	No
	A1SY82	12/24VDC, 64 output points, connector (source)	64 [64pt Y]	0.930	0.016	No
I/O composite module	A1SH42	12/24VDC, 32 input points, transistor 0.1A, 32 output points	32 [32pt Y]	0.500	0.008	No
	A1SH48-S1	24VDC, 32 input points, transistor 0.1A, 32 output points	32 [32pt Y]	0.500	0.008	No
	A1SX48Y58	24VDC, 8 input points, transistor 0.5A, 8 output points, terminal block	16 [16pt Y]	0.060	0.060	No
	A1SX48Y18	24VDC, 8 input points, 2A contact, 8 output points, terminal block	16 [16pt Y]	0.085	0.045	No
High-speed counter	A1SD61	High-speed counter	32 [32pt F]	0.35	—	Yes
	A1SD62	DC input sink output type	32 [32pt F]	0.14	—	Yes
	A1SD62D	Differential input sink output type (preset DC input)	32 [32pt F]	0.25	—	Yes
	A1SD62D-S1	Differential input sink output type (preset differential input)	32 [32pt F]	0.25	—	Yes
	A1SD62E	DC input source output type	32 [32pt F]	0.14	—	Yes
Analog-to-digital converter module	A1S64AD	Analog input, 4 channels	32 [32pt F]	0.40	—	No
	A1S68AD	Analog input, 8 channels	32 [32pt F]	0.40	—	No
Digital-to-analog converter module	A1S62DA	Analog output, 2 channels	32 [32pt F]	0.80	—	No
	A1S68DAV	0 to 10V, analog output, 8 channels	32 [32pt F]	0.65	—	No
	A1S68DAI	0 to 20mA, analog output, 8 channels	32 [32pt F]	0.85	—	No

■ When using QA1S6 □ B base unit (For details of whether there are restrictions or not, refer to the next section "System Configuration".)

Product	Type	Description	Number of Points Occupied [I/O Allocation]	Current Consumption (A)		Restrictions
				5VDC	24VDC	
Temperature-digital converter module	A1S62RD3	Pt100 (3 wire type) input, 2 channels	32 [32pt F]	0.54	—	No
	A1S62RD4	Pt100 (4 wire type) input, 2 channels	32 [32pt F]	0.44	—	No
	A1S68TD	Thermocouple input, 8 channels	32 [32pt F]	0.32	—	No
Analog I/O module	A1S63ADA	Analog input 2 channels, analog output 1 channel	32 [32pt F]	0.80	—	No
	A1S66ADA	Analog input 4 channels, analog output 2 channels	64 [64pt F]	0.16	—	No
Temperature control module	A1S64TCTT-S1	Thermocouple input, 4 channels	32 [32pt F]	0.42	—	No
	A1S64TCTTBW-S1	Thermocouple input, 4 channels, with heater wire breakage detection function	32 [32pt F]	0.42	—	No
	A1S64TCRT-S1	Pt100 input, 4 channels	32 [32pt F]	0.42	—	No
	A1S64TCRTBW-S1	Pt100 input, 4 channels, with heater wire breakage detection function	32 [32pt F]	0.42	—	No
	A1S62TCTT-S2	Thermocouple input, 2 channels	32 [32pt F]	0.28	—	No
	A1S62TCTTBW-S2	Thermocouple input, 2 channels, with heater wire breakage detection function	32 [32pt F]	0.28	—	No
	A1S62TCRT-S2	Pt100 input, 2 channels	32 [32pt F]	0.28	—	No
	A1S62TCRTBW-S2	Pt100 input, 2 channels, with heater wire breakage detection function	32 [32pt F]	0.28	—	No
Pulse catch	A1SP60	Pulse catch input	16 [16pt Y]	0.055	—	No
Analog timer	A1ST60	8 timer points	16 [16pt Y]	0.055	—	No
Interrupt module	A1SI61	Interrupt input, 16 points	32 [32pt F]	0.057	—	Yes
Positioning module	A1SD70	Analog output, 1 axis	48 [first half 16pt S, latter half 32pt F]	0.30	—	No
	A1SD71-S2	Pulse train output, 2 axes		0.80	—	No
	A1SD71-S7	Pulse output, 2 axes, manual pulse generator usable		0.80	—	No
	A1SD75M1	SSC network compatible, 1 axis	32 [32pt F]	0.70	—	Yes
	A1SD75M2	SSC network compatible, 2 axes				
	A1SD75M3	SSC network compatible, 3 axes				
	A1SD75P1-S3	Pulse train output, 1 axis	32 [32pt F]	0.70	—	Yes
	A1SD75P2-S3	Pulse train output, 2 axes				
	A1SD75P3-S3	Pulse train output, 3 axes				
	A1SD774M	4 axes, motion control module	32 [32pt F]	0.90	—	No
MELSECNET/MINI-S3 master module	A1SJ71PT32-S3	Master module for optical/twisted pair cables	32/48 [32/48pt F]	0.35	—	Yes
	A1S71T32-S3	Master module for twisted pair cables only		0.30	—	Yes
Intelligent communication	A1SD51S	BASIC program module	32 [32pt F]	0.40	—	Yes
Position detection module	A1S62LS	Absolute position detection by dedicated sensor	32 [32pt F]	0.55	—	No
PLC diagnostic module	A1SS91	PLC diagnostic module	16 [16pt Y]	0.080	—	No
Memory card module	A1SD59J-S2	Memory card interface module	32 [32pt F]	0.05 (Note 1)	—	No

Applicable Model List

■ When using QA1S6□B base unit (For details of whether there are restrictions or not, refer to the next section "System Configuration".)

Product	Type	Description	Number of Points Occupied [I/O Allocation]	Current Consumption (A)		Restrictions
				5VDC	24VDC	
ID interface module	A1SJ71ID1-R4	1 connectable reader/writer	32 [32pt F]	0.25	0.1	Yes
	A1SJ71ID2-R4	2 connectable readers/writers	32 [32pt F]	0.25	0.15	Yes
	A1SD32D1	1 connectable reader/writer	32 [32pt F]	0.25	0.15	No
	A1SD32D2	2 connectable readers/writers	32 [32pt F]	0.25	0.30	No
MELSEC-I/OLINK	A1SJ51T64	Max. 16 master stations, total of 128 I/O points	64 [64pt Y]	0.115	0.09	No
B/NET module	A1SJ71B62-S3	For B/NET transmission terminal control	32 [32pt F]	0.08	—	No
S-LINK master	A1SJ71SL92	For control of S-LINK equipment, max. 128 control I/O points	32 [32pt F]	0.20	—	No
JEMANET (JPCN-1) master module	A1SJ71J92-S3	JEMANET (JPCN-1) interface, for master station	32 [32pt F]	0.40	—	Yes
Profibus	A1SJ71PB96F	Profibus-FMS Client/Server	32 [32pt F]	0.56	—	Yes
	A1SJ71PB92D	Profibus-DP Master	32 [32pt F]	0.56	—	No
DeviceNet	A1SJ71DN91	DeviceNet Master	32 [32pt F]	0.24	—	No
Modbus	A1SJ71UC24-R2-S2	Modbus RTU/ASCII Slave, RS-232	32 [32pt F]	0.10	—	Yes
	A1SJ71UC24-R4-S2	Modbus RTU/ASCII Slave, RS-422/485	32 [32pt F]	0.10	—	Yes
Blank cover	A1SG60	Blank cover for I/O slot	16 [16pt vacant]	—	—	No
	A1SG62	16/32/64-point dummy module	16/32/64 [16/32/64pt X]	0.060	—	No

Note 1: When A1SD59J-MIF is connected

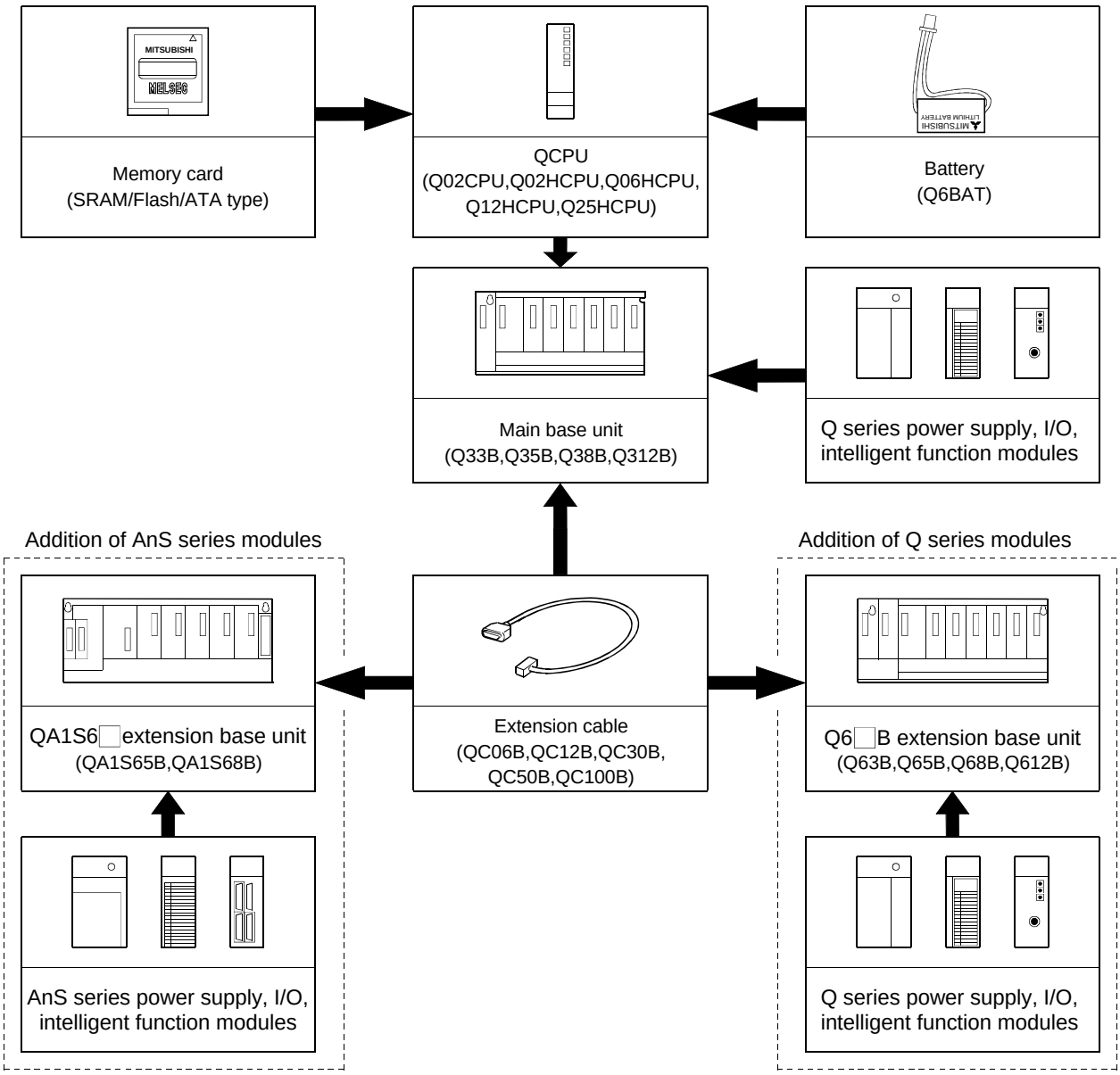
System Configuration

With the Q mode, you can use the Q series modules and AnS series modules given in the applicable model list. Because of the difference in size between Q and AnS series modules, bases for loading the Q series modules and AnS series modules are available, respectively. Choose the loading bases according to the modules used. For extension base cables, use the Q series extension cables with both the Q series and AnS series module bases. The AnS series main/extension bases and extension cables are unusable.

■ Basic configuration

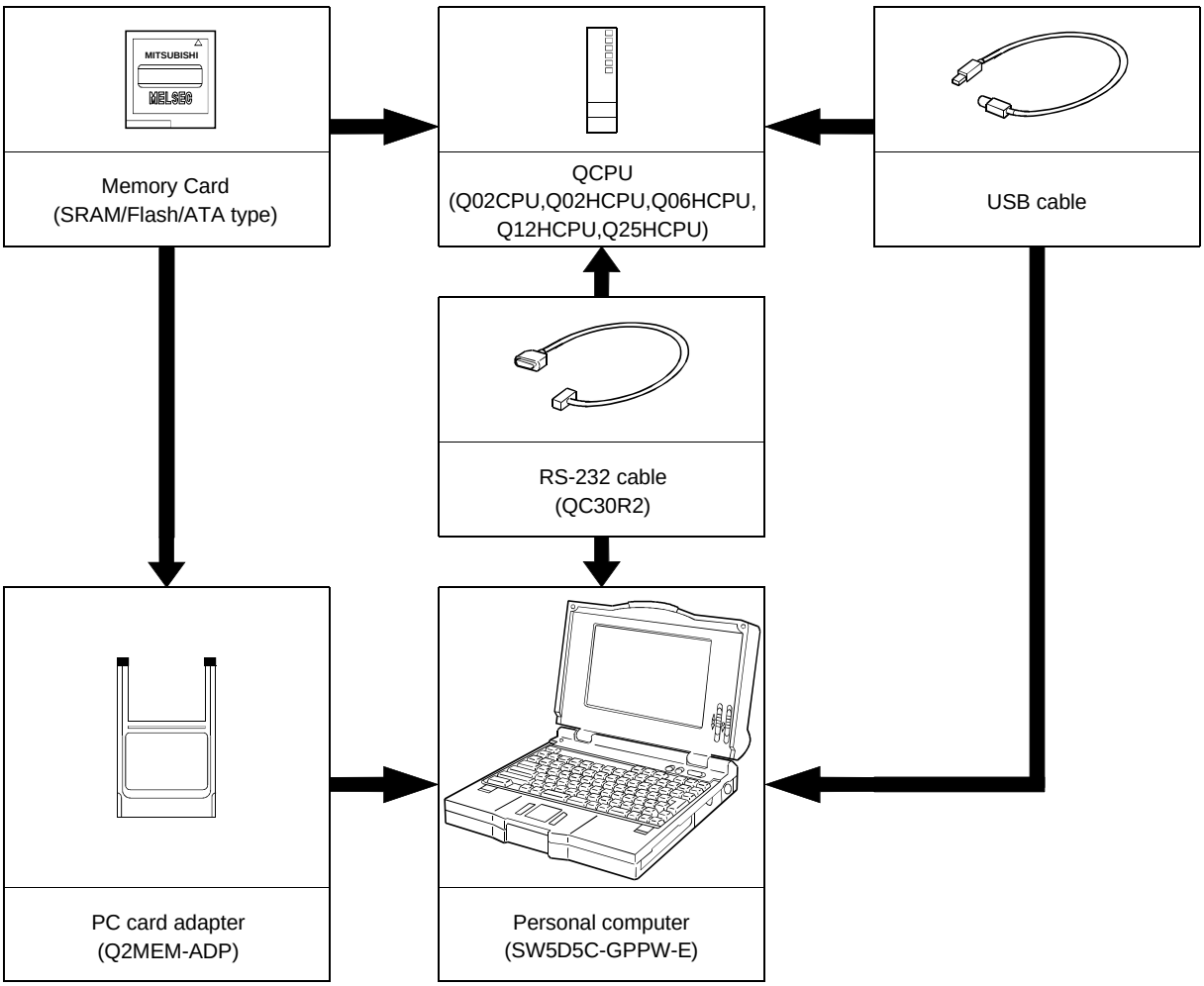
This section provides components, peripheral devices and configuration outline in a QCPU system.

(1) Components in QCPU system



Applicable Model List

(2) Peripheral devices for QCPU



■ Instructions for system configuration

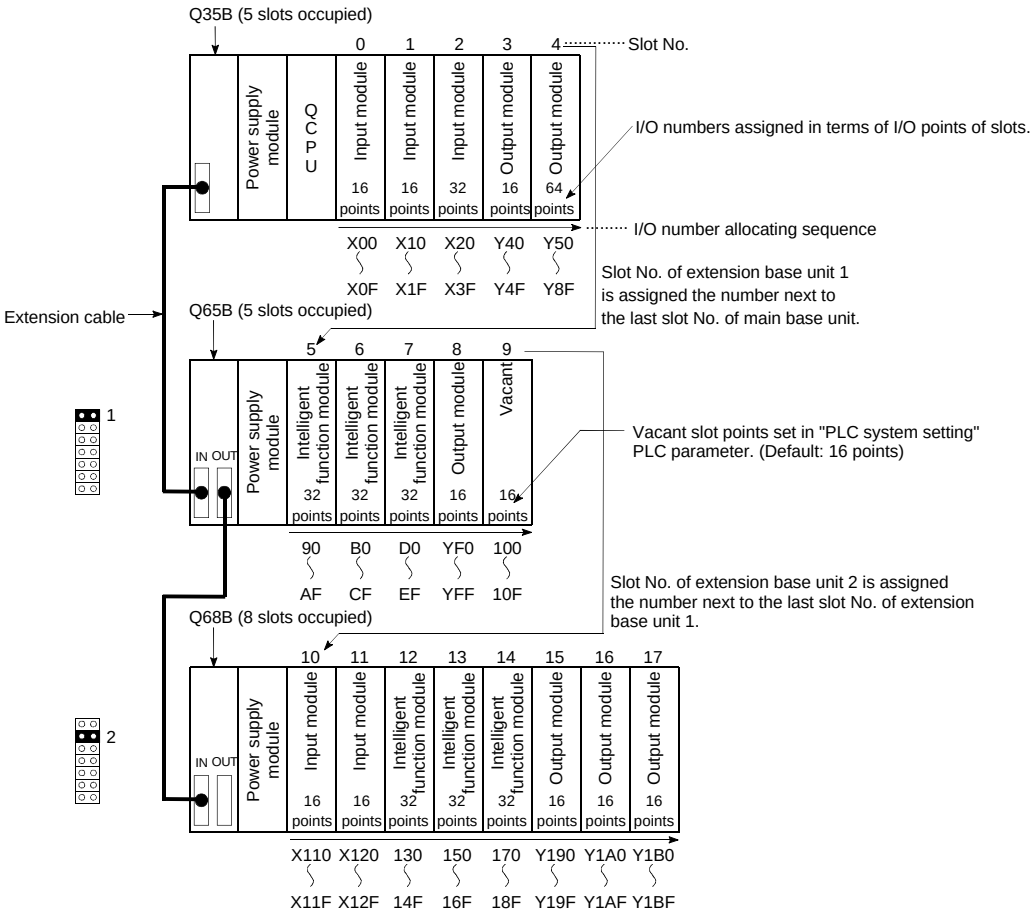
(1) The total number of I/O and intelligent function modules that may be loaded into the main and extension bases is up to 64. This total of loadable modules is the same whether you use the Q6 □ B (extension) or the QA1S6 □ B (extension). Also, you have a selection of base units from the 3 I/O slot model to the 12 I/O slot model. Whichever base units you combine, the total number of loadable modules is up to 64.

(2) You may combine the Q6 □ B and QA1S6 □ B up to 7 extension bases as you like. (Up to 8 bases including the main)

(3) You can use the Q6 □ B and QA1S6 □ B in combination, but you must set the extension numbers of Q6 □ B to lower than those of the QA1S6 □ B.

(4) The overall distance of extension cables is within 13.2m (43.28ft.).

(5) Different from the A and QnA series CPU modules, the Q mode CPU module automatically recognizes the number of slots of the connected main and extension bases and allocates the I/O numbers.
Refer to the QCPU (Q Mode) User's Manual (Hardware Design/Maintenance and Inspection).
The next page shows the I/O numbers assigned when the base unit setting is the automatic mode and I/O assignment is not made.



(6) Modules having restrictions on the number of modules loaded

Module	Modules Loaded
MELSECNET/10H network module QJ71LP21, QJ71BR11	Up to 4
Ethernet interface module QJ71E71(-B2)	Up to 4
CC-Link interface module QJ61BT11	4
Interrupt module A1SI61	1
MELSECNET/MINI-S3 data link module A1SJ71PT32-S3, A1SJ71T32-S3	No restriction (However, automatic refresh function cannot be set)
AnS series special function module (Note 1)	Up to a total of 6

Note 1: The following modules correspond to restrictions on the number of modules loaded. The other modules have no restrictions on the number of modules loaded.

AnS modules having restrictions on the number of modules loaded

Product	Type	Modules Loaded
Intelligent communication module	A1SD51	6
ID interface module	A1SJ71ID1-R4, A1SJ71ID2-R4	6
Profibus module	A1SJ71PB96F	6
Modbus module	A1SJ71UC24-R2-S2 A1SJ71UC24-R4-S2	6
JEMANET (JPCN-1) master module (Only when using GET/PUT service)	A1SJ71J92-S3	6

Note 2: The modules given in Note 1 have also functional restrictions. For details, refer to the corresponding module explanation sections.

Applicable Model List

(7) The instructions dedicated to the following modules which existed in the QnA/A series program instructions are unusable with the Q mode CPU. They must be rewritten using the FROM/TO instruction.

Product	Type
High-speed counter module	A1SD61, A1SD62 A1SD62D-S1, A1SD62E
MELSECNET/MINI-S3	A1SJ71PT32-S3, A1SJ71T32-S3
Positioning module	AISD75P1/P2/P3-S3 A1SD75M1/M2/M3
ID interface	A1SJ71ID1-R4, A1SJ71ID2-R4

(8) Only the GOT-A900 series graphic operation terminals are usable (Q mode-compatible system OS and communication driver must be installed).
Note that the Q series bus interface is required for bus connection.
The GOT800 series, A77GOT and A64GOT are not usable.

Q Mode CPU Modules: Q02CPU, Q02HCPU, Q06HCPU, Q12HCPU, Q25HCPU

Overview

In order to build optimal high-performance equipment, the Q mode CPU modules have greatly improved processing performance capabilities, program memory capacities, etc. and also improved performance capabilities for data communication with network modules and programming peripheral devices.
The Q mode CPU modules have the following features.

● High-speed program processing

The Q mode CPU modules have realized processing speed about three times greater than that of the existing models (Q4ACPU, Q2ASHCPU) in terms of PC MIX value.

● Use of base units adopting high-speed bus system

The Q series base units have significantly improved data transfer speed to and from I/O, intelligent function and network modules (approx. 4 to 8 times higher than existing models). Especially, they can reduce the influence of large amounts of data transfer to/from network modules on the scan time.

● Cyclic execution program

In addition to normal scan execution programs, you can create cyclic execution programs. Repeatedly run at preset intervals of 0.5ms to 60s, a cyclic execution program can achieve fast response uninfluenced by the entire program scan time.

● Event interruption

Network modules and some intelligent function modules have a function to interrupt CPU modules. This function allows fast response to events which take place asynchronously with the PLC program scan, e.g. receiving of network module data. Also, the scan time can be reduced because data transfer-related programs can be removed from scan execution programs.

● Large-capacity programs

The Q mode CPU modules are available in a total of five models having program capacities of 28k steps up to 252k steps. You can choose the optimum CPU module for your equipment.

● Large-capacity extra memory

The Q mode CPU module is equipped with a small PC card slot to accept a max. 32M byte memory card. A memory card can save previously used programs intact as a history as well as comment files, extension file registers and other CPU module internal devices.

● Number of control I/O points

Any model of the Q mode CPU can control up to 4096 points of I/O. Also, when used with a remote I/O network such as CC-Link, any model can control max. 8192 points of I/O.

● Extensibility of up to 64 I/O slots

In the Q series, up to seven extension bases can be connected and up to a total of 64 I/O slots can be used if more I/O slots are needed in addition to those of the main base (max. 12 I/O slots).

● Secrecy

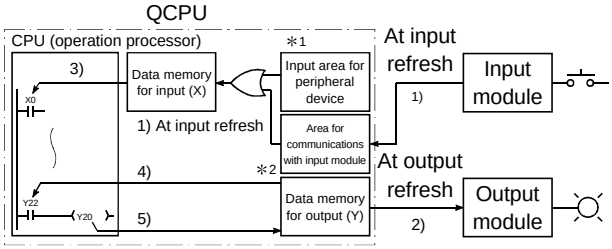
The Q mode manages sequence programs as files. You can specify passwords which restricts third-party access to individual files.

Function Explanations

The Q mode CPU module functions are described below. Note that the programming-related functions are given in Section 3 "Programming".

■ I/O control system

The I/O control system of the Q mode CPU modules is refresh mode. In refresh mode, acquisition of input data from an input module and output of output data to an output module are batch-performed when the END instruction of a sequence program is processed. When there are two or more scan execution programs, you can select whether refresh processing is carried out at the END instruction of the last run scan execution program or at the END instruction of the corresponding scan execution program.



To increase the response capability, I/O control in an interrupt program may require updating of I/O data at a point during program run before refresh processing is carried out at the END instruction. In that case, devices DX (input) and DY (output) may be used as I/O.
For example, when you describe X100, X100 data obtained by refresh processing is used for operation. When you describe DX100, operation is executed using the X100 data of the same input module acquired at the point of executing its contact instruction. This also applies to output.

Q Mode CPU Modules: Q02CPU, Q02HCPU, Q06HCPU, Q12HCPU, Q25HCPU

■ Operation processing

The Q mode CPU has three operation modes: RUN, STOP and PAUSE. Each operation mode performs the following operation processing.

● Operation processing in RUN mode

(1) In the RUN mode, sequence program operation alternates between step 0 and END (FEND) instruction.

(2) When the CPU goes into the RUN mode, the output (Y) status saved at STOP is re-output according to the parameter setting (STOP → RUN output mode setting). (Saved output data may be cleared to perform RUN.)

● Operation processing in STOP mode

(1) In the STOP mode, sequence program operation is stopped by the RUN/STOP switch or remote STOP, or operation is stopped due to error detection.

(2) When the CPU goes into the STOP mode, the current output (Y) status is saved and all outputs (Y) are turned off. Data memory other than the output (Y) is held. Note that the Q series output module can be set to hold the output at a STOP due to error detection.

● Operation processing in PAUSE mode

(1) In the PAUSE mode, sequence program operation is stopped with the output (Y) and data memory status held. This mode should be used carefully because outputs which are ON are kept ON and inputs which should turn OFF the outputs are ignored.

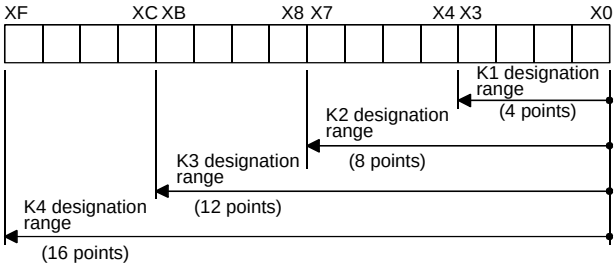
■ Data type

There are five data types that can be handled by the Q mode CPU: bit, word, double word, real number and character string. The following table lists the numerical ranges that can be handled and the CPU module's internal devices which can store those values.

	Numerical Range
Bit	0 (OFF), 1 (ON)
Word	-32768 to 32767
	Value can be handled as a collection of 4, 8, 12 and 16 bits. (Note 1)
Double word	-2147483648 to 2147483647
	Value can be handled as a collection of 4, 8, 12, 16, 20, 24, 28 and 32 bits. (Note 2)
Real number	±1.17549E-38 to ±3.40282E+38 (Note 3)
Character string	JIS8 code (Note 4)

Note 1: Bit devices can also handle numerical data by using digit designation. In digit designation, bit devices are represented by designating them in 4-bit increments.

Example: Setting range by digit designation of inputs X0 to XF

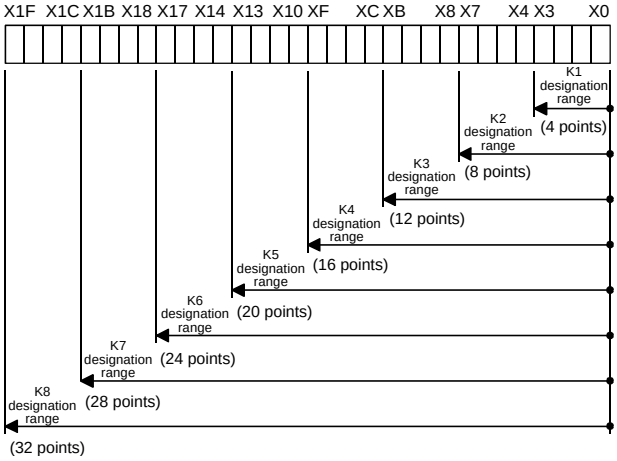


Designated Digits	Numerical Range That Can Be Handled
K1 (4 points)	0 to 15
K2 (8 points)	0 to 255
K3 (12 points)	0 to 4095
K4 (16 points)	-32768 to 32767

Values in parentheses are the numbers of bit device points.

Note 2: Bit devices can also handle numerical data by carrying out digit designation. In digit designation, bit devices are represented by designating them in 4-bit increments.

Example: Setting range by digit designation of inputs X0 to XF



Designated Digits	Numerical Range That Can Be Handled
K1 (4 points)	0 to 15
K2 (8 points)	0 to 255
K3 (12 points)	0 to 4095
K4 (16 points)	0 to 65535
K5 (20 points)	0 to 1048575
K6 (24 points)	0 to 167772165
K7 (28 points)	0 to 268435455
K8 (32 points)	-2147483648 to 2147483647

Values in parentheses are the numbers of bit device points.

Note 3: For 32-bit data, a real number uses two consecutive registers.

Note 4: A character string is stored in multiple consecutive registers and NULL (00) is used as a code to indicate the end of the character string. There are no restrictions on the number of characters handled.
Note that the character string that may be handled as a constant in a program is up to 32 characters long.

Note 5: Numerical values cannot be handled in an unsigned format (example: 0 to 65535 numerical range for word).

■ Timers' timing performance capabilities

The internal timers of the Q mode CPU modules are all on-delay timers and available in four types: low-speed timer, high-speed timer, low-speed retentive timer and high-speed retentive timer.
The timing increments and timing errors of the timers are indicated below.

	Timing Increments	Timing Error
Low-speed timer Low-speed retentive timer	Variable between 1 and 1000ms	+1 scan time
High-speed timer High-speed retentive timer	Variable between 0.1 and 100ms	+1 scan time

Note that the timing range is up to the preset timing increments × 32767. Timing error of max. 1 scan time is produced since the timer times by adding the value timed every scan at each END instruction to the timer's current value at processing of the OUT instruction.
Instructions for use of timers
Timers cannot be used in initial execution, standby, cyclic execution and interrupt programs.

■ Cyclic execution program performance capabilities

A cyclic program is run according to user's preset time (execution cycle) and its cycle time can be set from 0.5ms to 60s.

● Starting overhead time

The following overhead time is required to start a cyclic execution program.

CPU Type	Starting Time (μs)
Q02CPU	380
Q02HCPU, Q06HCPU, Q12HCPU, Q25HCPU	165

● Start inhibiting factor

A cyclic execution program is not started when the interrupt status is not enabled. It can be started after interrupt is enabled by the EI instruction.

● Start delaying factors

In any of the following cases, the start of a cyclic execution program is delayed.
(1) During execution of any instruction
(2) During processing of request for read/write of data in CPU's internal memory from GPPW, network module, GOT, etc.
(3) During execution of another cyclic program or interrupt program
(4) When multiple cyclic programs are started at the same time, the execution of the lower numbered program in program setting has priority and the other programs have to wait.
(5) When a cyclic program and an interrupt program are started simultaneously, the interrupt program has priority.

● Instructions for setting of cycle time

The execution processing time (including the starting overhead time) of a cyclic program must be set to less than the cycle setting time of that program.
Also, if the ratio of the cyclic execution program processing time compared to the total processing time is too high, it may delay the scan execution program processing, resulting in WDT error. Be careful when setting the cycle time.
If any of real-time interrupt programs I28 to I31 is used, automatic I/O (X/Y) refresh is not made at the start and end of the interrupt program. As required, the partial refresh instruction must be executed to perform I/O refresh processing.
In contrast, a cyclic program automatically performs input X and output Y refresh processing in the parameter-preset range at the start and end of the cyclic program.

■ Interrupt program performance capabilities

Any of the following starting factors can be used to initiate interrupt programs.
(1) Interrupt from the A1SI61 interrupt module
(2) Interrupt from the intelligent function module or network module
(3) Cyclic interrupt by CPU's internal timer (0.5ms to 1000ms)
(4) Interrupt due to CPU error occurrence

● Starting overhead time

The following overhead time is required to start an interrupt program.

CPU Type	Starting Time (μs)
Q02CPU	380
Q02HCPU, Q06HCPU, Q12HCPU, Q25HCPU	165

● Start inhibiting factor

An interrupt program is not started when the interrupt status is not enabled. It can be started after interrupt is enabled by the EI instruction.

● Start delaying factors

In any of the following cases, the start of an interrupt program is delayed.
(1) During execution of any instruction
(2) During processing of request for read/write of data in CPU's internal memory from GPPW, network module, GOT, etc.
(3) During execution of another cyclic program or interrupt program

(4) When multiple interrupt programs are started at the same time, the programs of lower priority wait until the processing of higher-priority programs is complete.

● Instructions for use of interrupt programs

If the ratio of the interrupt program processing time compared to the total processing time is too high, it may delay the scan execution program processing, resulting in WDT error. Take care when setting the interrupt factor.

■ High-speed execution of interrupt program

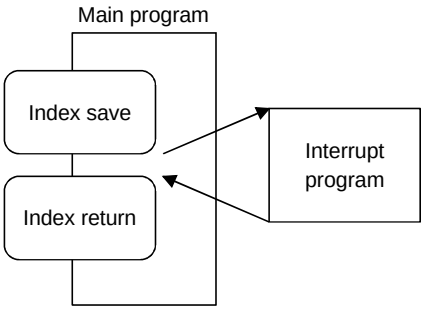
To shorten the overhead time from when an interrupt condition holds until interrupt program processing starts, you can choose the high-speed execution mode for an interrupt program. Selection of this mode can reduce the overhead time as follows.

CPU Type	Starting Time (μs)	
	Normal mode	High-speed mode
Q02CPU	380	230
Q02HCPU, Q06HCPU, Q12HCPU, Q25HCPU	165	100

Note that if you select the high-speed mode, the following processings performed in the normal mode are not performed, and care must be taken for programming.

● Save processing of index register

In the normal mode where the save/return processing of the index register Z is automatically performed at a shift to an interrupt program, use of the index register in the interrupt program does not corrupt the value of the index register.



In the high-speed mode, however, this save/return processing is not performed. Hence, use of the index register in the interrupt program may produce an illegal index register value at a return to the main program. To prevent this, use the ZPUSH/ZPOP instruction in the interrupt program to perform the save/return processing of the index register in the user program.

● Save processing of file register file name

In the normal mode, the save and return processings of the file register name being used are automatically performed at a shift to and a return from an interrupt program. Hence, using the QDRSET instruction in the interrupt program to change the file register file name re-sets the original file register file name automatically at a return.

In the high-speed mode, this save/return processing is not performed and this should be processed in the user program as required.

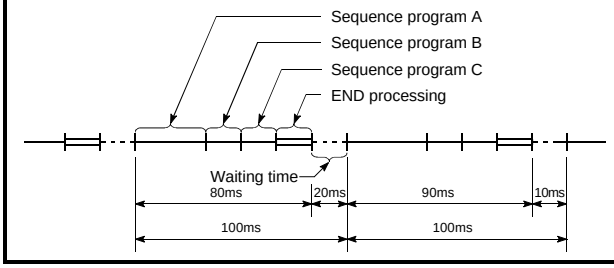
■ Constant scan function

In the program processing of the CPU module, the scan time changes per scan because the processing time differs depending on whether an instruction used in a sequence program is executed or not. The constant scan function is designed to run the sequence program repeatedly while simultaneously keeping the scan time uniform.

When the scan time is uniform, time delays in external signal input, operation processing and output are uniform, increasing the equipment control accuracy.

The constant scan setting is 0.5 to 2000ms.

Scan Time at Constant Scan Setting of 100ms for Execution of Multiple Programs



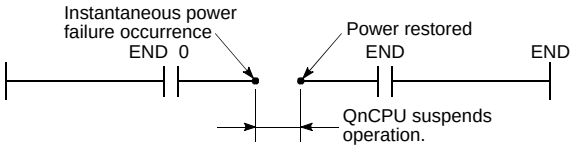
■ Processing at instantaneous power failure

When the input power supply voltage supplied to the power supply module has become less than the rated voltage, the Q mode CPU module detects an instantaneous power failure and performs the following operation processing.

● When an instantaneous power failure occurrs for the permissible instantaneous power failure time or shorter

(1) When an instantaneous power failure occurs, the output status is held and operation processing is suspended.
However, timer timing and watchdog timer (WDT) timing continue. (For example, when the scan time is 190ms at the WDT setting of 200ms, the occurrence of a 15ms instantaneous power failure causes a watchdog timer error.)

(2) When the instantaneous power failure is cleared, operation processing resumes.



● When an instantaneous power failure occurred for longer than permissible instantaneous power failure time

The Q mode CPU module performs the same operation processing as performed when it is reset and powered on or when it is reset by the reset switch.

■ Self-diagnostics

The Q mode CPU has a self-diagnostic function to determine whether if a fault is present. Self-diagnostics are designed to prevent PLC malfunctions and for preventive maintenance. On detection of a fault, an error is displayed and the PLC operation is stopped, for example. The diagnostic items are listed below.

Diagnostic Item	Description
CPU hardware fault	Diagnoses the hardware of the CPU module.
END instruction unexecuted	Diagnoses the execution status of the END instruction.
RAM check	Diagnoses the memory status.
Arithmetic circuit check	Diagnoses the execution status of the CPU module arithmetic circuit.
Fuse blown	Diagnoses the status of the output module fuse.
I/O interrupt error	Diagnoses the interrupt input.
Intelligent function module error	Diagnoses the statuses of the intelligent function modules.
Control bus error	Diagnoses the bus status on the base unit.
Instantaneous power failure occurrence	Diagnoses the occurrence of an instantaneous power failure.
Battery low	Diagnoses the voltage of the battery.
I/O module verify	Diagnoses the loading statuses of I/O modules.
Intelligent function module assignment error	Diagnoses the I/O assignment status of the intelligent function modules.
No parameters	Diagnoses the parameter write status.
Boot error	Diagnoses the setting status of boot operation.
Memory card operation error	Diagnoses the handling of the memory card.
File setting error	Diagnoses the file setting status.
File access error	Diagnoses the access status to the file.
Instruction inexecutable	Diagnoses the presence/absence of the program file to be executed.
Parameter setting check	Diagnoses the set data of the parameters.
Link parameter error	Diagnoses the set data of the link parameters.
SFC parameter error	Diagnoses the set data of the SFC parameters.
Instruction code check	Diagnoses the code of the instruction to be executed.
No END instruction	Diagnoses missing END instruction.
Pointer setting error	Diagnoses the pointer setting status.
Operation check error	Diagnoses the operation results.
FOR-NEXT instruction loop error	Diagnoses the FOR-NEXT instruction loop.
CALL-RET instruction loop error	Diagnoses the CALL-RET instruction loop.
Interrupt program error	Diagnoses the interrupt program construction.
Extension instruction error	Diagnoses the instruction data.
SFC error	Diagnoses the SFC program running status.
Watchdog timer error	Diagnoses the program running status.
Program time-out	Diagnoses the program running time.

■ Failure history

The Q mode CPU allows the results of detection by the self-diagnostic function with additional detection time data to be stored in memory as a failure history. Failure confirmation can be made after restoration from error.

System protective functions

The Q mode CPU has several protective functions (system protections) against program changes from the third party.
System protections have different means for different objects to be protected.

● Protecting the whole CPU

Use the CPU module DIP switches.
You can batch-inhibit external write to all files. This is the simplest way of protection.
However, a third party can easily clear the protection.

● Protecting the memory card

Use the write protect switch of the memory card. You can batch-inhibit external write to all files. This is also a simple way of protection.
However, a third party can also easily clear the protection.

● Protection on a file basis

Register passwords file-by-file. You can inhibit either or both external read and write from/to the specified file. Proper management of passwords achieves high protection capability against a third party. Use this method when you want to protect the required files only. A password can be set with four alphanumeric characters.

ROM operation

Debugged parameters and programs can be stored in ROM. The processing of the parameters and programs stored in ROM is started after they have been transferred to the program memory (drive 0) at power-on (or CPU reset). (Boot operation setting necessary)
The CPU's built-in standard ROM (drive 4) or memory card (ROM) (drive 2) may be used.

Clock function

The Q mode CPU module has an internal clock function. As the clock data can be read with a sequence program, it may also be used for system time management. The clock data is also used for a failure history. The clock function is battery-backed during power-off of the PLC.

● Clock data

Data Name	Description	
Year	4 digits	
Month	1 to 12	
Day	1 to 31 (automatic leap year judgment)	
Hour	0 to 23 (24 hour system)	
Minute	0 to 59	
Second	0 to 59	
Day of week	0	Sunday
	1	Monday
	2	Tuesday
	3	Wednesday
	4	Thursday
	5	Friday
	6	Saturday

● Accuracy

Refer to the CPU performance specifications for accuracy.

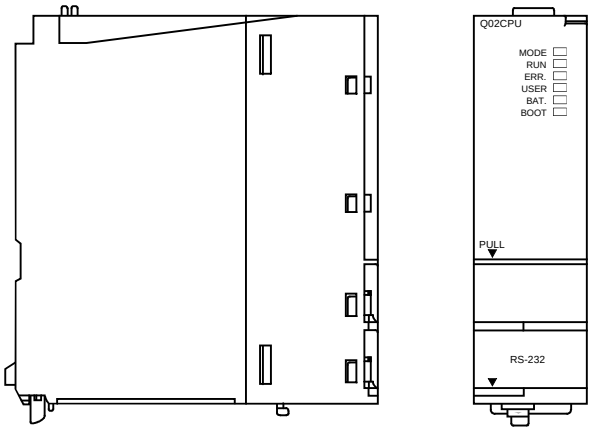
● Timing range

The clock can time between January 1, 1980 to December 31, 2079.

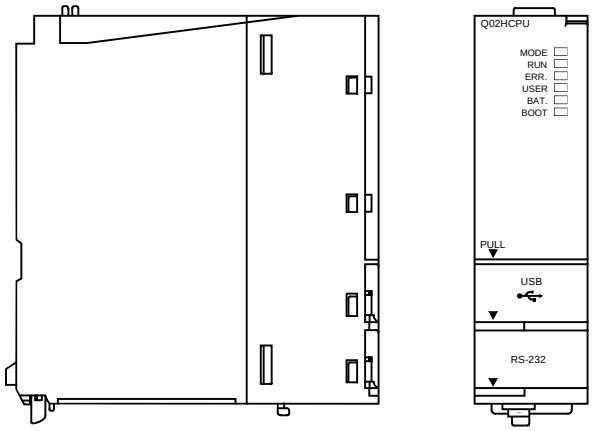
Q Mode CPU Modules: Q02CPU, Q02HCPU Q06HCPU, Q12HCPU, Q25HCPU

Appearance

■ Q02CPU



■ Q02CPU, Q06HCPU, Q12HCPU, Q25HCPU



Performance Specifications

Item		Type					Remarks
		Q02CPU	Q02HCPU	Q06HCPU	Q12HCPU	Q25HCPU	
Control system		Repeated operation using stored program					
I/O control method		Refresh mode					Direct I/O possible using device name
Programming language		Language dedicated to sequence control					
		Relay symbol type (ladder), logic symbolic language, MELSAP-3 (SFC)					
Processing speed (sequence instruction) (ns)	LD	79	34				
	MOV	237	102				
Constant scan (ms) (Program start at given time intervals)		0.5 to 2000ms (can be specified in 0.5ms increments)					Parameter setting
Program capacity	Number of steps	28k	28k	60k	124k	252k	
	Number of files	28	28	60	124	124	Two SFC files included (Note 3)
Number of I/O device points		8192 (X/Y0 to 1FFF)					(Note 1)
Number of I/O points		4096 (X/Y0 to FFF)					(Note 2)
Number of device points	Internal relay [M] (points)	Default 8192 (M0 to 8191)					Each number of device points can be changed by parameters. Note that the overall device capacity is uniform.
	Latch relay [L] (points)	Default 8192 (L0 to 8191)					
	Link relay [B] (points)	Default 8192 (B0 to 1FFF)					
	Timer [T] (points)	Default 2048 (T0 to 2047) (used as low-speed or high-speed timer) Switching between low-speed and high-speed timers is set by instruction. Low-speed/high-speed timer timing increments are parameter-set. (Low-speed timer: 1 to 1000ms, 1ms increments, default 100ms) (High-speed timer: 0.1 to 100ms, 0.1ms increments, default 10ms)					
	Retentive timer [ST] (points)	Default 0 (ST0 to 2047) (used as low-speed or high-speed timer) Switching between low-speed and high-speed timers is set by instruction. Low-speed/high-speed timer timing increments are parameter-set. (Low-speed timer: 1 to 1000ms, 1ms increments, default 100ms) (High-speed timer: 0.1 to 100ms, 0.1ms increments, default 10ms)					
	Counter [C] (points)	• Normal counters Default 1024 (C0 to 1023) • Interrupt counters Max. 256 (Default 0 points, parameter setting)					

(Continued on next page)

Q Mode CPU Modules: Q02CPU, Q02HCPU Q06HCPU, Q12HCPU, Q25HCPU

(Continued from preceding page)

Item		Type					Remarks
		Q02CPU	Q02HCPU	Q06HCPU	Q12HCPU	Q25HCPU	
Number of device points	Data register [D] (points)	Default 12288 (D0 to 12287)					Each number of device points can be changed by parameters. Note that the overall device capacity is uniform.
	Link register [W] (points)	Default 8192 (W0 to 1FFF)					
	Annunciator [F] (points)	Default 2048 (F0 to 2047)					
	Edge relay [V] (points)	Default 2048 (V0 to 2047)					
	File register [R] (points)	517, 120 points (ZR0 to 517,119 or R0 to 32767 + block switch-over) Refer to "Memory" on the following pages for the maximum number of file register points.					When using Q2MEM-1MBS
	Special link relay [SB] (points)	2048 (SB0 to 7FF)					Number of device points is fixed
	Special link register [SW] (points)	2048 (SW0 to 7FF)					
	Step relay [S] (points)	8192 (S0 to 8191)					
	Index register [Z] (points)	16 (Z0 to 15)					
	Pointer [P] (points)	4096 (P0 to 4095), set in parameters the range in which the pointers/common pointers are used.					
	Interrupt pointer [I] (points)	256 (I0 to 255) In parameters, set the cyclic intervals of the system interrupt pointers I28 to I31 (5 to 1000ms, 5ms increments).					
	Special relay [SM] (points)	2048 (SM0 to 2047)					
	Special register [SD] (points)	2048 (SD0 to 2047)					
	Function input [FX] (points)	5 (FX0 to 4)					
	Function output [FY] (points)	16 (FY0 to F)					
	Function register [FD] (points)	16 (FD0 to F)					
Link direct device		Device for direct access to link device. Dedicated. Specified format: J □ □ \ □ □					
Intelligent function module direct device		Device for direct access to buffer memory of intelligent function module. Specified format: U□ □ \ G □ □					
Latch (power failure compensation) range		L0 to 8191 (default) (Latch range setting can be made for B, F, V, T, ST, C, W and D)					Parameter setting
Remote RUN/PAUSE contact		1 point can be set for each RUN and PAUSE contacts from X0-1FFF.					
Clock function		Year, month, day, hour, minute, second, day of week (Automatic leap year judgment) Accuracy –3.18 to +5.25 (TYP +2.12) s/d @ 0°C Accuracy –3.93 to +5.25 (TYP +1.90) s/d @ 25°C Accuracy –14.69 to +3.53 (TYP –3.67) s/d @ 55°C					
Permissible instantaneous power failure time		Depends on power supply module.					Refer to the power supply module section.
5VDC internal current consumption (A)		0.60	0.64	0.64	0.64	0.64	
Weight (kg (lb))		0.20 (0.44)	0.20 (0.44)	0.20 (0.44)	0.20 (0.44)	0.20 (0.44)	
External dimensions (mm (inch))		98 (3.86) (H) × 27.4 (1.08) (W) × 89.3 (3.52) (D)					

Note 1: Sum of the number of I/O points on the main/extension 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 2: Number of I/O points on the main/extension base directly controlled by the CPU module

Note 3: In a total of two SFC files that may be created, one is the program execution management SFC.

Battery Life

The Q6BAT battery built in the CPU module is used to back up the programs and various data stored in the RAM memory of the CPU module during a power failure and to back up the clock element continuously during a power failure.
The Q6BAT is not used while 5VDC is supplied from the power supply module. The battery life of the Q6BAT depends on the total power failure time when 5VDC is not supplied from the power supply module. Note that the SRAM card contains a battery (Q2MEM-BAT) in itself and is independent of the consumption of the Q6BAT.

Battery life

CPU Type	Total Power Failure Time (Hours)		Backup Time after Battery Error ON (Hours)
	Guaran-teed value	Actual value	
Q02CPU	5433	13120	120
Q02HCPU Q06HCPU	2341	6435	120
Q12HCPU Q25HCPU	1260	4228	48

Note 1: If the total power failure time is less than the above value, the battery must be changed in 10 years as a guideline.

Accessories

Product	Type	Quantity
Battery	Q6BAT	1

Manuals

The following manuals are related to the Q mode CPU.

Name	Remarks
QCPU (Q Mode) User's Manual (Hardware)	Packed with Q3□B main base
QCPU (Q Mode) User's Manual (Hardware Design/Maintenance and Inspection)	Optional
QCPU (Q Mode) User's Manual (Function Explanation/Program Fundamentals)	Optional
QCPU (Q Mode)/QnACPU Programming Manual (Common Instructions)	Optional
QCPU (Q Mode)/QnACPU Programming Manual (SFC)	Optional
QCPU (Q Mode) Programming Manual (MELSAP-L)	Optional
QCPU (Q Mode)/QnACPU Programming Manual (PID Control Instructions)	Optional

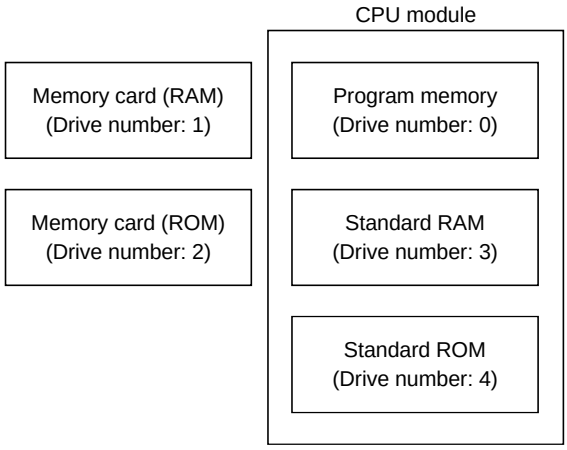
CPU Built-In Memories/Memory Cards

Overview

This section describes the memory configuration of PLC memories which store user-created data, such as programs and device comment files, and how to calculate necessary memory capacities. Note that the Q mode is different in concept from the A mode. Refer to the Chapter of the A Mode for the memory concept of the A mode.

Memory Makeup

The Q mode uses multiple memories according to the purpose of use in the CPU. These memories are identified by the drive numbers for access. The memories used in the Q mode are as follows. It should be noted that the Q mode CPU is equipped with only one memory card slot, which accepts only one card.



List of data that may be stored into each memory

Memory Name	CPU Built-In Memory			Memory Card		
	Program memory	Standard RAM	Standard ROM	Memory card (RAM)	Memory card (ROM) Flash card	Memory card (ROM) ATA card
Drive number	0	3	4	1	2	
File size increment	4kB	512B				
Program	○	×	○	○	○	○
Parameter	○	×	○	○	○	○
Intelligent parameter	○	×	○	○	○	○
Device comment	○	×	○	○	○	○
Device initial value	○	×	○	○	○	○
File register	×	○	×	○	○	×
Local device	×	○	×	○	×	×
Debugging data	×	×	×	○	×	×
Failure history	×	×	×	○	×	×
General-purpose file	×	×	×	×	×	○

A program stored in the standard ROM, memory card (RAM) or memory card (ROM) is transferred to the program memory at power-on and executed in the program memory. Hence, if the program is stored in the standard ROM, memory card (RAM) or memory card (ROM), the program memory needs a sufficient free space to accept that program.

For use of the debugging data for trace function, a failure history or a general-purpose file, the memory card must be loaded.

● Program

Ladder, list or SFC sequence program file. When running multiple programs, multiple program files are also stored in memory.

● Parameter

File storing PLC parameters and network parameters set during programming.

● Intelligent parameter

Intelligent function module parameter file set using the intelligent function module utility software. This file does not exist if you do not use the setting made with the utility software.

● Device comment

File of device comments annotated to each device of the CPU.

● Device initial value

Initial value file required when setting given initial values to devices in the CPU at power-on.

● File register

File register (R, ZR) file. Setting different file names allows multiple file register files to be stored.

Note that the file registers can be stored in the memory card (ROM) (drive number: 2), but not in the ATA card (Q2MEM-8MBA/16MAB/32MBA).

The file registers stored in the flash card allow read only in the program and do not allow data changes in the program.

● Local device

Local devices are devices exclusively used with the corresponding programs in the presence of multiple programs.

When processing any program, the corresponding local device data is transferred from the local device area to the executing device area and program processing is then performed.

● Debugging data

Trace result storage file for the trace function used for program debugging.

● General-purpose file

Data file written by the FWRITE instruction.

Note that the general-purpose file can be stored in the ATA card (Q2MEM-8MBA/16MBA/32MBA) only.

■ Program memory (Drive number: 0)

Memory equipped as standard inside the CPU.

The memory capacity depends on the CPU type.

Type	Memory Capacity (Bytes)	Number of Files Stored
Q02 (H) CPU	112k	28
Q06HCPU	240k	60
Q12HCPU	496k	124
Q25HCPU	1008k	252

Up to 124 program files can be executed.

■ Memory card (RAM) (Drive number: 1)

Memory used in the memory card interface of the CPU, where the SRAM card can be used.

Type	Memory Capacity (Bytes)	Number of Files Stored
Q2MEM-1MBS	1011k	128

The above capacity is achieved after formatting.

The program stored in the RAM memory card is transferred to the program memory at power-on of the system and executed in the program memory. (When boot operation setting has been made)

■ Memory card (ROM) (Drive number: 2)

Memory used in the memory card interface of the CPU, where the flash card or ATA card can be used.

Type	Memory Capacity (Bytes)	Number of Files Stored
Q2MEM-2MBF	2032k	256
Q2MEM-4MBF	4080k	288
Q2MEM-8MBA	7972k	512
Q2MEM-16MBA	15964k	512
Q2MEM-32MBA	31918k	512

The above capacity is achieved after formatting.

The program stored in the ROM memory card is transferred to the program memory at power-on of the system and executed in the program memory. (When boot operation setting has been made)

■ Standard RAM (Drive number: 3)

Memory equipped as standard inside the CPU.

Type	Memory Capacity (Bytes)	Number of Files Stored
Q02 (H) CPU	64k	2 (Note 1)
Q06HCPU	64k	2 (Note 1)
Q12HCPU	64k	2 (Note 1)
Q25HCPU	64k	2 (Note 1)

Note 1: One file register file and one local device file can be stored.

■ Standard ROM (Drive number: 4)

Memory equipped as standard inside the CPU.

Type	Memory Capacity (Bytes)	Number of Files Stored
Q02 (H) CPU	112k	28
Q06HCPU	240k	60
Q12HCPU	496k	124
Q25HCPU	1008k	252

The program stored in the standard ROM is transferred to the program memory at power-on of the system and executed in the program memory. (When boot operation setting has been made)

Capacity Calculation

Use the following table to calculate the capacity of the files stored in each memory (drive). Note that the file size increment of drive 0 is 4096 bytes, and those of drives 1 to 4 are each 512 bytes. If less than the size increment, the capacity is calculated in the size increment.

Choose the memory with enough allowance since the system may set several files (about 4k to 20k bytes) to each memory (drive) automatically.

File Function	File Capacity (Bytes)
Parameter	11k + network parameter capacity (Note 2)
Intelligent parameter	(Note 2)
Program	(Number of steps × 4) + 136
Device comment	Number of comment characters × total number of comments + number of comment ranges × 10
Device initial value	Assuming that n = setting number, 44 × n + (number of device points of setting 1 + ... + number of device points of setting n) × 2 + 66
File register	Number of file register points × 2 (Note 2)

CPU Built-In Memories/Memory Cards

File Function	File Capacity (Bytes)
Local device	72 + (set device type × 6) + ((total number of set M and V points ÷ 16) + (total number of set T, ST and C points ÷ 16 × 18) + (number of set D points)) × 2 × number of program files
Failure history data	(Number of failures stored × 54) + 72
Debugging data	Specified devices traced: (20 + (number of word device points × 2) + (number of bit device points ÷ 16) × 2) × trace count + (device range × 12) + 362
General-purpose file	Number of write points set by FWRITE instruction

Note 2: The network parameter and intelligent parameter sizes are listed below. The following table indicates the maximum capacity per corresponding module and the capacity will be less than the given size according to the setting.

Corresponding Module	Capacity
Ethernet	With e-mail setting: 12488 (bytes/module) Without e-mail setting: 2060 (bytes/module)
MELSECNET/10(H)	11466 (bytes/module) + 1548 bytes
CC-Link	1423 (bytes/module) + 6 bytes
Analog-to-digital conversion module	76 (bytes/module)
Digital-to-analog conversion module	24 (bytes/module)
Serial communication module	1000 (bytes/module)

Note 3: The maximum number of file register points that may be stored in each memory is as listed below. However, if other files exist in the same memory, the capacity usable by file registers reduces. Note that if the file registers are stored separately in different memories (drives), the file register file used must be selected by the QDRSET instruction. In addition, the file registers stored in the ROM memory card are read-only and cannot be rewritten with a program.

Memory Type		Max. Number of File Register Points
RAM memory card (Drive: 1)	Q2MEM-1MBS	517,120 points
ROM memory card (Drive: 2)	Q2MEM-2MBF	1,040,384 points
	Q2MEM-4MBF	1,042,432 points
Standard RAM (Drive: 3)		32,768 points

Performance Specifications

Memory cards are available in SRAM type, linear flash ROM type and ATA flash ROM type. They are classified as follows according to their applications and capacities.

Type	Memory Type	Memory Capacity (bytes)	Write Count (times)
Q2MEM-1MBS	SRAM	1011k	No restriction
Q2MEM-2MBF	Linear flash ROM	2032k	100,000
Q2MEM-4MBF		4080k	100,000
Q2MEM-8MBA	ATA flash ROM	7972k	1,000,000
Q2MEM-16MBA		15964k	1,000,000
Q2MEM-32MBA		31918k	1,000,000

Note 4: Both the linear flash ROM and ATA flash ROM are rewritable non-volatile memories.

Battery Life of Q2MEM-1MBS

The Q2MEM-1MBS built in battery has the following battery life. Note that the Q2MEM-1MBS is loaded into the PLC CPU and consumes battery current if power is ON.

	Memory Backup Time (Hours)		Backup Time after Battery Error ON (Hours)
	Guaran-teed (MIN.)	Actual (TYP.)	
During storage	690	6336	8
During operation	11784	13872	8

During storage: Loaded in PLC CPU with power off or card is stored alone.
During operation: Loaded in PLC CPU with power on.

Overview

In production locations, the introduction of a network system suited to applications and objectives is significant to ensure efficient production and appropriate quality control and to achieve reductions in equipment sizes and costs by labor saving and wiring reduction.
The Q mode inherits the conventional MELSEC network and offers a network with advanced performance, functions and user-friendliness.

Features

■ Hierarchical network

Assuming a three-level network, the Q mode offers network products optimum for respective applications.

● Information network/Ethernet:

We assume that an information network is on the highest network level in production fields. Designed to transfer production control information, quality control information, facility operating status and other information between the PLC or facility controller and the production control computer, the information network assumes the use of the most general-purpose Ethernet. Ethernet accepts not only a wide variety of computers such as Windows and UNIX type personal computers but also various Factory Automation equipment. The Q mode has functions which make the best use of the Ethernet features and utilize Ethernet easily.

● Control network/MELSECNET/10H

We assume that a control network which links control devices, e.g. PLC and CNC, is on the middle network level in production sites. Designed to transfer data directly related to the operations and motions of machinery and equipment between the control devices, the control network is required to have excellent real-time capabilities. MELSECNET(II/10), MELSEC's control network, is highly regarded in the market for its excellent real-time capabilities, simple network settings, highly redundant reliability typified by duplex loop, and boasts the largest share in Japan and a great number of installations throughout the world. In the Q mode, the MELSECNET/10H inherits the features of this excellent MELSECNET(II/10H), and has also extra real-time capabilities and data capacities to meet further market needs.

● Field network/CC-Link

We assume that a field network which links control devices, such as PLC, with sensors and drive equipment is on the lowest network level in production locations. While control devices were previously linked with sensors and drive equipment by wires on a point-by-point basis, the field network can connect multiple sensors and drive equipment with a single network cable, reducing the number of wires and wiring processes. When connected with intelligent equipment such as the ID system, bar-code reader, inverter and display, the field network allows production data control at network ends through transfer of various data, in addition to ON/OFF data, and serves for improved maintenance efficiency by centralized control of equipment operating statuses. In the Q mode, the CC-Link functions having high speed and excellent data transmission performance has been improved to ensure further ease of use.

■ Seamless communication

The Q mode networks are seamless networks which remove the feeling of difference between network types. You can send/receive data, remote-monitor or correct/change programs regardless of differences in network level and type.

■ Ease of setting network parameters

For the Ethernet, MELSECNET/10H and CC-Link networks for Q mode, you can set the parameters and various functions required for network connection in GPPW, greatly reducing programs related to network setting. Also, you can easily confirm the settings on screen.
Also, a dedicated utility package is available for the RS232/422/485 serial communication module, and you can set the functions and communication parameters of the module on screen.

Network Overview

■ Cyclic communication

The basis of MELSECNET/10H or CC-Link communication having close relationships with machine control is cyclic communication. Since the data of the pre-specified region is transferred periodically (cyclically) and automatically, cyclic communication does not need a sequence program for data transfer.
The cyclic communication data of MELSECNET/10H or CC-Link is sent by broadcast. Broadcasting is a method in which the data sent from a given station is received by all other stations. Broadcasting allows data to be transmitted to multiple stations at once and to be shared by all stations.

■ Network modules unusable with the Q mode

MELSECNET(II) and MELSECNET/B can not be used with Q mode.
Also, the Ethernet, MELSECNET/10, CC-Link and serial communication/computer link modules for AnS/Q2AS series cannot be used. Use the Q series modules.

■ Other networks

In addition to the Ethernet, MELSECNET/10(H), CC-Link network and RS232C/422/485 serial communication modules developed for the Q mode, the Q mode allows you to use the other network-compatible modules developed for the AnS series. When using those network modules, use the QA1S6□B extension base for AnS series modules.
Since there are restrictions on use, refer to the explanation sections of the corresponding modules.

AnS series network modules usable with the Q mode

Network Name	Module Type
MELSECNET/MINI-S3	A1SJ71PT32-S3
	A1SJ71T32
I/O LINK	A1SJ51T64
JPCN-1	A1SJ71J92-S3
S-LINK	A1SJ71SL92
B-NET	A1SJ71B62-S3
Intelligent communication	A1SD51S
ID interface	A1SJ71D1-R4
	A1SJ71ID2-R4
	A1SD32ID1
	A1SD32ID2
Profibus-FMS Profibus-DP	A1SJ71PB96F A1SJ71PB92D
DeviceNet	A1SJ71DN91
Modbus	A1SJ71UC24-R2/R4-S2

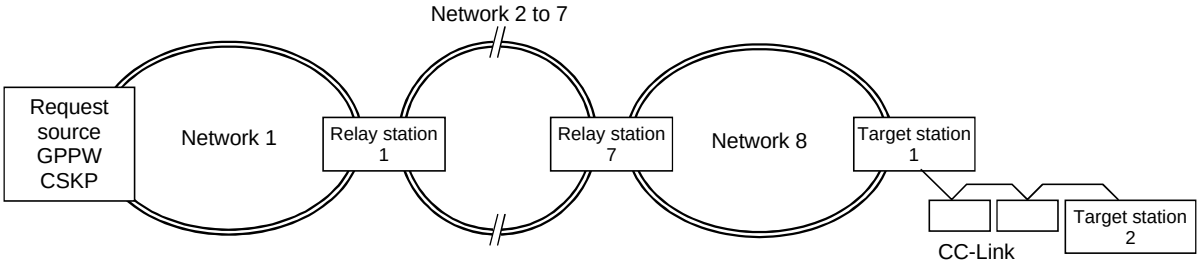
■ Ranges accessible by GPPW/CSKP using the routing function

The ranges accessible with GPPW and CSKP using the routing function are given below. Refer to the following table for the PLC types given in the description.

Type	CPU Type	Ethernet Module Type	MELSECNET/10 Module Type	Serial Communication Module Type	CC-Link Module Type
I	Q02/Q02H/Q06H/ Q12H/Q25H	QJ71E71 QJ71E71-B2	QJ71LP21,QJ71BR11	QJ71C24 QJ71C24-R2	QJ61BT11
II	Q2A(S1)/Q3A/Q4A/ Q2AS(S1)/Q2ASH(S1)	AJ71QE71 AJ71QE71-B5 A1SJ71QE71-B2 A1SJ71QE71-B5	AJ71QLP21 AJ71QBR11 A1SJ71QLP21 A1SJ71QBR11 A1SJ71LP21 A1SJ71BR11	AJ71QC24N AJ71QC24N-R2 A1SJ71QC24N A1SJ71QC24N-R2/R4	AJ61QBT11 A1SJ61QBT11
III	A2U(S1)/A3U/A4U/ Q02-A/Q02H-A/ Q06H-A/ A2AS(S1)/A2USH-S1	AJ71E71-S3 A1SJ71E71-B2-S3 A1SJ71E71-B5-S3	AJ71LP21, AJ71BR11 A1SJ71LP21 A1SJ71BR11	AJ71UC24 AISJ71UC24-R2/R4	AJ61BT11 A1SJ61BT11
IV	Other than above				

If the combination of CPU module and communication module on a type basis is other than that shown in the above list, the accessible range may differ from the one given.

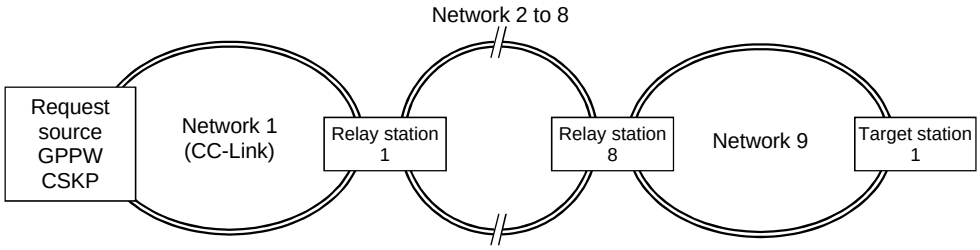
■ When connecting via MELSECNET/10 or Ethernet



Request Source	Condition 1	Condition 2	Condition 3	Condition 4	Condition 5	Access Range
	Type of network 1	Type of relay station 1	Type of networks 2 to 8	Type of relay stations 2 to 7	Type of target station 1	
GPPW	Ethernet	I	MELSECNET/10	I, II or III	I	PLC on path up to target station 2
		I		I, II or III	II, III or IV	PLC on path up to target station 1
		II		I, II or III	—	PLC of type II on path up to target station 1
		III		—	—	Inaccessible
		IV		—	—	PLC of type IV on network 2
	MELSECNET/10	I, II or III		I, II or III	I	PLC on path up to target station 2
		I, II or III		I, II or III	II, III or IV	PLC on path up to target station 1
		IV		IV	—	PLC of type III or IV on network 2
CSKP	Ethernet	I		I, II or III	I, II, III or IV	PLC on path up to target station 1
		II or III		I, II or III	—	PLC of the same type as relay station 1 on path up to target station 1
		IV		—	—	PLC of type III or IV on network 2
	MELSECNET/10	I, II or III		I, II or III	I, II, III or IV	PLC on path up to target station 1
		IV		IV	—	PLC of type III or IV on network 2

Note 1: The ISA bus MELSECNET/10 board and SW3DNF-MNET10 driver are required to connect a GPPW or CSKP-installed personal computer to MELSECNET/10. The access ranges for use of the driver of SW3DNF-MNET10 or earlier are different from those in the above table.

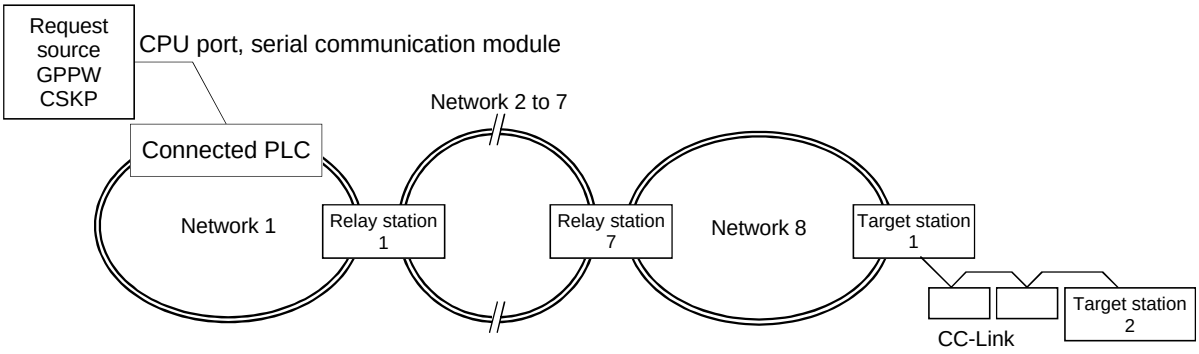
● When connecting via CC-Link



Request Source	Condition 1	Condition 2	Condition 3	Access Range
	Type of relay station 1	Type of networks 2 to 9	Type of relay stations 2 to 9	
GPPW	I or II	MELSECNET/10	I, II or III	PLC of the same type as relay station 1 on path up to target station 1
	III or IV	—	—	PLC on network 1
CSKP	—	—	—	PLC on network 1

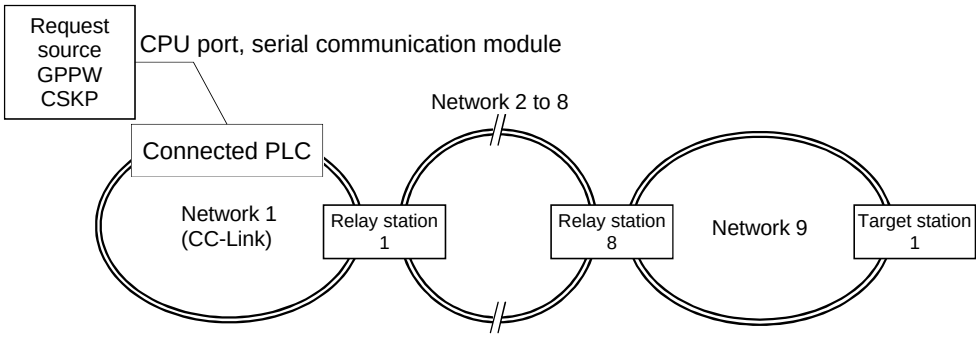
Note 2: The PCI bus CC-Link board and SW3DNF-CCLINK driver are required to connect a GPPW or CSKP-installed personal computer to CC-Link. The access ranges for use of the driver of SW3DNF-CCLINK or earlier are different from those in the above table.

● When connecting via CPU port or serial communication/computer link module (1)



Request source	Condition 1	Condition 2	Condition 3	Condition 4	Access Range
	Type of connected PLC	Type of networks 1 to 8	Type of relay stations 1 to 7	Type of target station 1	
GPPW	I	MELSECNET/10	I, II or III	I	PLC on path up to target station 2
	I		I, II or III	II, III or IV	PLC on path up to target station 1
	II		I, II or III	II, III or IV	PLC of type II on path up to target station 1
	III		I, II or III	II, III or IV	PLC of type III or IV on path up to target station 1
	IV		—	—	PLC of type III or IV on network 1
CSKP	I		I, II or III	II, III or IV	PLC on path up to target station 1
	II		I, II or III	II, III or IV	PLC of type II on path up to target station 1
	III		I, II or III	II, III or IV	PLC of type III or IV on path up to target station 1
	IV		—	—	PLC of type III or IV on network 1

● When connecting via CPU port or serial communication/computer link module (2)



Request Source	Condition 1	Condition 2	Condition 3	Condition 4	Condition 5	Access Range
	Type of connected PLC	Type of network 1	Type of relay station 1	Type of networks 2 to 9	Type of relay stations 2 to 8	
GPPW or CSKP	I	CC-Link	I, II or III	MELSECNET /10	I, II or III	PLC of type I on path up to target station 1
	II, III or IV		—	—	—	Accessible to connected PLC only

■ Ranges accessible by MELSEC communication protocol of Ethernet module

The ranges accessible using the MELSEC communication protocol of the Ethernet module are given below. Refer to the following table for the PLC types given in the description.

Type	CPU Type	Ethernet Module Type	MELSECNET/10 Module Type	CC-Link Module Type
I	Q02/Q02H/Q06H/Q12H/ Q25H	QJ71E71 QJ71E71-B2	QJ71LP21,QJ71BR11	QJ61BT11
II	Q2A(S1)/Q3A/Q4A/ Q2AS(S1)/Q2ASH(S1)	AJ71QE71 AJ71QE71-B5 A1SJ71QE71-B2 A1SJ71QE71-B5	AJ71QLP21 AJ71QBR11 A1SJ71QLP21 A1SJ71QBR11	AJ61QBT11 A1SJ61QBT11
III	A2U(S1)/A3U/A4U/ Q02-A/Q02H-A/ Q06H-A/ A2AS(S1)/A2USH-S1	AJ71E71-S3 A1SJ71E71-B2-S3 A1SJ71E71-B5-S3	AJ71LP21, AJ71BR11 A1SJ71LP21 A1SJ71BR11	AJ61BT11 A1SJ61BT11
IV	Other than above			

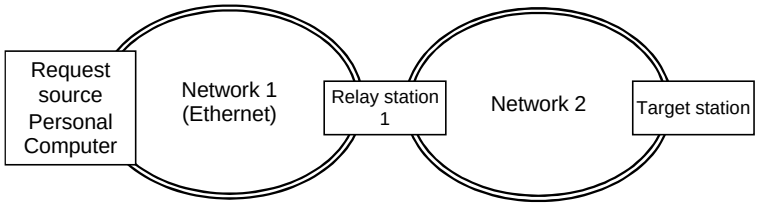
If the combination of CPU module and communication module on a type basis is other than that shown in the above list, the accessible range may differ from the one given.

The levels of the MELSEC communication protocol supported by the Ethernet modules are as listed below.

Ethernet Module Type	Protocol Level
QJ71E71, QJ71E71-B2	1, 2, 3, 4
AJ71QE71, AJ71QE71-B5, A1SJ71QE71-B2, A1SJ71QE71-B5	1, 2, 3
AJ71E71-S3, A1SJ71E71-B2-S3, A1SJ71E71-B5-S3	1

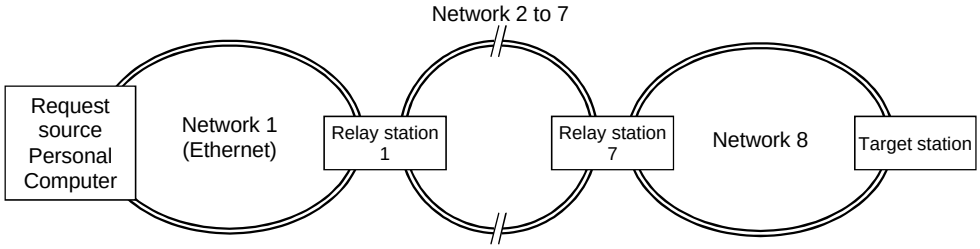
Network Overview

● Protocol level 1 and level 2



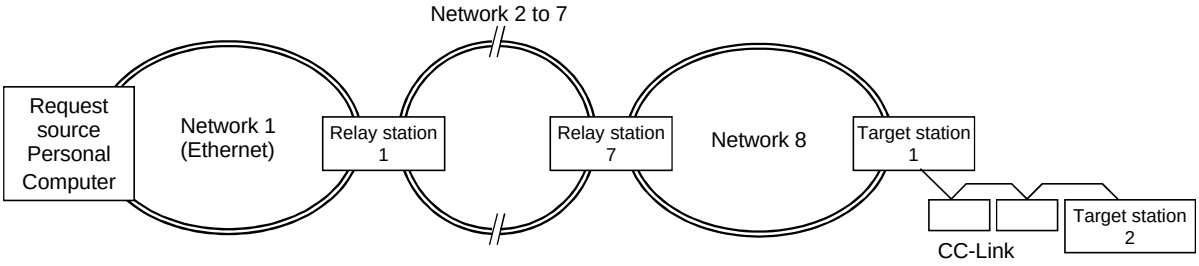
Request Source	Condition 1	Condition 2	Access Range
	Type of relay station 1	Type of network 2	
Personal computer	I, II, III or IV	MELSECNET/10	PLC on path up to target station

● Protocol level 3



Request Source	Condition 1	Condition 2	Condition 3	Access Range
	Type of relay station 1	Type of networks 2 to 8	Type of relay stations 2 to 7	
Personal computer	I or II	MELSECNET/10	I, II or III	PLC on path up to target station
	III or IV	—	—	Protocol level 3 is unusable.

● Protocol level 4



Request source	Condition 1	Condition 2	Condition 3	Condition 4	Access Range
	Type of relay station 1	Type of networks 2 to 8	Type of relay stations 2 to 7	Type of target station 1	
Personal computer	I	MELSECNET/10	I, II or III	I	PLC on path up to target station 2
	I	MELSECNET/10	I, II or III	II or III	PLC on path up to target station 1
	II, III or IV	—	—	—	Protocol level 4 is unusable.

■ Ranges accessible by MELSEC communication protocol of serial communication module

The ranges accessible using the MELSEC communication protocol of the serial communication module are given below. Refer to the following table for the PLC types given in the description.

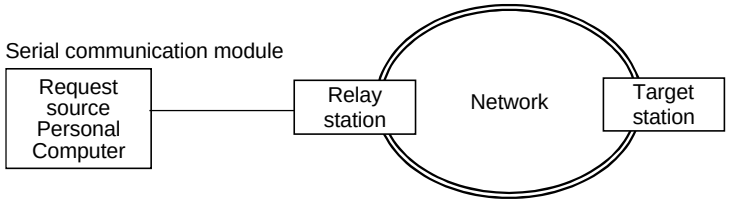
Type	CPU Type	Serial Communication Module Type	MELSECNET/10 Module Type	CC-Link Module Type
I	Q02/Q02H/Q06H/Q12H/ Q25H	QJ71C24 QJ71C24-R2	QJ71LP21,QJ71BR11	QJ61BT11
II	Q2A(S1)/Q3A/Q4A/ Q2AS(S1)/Q2ASH(S1)	AJ71QC24N AJ71QC24N-R2 A1SJ71QC24N A1SJ71QC24N-R2/R4	AJ71QLP21 AJ71QBR11 A1SJ71QLP21 A1SJ71QBR11	AJ61QBT11 A1SJ61QBT11
III	A2U(S1)/A3U/A4U/ Q02-A/Q02H-A/ Q06H-A/ A2AS(S1)/A2USH-S1	AJ71UC24 AISJ71UC24-R2/R4	AJ71LP21, AJ71BR11 A1SJ71LP21 A1SJ71BR11	AJ61BT11 A1SJ61BT11
IV	Other than above			

If the combination of CPU module and communication module on a type basis is other than that shown in the above list, the accessible range may differ from the one given.

The levels of the MELSEC communication protocol supported by the serial communication modules are as listed below.

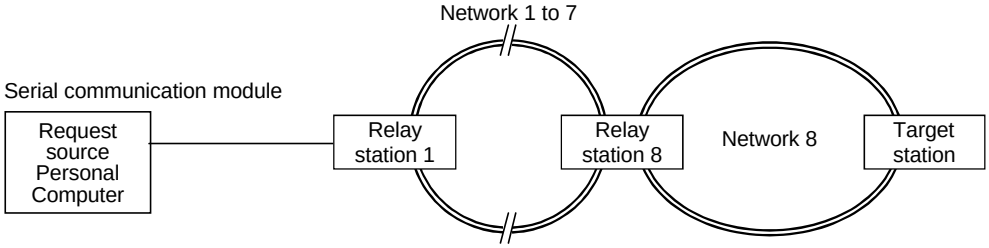
Serial Communication Module Type	Protocol Level
QJ71C24, QJ71C24-R2	1, 2, 3, 4
AJ71QC24N, AJ71QC24N-R2, A1SJ71QC24N, A1SJ71QC24N-R2/R4	1, 2, 3
AJ71UC24, AISJ71UC24-R2/R4	1

● Protocol level 1 and level 2



Request Source	Condition 1	Condition 2	Access Range
	Type of relay station	Type of network	
Personal computer	I, II, III or IV	MELSECNET/ 10	PLC on path up to target station

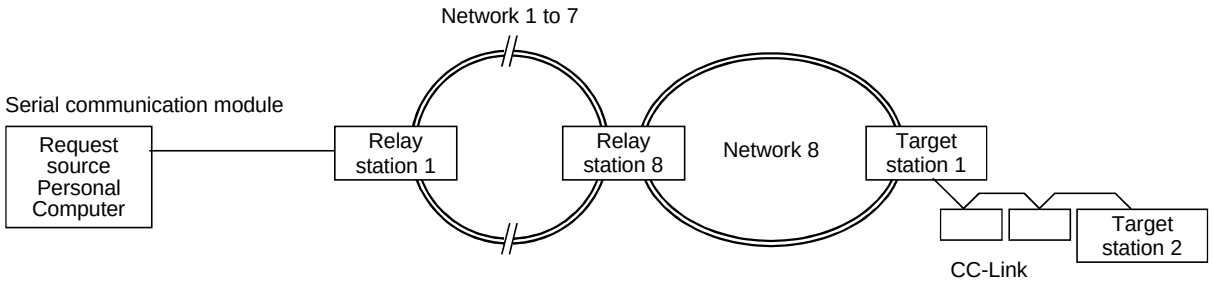
● Protocol level 3



Request Source	Condition 1	Condition 2	Condition 3	Access Range
	Type of relay station 1	Type of networks 1 to 8	Type of relay stations 2 to 8	
Personal computer	I or II	MELSECNET/10	I, II or III	PLC on path up to target station
	III or IV	—	—	Protocol level 3 is unusable.

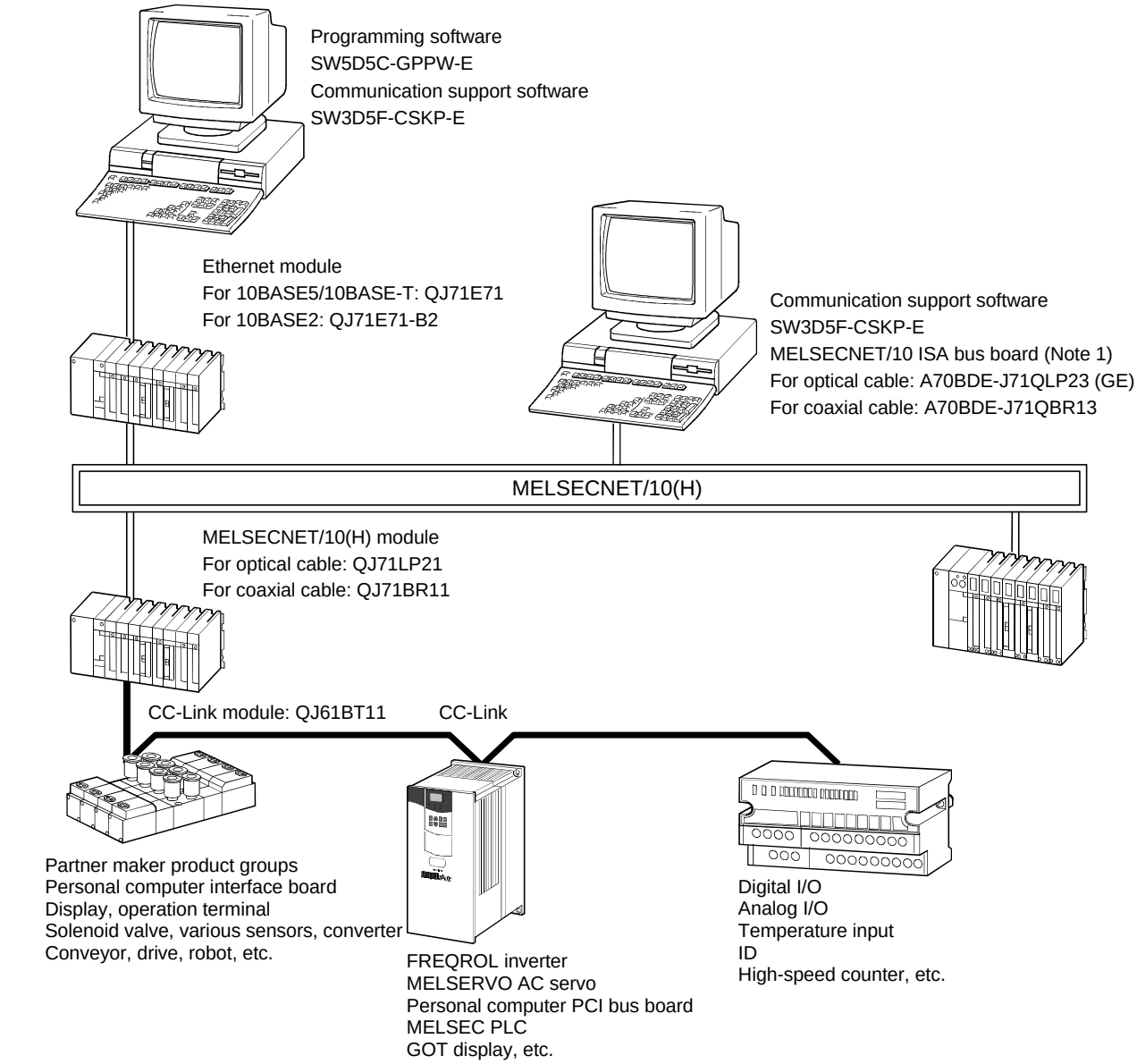
Network Overview

● Protocol level 4



Request source	Condition 1	Condition 2	Condition 3	Condition 4	Access Range
	Type of relay station 1	Type of networks 1 to 8	Type of relay stations 2 to 8	Type of target station 1	
Personal computer	I	MELSECNET/10	I, II or III	I	PLC on path up to target station 2
	I	MELSECNET/10	I, II or III	II or III	PLC on path up to target station 1
	II, III or IV	—	—	—	Protocol level 4 is unusable.

■ Whole network system configuration



Note 1: Usable in MELSECNET/10 mode. Unusable in MELSECNET/10H mode. (Driver of version SW3DNF-MNET10 or later is required.)

Ethernet: QJ71E71, QJ71E71-B2

Overview

The Ethernet interface module (hereafter referred to as the "QJ71E71") is used on the PLC side to connect a host system, e.g. personal computer or work station, and Q mode PLC via Ethernet (10BASE5, 10BASE2, 10BASE-T) to collect/change PLC data, monitor CPU module operation, control the status, and transfer any data by TCP/IP or UDP/IP communication.
Currently, Ethernet is the most widespread network for connection of information processors such as personal computers and work stations. By using an Ethernet interface with the PLC, production-related management information can be transmitted rapidly to personal computers or work stations.

Features

■ 10BASE5/10BASE2/10BASE-T

You can choose from three different network types of 10BASE5, 10BASE2 and 10BASE-T.

■ Communications with personal computer

For access from a personal computer to the PLC CPU, there is a communications function (Note 1) using the MELSEC communication protocol.
In data communications using the MELSEC communication protocol (hereafter referred to as the "MC protocol"), PLC data and program file read/write, PLC CPU status control (remote RUN/STOP), etc. can be performed from a host system. In this protocol, sequence programs are not needed since the PLC sends and receives all data under the commands of the host system. In communications using the MC protocol, one communication allows read/write of up to 960 points (960 words) of word devices.

Note 1: Equivalent to the PLC CPU data read/write communications function of the A/QnA series PLC.

■ Communication support software package

When the host system is a Windows personal computer, you can easily create a host system side communication program, without needing to be aware of the MC protocol by use of the optionally available communication support software package (SW3D5F-CSKP-E). CSKP offers general-purpose functions for Visual Basic and Visual C++.

■ Communications with personal computer and other PLCs

The communications function using fixed buffers is available to transfer data between the PLC and personal computer or another PLC.
In fixed buffer communications, the PLC can transmit data actively, so it can send data to the host system when a given condition holds at the occurrence of a machinery/equipment error. In data communications using fixed buffers, up to 1k word of data can be sent or received between PLCs or between PLC and host system. The 16 1k-word fixed buffers available for the QJ71E71 are used by allocating them as sending or receiving buffers to or from any equipment.

■ Communications of large volumes of data with personal computer

The communications function using random access buffer is available as a way to transfer 1k word or more data.
In data communications using random access buffer, up to 6k words of data can be transferred. Large amounts of data can be transferred by use of the random access buffer communications function if data capacity is insufficient in fixed buffer communication (max. 1k word).

■ Communications with remote locations, automatic notice

Using the e-mail communication function, you can send or receive up to 6k words of data to or from a remote computer as an attached e-mail file. By setting automatic notice in transmission from the PLC, the QJ71E71 monitors the user-set notice conditions (PLC CPU status and device value) at fixed intervals and automatically sends e-mail when the notice conditions are true.
Note that up to 16 e-mail addresses can be registered for transmission.

■ Communications with other PLCs

The communication function using data link instructions is available for read/write of device data and any data to/from other PLCs.
In communications using data link instructions, read/write of device data and any data from one PLC to another PLC, PLC CPU status control (remote RUN/STOP), etc. can be performed if data communication with other PLCs is made using Ethernet.

Ethernet is a registered trademark of XEROX CORP, U.S.A.

■ Number of simultaneously opened communication lines

Up to 16 communication lines can be opened (logical lines connected) for concurrent data communications.
Two communication lines are used for sending and receiving by fixed buffer communications with the same equipment.

* Opening one communication line allows communications by MC protocol from host system, random accessing buffer communications, and fixed buffer communications from host system/PLC CPU (sending or receiving with protocol). The communication line for fixed buffer communications (sending or receiving) with no protocol does not permit combined use with another data communications system (such as communications using MC protocol).

■ Ease of parameter setting (programless)

Using the network parameter setting of "GPPW", you can make on-screen setting of the initial processing of the QJ71E71 and logical link processing (open processing) with other nodes, significantly simplifying sequence programs and enhancing the visual recognition of the network setting status.

■ Programming via Ethernet

PLC programming and monitoring can be performed from GPPW on a personal computer via Ethernet. With this function, you can perform programming/monitoring at a remote location utilizing the fast communication of Ethernet.

■ Communications via multiple networks

When accessing the PLC from the host system using the MC protocol, or when accessing the PLC from the GPPW-installed personal computer, access can be made to the PLC located beyond multiple MELSECNET/10 and Ethernet networks.

Ethernet Module-Dedicated Instructions

The following Ethernet dedicated instructions can be used to program the QJ71E71 and QJ71E71-B2.

Class-ification	Inst-ruction Name	Description	Remarks
Connect-ion process-ing	OPEN	Opens connection.	Fundamental
	CLOSE	Closes connection.	Fundamental
Comm-unication process-ing	BUFRCV	Reads data received by fixed buffers.	Fundamental
	BUFRCVS	Reads data received by fixed buffers in interrupt program.	Fundamental
	BUFSND	Uses fixed buffers to send data of other-end equipment.	Fundamental
	MRECV	Receives e-mail.	Application
	MSEND	Sends e-mail.	Application
	RECVS	Reads channel data sent to own station (1 scan completion).	Application
	READ	Reads word device of other station.	Application
	RECV	Receives message.	Application
	REQ	Makes transient request to other station.	Application
	SEND	Sends message.	Application
	SREAD	Reads data from word device of other station (with completion device).	Application
	SWRITE	Writes data to word device of other station (with completion device).	Application
	WRITE	Writes data to word device of other station.	Application
	ZNRD	Reads data from word device of other station.	Application
	ZNWR	Writes data to word device of other station.	Application
Error process-ing	ERRCLR	Clears error (ERROR LED off, error log clear)	Fundamental
	ERRRD	Reads error information.	Fundamental

Ethernet: QJ71E71, QJ71E71-B2

"Fundamental" in the Remarks field indicates the instructions explained in the Ethernet User's Manual (Fundamentals) and "Application" indicates the instructions explained in the Ethernet User's Manual (Applications).

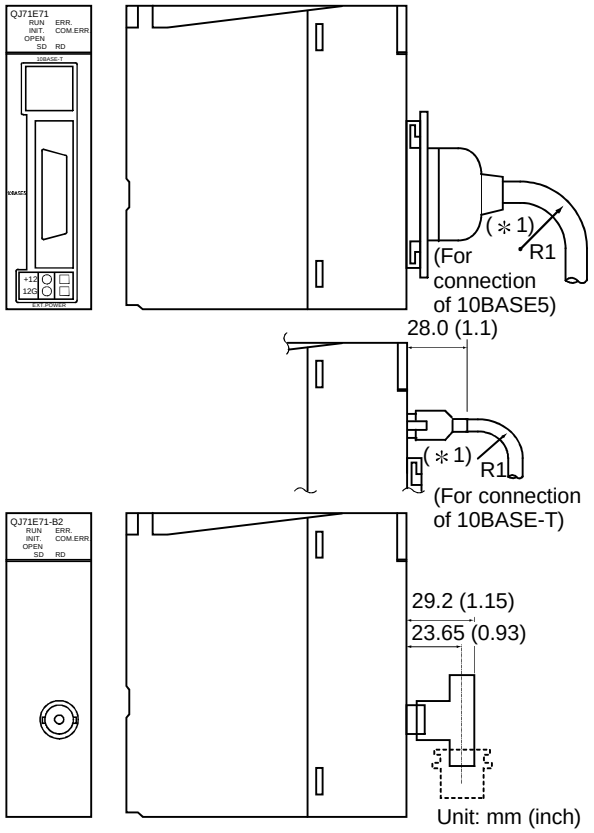
Program Compatibility

The sequence program of the system which uses the A series/QnA series Ethernet interface module (e.g. A1SJ71E71-B2-S3, A1SJ71QE71-B2, hereafter referred to as the "E71") and the program of its host system can be utilized for the system using the QJ71E71.
E71 program usability for data communications which uses the QJ71E71 is be described below.

	Compatibility with Program for A Series Ethernet Module	Compatibility with Program for QnA Series Ethernet Module
Host system side program (Note 1)	Compatible However, only data in PLC is accessible in MC protocol. (Note 7)	Compatible (Note 5, 6)
PLC side program (Note 1)	Incompatible	Compatible (Note 2, 3,4)

Note 1: In any of the above cases, performance and communications timings are incompatible, so communications may not be made by utilizing the program as it is. Always check operation when utilizing the program.
Note 2: The QJ71E71 has no E^2PROM. Delete an access program to E^2PROM.
Note 3: For the QJ71E71, it is not neccessary to set in the program whether communications are possible or not during PLC CPU STOP (GPPW parameters are used for setting). Delete the sequence program used for this setting.
Note 4: The LED ON status/switch setting status read from the buffer memory of the QJ71E71 are different from those of the AJ71QE71.
Note 5: When using the file transfer (FTP server) function, the default value of the FTP login name and FTP password specified on the external device side changes from "AJ71QE71" to "QJ71E71".
Note 6: For file access in the Q series CPU using MC protocol, create a new program since a dedicated new command will be used.
Note 7: Can be used in the same range as that of the conventional A series CPU for read/write communications (MC protocol level 1) of data in the PLC CPU compatible with the conventional A series E71.

Appearance



＊1 When connecting a cable, its flexing radius (R1: guideline value) near the connector should be (cable outline × 4) or more.

Function List

Function		Outline
Main functions	MC protocol communications	Reads/writes data from/to CPU module in accordance with MC protocol from host system. PLC always performs passive processing.
	Communications using fixed buffers	Sends or receives data using 16 1k-word fixed buffers. Sequence program is required for data transfer.
	Random access buffer communications	Sends or receives data using random accessing buffer (6k words) in QJ71E71. PLC reads/writes data from/to random accessing buffer, and host system accesses that data to make communications.
	Sending/receiving by e-mail	Communicates data using e-mail. Can also be used with PLC monitoring function to transmit alarm information, etc. automatically by e-mail. Number of registerable e-mail addresses: 16 Number of monitoring function conditions: 1

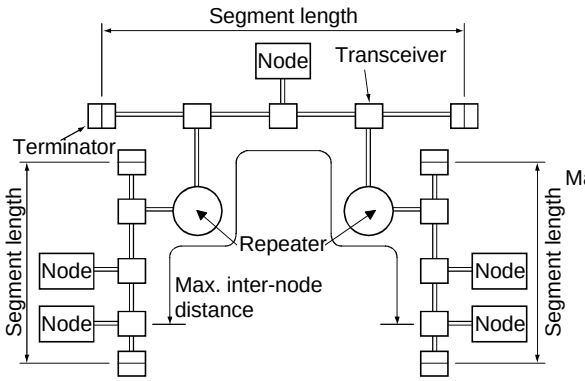
Ethernet: QJ71E71, QJ71E71-B2

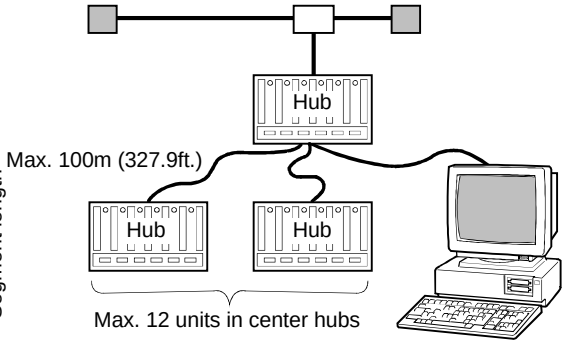
Function		Outline
Sub functions	Router relay function	Can send data to personal computer, etc. located beyond router.
	Data link instruction	Instructions for data communication with other PLCs (MELSEC) via Ethernet.
	File transfer	Can transfer file by FTP. Can read/write programs and data stored in CPU module as files.
	Broadcasting	Sends data to all other personal computers, etc. within same segment using UDP/IP.
	Existence check	Checks whether other nodes are operating properly or not if communications had not been made with other nodes for given period. (Use GPPW to set existence confirmed/not confirmed and time interval.)
	Error information	At occurrence of data communications error, stores in buffer memory up to 16 sets of error history information including message sub-headers, other-end equipment IP addresses, etc.
	Self loopback test	Checks hardware including communication circuit of Ethernet module. (Set from GPPW)

Performance Specifications

Item		QJ71E71		QJ71E71-B2
Compatible cable		10BASE5	10BASE-T	10BASE2
Transmission specifications	Data transmission speed (bps)	10Mbps		
	Transmission method	Base band		
	Max. inter-node distance (m (ft.))	2500 (8196.72)	4000 (13114.75)	925 (3032.79)
	Max. segment length (m (ft.))	500 (1639.34)	100 (327.87)	185 (606.56)
	Max. number of nodes	100 units/segment	1024 units/all hub (12 units)	30 units/segment
	Min. node interval (m (ft.))	2.5 (8.2)	—	0.5 (1.64)
Data size	Number of simultaneously openable connections	16 connections (connections usable in sequence program)		
	Fixed buffer size	1k word × 16 areas		
	Random accessing buffer size (E-mail attached file size)	6k words × 1 area		
Max. number of data per communication	MC protocol communication	960 words		
	Fixed buffer communication	1k words		
	Random buffer communication (E-mail attached file)	6k words		
	Data communication instructions RECVS, RECV, READ, SREAD, SEND, WRITE, SWRITE	480 words		
	Data communication instructions ZNRD, ZNWR	230 words		
Loadable station		Q series CPU (Q mode)		
Number of loadable modules per CPU		Max. 4 modules		
Number of I/O signals occupied		32 points		
5VDC internal current consumption (A)		0.8		
External dimensions (mm (inch))		98 (3.86) (H) × 27.4 (1.08) (W) × 90 (3.55) (D)		
Weight (kg (lb))		0.5 (1.1)		

Ethernet: QJ71E71, QJ71E71-B2





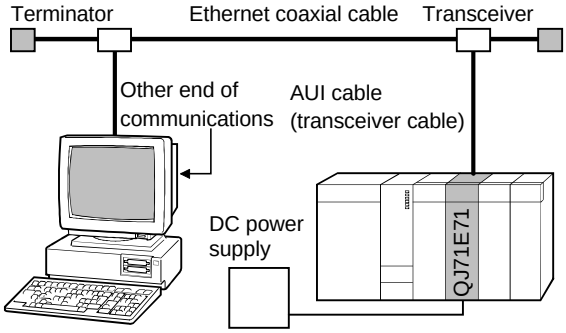
■ E-mail specifications

Item	Specifications
Data size	6k words × 1
Data transfer method	Send/receive in the form of an attached file When two or more files are received, the first file is received and the others are discarded.
Attached file format	MIME format
MIME	Version 1.0
Data of attached file	Binary data or ASCII data may be selected. File name: ********.bin (binary), ********.asc (ASCII)
Encode/decode of attached file	base64
Subject	us=ascII format or ISO-2022-JP (base64)
Division	Attached file cannot be divided (max. 6k words/file) When divided files are received, the first file portion is received and the others are discarded.
Encryption function	No
Compression function	No
Communications with mail server	SMTP (sending server) port number=25 POP3 (receiving server) port number=110

System Equipment

The following equipment is required for configuring an Ethernet system.

■ 10BASE-5: QJ71E71



<QJ71E71 accessories>

Product	Description
Manual	Ethernet Interface Module User's Manual (Hardware)

<Separately prepared products>

The following equipment must be prepared separately.

Product	Description
Transceiver	Ethernet Standard-compatible product. Product where SQETEST (Signal Quality Error Test) or heartbeat will operate.
Coaxial cable	Ethernet Standard-compatible product.
AUI cable	Ethernet Standard-compatible product.
N type terminator	Ethernet Standard-compatible product.
12VDC power supply	Power supply for transceiver

Note: Refer to <separately prepared manuals> on the next page for separately prepared manuals.

<Connectable products>

Product	Maker	Type
Transceiver	Mitsubishi Cable Industries	ET-10081/ET-10071
	Optic Dai-Ichi Denko	CNT-101
	Makunika	JET-803
	TDK	CIU-1000
	Allied Telesys	CentreCOM106 CentreCOM116
AUI cable	Hirakawa Hutech	HLTC-100B 4022

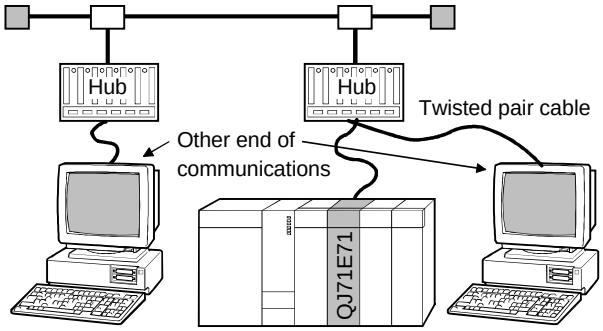
<Software>

Type	Description	Remarks
SW4D5C-GPPW-E or later	For sequence programming For Ethernet parameter setting	○
SW3D5F-CSKP-E	Communication support software for personal computer	△

○: Must be prepared. △: Prepared as required.

Note: The software of the above products or later version are usable.

■ 10BASE-T: QJ71E71



<QJ71E71 accessories>

Product	Description
Manual	Ethernet Interface Module User's Manual (Hardware)

<Separately prepared products>

The following separately prepared equipments are required up to hub connection.

Product	Description
Non-shielded twisted pair cable	Ethernet Standard-compatible product. Category 3 (4, 5)
Jack	Ethernet Standard-compatible product. RJ45
Hub	Ethernet Standard-compatible product. For 10BASE-T.

Note: Refer to <separately prepared manuals> on the next page for separately prepared manuals.

The following product is usable as the hub for 10BASE-T.

<Connectable products>

Product	Maker	Type
Hub for 10Mbps	Allied Telesys	CentreCOM SB3012TR CentreCOM RH509S

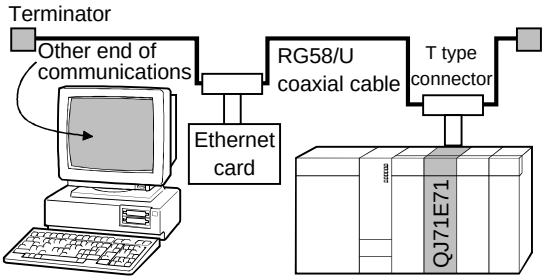
<Software>

Type	Description	Remarks
SW4D5C-GPPW-E or later	For sequence programming For Ethernet parameter setting	○
SW3D5F-CSKP-E	Communication support software for personal computer	△

○: Must be prepared. △: Prepared as required.

Note: The software of the above products or later version are usable.

■ 10BASE-2: QJ71E71-B2



<QJ71E71-B2 accessories>

Product	Description
Manual	Ethernet Interface Module User's Manual (Hardware)

<Separately prepared products>

The following equipment must be prepared separately.

Product	Description
Coaxial cable	Ethernet Standard-compatible product. RG-58A/U (50 Ω)
BNC type terminator	Ethernet Standard-compatible product (Nippon AMP's 221629-4 or equivalent)
T type connector	Ethernet Standard-compatible product (Hirose Electric's UG-274/U(1S) or equivalent)

<Software>

Type	Description	Remarks
SW4D5C-GPPW-E or later	For sequence programming For Ethernet parameter setting	○
SW3D5F-CSKP-E	Communication support software for personal computer	△

○: Must be prepared. △: Prepared as required.

Note: The software of the above products or later version are usable.

<Separately prepared manuals>

Ethernet Interface Module User's Manual (Fundamentals)
Specifications
Pre-operation settings and procedures
Maintenance, inspection, troubleshooting
Logical line connection method
Communications using MC protocol (Note 1)
Communications using fixed buffers
Communications using random accessing buffer
Dedicated instructions (instructions related to open processing)
Ethernet Interface Module User's Manual (Applications)
How to confirm existence of other nodes
E-mail function
PLC CPU's monitoring function
Function to make communications via MELSECNET/10
Function to make communications by data link instructions
For use of file transfer (FTP server)
Dedicated instructions (instructions related to data transfer)
MELSEC Communication Protocol Reference Manual
Protocol specification manual that describes the functions with which the MC protocol for serial communication module/Ethernet module is compatible, their send and receive frames, and send and receive procedures.

Note 1: The description of the MC protocol is not given.
For its description, refer to the MELSEC Communication Protocol Reference Manual.

MELSECNET/10H: QJ71LP21, QJ71BR11

Overview

MELSECNET/10H is a network system which has improved performance capabilities compared to MELSECNET/10, it has the functions and performance capabilities required to exercise centralized control of manufacturing lines by connection of multiple PLCs and a personal computer.
MELSECNET/10H network module has the functions of both MELSECNET/10 mode designed for connection to the existing MELSECNET/10 system constructed with the A series/QnA series PLCs and MELSECNET/10H mode where only the Q series PLCs are used to configure a network for higher performance. You have the choice between these modes.

Note 1: QJ71LP21 and QJ71BR11 may be used only for inter-PLC network. Note that they cannot be used as master station modules of a remote I/O network system. To make a remote I/O network system, use the CC-Link system (CC-Link master module QJ61BT11).

Features

■ High-speed network

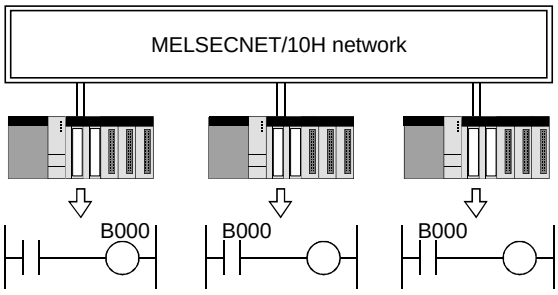
The MELSECNET/10 and MELSECNET/10H are 10Mbps token passing networks. Since the transmission right is always assigned cyclically in a token passing network, data transmission can always be made if the number of connections or communications with the network increase. Hence, this network is suitable for facility control requiring real-time capabilities.
MELSECNET/10H is identical in communication speed to MELSECNET/10, the network module has shorter processing time to reduce the link scan time.

■ User-friendly network

MELSECNET/10 and MELSECNET/10H have a cyclic communication system for data communications. The cyclic communication system is designed to transfer periodically or automatically the data pre-specified in the network parameters and does not need programming for data transfer.
It also has dedicated devices of link relays B (ON/OFF data) and link registers W (16-bit numerical data) used for cyclic communication. B and W operate as the shared memories of that network and can be handled as ordinary internal relays and data registers in programs, so you can create programs without having to think about the network configuration. (Note 2)

Note 2: The link relays B and link registers W are the names of data in the CPU. They are called LB and LW in the network module, respectively, and the data actually shared on the network are LB and LW. Since the CPU cannot handle LB and LW directly, LB/LW data are read into the CPU module after they are shifted to B/W.

To transfer larger volumes of data than MELSECNET/10, MELSECNET/10H has been increased from the 8k points LB and LW capacities of MELSECNET/10 to 16k points. If link relays B and link registers W are insufficient, you can use link inputs (LX) and link outputs (LY). Note that the link inputs and link outputs are different in usage from link relays and link registers, and they may be used only in 1-to-1 communications.



You can handle B000 controlled in one PLC as contact data in the other PLCs, without thinking about the network configuration.

■ Applicable cables

When configuring the MELSECNET/10H network system, optical fiber and coaxial cables are usable.
They have the following features.

● Optical fiber cables

(1) Optical fiber has high noise immunity.
(2) Long, 500m (1639.34ft.) / 1km (3278.69ft.) distance between stations for long-distance configuration.

● Coaxial cables

(1) Cables can be fabricated easily by the user.
(2) Cables are low in price.

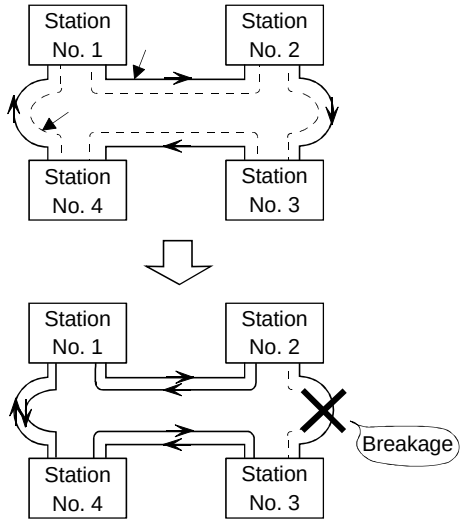
MELSECNET/10H: QJ71LP21, QJ71BR11

■ High reliability

When a problem occurs, network recovery may take a long time since many PLCs are connected over a wide range and cables are run in ducts and ceilings which are difficult to replace, etc. With emphasis on this point, the MELSECNET/10 and MELSECNET/10H have functions to increase reliability.

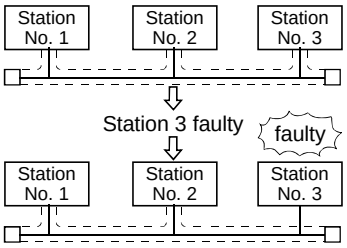
● Loopback function (Optical duplex loop system only)

With the optical loop cables duplexed, a faulty portion is separated at occurrence of a fault such as cable breakage or PLC failure to continue normal transmission with operable stations.



● Station separating function (Coaxial bus system only)

When a station becomes faulty due to power-off, for example, that station is separated to continue normal transmission with operable stations.



● Control station shifting function

When the specified control station is disconnected due to a fault such as power-off, the ordinary station replaces the specified control station (to act as a sub-control station) to continue communication.

● Automatic return function

When the station disconnected as a faulty station is recovered from its cause of fault, it returns to the network automatically to resume data link.

■ Network monitoring

In the MELSECNET/10 and MELSECNET/10H network systems, the network status can be diagnosed easily by GPPW. If a fault occurs in the network, a fast search for a faulty portion can be made for ease of troubleshooting. Here are the following ways to diagnose:

(1) Network diagnosis (own station information): Checks the status of the network of the connected host station.
(2) Other station information: Checks the status of the network of the other specified station.
(3) Network test: Makes link start/stop of the host station, specified station or all stations.
(4) Setting confirmation test: Checks the station number, network number and group number set for each station.
(5) Station sequence confirmation test: For optical loop system, checks the station sequence of forward/reverse loop on the network.
(6) Loop test: Checks the loop status of the optical loop system.
(7) Communications test: Checks whether communications can be made between the host station and specified station.

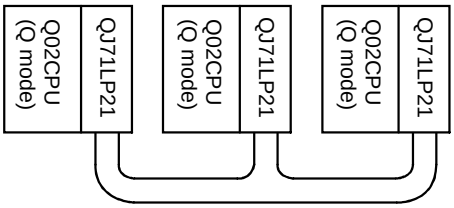
■ MELSECNET/10H mode system

When a network is made up of the Q mode PLCs only, choose the MELSECNET/10H mode. It can achieve fast, large-capacity communication, compared to MELSECNET/10 mode.

When using the QCPU (A mode), you cannot use the MELSECNET/10H modules. Use the AnS series MELSECNET/10 modules.

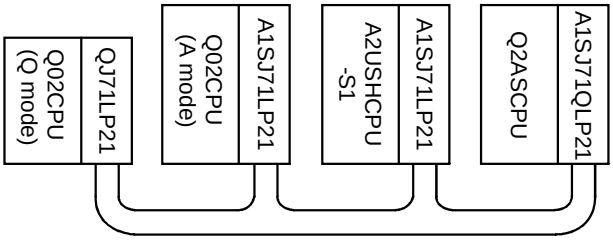
Optical or coaxial cables are used in the MELSECNET/10 network system.

MELSECNET/10H: QJ71LP21, QJ71BR11



■ MELSECNET/10 mode system

Choose the MELSECNET/10 mode when connecting the Q mode PLC to the existing MELSECNET/10 network system configured with the ACPU, QnACPU, etc. The QCPU (A mode) can also be connected to the MELSECNET/10 network.

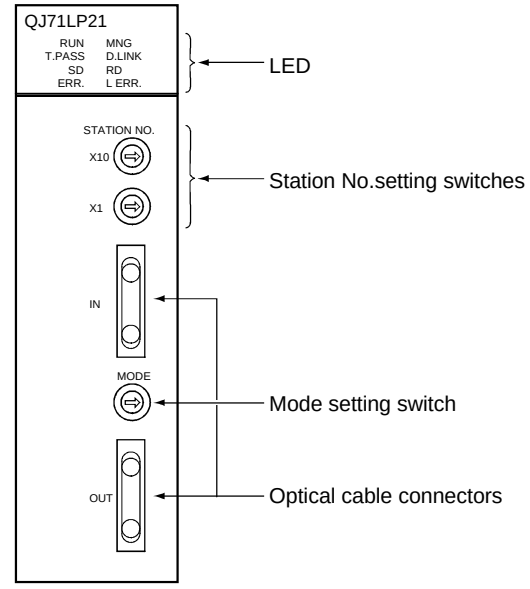


MELSEC/10(H) Dedicated Instructions

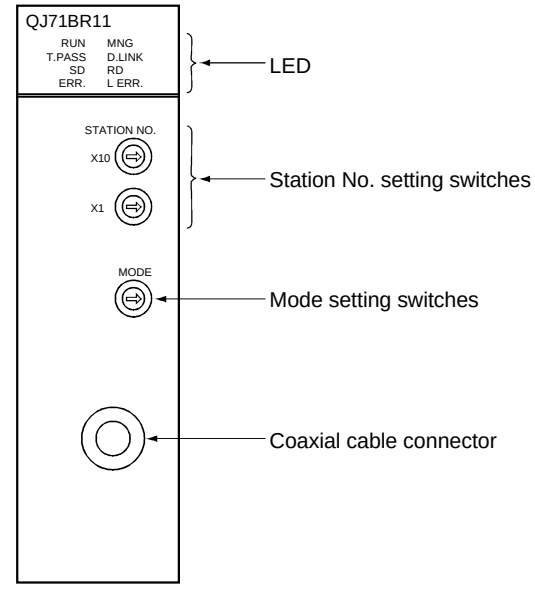
For the QJ71LP21 and QJ71BR11, the MELSECNET/10(H) dedicated instructions listed below can be used to create programs for data transfer other than cyclic communication.

Instruction	Description	Target Station
SEND	Writes data to target station network module	Q mode QnA/Q2AS
RECV RECVS	Reads data written by SEND instruction from network module. (RECVS is executed in interrupt program.)	
READ SREAD	Writes data to target station CPU module.	
WRITE SWRITE	Reads data from target station CPU module.	
REQ	Performs remote operation for target station CPU.	
ZNRD	Reads data from target station CPU module.	Q mode QnA/Q2AS A mode AnU/A2AS
ZNWR	Writes data to target station CPU module.	

Appearance



Optical loop module



Coaxial bus module

MELSECNET/10H: QJ71LP21, QJ71BR11

Comparison between MELSECNET/10H and MELSECNET/10

		MELSECNET/10H	MELSECNET/10	MELSECNET/10	MELSECNET/10	Remarks
Host PLC type		Q mode	Q mode	QnA/Q2AS	A mode, AnU/A2AS	
Applicable other station PLC type		Q mode	Q mode, A mode, QnA/Q2AS, A/AnS, A70BD series MELSECNET/10 board			
Number of cyclic points per network	LX/LY (1Bit)	0 to 1FFF (8192 points)	0 to 1FFF (8192 points)			
	LB (1Bit)	0 to 3FFF (16384 points)	0 to 1FFF (8192 points)			
	LW (16Bit)	0 to 3FFF (16384 points)	0 to 1FFF (8192 points)			
Number of cyclic transmission points per station	Cyclic communications	Max. 2000 bytes	Max. 2000 bytes			Total of LY, LB and LW
	Low-speed cyclic	Max. 2000 bytes	No			
Communication speed		10Mbps	10Mbps	10Mbps	10Mbps	
Link scan time		Short	Normal	Normal	Normal	
Inter-PLC network and remote I/O network		Inter-PLC network	Inter-PLC network	Inter-PLC network, remote I/O network		
Cable	Optical SI/QSI-200/250	○	○	○	○	(Note 2)
	Optical GI/50/125	×	×	○	○	
	Coaxial (3C/5C-2V)	○	○	○ (simplex bus, duplex loop)	○ (simplex bus, duplex loop)	
Max. number of networks		239	239	239	255	
Dedicated instructions	ZCOM	○	○	○	○	Check the details of the dedicated instructions in the relevant programming manual.
	REQ	○	○	○	×	
	ZNRD, ZNWR	○	○	○	○	
	READ, WRITE, SREAD, SWRITE	○	○	○	×	
	SEND, RECV	○	○	○	×	
	ZNFR, ZNTO	×	×	○	○	
	RFRP, RTOP	×	×	○	○	
Routing function		(Note 1)	(Note 1)	(Note 1)	(Note 1)	
32-bit data split prevention function		Yes	No	Yes	No	

Note 1: Accessible to the PLC on the network located beyond seven relay (gateway) PLCs which connect two MELSECNET/10H, MELSECNET/10 or Ethernet networks. Note that the A mode does not have the Ethernet relay function.

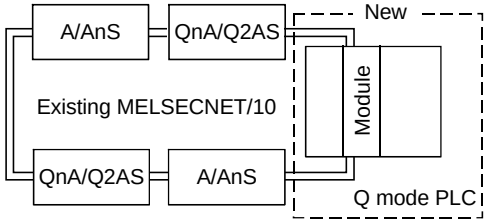
Note 2: Some cables are not compatible with some CPU types. Check details in the corresponding catalog.

Connection with the Existing Network System

This section describes the compatibility of the Q mode PLC for additional connection to the existing MELSECNET network.

Note 1: The compatibility specifications of the A mode PLC with the existing network are different from those of the Q mode PLC. The A mode PLC has the same network connectability as that of the AnS and can be connected to all networks to which the AnS can be connected.

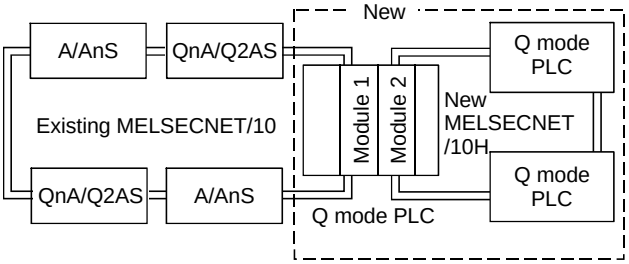
■ Connecting the Q mode PLC to the existing MELSECNET/10 (inter-PLC network)



MELSECNET/10H: QJ71LP21, QJ71BR11

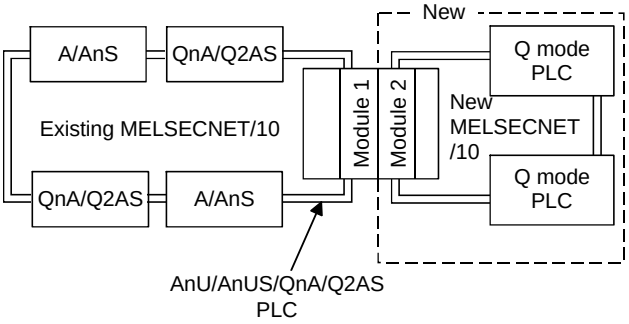
[Modules required for Q mode PLC]
QJ71LP21: For optical SI/QSI cable
QJ71BR11: For coaxial 75 ohm cable
[Instructions]
Use the QJ71LP21/QJ71BR11 in the MELSECNET/10 mode. They are not compatible with the GI optical cable.

■ Connecting the existing MELSECNET/10 (inter-PLC network) and new MELSECNET/10H network (Method 1)



[Modules required for relay PLC]
Module 1
QJ71LP21: For optical SI/QSI cable
QJ71BR11: For coaxial 75 ohm cable
Module 2
QJ71LP21: For optical SI/QSI cable
QJ71BR11: For coaxial 75 ohm cable
[Instructions]
Use module 1 in the MELSECNET/10 mode.
Module 2 may also be used in the MELSECNET/10H mode.

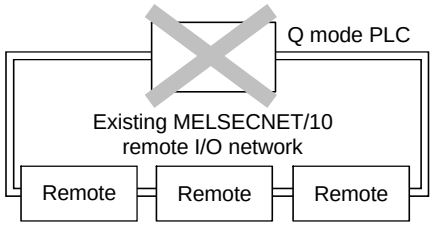
■ Connecting the existing MELSECNET/10 (inter-PC network) and new MELSECNET/10 network (Method 2)



[Modules required for relay PLC]
Module 1 (existing module)
MELSECNET/10 module compatible with A/AnS/QnA/Q2AS
Module 2 (newly added module)
AJ71LP21/A1SJ71LP21/AJ71QLP21(S)/A1SJ71QLP21(S): For optical SI/QSI cable
AJ71BR11/A1SJ71BR11/AJ71QBR11/A1SJ71QBR11: For coaxial 75 ohm cable
[Instructions]
Module 1 is the existing MELSECNET/10 module.
Module 2 is a MELSECNET/10 module for A/AnS/QnA/Q2AS.

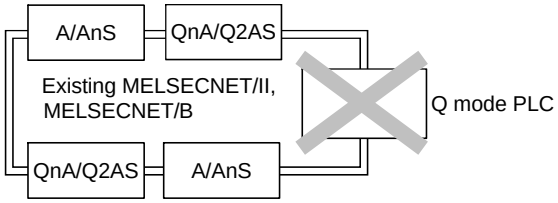
■ Changing the master module of the existing MELSECNET/10 (remote I/O network) for the Q mode PLC

You cannot replace the master module of the existing MELSECNET/10 (remote I/O network) with the Q mode PLC. The Q mode PLC is not compatible with the MELSECNET/10 remote I/O network.



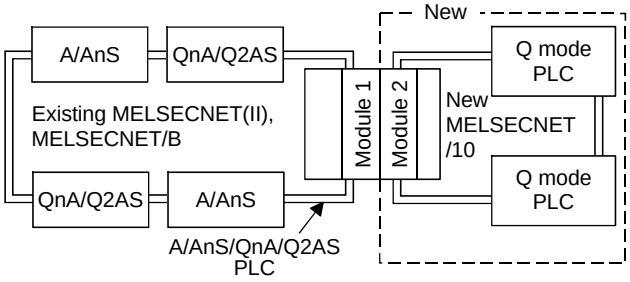
■ Connecting the Q mode PLC to the existing MELSECNETII or MELSECNET/B network

You cannot connect the Q mode PLC to the existing MELSECNETII or MELSECNET/B network.



MELSECNET/10H: QJ71LP21, QJ71BR11

■ Connecting the existing MELSECNET (II) or MELSECNET/B network and new MELSECNET/10 network



[Modules required for relay PLC]

Module 1 (existing module)

MELSECNET (II) or MELSECNET/B module compatible with A/AnS/QnA/Q2AS

Module 2 (newly added module)

AJ71LP21/A1SJ71LP21/AJ71QLP21(S)/A1SJ71QLP21(S): For optical SI/QSI cable

AJ71BR11/A1SJ71BR11/AJ71QBR11/A1SJ71QBR11: For coaxial 75 ohm cable

[Instructions]

Module 1 is the existing MELSECNET (II) or MELSECNET/B module.

Module 2 is an MELSECNET/10 module for A/AnS/QnA/Q2AS.

Function List

Function		Outline	Usable Mode	
			MELSECNET/10H	MELSECNET/10
Data communication function	Cyclic communication	Refreshes link relays and link registers assigned in network common parameters periodically to all stations in the same network.	○	○
	Low-speed cyclic communication	Using this system to communicate data which does not require high-speed communication reduces ordinary cyclic communication data volumes and increases speed.	○	×
	Transient communication	Uses network instructions in sequence program to transfer data to/from stations specified in instructions. Several different instructions give choice of data transfer methods.	○	○
	Group function	You can specify multiple stations on the same network as a certain group. By specifying a group for data transmission in transient communication, data can be broadcasted to specific stations only.	○	○
	Multiplex transmission function	In duplex loop system, data can be transmitted using each loop of duplex loop. This enables faster communication than 10Mbps.	○	○
	Refresh data split prevention	Prevents data from being transmitted 16 bits-by-16 bits during 32-bit data transmission.	○	×
	Network debugging mode	When adding PLC to existing network, data transmission from that station is shut off and only data receiving is performed until its program debugging is completed.	○	×
	Interrupt program start	Can cause some station to interrupt CPU module of another station to start sequence program.	○	×
	Inter-data link transfer	When there are multiple networks, some of data communicated cyclically in one network is automatically transferred to another network	○	○
	Routing function	When there are multiple networks, data can be transferred to/from station on network where own station is not connected directly. This function is used when monitoring PLC located beyond multiple networks on GPPW software.	○	○
RAS function	Reserved station designation	When there are no stations set in network common parameters, it is recognized as an error and affects link scan time. Error recognition and link scan time delay are not caused if stations planned to be added in future are specified as reserved stations.	○	○
	Control station shift function	If control station fails to make communication due to some fault, another station automatically serves as control station to continue network control, preventing whole system from being faulty.	○	○
	Specified control station return mode selection	You can select whether faulty control station that has returned to normal will return as ordinary station or control station.	○	×
	Automatic return function	When station that suspended communication due to some fault returns to normal, it participates in communication automatically.	○	○
	Loopback function	If cable breakage occurs in duplex loop type network, communication is continued as long as transmission route is established.	○	○
	Station separation function	If some station is powered off in simplex bus type network, it does not affect other normal stations.	○	○
	Network duplexing	One CPU module can each be loaded with two network modules to duplex network.	○	○
	Network diagnostics	Network status and each station status can be monitored using GPPW software.	○	○

MELSECNET/10H: QJ71LP21, QJ71BR11

Performance Specifications

		MELSECNET/10H	
Item		QJ71LP21	QJ71BR11
Connection form		Duplex loop type	Simplex bus type
Max. number of link points per network	LX/LY	8192 points (8k bits)	
	LB	MELSECNET/10 mode: 8192 points (8k bits), MELSECNET/10H mode: 16384 points (16k bits)	
	LW	MELSECNET/10 mode: 8192 points (8k bits), MELSECNET/10H mode: 16384 points (16k words)	
Max. number of link points per station		[LW+LB+LY<=2000 bytes (cyclic communication)]+[LW+LB+LY<=2000 bytes (low-speed cyclic communication)]	
Transient transmission capacity		Max. 1920 bytes/frame	
Communication speed		10Mbps	
Communication system		Token passing	
Synchronous system		Flag synchronization (frame synchronization system)	
Modulation system		Base band system	
Transmission sign		NRZI (Non Return to Zero Inverted)	Manchester
Cable type		Optical (SI/QSI)	Coaxial 75 Ω (3C-2V/5C-2V)
Transmission frame format		HDLC conformance (frame format)	
Error control system		CRC (X16+X12+X5+1) and time-out retry	
Max. number of networks		239	
Max. number of groups		32	
Number of stations connected		64 stations (1: control station, 63: normal station)	32 stations (1: control station, 31: normal station)
Max. number of modules loaded per CPU		4 modules	
Overall distance		30km (98360.66ft.) (inter-station distance SI: 500m (1639.34ft.) /QSI: 1km (3278.69ft.)	500m (1639.34ft.) (5C-2V) / 300m (983.61ft.) (3C-2V)
Distance extension repeater		—	Up to 2.5km (8196.72ft.) by connection of max. four repeaters
Number of I/O points occupied		32 points (I/O assignment, 32 intelligent points)	
Internal current consumption (5VDC)		0.55A	0.75A
Weight (kg (lb))		0.11 (0.24)	

Cyclic Communications Time

The following calculation expressions are used to find the normal values of cyclic communications time (transmission delay time) in the MELSECNET/10H mode and MELSECNET/10 mode. (Since they are not the worst values, the time taken may become longer than the values given depending on the timing.)

	MELSECNET/10H Mode	MELSECNET/10 Mode
Transmission delay time TD1	TD1=ST+ α T+(LS×1)+(SR×2)+ α R	TD1=ST+ α T+(LS×2)+(SR×2)+ α R

ST : Sending side sequence program scan time
SR : Receiving side sequence program scan time
α T : Sending side link refresh time
α R : Receiving side link refresh time
LS : Link scan time

MELSECNET/10H: QJ71LP21, QJ71BR11

<table>
<tr><th></th><th>MELSECNET/10H Mode</th><th>MELSECNET/10 Mode</th></tr>
<tr><td>Max. link refresh time α T, α R [ms]</td><td colspan="2">α T, α R=KM1+KM2×{LB+LX+LY+SB+(LW×16)+(SW×16)}÷8+(number of network modules-1)
LB: Total number of link relay LB points refreshed by that station
LW: Total number of link register LW points refreshed by that station
LX: Total number of link input LX points refreshed by that station
LY: Total number of link output LY points refreshed by that station
SB: Number of link special relays
SW: Number of link special registers
KM1, KM2: Constants
<table>
<tr><th rowspan="2"></th><th colspan="2">Network Module Loaded in Main Base</th><th colspan="2">Network Module Loaded in Extension Base</th></tr>
<tr><th>KM1</th><th>KM2 ($X10^{-3}$)</th><th>KM1</th><th>KM2 ($X10^{-3}$)</th></tr>
<tr><td>QnCPU</td><td>0.30</td><td>0.48</td><td>0.30</td><td>1.20</td></tr>
<tr><td>QnHCPU</td><td>0.13</td><td>0.41</td><td>0.13</td><td>0.97</td></tr>
</table>
More time will be taken if the data refresh destination is a file register on the memory card or inter-data link transfer function is to be performed.</td></tr>
<tr><td>Link scan time LS [ms]</td><td>LS=KB+0.45× total number of stations
+(LB+LY+LW×16)÷8×0.001+(T×0.001)+(F×4)</td><td>LS=KB+0.75× total number of stations
+(LB+LY+LW×16)÷8×0.001+(T×0.001)+(F×4)</td></tr>
<tr><td></td><td colspan="2">LB: Total number of link relay (B) points of all stations on network
LW: Total number of link register (W) points of all stations on network
LY: Total number of link output (Y) points of all stations on network
T : Total number of bytes transient-transmitted during one link scan
When transient transmission is made simultaneously from multiple stations during one link scan, this value is the total of data lengths of frames to be transferred.
F : Number of returning stations (valid only when faulty stations exist). The number of returning stations indicates the number of stations which will return to network when faulty stations return to normal and reenter data link.
KB: Constant
<table>
<tr><td>Total number of stations</td><td>1 to 8</td><td>9 to 16</td><td>17 to 24</td><td>25 to 32</td><td>33 to 40</td><td>41 to 48</td><td>49 to 56</td><td>57 to 64</td></tr>
<tr><td>KB</td><td>4.0</td><td>4.5</td><td>4.9</td><td>5.3</td><td>5.7</td><td>6.2</td><td>6.6</td><td>7.0</td></tr>
</table></td></tr>
</table>

The following expressions are used to calculate the transmission delay time.

(Conditions)

Sending and receiving side CPU modules : Q06HCPU

Position where network module is loaded : Main base unit

Number of stations : Total number of stations = 8

Number of cyclic data points of all stations on network : LB=1024 points, LW=1024 points, LX, LY=0 points

Sending side sequence program scan time ST : 1ms

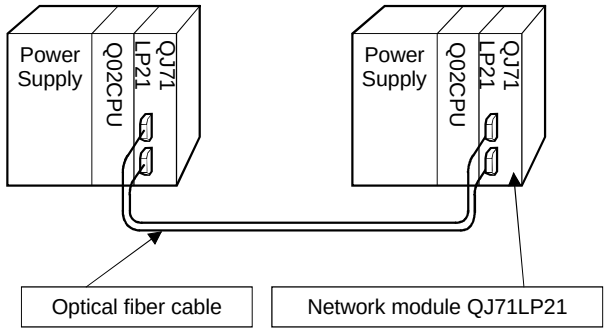
Receiving side sequence program scan time SR : 1ms

On both sending and receiving sides, cyclic data of all stations on network are to be refreshed.

	MELSECNET/10H Mode	MELSECNET/10 Mode
Sending side link refresh time α T [ms]	α T=KM1+KM2×{LB+LX+LY+SB+(LW×16)+(SW×16)}÷8+(number of network modules-1) =0.13+0.41×10^{-3}×{1024+0+0+512+(1024×16)+(512×16)}÷8+(1-1) =1.47ms	α T=KM1+KM2×{LB+LX+LY+SB+(LW×16)+(SW×16)}÷8+(number of network modules-1) =0.13+0.41×10^{-3}×{1024+0+0+512+(1024×16)+(512×16)}÷8+(1-1) =1.47ms
Receiving side link refresh time α R [ms]	α T=KM1+KM2×{LB+LX+LY+SB+(LW×16)+(SW×16)}÷8+(number of network modules-1) =0.13+0.41×10^{-3}×{1024+0+0+512+(1024×16)+(512×16)}÷8+(1-1) =1.47ms	α T=KM1+KM2×{LB+LX+LY+SB+(LW×16)+(SW×16)}÷8+(number of network modules-1) =0.13+0.41×10^{-3}×{1024+0+0+512+(1024×16)+(512×16)}÷8+(1-1) =1.47ms
Link scan time LS [ms]	LS=KB+0.45×total number of stations+(LB+LY+LW×16)÷8×0.001+(T×0.001)+(F×4) =4.0+0.45×8+ ((1024+0+1024×16)÷8×0.001)+(0×0.001)+ (0×4) =9.78ms	LS=KB+0.75×total number of stations+(LB+LY+LW×16)÷8×0.001+(T×0.001)+(F×4) =4.0+0.75×8+ ((1024+0+1024×16)÷8×0.001)+(0×0.001)+ (0×4) =12.18ms
Transmission delay time TD1 [ms]	TD1=ST+ α T+(LS×1)+(SR×2)+ α R =1+1.47+(9.78×1)+(1×2)+1.47 =15.72ms	TD1=ST+ α T+(LS×2)+(SR×2)+ α R =1+1.47+(12.18×2)+(1×2)+1.47 =30.30ms

System Equipment

■ Optical loop system



<QJ71LP21 accessories>

Product	Description
Manual	QJ71LP21/BR11 MELSECNET/10H Network Module User's Manual

<Separately prepared products>

The following equipment (manual) must be prepared separately.

Product	Description
Optical cable	SI/QSI cable
Manual	MELSECNET/10H Reference Manual

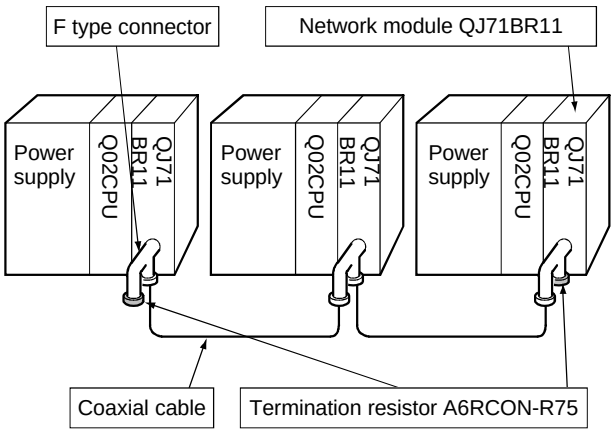
<Software>

Type	Description	Remarks
SW4D5C-GPPW-E or later	For sequence programming For MELSECNET/10H parameter setting	○

○ : Must be prepared. △ : Prepared as required.

Note1: The software of the above products or later version are usable.

■ Coaxial bus system



∗ Termination resistors are fitted to stations at both ends.

<QJ71BR11 accessories>

Product	Description
Manual	QJ71LP21/BR11 MELSECNET/10H Network Module User's Manual
Connector	F type BNC connector

<Separately prepared products>

The following equipment (manual) must be prepared separately.

Product	Description
Coaxial cable	3C-2V/5C-2V (JISC3501 conformance)
Connector plug	Connector plug for 3C-2V/5C-2V
Termination resistor	A6RCON-R75 (75 Ω termination resistor)
Manual	MELSECNET/10H Reference Manual

<Software>

Type	Description	Remarks
SW4D5C-GPPW-E or later	For sequence programming For MELSECNET/10H parameter setting	○

○: Must be prepared. △: Prepared as required.

Note2: The software of the above products or later version are usable.

Applicable Optical Cables

■ Optical fiber cable specifications

For purchasing of optical fiber cables, consult your sales representative.

Applicable optical cables

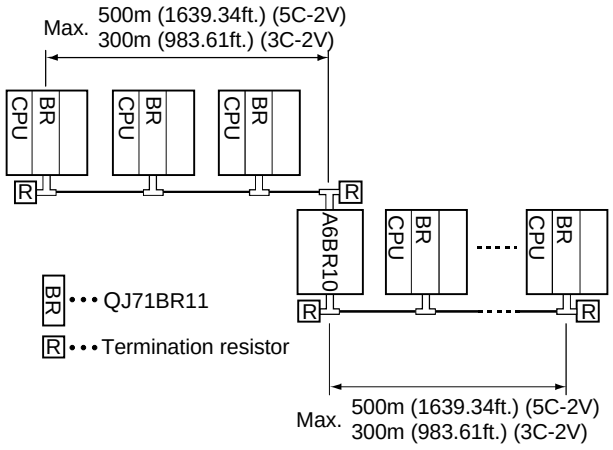
	SI Cable	QSI Cable
Core/clad diameter	200/220 μm	185/230 μm
Transmission loss (@wavelength 830 to 880nm)	Max. 12dB/km	Max. 5.5dB/km
Applicable connector	CA7003 DL-72ME	CA7003

Repeater Module for Coaxial Bus

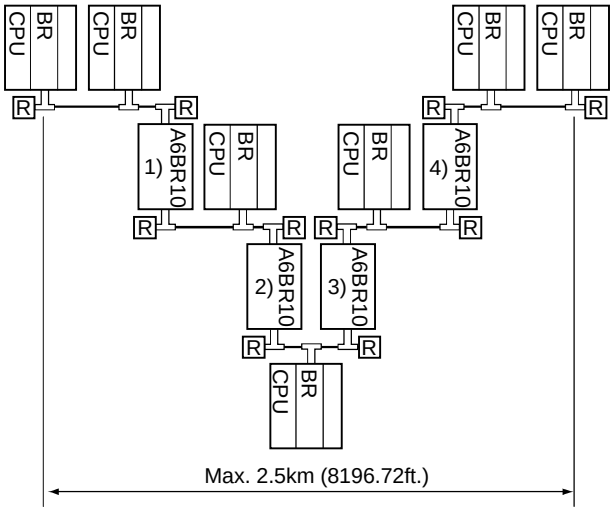
The A6BR10 and A6BR10-DC coaxial bus repeater modules are designed to increase an overall distance in the coaxial bus system of the MELSECNET/10 or MELSECNET/10H network system.

Functions

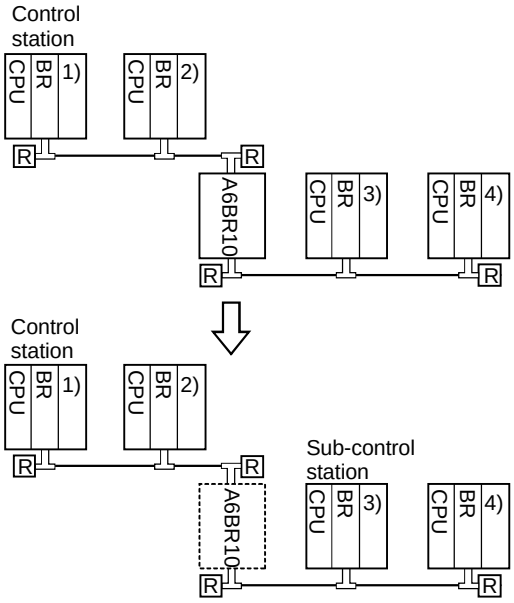
(1) One module can increase the distance by 500m (1639.34ft.) (5C-2V) or 300m (983.61ft.) (3C-2V).



(2) Up to four modules can be used in one network. The overall distance can be increased to 2.5km (8196.72ft.) (five networks 500m (1639.34ft.)).



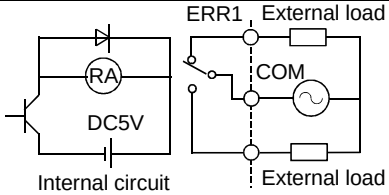
(3) If the A6BR10 becomes faulty, the network is broken at the A6BR10 and communication continues in respective networks.
In the following example, data link is made between 1) and 2) and between 3) and 4) when the A6BR10 becomes faulty.



Q mode

MELSECNET/10H: A6BR10, A6BR10-DC

Performance Specifications

Item			A6BR10	A6BR10-DC
Communication speed			10Mbps	
Number of modules connected/network			Max. 4 modules	
Extension distance/unit			300m (983.61ft.) (3C-2V) 500m (1639.34ft.) (5C-2V)	
Overall distance			300m (983.61ft.)×5=1.5km (4918.03ft.) (3C-2V) 500m (1639.34ft.)×5=2.5km (8196.72ft.) (5C-2V)	
Number of stations connected			Max. 32 stations	
Input power supply	Voltage		100 to 240VAC (+10%/-15%)	24VDC (+30%/-35%)
	Frequency		50/60Hz±5%	—
	Max. apparent power		21VA	—
	Max. power		—	9W
	Inrush current		40A, within 8ms	17A, within 1ms
	Efficiency		65% or more	65% or more
	Permissible instantaneous power failure time		20ms	10ms
	Current consumption		0.2A	0.6A
Continuous alarm transmission Warning output			ERR1: On when A6BR10 becomes faulty (power off, error occurrence). ERR2: On when A6BR10 is normal.	
	Isolation method		Non-isolated	
	Rated switching voltage /current		24VDC 2A (resistive load) 240VAC 2A (COS ϕ =1)	
	Minimum switching load		5VDC 1mA	
	Maximum switching load		264VAC 125VDC	
	Response time		OFF to ON: 10ms or less ON to OFF: 12ms or less	
	Life	Mechanical	10 million times or more	
		Electrical	Rated switching voltage/current load 100 thousand times or more	
			200VAC 1.5A, 200VAC 1A (COS ϕ =0.7) 100 thousand times or more	
			200VAC 1A, 200VAC 0.5A (COS ϕ =0.35) 100 thousand times or more	
			24VDC 1A, 100VDC 0.1A (L/R=7ms) 100 thousand times or more	
	Surge suppressor		No	
External wiring				
Weight (kg (lb))			0.5 (1.1)	

Equipment

<A6BR10, A6BR10-DC accessories>

Product	Description
Manual	A6BR10, A6BR10-DC User's Manual
Connector	T type BNC connector (2 pcs.)

<Separately prepared products>

The following equipment (manual) must be prepared separately.

Product	Description	Remarks
Coaxial cable	3C-2V/5C-2V (JISC3501 conformance)	○
Connector plug	Connector plug for 3C-2V/5C-2V	○
Termination resistor	A6RCON-R75 (75 Ω termination resistor)	○

○ : Must be prepared. △ : Prepared as required.

CC-Link: QJ61BT11

Overview

CC-Link (Control & Communication Link) designed for merger of control and communication is a wiring-saving and information network which has the industry's latest advanced functions and performance capabilities, e.g. real-time capability, decentralized control, communication with intelligent equipment and RAS (Note 1) function, and also offers multi-vendor environment in conjunction with various field equipment manufacturers.

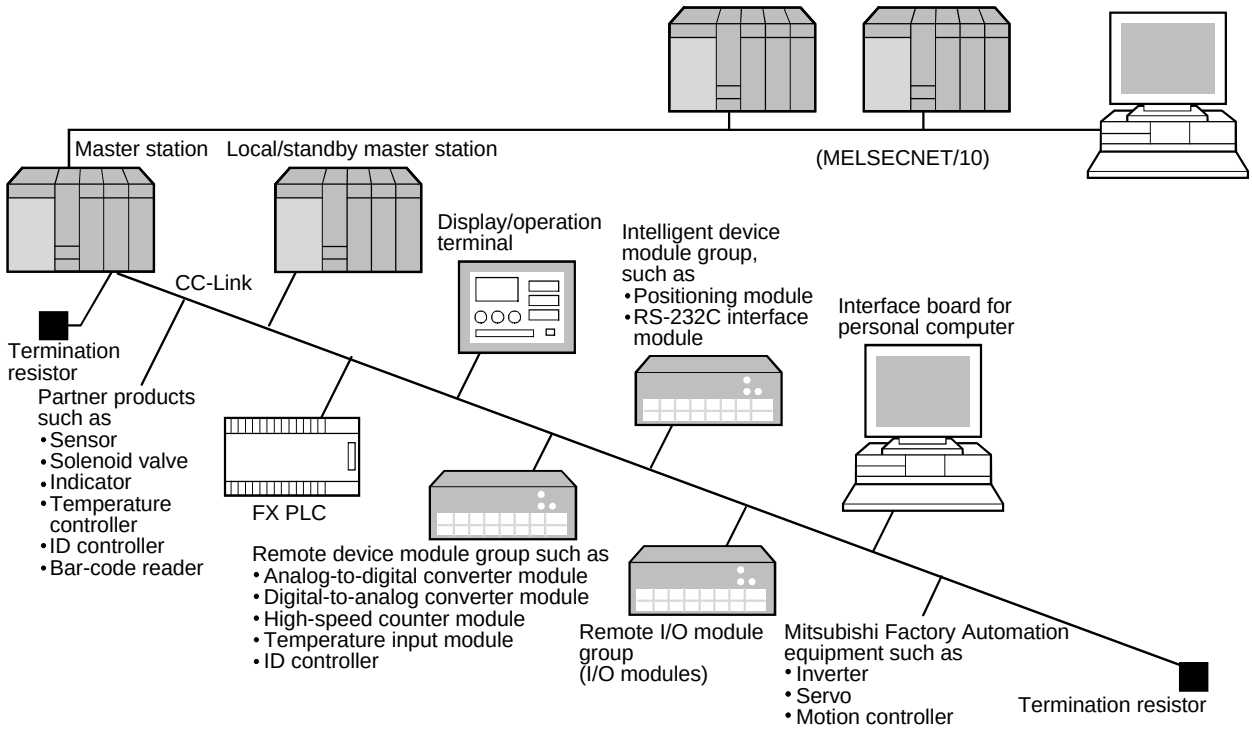
The QJ61BT11 CC-Link modules for Q mode inherit the features of the MELSEC-A/QnA series and newly adopt useful functions such as remote device station initial setting function.

Note 1: RAS stands for Reliability, Availability, Serviceability.

Features

System configuration

A total of 64 remote I/O, remote device, local, standby master and intelligent device stations can be connected to one master station.



CC-Link station types

CC-Link has the following station types.

CC-Link Station Type	Description
Master station	Controls all stations on CC-Link. One station is required in one system.
Local station	Has CPU and can communicate with master and other local stations.
Standby master station	Replaces master station when it becomes faulty and continues data link as master station.
Remote I/O station	Handles bit data only.
Remote device station	Handles bit and word data.
Intelligent device station	Handles bit and word data. Can also make data transfer irregularly.

Communication speed and distance

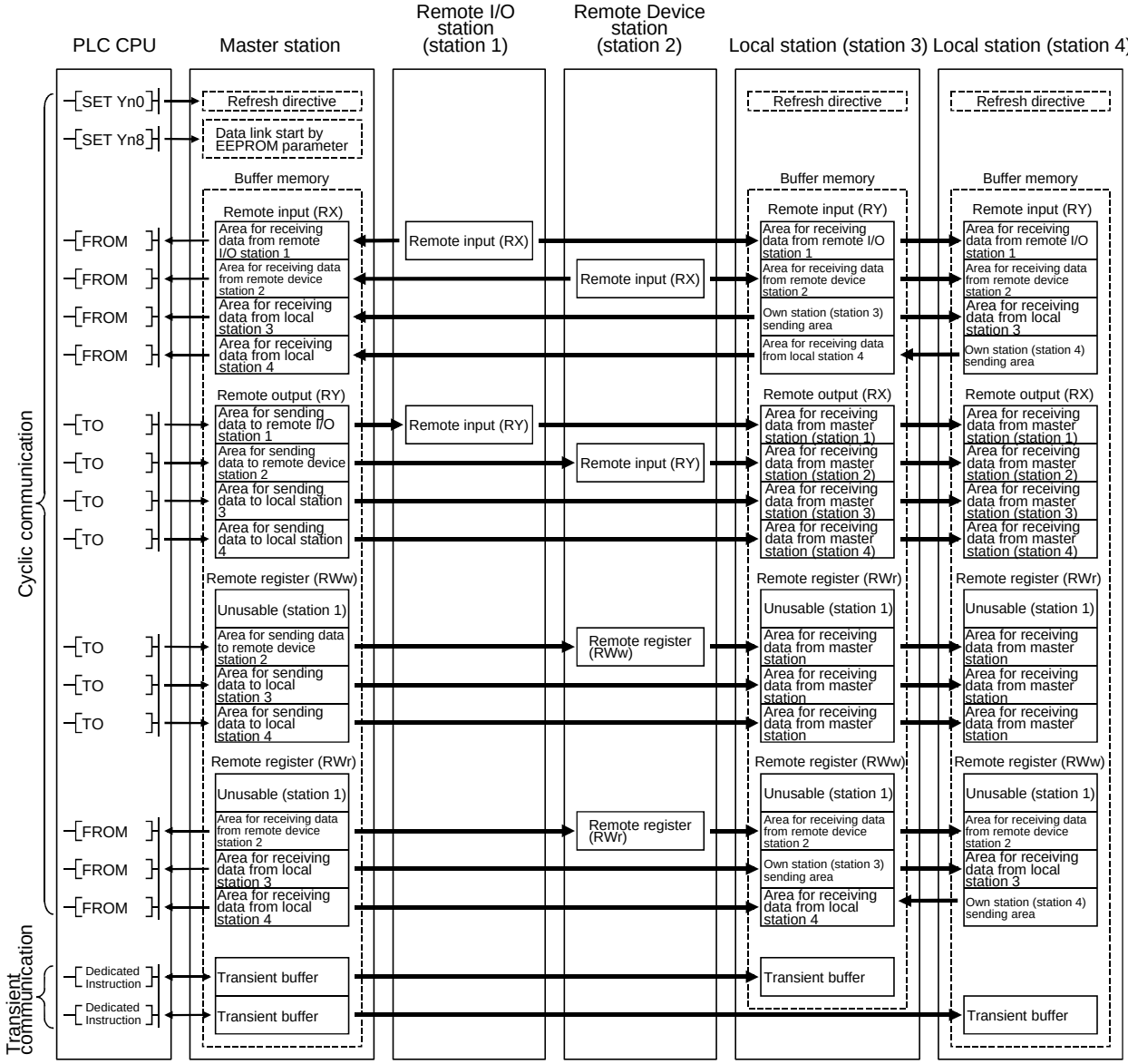
The industry's fastest class communication speed (10Mbps) ensures compatibility with the sensor input which requires fast response and with communication with intelligent equipment which needs large volumes of data communication. Also you can choose the optimum communication speed and overall distance according to your system.

CC-Link: QJ61BT11

Communication Speed	Overall Distance
10Mbps	100m (327.87ft.)
5Mbps	150m (491.8ft.)
2.5Mbps	200m (655.74ft.)
625Mbps	600m (1967.21ft.)
156Mbps	1200m (3934.43ft.)

■ Cyclic communication system

The CC-Link cyclic communication system is shown below. In CC-Link, the cyclic data areas of the master and local stations are assigned to respective remote I/O, remote device and intelligent device stations, and remote I/O and remote register data are refreshed automatically. Also, since information from the master station to the remote I/O, remote device and intelligent device stations are transmitted to other local stations, the operating statuses of the remote stations can also be acquired by the local stations.



● CC-Link cyclic communication data

Communication Method		Description
Cyclic communication	Bit transmission	32 points I/O data communications per station.
	Word transmission	4-point write/read data communications per station.

■ Link devices

In addition to a total of 4096 points of bit data per CC-Link system, the cyclic communication of a total of 512 points of word data permits rapid communication with Factory Automation equipment products such as remote I/O and analog modules, indicators and inverters.

Item		Specifications
Max. number of link points	Remote input (RX)	2048 points
	Remote output (RY)	2048 points
	Remote register (RWw)	256 points
	Remote register (RWr)	256 points
Number of link points per station	Remote input (RX)	32 points
	Remote output (RY)	32 points
	Remote register (RWw)	4 points
	Remote register (RWr)	4 points

Note 1: Remote input (RX) indicates ON/OFF data (bit data) input from remote station to master station and is represented by RX for convenience.

Note 2: Remote output (RY) indicates ON/OFF data (bit data) output from master station to remote station and is represented by RY for convenience.

Note 3: Remote register (RWw) indicates numerical data (word data) output from master station to remote station and is represented by RWw for convenience.

Note 4: Remote register (RWr) indicates numerical data (word data) input from remote station to master station and is represented by RWr for convenience.

■ Transient communication

In addition to cyclic communication where data are transmitted periodically and automatically, CC-Link can use the transient communication system where data are transferred irregularly. Transient communication can be made by the master, local and intelligent device stations and can perform the following processes.

(1) A PLC reads/writes device data, etc. from/to another PLC.

(2) The master PLC transfers data to/from an intelligent device station.

(3) GPPW programming software is used to read/write or monitor the program of another PLC.

(4) The host personal computer, etc. reads/writes device data from/to a PLC.

■ Automatic CC-Link start

In a system consisting of only the master and remote I/O stations, simply switching power on initiates data link automatically without setting of the network and automatic refresh parameters.

Note 5: Data link is started on the assumption that there are 64 remote I/O stations. If there are less than 64, the link scan time is not optimized. To optimize, set the network and automatic refresh parameters.

Note 6: This function cannot be used if there are stations other than the master and remote I/O stations (e.g. remote device, intelligent device stations).

■ High-speed link scan

In a system consisting of only the master and remote I/O stations, choosing the remote I/O network mode reduces the link scan time.

(At communication speed of 10Mbps)

Number of Stations	Remote I/O Network Mode	Remote Network Mode (Normal Mode)
16	1.02ms	1.57ms
32	1.77ms	2.32ms
64	3.26ms	3.81ms

■ Multi-vendor

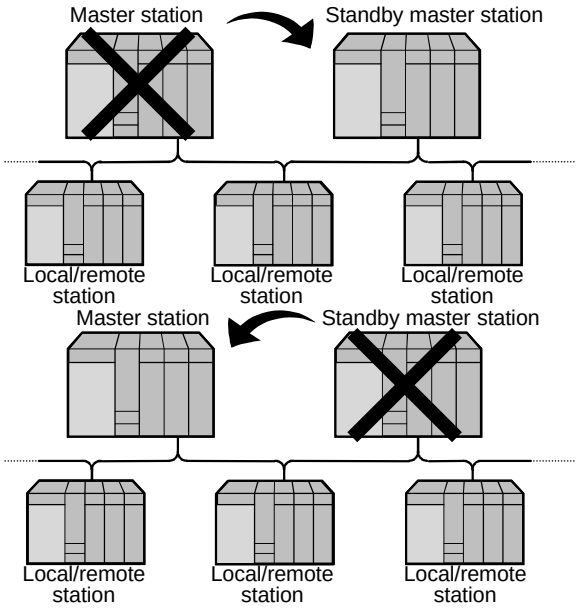
We have gone into partnerships with many Japanese and foreign equipment manufacturers to connect a wide variety of field equipment directly to CC-Link in order to help reduce wiring.

We realized an open network where you can use the optimum field equipment worry-free from among many choices.

Refer to the CC-Link Catalog L(NA)74108143 for the partner maker products and remote I/O, remote device and intelligent device stations that may be connected to CC-Link.

■ Standby master function

By setting a standby master station, data link can be continued if a fault occurs in the master station.
When the master station returns to normal during operation performed by the standby master station, it can return to data link as a standby station. If the standby master station becomes faulty during operation in this status, the master station on standby continues data link.



■ Remote device station registration function

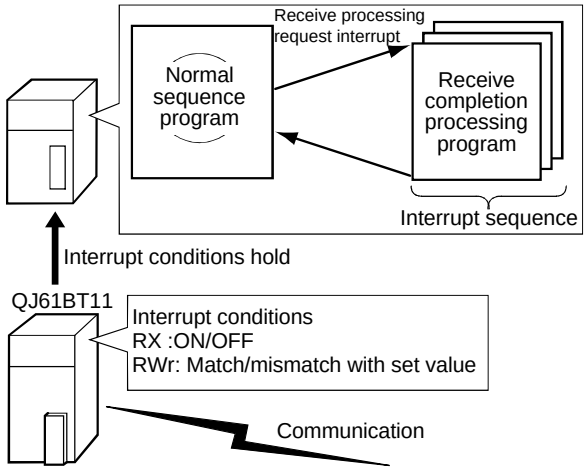
Using GPPW, initial setting can be made to a remote device station without creating a sequence program.
The setting example and setting items are shown below.

■ Setting items for remote device station registration function

Setting Item	Description
Execution flag	Setting of whether set data is valid or invalid.
Operating condition/procedure execution condition	Set write conditions.
Execution data	Set write devices and write data.

■ Start of interrupt program (event interrupt)

The interrupt program of the CPU module can be started when data is received from the network and the set conditions hold.
This ensures compatibility with the system which requires faster processing.
You can set up to 16 interrupt program starting conditions.
The conceptional diagram and execution conditions are shown below.

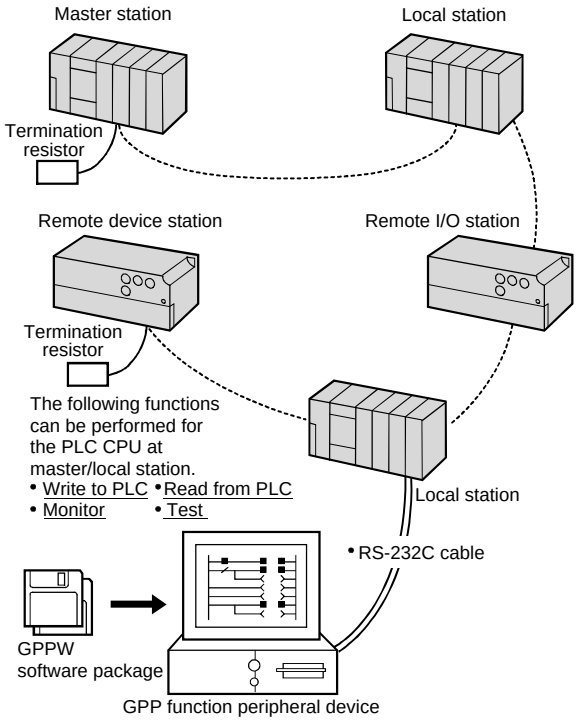


■ Interrupt program starting condition devices

Set Device	Description
RX, RY, SB	ON/OFF
RWr, SW	Match/mismatch with set value

■ Remote operation

From the GPPW software linked to a PLC on CC-Link, remote programming can be performed for another PLC.



■ Dedicated instructions

The following dedicated instructions are available for transient transmission.

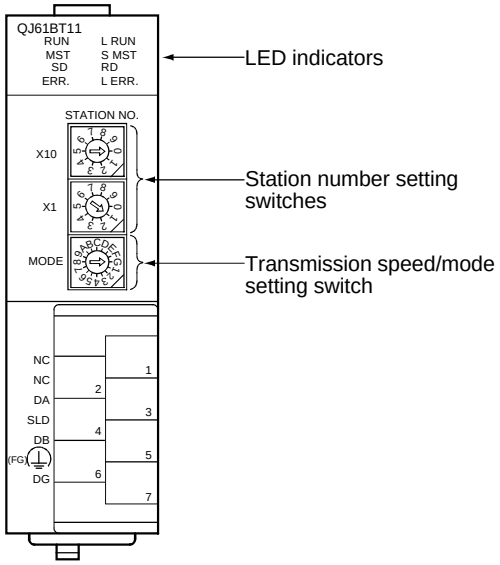
Target Station	Instru-ction	Description
Master station Local station	RIRD	Reads data from buffer memory or CPU device of target station.
	RIWT	Writes data to buffer memory or CPU device of target station.
Intelligent device station	RIRD	Reads data from buffer memory of target station.
	RIWT	Writes data to buffer memory of target station.
	RIFR	Reads contents of automatic updating buffer of target station.
	RITO	Writes data to automatic updating buffer of target station.

Program Compatibility

The existing program can be utilized by using A to Q program conversion or QnA to Q program conversion of GPPW.

Note 1: The RLPA network parameter setting instruction and RRPA automatic refresh parameter setting instruction are not supported. After deleting the RLPA/RRPA instruction, set the CC-Link parameters using the network parameters of GPPW.

Appearance



● Part names

Name	Description	
LED indicators	RUN	ON: Module is normal. OFF: Module is abnormal.
	ERR.	ON: All stations in communications error Lit at occurrence of any of the following errors. • Switch or control setting is abnormal. • There is more than one master station on the same line. • Parameter setting error • Data link watchdog timer activated. • Cable broken or transmission path affected by noise, etc. Flicker: There is a station with communications error.
	MST	ON: Master station operation
	S MST	ON: Standby master station operation
	L RUN	ON: Data link during execution (Host station)
	L ERR.	ON: Communications error (Host station) Flicker: Switch setup is changed during power-on.
	SD	ON: Data being transmitted.
	RD	ON: Data being received.
Station number setting switches	Used to set the station number of the module. (Factory setting: 0) <Settings> Master station: 0 Local stations: 1 to 64 Standby master stations: 1 to 64 "ERR." LED is lit if setting is other than 0 to 64.	

CC-Link: QJ61BT11

Name	Description
Transmission speed/mode setting switch	Used to set the transmission speed and operating status of the module. (Factory setting: 0)

No.	Transmission speed	Mode
0	Transmission speed 156kbps	Online
1	Transmission speed 625kbps	
2	Transmission speed 2.5Mbps	
3	Transmission speed 5Mbps	
4	Transmission speed 10Mbps	
5	Transmission speed 156kbps	Line test At station number setting of 0: Line test 1 At station number setting of 1 to 64: Line test 2
6	Transmission speed 625kbps	
7	Transmission speed 2.5Mbps	
8	Transmission speed 5Mbps	
9	Transmission speed 10Mbps	

Name	Description
Transmission speed/mode setting switch	

No.	Transmission speed	Mode
A	Transmission speed 156kbps	Hardware test
B	Transmission speed 625kbps	
C	Transmission speed 2.5Mbps	
D	Transmission speed 5Mbps	
E	Transmission speed 10Mbps	
F	Must not be set (reserved for system)	

Comparison of Q-Compatible CC-Link and AnS/Q2AS-Compatible CC-Link

		Remote I/O Network Mode			Remote Network Mode			Remarks
PLC type		Q mode	QnA/ Q2AS	A mode, AnU/ A2AS	Q mode	QnA/ Q2AS	A mode, AnU/ A2AS	
CC-Link module type		QJ61BT11	AJ61QBT11, A1SJ61QBT11	AJ61BT11, A1SJ61BT11	QJ61BT11	AJ61QBT11, A1SJ61QBT11	AJ61BT11, A1SJ61BT11	
Connectable remote/local station		Remote I/O station			Remote I/O station, remote device station, intelligent device station, local station, standby master station			
Communication speed		Max. 10Mbps						
Number of cyclic points per network	RX (1Bit)	0 to 7FF (2048 points)			0 to 7FF (2048 points)			
	RY (1Bit)	0 to 7FF (2048 points)			0 to 7FF (2048 points)			
	RWr (16Bit)	No			0 to FF (256 points)			
	RWw (16Bit)	No			0 to FF (256 points)			
Number of cyclic points per remote station	RX	32 points			32 points			
	RY	32 points			32 points			
	RWr	—			4 points			
	RWw	—			4 points			
Link scan time		Short			Normal			
CC-Link automatic start function		No			Yes (Note 1)	No		

(Continued)

		Remote I/O Network Mode			Remote Network Mode			Remarks
PLC type		Q mode	QnA/ Q2AS	A mode, AnU/ A2AS	Q mode	QnA/ Q2AS	A mode, AnU/ A2AS	
CC-Link module type		QJ61BT11	AJ61QBT11, A1SJ61QBT11	AJ61BT11, A1SJ61BT11	QJ61BT11	AJ61QBT11, A1SJ61QBT11	AJ61BT11, A1SJ61BT11	
Standby master function		No			Yes When master station returns to normal from failure status, it can return to network.	Yes When master station returns to normal from failure status, it can not return to network.		
Remote device station registration function		No			Yes	No		
Interrupt program start		Yes	No		Yes	No		
Network parameter setting from GPPW		Yes	Yes	No	Yes	Yes	No	
Dedicated instructions	RLPA, RRPA	×	×	×	×	×	○	Network parameter, automatic refresh parameter setting (compatible with A1SJH/A1SH/A2SH only)
	CCL, CCLEND	×	×	×	×	○	×	Mail box registration
	SPCCLR, SPCBUSY	×	×	×	×	○	×	Suspension of transfer to/from intelligent device station Remote station status read
	RIRD, RIWT	×	×	×	○	○	○	Data transfer to/from target station
	RISEND, RIRCV	×	×	×	○	○	○	Transfer to/from RS232 module with handshake
	RIFR, RITO	×	×	×	○	○	○	Access to automatic updating buffer

Note 1: Only remote I/O stations are connectable.

Function List

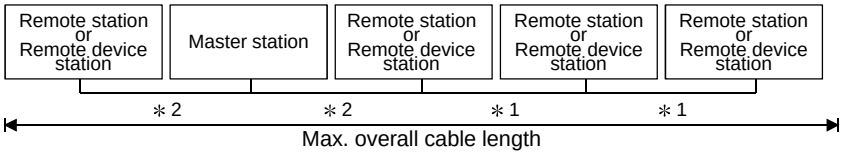
Item	Outline
Cyclic communication function	Communication function by link device RX/RY/RWr/RWw between master, remote I/O, remote device, intelligent device and local stations
Transient communication function	Communication function for data transfer by CC-Link dedicated instructions or for program read/write by GPPW programming software between master, intelligent device and local stations
Automatic CC-Link start	If made up of remote I/O stations only, network can be started without parameter setting.
Remote device station initial setting function	Initial setting data to remote device stations is set in parameters for program deletion.
Scan synchronization function	Cyclic communication is synchronized with program scan of master station CPU module.
Standby master function	When master station is disconnected due to a fault, standby master station replaces it to continue communication.
Interrupt program start	When specified condition data is received, interrupt program of CPU module is started.
Slave station separation function	Only module that failed to make data link due to power-off, etc. is separated and data link continues with normal modules only.
Automatic return function	When returning to normal, module disconnected from data link due to power-off, etc. automatically takes part in data link.
Reserved station function	By setting remote and local stations to be connected in future as reserved stations, you can set them so that they will not be handled as data link error stations.
Error-invalid station setting function	You can set module that failed to make data link due to power-off, etc. so that they will not be handled as data link error stations.
Temporary error-invalid station setting function	Communications with station where communication error occurred is suspended temporarily to prevent delay in link scan time.
Station number overlap checking function	Checks for multiple remote stations of the same station number.

CC-Link: QJ61BT11

Performance Specifications

Item		Specifications
Control specifications	Max. number of link points	Remote I/O (RX, RY): 2048 points each Remote register (RWw): 256 points (master → remote, local stations) Remote register (RWr): 256 points (remote, local stations → master)
	Number of link points per station	Remote I/O (RX, RY): 32 points each (30 points for local stations) Remote register (RWw): 4 points (master → remote, local stations) Remote register (RWr): 4 points (remote, local stations → master)
	Max. number of stations occupied (for local stations)	4 stations (max. number of I/O points 128 points, link register 32 points)
	Transient transmission	Max. 1024 bytes/station
Performance	Link scan time (at 10Mbps)	3.3ms (remote I/O 2048 points, in remote I/O network mode, normal value) 4.4ms (remote I/O 2048 points, remote register 512 points, in remote network mode, normal value)
Communication specifications	Communication speed	10M/5M/2.5M/625k/156kbps
	Communication system	Polling
	Synchronous system	Frame synchronization system
	Encryption system	NRZI system
	Transmission path form	Bus (RS-485)
	Transmission format	HDLC conformance
	Error control system	CRC ($X^{16}+X^{12}+X^5+1$)
	Number of modules connected	64 modules Note that the following conditions must be satisfied. $(1\times a)+(2\times b)+(3\times c)+(4\times d) \leq 64$ a: Number of 1 station occupying modules b: Number of 2 station occupying modules c: Number of 3 station occupying modules d: Number of 4 station occupying modules $(16\times A)+(54\times B)+(88\times C)+(4\times d) \leq 2304$ A: Number of remote I/O stations ≤ 64 B: Number of remote device stations ≤ 42 C: Number of local, standby master and intelligent device stations26
	Remote station number	1 to 64

(Continued)

Item			Specifications
Communication specifications	Max. overall cable length and inter-station cable length	System configuration (1) made up of remote I/O and/or remote device stations only	 ∗1 Inter-station cable length between remote I/O or remote device station and remote I/O or remote device station ∗2 Inter-station cable length between master station and adjacent station

CC-Link dedicated cable (100 Ω termination resistor used)

Communication speed	Inter-station cable length ∗1	Inter-station cable length ∗2	Max. overall cable length
156kbps	30cm (11.82 inch) or more	1m (39.4 inch) or more	1200m (3934.43 ft.)
625kbps			600m (1967.21 ft.)
2.5Mbps			200m (655.74 ft.)
5Mbps	30cm (11.82 inch) to 59cm (23.25 inch) ∗		110m (360.66 ft.)
	60cm (23.64 inch) or more		150m (491.8ft.)
10Mbps	30cm (11.82 inch) to 59cm (23.25 inch) ∗		50m (163.93 ft.)
	60cm (23.64 inch) to 99cm (39.01 inch) ∗		80m (262.3ft.)
	1m (39.4 inch) or more		100m (327.87 ft.)

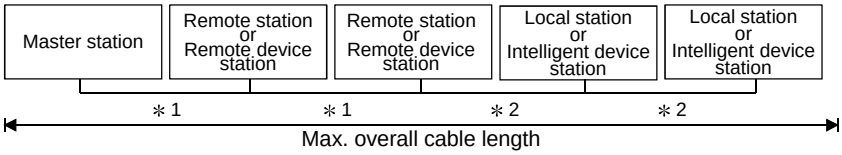
CC-Link dedicated, high-performance cable (130 Ω termination resistor used)

Communication speed		Inter-station cable length ∗1	Inter-station cable length ∗2	Max. overall cable length
156kbps		30cm (11.82 inch) or more	1m (39.4 inch) or more	1200m (3934.43 ft.)
625kbps				900m (2950.82 ft.)
2.5Mbps				400m (1311.48 ft.)
5Mbps				160m (524.59 ft.)
10Mbps	No. of connected modules: 1 to 32			100m (327.87 ft.)
	No. of connected modules: 33 to 48	30cm (11.82 inch) to 39cm (15.37 inch) ∗		80m (262.3ft.)
		40cm (15.76 inch) or more		100m (327.87 ft.)
	No. of connected modules: 49 to 64	30cm (11.82 inch) to 39cm (15.37 inch) ∗		20m (65.57ft.)
		40cm (15.76 inch) to 69cm (27.19 inch) ∗		30m (98.36ft.)
		70cm (27.58 inch) or more		100m (327.87 ft.)

∗ If wiring is run at even one location within this range of the inter-station cable length between remote I/O or remote device station and remote I/O or remote device station, the max. overall cable length is as indicated above.

CC-Link: QJ61BT11

(Continued)

<table>
<tr><th colspan="3">Item</th><th>Specifications</th></tr>
<tr><td rowspan="2">Communication specifications</td><td>Max. overall cable length and inter-station cable length</td><td>System configuration (2) made up of remote I/O, remote device, local, standby master and intelligent device stations</td><td>


∗1 Inter-station cable length between remote I/O or remote device station and remote I/O or remote device station
∗2 Inter-station cable length between master station and adjacent station
CC-Link dedicated cable (100 Ω termination resistor used)
<table>
<tr><th rowspan="2">Commu-nication speed</th><th colspan="2">Inter-station cable length</th><th rowspan="2">Max. overall cable length</th></tr>
<tr><th>∗1</th><th>∗2</th></tr>
<tr><td>156kbps</td><td>30cm (11.82 inch) or more</td><td>1m (39.4 inch) or more</td><td>1200m (3934.43 ft.)</td></tr>
<tr><td>625kbps</td><td></td><td></td><td>600m (1967.21 ft.)</td></tr>
<tr><td>2.5Mbps</td><td></td><td></td><td>200m (655.74 ft.)</td></tr>
<tr><td>5Mbps</td><td>30cm (11.82 inch) to 59cm (23.25 inch) ∗</td><td></td><td>110m (360.66 ft.)</td></tr>
<tr><td></td><td>60cm (23.64 inch) or more</td><td></td><td>150m (491.8ft.)</td></tr>
<tr><td>10Mbps</td><td>30cm (11.82 inch) to 59cm (23.25 inch) ∗</td><td></td><td>50m (163.93 ft.)</td></tr>
<tr><td></td><td>60cm (23.64 inch) to 99cm (39.01 inch) ∗</td><td></td><td>80m (262.3ft.)</td></tr>
<tr><td></td><td>1m (39.4 inch) or more</td><td></td><td>100m (327.87 ft.)</td></tr>
</table>
CC-Link dedicated, high-performance cable (130 Ω termination resistor used)
<table>
<tr><th rowspan="2">Commu-nication speed</th><th colspan="2">Inter-station cable length</th><th rowspan="2">Max. overall cable length</th></tr>
<tr><th>∗1</th><th>∗2</th></tr>
<tr><td>156kbps</td><td>30cm (11.82 inch) or more</td><td>1m (39.4 inch) or more</td><td>1200m (3934.43 ft.)</td></tr>
<tr><td>625kbps</td><td></td><td></td><td>600m (1967.21 ft.)</td></tr>
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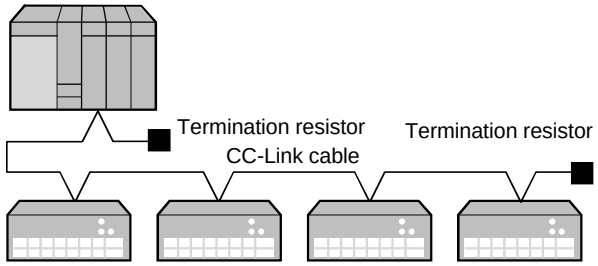
<tr><td></td><td>60cm (23.64 inch) or more</td><td></td><td>150m (491.8ft.)</td></tr>
<tr><td>10Mbps</td><td>70cm (27.58 inch) to 99cm (39.01 inch) ∗</td><td></td><td>50m (163.93 ft.)</td></tr>
<tr><td></td><td>1m (39.4 inch) or more</td><td></td><td>80m (262.3ft.)</td></tr>
</table>
∗ If wiring is run at even one location within this range of the inter-station cable length between remote I/O or remote device station and remote I/O or remote device station, the max. overall cable length is as indicated above.
</td></tr>
<tr><td>Connection cable</td><td colspan="2">CC-Link dedicated cable/CC-Link dedicated, high-performance cable</td></tr>
<tr><td rowspan="4">Others</td><td colspan="2">Number of I/O points occupied</td><td>32 points (I/O assignment: 32 intelligent points)</td></tr>
<tr><td colspan="2">Internal current consumption (5VDC) (A)</td><td>0.46</td></tr>
<tr><td colspan="2">External dimensions (mm (inch))</td><td>27.4 (1.08) W × 98 (3.86) H × 90 (3.55) D</td></tr>
<tr><td colspan="2">Weight (kg (lb))</td><td>0.12 (0.26)</td></tr>
</table>

Note 1: CC-Link dedicated cables and CC-Link dedicated, high-performance cables cannot be used together.

System Equipment

■ QJ61BT11



<QJ61BT11 accessories>

Product	Description
Termination resistor	110Ω, 130Ω, 2 pcs. each
Manual	QJ61BT11 User's Manual (Hardware)

<Separately prepared products>

The following equipment must be prepared separately.

Product

Product	Description
CC-Link cable	Choose CC-Link cable partner maker product. For details, refer to CC-Link catalog.
Manual	QJ61BT11 User's Manual (Details)

<Software>

Type	Description	Remarks
SW4D5C-GPPW-E or later	For sequence programming For CC-Link parameter setting	○

○ : Must be prepared. △ : Prepared as required.

Note 2: The software of the above products or later version are usable.

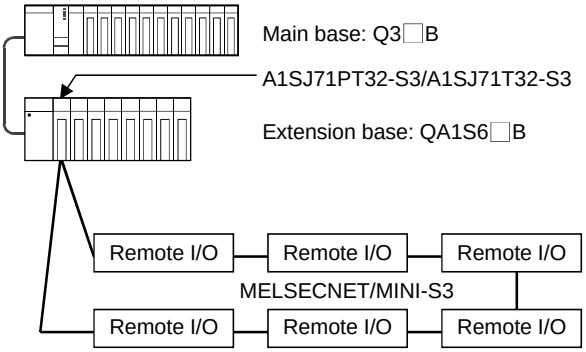
MELSECNET/MINI-S3: A1SJ71PT32-S3, A1SJT32-S3

Overview

The MELSECNET/MINI-S3 is a wiring-saving remote I/O network using plastic fiber or twisted pair cables. The A2C series I/O and special modules, FX series PLC, partner maker solenoid valves and others can be connected to MELSECNET/MINI-S3 as remote modules.

Features

System configuration



The master module of the MELSECNET/MINI-S3 can be used with QAS1S3 □ B or QAS1S6 □ B.

Connectable remote modules

The modules which may be connected are all conventional remote I/O modules that may be connected to MELSECNET/MINI-S3, such as the remote I/O of MELSECNET/MINI-S3 and A2C series. For full information on the usable modules, refer to the MELSEC-AnS catalog.
Please note that the following software is necessary for remote I/O modules other than digital remote I/O modules.
SW0IVD-MINIP-E

Twisted pair cable specifications

Item	Specifications
Cable type	Shielded twisted pair cable
Number of pairs	2P or more
Conductor resistance	88.0 Ω/km max. @20°C
Capacitance	Average 60nF/km max. @1kHz
Characteristic impedance	110 ± 10 Ω

Optical cable specifications

Item	Specifications
Type	Plastic fiber cable
Transmission loss	260dB/km max.
Fiber OD	1000 μm
Connector	1-core connector
Permissible flexing radius	25mm (0.99inch)

Optical fiber cables are available from Mitsubishi Electric System Service.

Restrictions on use with Q mode

The following MELSECNET/MINI-S3 dedicated instructions compatible with the A/QnA cannot be used with the Q mode. Programming must be performed using the FROM/TO and similar instructions.

Unusable instructions	INPUT, PRN, PR, MINI, MINIERR, SPBUSY, SPCLR

The Q mode CPU does not have the MELSECNET/MINI automatic refresh function.

MELSECNET/MINI-S3: A1SJ71PT32-S3, A1SJT32-S3

Performance Specifications

		A1SJ71PT32-S3		A1SJ71T32-S3
Compatible cable		Optical cable	Twisted pair cable	Twisted pair cable
Number of master modules loaded		No restriction		
Per master module	Max. number of link stations	64 stations (Note 1)		
	Number of I/O points	512 points		
I/O refresh time		3.2 to 18ms (when 64 stations are connected) (Note 2)		
Communication speed		1.5Mbps		
Max. inter-station distance		1 (3.28ft.) to 50m (163.93ft.) (Note 3)	1 (3.28ft.) to 100m (327.87ft.) (Note 4)	1 (3.28ft.) to 100m (327.87ft.) (Note 4)
Number of I/O points occupied		I/O dedicated mode: 32 points, extension mode: 48 points		
5VDC internal current consumption		0.35A		0.3A
Weight		0.6kg (1.32lb)		

Note 1: The max. number of link stations indicates that the total number of occupied stations assigned to remote modules is up to 64. However, the max. number of connectable remote terminal modules (number of occupied stations: 4) is 14.

Note 2: The I/O refresh time changes with the number of remote module stations connected, their type, and the operating mode of the master module.

Note 3: Communications may not be made if the inter-station distance of the optical cable is less than 1m (3.28ft.). When the 2VTPE-1 cable (Mitsubishi Cable Industries make) is used, the max. inter-station distance is 35m (114.75ft.).

Note 4: The max. inter-station distance changes with the twisted pair cable diameter used. It is 50m (163.93ft.) for cables of not less than 0.2mm^2 to less than 0.5mm^2, and 100m (327.87ft.) for cables of not less than 0.5mm^2.

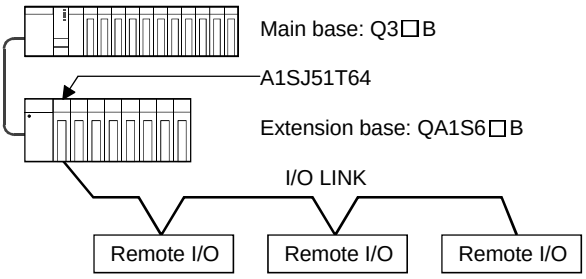
MELSEC-I/O LINK: A1SJ51T64

Overview

The MELSEC-I/O LINK is a simple, wiring-saving remote I/O network that does not need network parameter setting and can be programmed as if you are using ordinary I/O modules.
It can control 64 points of input or output (up to 128 points when 8- or 16-point composite modules are used) per network. This network uses a multidrop bus wiring system and is flexible enough to permit T branching. In addition, it does not require termination resistors.

Features

■ System configuration



The A1SJ51T64 can be used with QA1S6□B.

■ Connectable remote I/O

The I/O which may be connected are all conventional remote I/O modules that may be connected to the MELSEC-I/O LINK.
For full information on the usable modules, refer to the MELSEC-A [small/mid-scale-compatible types] catalog.

■ Twisted pair cable specifications

Item	Specifications	
Cable type	Shielded twisted pair cable	Cabtyre cable
Wire diameter, number of pairs	0.75mm^2 ×1P	0.75mm^2 ×2C
Conductor resistance	29Ω/km max. @20ºC	
Capacitance	75nf/km max. @1kHz	—
Characteristic impedance	100Ω	—
Insulation resistance	500MΩ or more	
Withstand voltage	500VAC 1 minute or longer	
OD	φ8.5mm max.	φ9mm max.

■ Restrictions on use with Q mode

No restrictions.

Performance Specifications

Item	Specifications
Max. number of I/O points	128 points (when I/O composite remote modules are used)
I/O refresh time	Approx. 5.4ms
Applicable communication cable	Twisted pair cable or cabtyre cable 0.75mm^2 or more
Communication speed	38.4kbps
Synchronous system	For frame synchronization and bit synchronization
Error control	Parity check
Transmission path form	Bus system (T branching possible, termination resistors not needed)
Transmission distance	Overall 200m (Overall 665.74feet)
Number of I/O points occupied	64 points
External power supply rated voltage	24VDC (+15%/-10%) (for transmission path)
External power current consumption	Typ 90mA @24VDC
Internal current consumption (5VDC)	115mA
Weight (kg (lb))	0.3 (0.66)

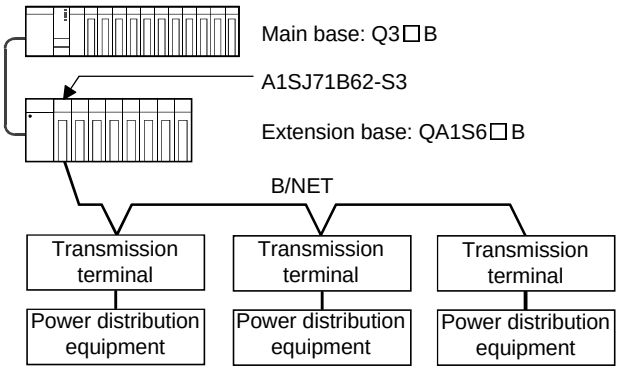
B/NET: A1SJ71B62-S3

Overview

B/NET is Mitsubishi Electric's network designed for power distribution control equipment. Connecting power distribution control equipment distributed within a building or plant to B/NET allows centralized management and centralized control of the power distribution control equipment.
The A1SJ71B62-S3 is an interface designed for B/NET PLC and accepts up to 63 stations of transmission terminals.

Features

System configuration



The A1SJ71B62-S3 can be used with QA1S6□B.

Connectable remote modules

B/NET transmission terminals are connectable.
For details of the transmission terminal, refer to the Mitsubishi B/NET facility monitoring system catalog.

Twisted pair cable specifications

Item	Specifications
Cable type	Local pair polyethylene insulation vinyl sheathed cable (with shield) JCS 224B
Number of pairs	1
Conductor diameter	φ1.2
Conductor resistance	16.5Ω/km max. @20°C
Insulation resistance	10,000MΩ/ km or more
Withstand voltage	1000VAC 1 minute or longer

Restrictions on use with Q mode

No restrictions.

Performance Specifications

Item	Specifications
Max. number of transmission terminals connected	63 stations
Data capacity	2048 words
Max. transmission distance	1km (3278.69feet) (overall distance)
Transmission path	Bus
Communication protocol	CSMA/CS survival system
Data transfer volume	Max. 16 bytes
Error control	Even parity, sumcheck
Applicable cable	CPEV-S φ 1.2 (Twisted pair cable)
Number of I/O points occupied	32 points
Internal current consumption (5VDC)	170mA
Weight (kg (lb))	0.38 (0.84)

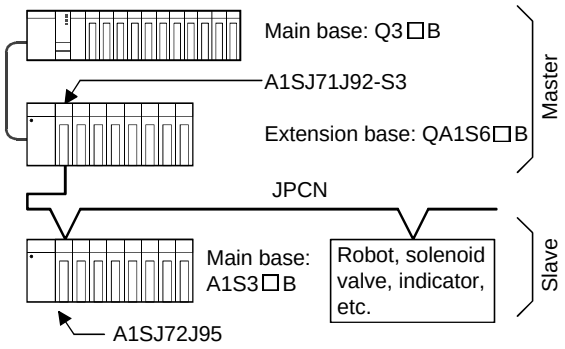
JPCN-1 Field Network: A1SJ71J92-S3, A1SJ72J95

Overview

JPCN-1 is a field network for PLC standardized by the Japan Electrical Manufacturers' Association and can control JPCN-1-compatible slave stations, such as remote I/O, solenoid valves, robots and indicators, from the master PLC.

Features

■ System configuration



The A1SJ71J92-S3 can be used with QA1S6□B.
The A1SJ72J95 can be used with A1S3□B.

■ Modules connectable to slave stations

The A1SJ72J95 slave station module may be loaded in the CPU slot of the A1S3□B to control the AnS series I/O modules (A1SX□□, A1SY□□).

The AnS series special, network and I/O composite modules cannot be loaded.

■ Twisted pair cable specifications

Item	Specifications
Cable type	Shielded twisted pair cable
Number of pairs	2P or more
Conductor resistance	88.0Ω /km max. @20ºC
Capacitance	Average 60nF/km max. @1kHz
Characteristic impedance	110 ± 10Ω

■ Restrictions on use with Q mode

When device memory data in the master PLC are accessed by slave stations by the GET-PUT service, the accessible ranges are limited as indicated below.

Device Type		Range
X		0 – 7FF
Y		0 – 7FF
M/L/S		0 – 8191
B		0 – FFF
T	Contact	0 – 2047
	Coil	0 – 2047
	Current value	0 – 2047
	Set value	0 – 2047
C	Contact	0 – 1023
	Coil	0 – 1023
	Current value	0 – 1023
	Set value	0 – 1023
D		0 – 6143
W		0 – FFF
F		0 – 2047

Performance Specifications

Item	Specifications		
	A1SJ71J92-S3		A1SJ72J95
JPCN-1 compliant class	TYPE-M52I (master station)		TYPE-S52I (slave station)
Communication speed	125k/250k/500k/1M bps		
Communication system/modulation system/ electrical characteristic/transmission path	Half duplex synchronous communication/NRZI system/EIA RS485/bus format		
Overall distance	Depends on communication speed. 125kbps: 1000m (3278.69feet),250kbps: 800m (2622.95feet), 500kbps:480m (1573.77feet), 1Mbps: 240m (786.89feet)		
Number of stations connected	Up to 31 slave stations to one master station		
Transmission right control	Polling/selecting		
Service type	Initial setting I/O Reset Data write Data read	Broadcasting Message write Message read GET PUT	Initial setting I/O Reset
Number of link points	Input + output ≤ 2048		Input + output ≤ 2048
Number of I/O points occupied	32 points		
Internal current consumption (5VDC)	0.4A		0.4A
Weight (kg (lb))	0.31(0.68)		0.43 (0.68)

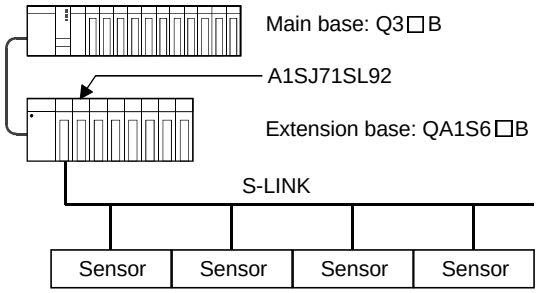
S-LINK: A1SJ71SL92

Overview

The A1SJ71LS92 is a master module connected to SUNX's S-LINK equipment to control it. S-LINK can control 128 points per master module and be used as a wiring-saving network.

Features

■ System configuration



The A1SJ71SL92 can be used with QA1S6□B.

■ Connectable remote modules

The S-LINK equipment of SUNX Ltd. can be connected.

■ Restrictions on use with Q mode

No restrictions.

Performance Specifications

Item		Specifications
Transmission system		Bidirectional time-sharing multiplex transmission system
Synchronization system		Bit synchronization system, frame synchronization system
Transmission protocol		S-LINK protocol
Transmission speed		28.5kbps
Transmission distance		Signal trunk: Max. overall distance 200m (655.74feet) (400m (1311.48feet)when booster is used)
Connection system		T-branching multidrop connection/multidrop connection[+24V•0V•D•G (with short protection across D-G)]
Number of branches		10 branches max.
Number of control I/O points		128 points
External power supply for S-LINK system	24VDC ±10% /permissible ripple p-p±10% or less	24VDC ±10% /permissible ripple p-p±10% or less
	Across D-G: 1.60A, across +24-0V: 5.00A	Across D-G: 1.60A, across +24-0V: 5.00A
Number of I/O points occupied		32 points
Internal current consumption (5VDC)		0.2A
Weight (kg (lb))		0.27 (0.59)

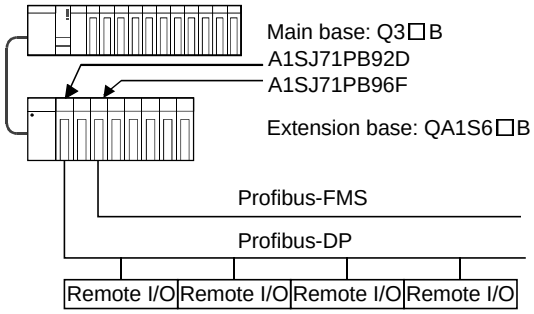
Profibus-FMS / Profibus-DP interface: A1SJ71PB96F / A1SJ71PB92D

Overview

The A1SJ71PB96F is a Profibus-FMS network interface module to connect MELSEC PLC to a Profibus-FMS network.
Profibus-FMS is used to connect various kinds of controllers such as PLC, CNC, robot controllers, etc. produced by different manufacturers.
The A1SJ71PB92D is a Profibus-DP network interface module to connect various field sensors and actuators to a MELSEC PLC. Because Profibus-DP is an open network, sensors and actuators of various manufacturers can be connected to the network.

Features

■ System configuration



A1SJ71PB96F and A1SJ71PB92D can be used with QA1S6□B.

■ Network configuration software

The following software is necessary to configure parameters in A1SJ71PB96F and A1SJ71PB92D.
MELSEC PROFIMAP Ver.2.0 or later

■ Restrictions on use with Q mode

The ranges of devices in the PLC available as Local Object Dictionary for A1SJ71PB96F are limited as indicated below.

Device Type		Range
X		0 – 7FF
Y		0 – 7FF
M/L/S		0 – 8191
B		0 – FFF
T	Contact	0 – 2047
	Coil	0 – 2047
	Current value	0 – 2047
	Set value	0 – 2047
C	Contact	0 – 1023
	Coil	0 – 1023
	Current value	0 – 1023
	Set value	0 – 1023
D		0 – 6143
W		0 – FFF
F		0 – 2047

Performance Specifications

Item	A1SJ71PB96F		A1SJ71PB92D	
Compatible network	Profibus-FMS		Profibus-DP	
Function	Client or Server		Master	
Transmission speed & distance	9.6k/19.2k/93.75k bps	1,200m (3.937ft)	9.6k/19.2k/93.75k bps	1,200m (3.937ft)
	187.5k bps	600m (1.969ft)	187.5k bps	600m (1.969ft)
	500k bps	200m (656ft)	500k bps	400m (1,312ft)
	1.5M bps	100m (328ft)	1.5M bps	200m (656ft)
			3M/6M/12M bps	100m (328ft)
No. of nodes	32,62 with 1 repeater, 92 with 2 repeaters, 122 with 3 repeaters			
No. of repeaters	3 repeaters max. per network			
Max. No. of slave nodes			60	
Transmission data size	Max 241 bytes/transmission		Max. 32 bytes/transmission	
Current consumption (5VDC)	0.56A			

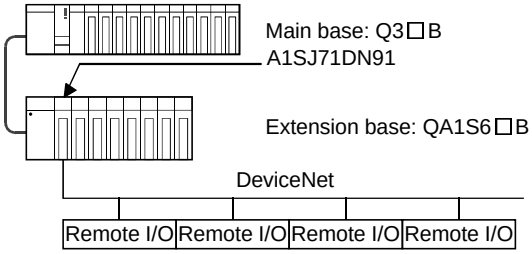
DeviceNet: A1SJ71DN91

Overview

The A1SJ71DN91 is a DeviceNet network interface module to connect various field sensors and actuators to a MELSEC PLC. Because DeviceNet is an open network, senseors and actuators of various manufacturers can be connected to the network.

Features

System configuration



AISJ71DN91 can be used with QA1S6□B.

Network configuration software

Network parameter in A1SJ71DN91 can be configured by using PLC program. However, the following software may be used instead.

SysCon Ver.2.0.6.2 or later including DLL file Ver.2.5.0.1 or later.

Please contact to the following companies for pufchase of SysCon software.

Sysergetic Maicro Systems, Inc., USA:
+1-630-434-1770

Hilscher Gesellschaft, Germany:
+49-6190-9907-0

NPS Ltd., Japan
+81-3-3226-8110

Restrictions on use with Q mode

No restriction.

Performance Specifications

Item		Specifications					
Node type		Group 2 dedicated client					
Station number range		0 to 63					
No. of slave nodes		Max.63					
Data size	I/O communication	2048 points (256 bytes) each for send receive					
	Message communication	240 bytes each for send and receive					
Communication speed & distance		Speed	Truck cable max. distance			Drop cable	
			Thick cable	Thin cable	Thick/thin cable combination	Max.	Total
		125k bps	500m	100m	See the table below	6m	156m
		250k bps	250m				78m
		500k bps	100m				39m
Consumption on network		26.5mA					
Occupied I/O points		32					
Consumption current (5VDC)		0.24A					
Weight		0.23kg					

Combined distance of thick and thin cables

Communication speed	Max. combined distance of thick and thin cables
125k bps	(Thick cable distance + 5) × thin cable distance ≤ 500m
250k bps	(Thick cable distance + 2.5) × thin cable distance ≤ 250m
500k bps	Thick cable distance × thin cable distance ≤ 100m

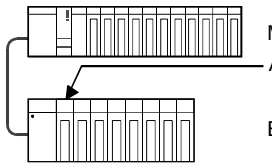
Modbus interface: A1SJ71UC24-R2-S2 / A1SJ71UC24-R4-S2

Overview

The A1SJ71UC24-R2-S2 and A1SJ71UC24-R4-S2 are Modbus interface modules. These modules support slave functions of ASCII and RTU protocols to connect MELSEC PLC to SCADA system.

Features

System configuration



AISJ71UC24-R2-S2 and AISJ71UC24-R4-S2 can be used with QA1S6☐B.

Supported Modbus functions

The following Modbus functions are supported by these modules. Please note that these modules support only Modbus slave functions.

Function	Description
01	Read coil status
03	Read holding register
05	Present single coil
06	Present single register
07	Read exception status
08	Loopback test
11	Fetch event counter communication
12	Fetch event communication event log
15	Force multiple coils
16	Force multiple registers
17	Report slave ID
20	Read general reference-584 only
21	Write general reference-584 only

Restrictions on use with Q mode

The ranges of devices in the PLC available to be accessed through the Modbus modules are limited as indicated below.

Device Type		Range
X		0 – 7FF
Y		0 – 7FF
M/L/S		0 – 8191
B		0 – FFF
T	Contact	0 – 2047
	Coil	0 – 2047
	Current value	0 – 2047
C	Contact	0 – 1023
	Coil	0 – 1023
	Current value	0 – 1023
D		0 – 6143
W		0 – FFF
F		0 – 2047

Performance Specifications

Item	A1SJ71UC24-R2-S2	A1SJ71UC24-R4-S2
Supported protocol	Modbus ASCII and Modbus RTU	
Interface	RS-232	RS-422/485
Transmision mode	Half-duplex	
Syncronization	USART	
Speed	300, 600, 1200, 2400, 4800, 9600, 19200bps	
Data format	Start bit: 1, Data bits: 7 or 8, Parity: even/odd/none, Stop: 1 or 2	
Frame check	LRC for ASCII, CRC for RTU	
Distance	15m	500m
Occupied I/O points	32	
Consumptiion current	0.1A	

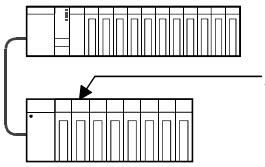
Intelligent Communication: A1SD51S

Overview

The A1SD51S is a module equipped with two RS232C ports and one RS422 port to permit creation of two BASIC language programs which operate in multitask mode. Communication protocols which are too complex to be created in a sequence program can be created using the BASIC language.

Features

■ System configuration



The A1SD51S can be used with QA1S6□B.

■ Programming software

The following software programs are available as a console for BASIC programming and for saving created programs.
SW1IX-AD51HP-E

■ Restrictions on use with Q mode

When the A1SD51S accesses the devices in the PLC, their ranges are limited as indicated below.

Device Type		Range
X		0 – 7FF
Y		0 – 7FF
M/L/S		0 – 8191
B		0 – FFF
T	Contact	0 – 2047
	Coil	0 – 2047
	Current value	0 – 2047
	Set value	0 – 2047
C	Contact	0 – 1023
	Coil	0 – 1023
	Current value	0 – 1023
	Set value	0 – 1023
D		0 – 6143
W		0 – FFF
F		0 – 2047

Performance Specifications

Item	Specifications
Programming language	D51H-BASIC
Number of tasks	2 tasks
Task starting condition	At power-on, start from PLC CPU, start from other task
Internal memory	Program memory: 64k bytes/2 tasks Common memory: 8k bytes Expanded register: 1024 points (2k bytes) Expanded relay: 1024 points
I/O to/from PLC CPU	Input 27 points, output 17 points
Buffer memory	3k words
Communication port	RS232C 2ch, RS422 1ch
Number of I/O points occupied	32 points
Internal current consumption (5VDC)	0.4A
Weight (kg (lb))	0.3 (0.66)

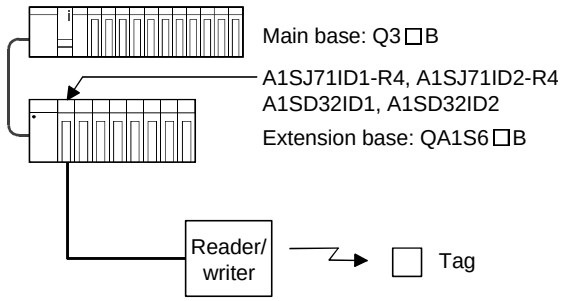
ID Interfaces: A1SJ71ID1-R4, A1SJ71ID2-R4, A1SD32ID1, A1SD32ID2

Overview

The A1SJ71ID1-R4, A1SJ71ID2-R4, A1SD32ID1 and A1SD32ID2 are interface modules designed to connect one or two reader/writers of the Mitsubishi D series/D-NS series ID system.
Using the ID system moves information together with the object to be controlled. Therefore, information management can be facilitated and you can easily perform exceptional processing in production.

Features

System configuration



The A1SJ71ID1-R4, A1SJ71ID2-R4, A1SD32ID1 and A1SD32ID2 can be used with QA1S6□B.

Restrictions on use with Q mode

The following QnA-compatible instructions dedicated to ID interfaces cannot be used with the Q mode. The FROM/TO instruction, etc. must be used for programming.

Unusable instructions	IDINT1, IDINT2, IDRD1, IDRD2, IDWD1, IDWD2, IDARD1, IDARD2, IDAWD1, IDAWD2, IDCMP1, IDCMP2, IDFILL1, IDFILL2, IDCOPY1, IDCOPY2

IMPORTANT

These ID products are radio transmitting devices.
Please confirm these products comply with local laws and regurations for radio transmitting devices before use.

Performance Specifications

Item	Specifications			
	A1SJ71ID1-R4	A1SJ71ID2-R4	A1SD32ID1	A1SD32ID2
Compatible reader/writer	D-422RW, D-422RWL		D-NS422RW	
Number of modules connectable	1	2	1	2
Connectable cable (m (feet))	D-422CAB10 (10 (32.79)), D-422CAB30 (30 (98.36)), D-422CAB50 (50 (163.93)), D-422CAB100 (100 (327.87))		D-NS422CAB10 (10 (32.79)), D-NS422CAB20 (20 (65.57)), D-NS422CAB40 (40 (131.15)), D-NS422CAB100 (100 (327.87))	
Usable data carrier	D-03C, D-03CS, D-03P, D-8P,D-8PS, D-8PX		D-NS03P, D-NS03PS, D-NS03PM	
Number of I/O points occupied	32 points			
Internal current consumption (5VDC)	0.1A	0.1A	0.15A	0.3A
Weight (kg (lb))	0.63 (138.60)		0.26 (57.20)	0.27 (59.40)

Serial Communication Modules: QJ71C24, QJ71C24-R2

Overview

The serial communication module (hereafter referred to as the "QJ71C24") can connect an external device and Q series PLCs by a serial communication line (RS-232, RS-422, RS-485) to achieve the following functions. Also, connection of an external modem/terminal adaptor permits data communications to be made with a remote external device via a dialup line/ISDN line.

(1) An external device (e.g. personal computer, display) performs the collection/changing of PLC data and the operation monitoring and status control of the CPU module to manage and monitor the PLC side facilities.
(2) Measurement data, etc. is collected from external devices (e.g. temperature controller, bar-code reader).
(3) Messages and numerical data, etc. is output to an external device (e.g. printer) for printing.
(4) Data is transferred to/from external devices and other PLCs.
(5) A personal computer in which the GPPW function software package (SW4D5C-GPPW-E or later, hereafter referred to as "GPPW") has been installed is connected to perform programming and other operations for the Q series CPU.

Features

■ Fast, large-capacity communication

The communication port of the QJ71C24 permits communication at max. speed of 115.2kbps and can make max. 960 words of data communications in one communication with MC protocol communications.

■ Communications with personal computer

To exercise PLC monitoring control from a personal computer, the MELSEC communication protocol (Note 1) can be used to perform PLC data read/write, etc. Using this protocol, PLC device data and program file read/write, PLC CPU status control (remote RUN/STOP), etc. can be performed from an external device (e.g. personal computer, display).
The PLC transfers all data under commands from the external device and does not need sequence programs.

Note 1: This protocol is called "dedicated protocol" in the A/QnA series PLC and referred to as the MC protocol.

■ Communication support software package

When an external device is a Windows personal computer, using the optionally available basic communication support tool (SW3D5F-CSKP-E) allows you to create external device side communication programs without being concerned with the details of the protocol (communication procedure) for MC protocol.

■ Transmission of data from PLC to personal computer

Communication using MC protocol cannot transmit data at the desired timing of the PLC since it transfers all data under commands from the personal computer (PLC always performs passive processing).
The on-demand function is designed to interrupt MC protocol communications to actively send data from the PLC. Using this function, data can be transmitted to the external device when a machinery/equipment error occurs or when a given condition holds.

Note 2: The on-demand function is unavailable for a system which uses the communication support software package on the personal computer side.
Note 3: To use the on-demand function to send data, a sequence program is required.

■ Communications with measuring instruments such as bar-code reader

The data communications function using the no protocol mode can be used to transfer data between the PLC and printer/bar-code reader/measuring instrument, etc, in the communication protocol determined by the external device. The no protocol mode is a function designed to communicate any data using a sequence program and can be used in accordance with the protocol of the external device. Note that data generation, transmission frame generation, receiving frame data extraction, send/receive procedure control and others must all be performed in sequence programs.

Serial Communication Modules: QJ71C24, QJ71C24-R2

Communications with personal computer and other PLCs

The bidirectional protocol can be used to communicate any data with other PLCs or the external device which can be matched in communication procedure with the PLC.
For example, this protocol is applicable to a case where mutual communication is made between a certain PLC and another remote PLC which would be difficult to use Ethernet or MELSECNET/10 with.

Notification function from PLC

The notification function is available to facilitate the external monitoring of PLC equipment. With notification conditions preset to the QJ71C24, the notification function automatically collects and sends data within the CPU to external devices when those conditions (time intervals and CPU data states) hold. When an alarm occurs, it can also transmit alarm data to external devices without sequence program. If modems are connected, it can notify pagers.
This function can be used when the MC protocol or no protocol is used.

Communications using user-registered frame

A user-registered frame is a transferred frame whose header (head of the transferred frame) and footer (end of the transferred frame) are preregistered. These header and footer are added automatically when the data is sent, and are automatically removed when the data is received.
This function is applicable to the data frames which are transferred in the no protocol mode and those sent by the on-demand function and notification function in the MC protocol. Normally, the transmission destination and source addresses included in the headers need not be added for each transmission in sequence programs.
Also, checksum can be calculated as required and added when data is sent, and frame check can be made when data is received.

Independent operation of communication ports

The two channels of communication ports (interfaces) of the QJ71C24 allow any of the different operation modes (MELSEC communication protocol, no protocol, bidirectional protocol) to be set per port for use in separate communication applications.

Programming via QJ71C24

You can perform PLC programming and monitoring from GPPW on a personal computer through the RS-232 serial communication line. When the peripheral device connecting interface of the Q series CPU is already used, programming/monitoring can be made from GPPW via the QJ71C24.

Communications via multiple networks

When access to the PLC is made from the GPPW-installed personal computer in data communications made from the host system in the MC protocol, other PLCs located beyond MELSECNET/10 and Ethernet are accessible.

Remote communications using modem function

The QJ71C24 has a telephone line modem-compatible function which initializes the modems used and performs connection processing with devices to allow communications with remote devices and modems through a telephone line.
After the line has been connected, data communications can be made by full duplex communication in the MC protocol/no protocol/bidirectional protocol.

Instructions Dedicated to Serial Communication Modules

The following serial communication-dedicated instructions can be used to program the QJ71C24 and QJ71C24-R2.

Instruction	Description	Protocol	Target Station
ONDEMAND	Data transmission using on-demand function	M	Funda-mental
OUTPUT	Transmission of specified data	N	
INPUT	Data receiving (Read of receive data)	N	
BIDOUT	Data sending	Bi	
BIDIN	Data receiving (Read of receive data)	Bi	
BUFRCVS	Receiving of data in interrupt program (Read of receive data)	N/bi	Appli-cation
PRR	Data sending in user-registered frame using transmission schedule table	N	
SPBUSY	Read of data sending/receiving status using each dedicated instruction	M/N/ bi	
PUTE	Registration (write) of user-registered frame to flash ROM	M/N/ bi	
GETE	Read of user-registered frame registered on flash ROM	M/N/ bi	
CSET	Setting of PLC CPU monitoring registration/deregistration and of the unit (word/byte) of the number of transferred data	M/N	

The following protocol symbols indicate usable protocols.
M: MC protocol, N: No protocol, bi: bidirectional protocol
"Fundamental" in the Remarks field indicates the instruction explained in the Serial Communication Module User's Manual (Fundamentals) and "Application" indicates the instruction explained in the Serial Communication Module User's Manual (Applications).

Program Compatibility

The sequence programs of the system using the A series/QnA series serial communication modules (A1SJ71UC24-R2, A1SJ71QC24N, etc., hereafter referred to as the "C24") and the programs of external devices can be utilized in the system using the QJ71C24. The C24 program compatibility for data communications using the QJ71C24 are described in the next column.

	Compatibility with Programs for A Series Computer Link Modules	Compatibility with Programs for QnA Series Serial Communication Modules
Other-end external device side program (＊1)	Compatible. Note that only data within PLC is accessible in MC protocol. (Note 6)	Compatible. (Note 5)
PLC side program (＊1)	Incompatible.	Compatible. (Note 2, 3, 4)

Note 1: In any of the above cases, performance capabilities and communications timings are incompatible, and therefore utilization of programs as they are may not permit communications. When utilizing programs, always confirm their operations.

Note 2: The following instructions cannot be used with the QJ71C24.

Instructions unavailable for QJ71C24	READ, SWRITE, SEND, RECV, REQ

Note 3: The QnA series serial communication modules (such as A1SJ71QC24N) contain E^2PROM but the QJ71C24 includes flash memory instead of E^2PROM. Namely, if access to E^2PROM is executed in the conventional program, access to flash memory is made. Note that communications will stop during write to flash memory.

Note 4: The LED ON states/switch setting states read from the buffer memory of the QJ71C24 are different from those of the AJ71QC24.

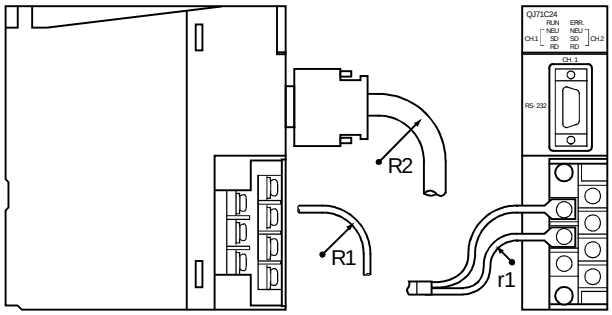
Note 5: Access to a file in the Q series CPU by the MC protocol uses a new dedicated command and a new program should be created.

Note 6: The conventional A series computer link module-compatible dedicated protocol (MC protocol level 1) has an area inaccessible to the internal device memory of the Q mode CPU expanded from the conventional A series CPU.

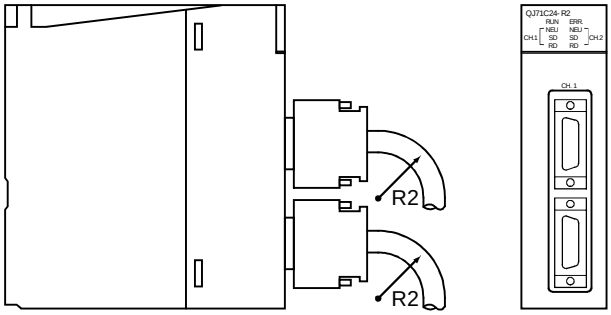
Serial Communication Modules: QJ71C24, QJ71C24-R2

Appearance

● QJ71C24



● QJ71C24-R2



∗ R1 (flexing radius near terminal block): Cable diameter × 4
∗ R2 (flexing radius near connector): Cable diameter × 4
∗ r1 (flexing radius near crimping terminal): Connectable to the degree that it is not flexed extremely.

Function List

Main Function / Sub Function	Outline	MC Protocol Communications		No Protocol	Bidirectional Protocol
			ON-demand transmission		
User frame registration	User-defined header/footer is added to sent data for transmission. Also header/footer is removed from received data.	×	○	○	×
Notice function	When specified conditions hold, data is sent to exterior automatically.	×	○	○	×
Global transmission function	Data is broadcast to multiple QJ71C24's connected in RS-422 multidrop.	○	×	×	×
Mode changing	Communications protocol switching function	○	×	○	○
Transparent code setting	Transparent code/added code is set to enable data communication of the same value as transmission control code.	×	×	○	○
ASCII-BIN conversion	Sent data is automatically converted into ASCII and received data is converted into BIN.	×	×	○	○
Interrupt function	When specified data is received, CPU module interrupt program is started.	×	×	○	○
GPP communications	Interface function for GPPW programming software to access CPU module.	○	×	×	×
Modem function	Makes modem initialization and telephone line connection.	○	○	○	○

Performance Specifications

Item		Specifications			
		QJ71C24		QJ71C24-R2	
Interface	CH. 1	RS-232 compliant (D-sub 9P)		RS-232 compliant (D-sub 9P)	
	CH. 2	RS-422/485 compliant (two-piece terminal block)		RS-232 compliant (D-sub 9P)	
Communication system		Protocol	Line	Protocol	Line
	MELSEC communication protocol	Half duplex	Full duplex/half duplex	Half duplex	Full duplex/half duplex
	No protocol	Full duplex/half duplex		Full duplex/half duplex	
	Bidirectional protocol	Full duplex/half duplex		Full duplex/half duplex	
Synchronization system		Asynchronous system			
Transmission speed (bps) (Note 2)		300, 600, 1200, 2400, 4800, 9600, 14400, 19200, 28800, 38400, 57600, 115200 ∗Usable when the total transmission speed of two interfaces is within 115200bps.			
Transmission distance	RS-232 (m (feet))	Max. 15 (49.18)			
	RS-422/485 (m (feet))	Max. 1200 (3934.43) (overall distance)			
Data format	Start bit	1			
	Data bit	7 or 8			
	Parity bit	1 (lateral parity) or none ... (to be selected)			
	Stop bit	1 or 2 ... (to be selected)			
Error detection		Parity check, sumcheck			
Flow control		DTR/DSR (ER/DR) control (only RS-232 controllable) or DC1/DC3 (Xon/Xoff), DC2/DC4 control			
Line configuration (connection)(Note 1)	RS-232	1:1			
	RS-422/485	Total of 1:1, 1:n, n:1, m:n...n and m+n is max. 32.			
Line configuration (data communications) (Note 1)	MELSEC communication protocol	1:1, 1:n, m:n		1:1	
	No protocol	1:1, 1:n, n:1		1:1	
	Bidirectional protocol	1:1		1:1	
Max. number of data per communication	MC protocol communication	960 words			
	No protocol communication/bidirectional communication	3839 words (No protocol and bidirectional communications cannot transfer 3839 words, respectively.)			
Loadable station		Q series CPU (Q mode)			
Number of loadable modules per CPU		No restrictions (loadable within I/O signal points)			
Number of I/O points occupied		32 points			
Internal current consumption (5VDC)		0.28		0.24	
External dimensions (mm (inch))		98 (3.86)(H) × 27.4 (1.08)(W) × 90 (3.55)(D)			
Weight (kg (lb))		0.2 (0.44)		0.2 (0.44)	

Note 1: Indicates the combination for connection of external device and CPU. (External device side:PLC CPU side)
Note 2: Depending on the characteristics of the cable used, the transmission distance may be less than the distance given above.

■ Usable modem specifications

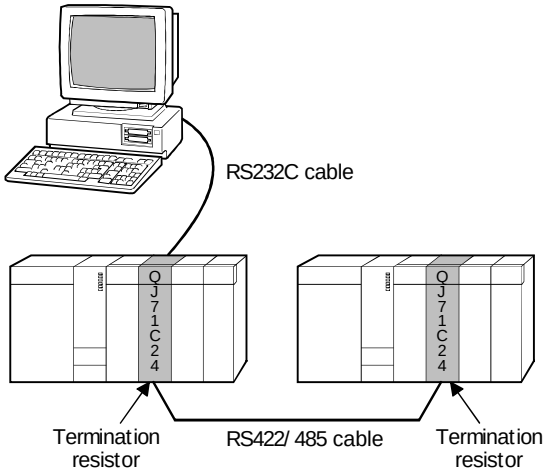
Item	Specifications	
Telephone line	Subscriber telephone/private line/cellular phone/PHS	ISDN
Connection line	Analog 2-wire type/4-wire type	ISDN line
Initialization	Hayes AT command-compatible product	Hayes AT command-compatible product
Communication standard	V.34/V.32bis/V.32/V.22bis/V.22/V.21V.fc, 212A/103	V.110 (B-channel circuit exchange, D-channel packet switching)
Error correction	Class 4, class 10 compatible, V.42 compatible	
Data compression	Class 5 compatible, V.42bis compatible	
Others	One which can turn on only DR (DSR) signal independentlyShould be able to exercise flow control (RS/CS control)	

∗ When using a cellular phone/PHS, it is recommended to use a modem whose error correction function supports MNP class 10.
Note that communications may not be made depending on the line status.

Serial Communication Modules: QJ71C24, QJ71C24-R2

Equipment

■ QJ71C24



<QJ71C24 accessories>

Product	Description
Termination resistor	110Ω, 130Ω, 2 pcs. each
Manual	Serial Communication Module User's Manual (Hardware)

<Separately prepared products>

The following equipment must be prepared separately.

(Recommended cables)

Product	Description
RS232 cable	7/0x127 □P HRV-SV, 8.5mm (0.33inch) or more in OD(Oki Electric Cable make, specify the number of pairs in □.) QJ71C24 is equipped with D-Sub 9P (female) connector.
RS422 cable	SPEV(SB)-MC-0.2×3P, about 6.5mm (0.26inch) in OD SPEV(SB)-0.2×3P, about 7.5mm (0.30inch) in OD(Mitsubishi Cable Industries make)

Note 1: Refer to <Separately prepared manuals> for separately prepared manuals.

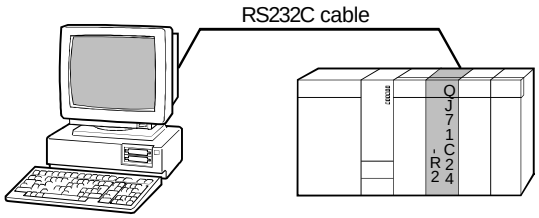
<Software>

Type	Description	Remarks
SW4D5C-GPPW-E or later	For sequence programming For Ethernet parameter setting	○
SW0D5C-QSCU-E	Data package for serial communication module	△
SW3D5F-CSKP-E	Communication support software for personal computer	△

○: Must be prepared. △ : Prepared as required.

Note2 : The software products shown above or later version are usable.

■ QJ71C24-R2



<QJ71C24-R2 accessories>

Product	Description
Manual	Serial Communication Module User's Manual (Hardware)

<Separately prepared products>

The following equipment must be prepared separately.

Product	Description
RS-232 cable	7/0x127 □P HRV-SV, 8.5mm (0.33inch) or more in OD(Oki Electric Cable make, specify the number of pairs in □.) QJ71C24-R is equipped with D-Sub 9P (female) connector.

Note 4: Refer to <Separately prepared manuals> for separately prepared manuals.

<Separately prepared manuals>

Serial Communication Module User's Manual (Fundamentals)

Specifications, functions
Pre-operation procedures
Maintenance, inspection, troubleshooting
Basic communications method in MC/No protocol/bidirectional protocol (Note 5)
About data package
Dedicated instructions

Serial Communication Module User's Manual (Applications)

User-registered frame function
On-demand function
PLC CPU monitoring function
Modem-compatible function
ASCII-binary conversion function
Transparent code usage method
Transmission control method, communications mode, data communication watchdog timer changing
Half duplex communication
m:n communications between external device and PLC CPU
Interrupt program

MELSEC Communication Protocol Reference Manual

Protocol specification manual that describes the functions with which the MC protocol for serial communication module/Ethernet module is compatible, their send and receive frames, and send and receive procedures.

Note 5: The description of the MC protocol is not given. For details, refer to the MC Protocol Reference Manual.

Utility Package for Serial Communication Modules: SW0D5C-QSCU-E

Overview

SW0D5C-QSCU-E is a utility package designed to set the condition data needed to use the QJ71C24 or QJ71C24-R2 serial communication module and to read and set the error codes and other status data. It is added to SW4D5C-GPPW-E or later.
The use of QSCU is not required for use of the QJ71C24 or QJ71C24-R2, and initial value and other settings can be made in sequence programs. However, the use of QSCU removes the need for these programs and facilitate checking of the setting and operating statuses. Especially when using the modem, notification or other application function of the serial communication module, it is recommended to use QSCU for various data settings.

Monitoring and Testing Functions

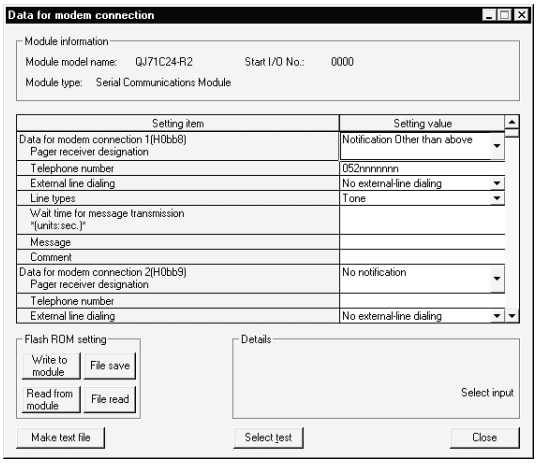
The monitoring and testing functions are designed to set data and conditions necessary to use various functions of the QJ71C24 and change the transmission control system on the screen and to register them in the flash memory of the QJ71C24. Also, they can display the registration status of the buffer memory (Note 1) or flash memory and the operating status of the module on the screen. Major items that may be monitored and tested are indicated below.

● Main monitoring and testing (data setting) function list

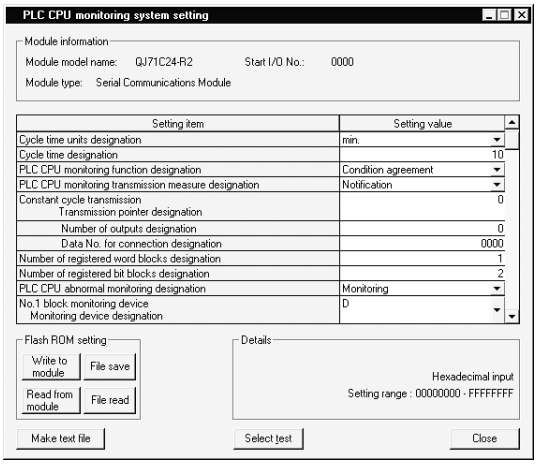
Item	Outline	Detailed Items
Transmission control	Performs transmission control method setting and status monitoring.	DR control/DC control selection, DC1/DC3 code designation, DC2/DC4 code designation, half duplex/full duplex selection, CD terminal enable/disable, priority designation for half-duplex simultaneous communication, transmission method for half-duplex transmission resumption, no-receive monitoring time, response monitoring time, transmission monitoring time, unit selection (word/byte), sending and receiving buffer first addresses, sending and receiving buffer lengths, sending and receiving transparent code designation, ASCII-BIN conversion designation
MC protocol communications	Performs necessary condition and other settings and status monitoring when on-demand function is used in MC protocol communications.	On-demand transmission data storage first address and data length, user-registered frame number designation for on-demand, message waiting time
No protocol communications	Performs necessary condition and other settings and status monitoring when No protocol communications are used.	Number of receiving end data, receiving end code, receiving user-registered frame use yes/no designation, receiving user-registered frame number, sending user-registered frame number, CR/LF output designation, output first pointer designation, output quantity designation
Bidirectional protocol communications	Performs necessary condition and other settings and status monitoring when bidirectional protocol communications are used.	Data enable/disable designation for simultaneous transmission
PLC CPU supervisory function	Supervises PLC CPU periodically and monitors status of function notifies external system by message when given condition holds.	Cyclic time unit selection, cyclic time, supervising function designation, sending means designation, cyclic transmission pointer, output quantity/connecting data number designation, registered word block quantity designation, registered bit block quantity designation, abnormality supervising designation, supervising device designation
Modem	Performs condition settings and status monitoring necessary to make communications with remote equipment using modems.	Connection channel designation, notice execution designation, connection retry count, connection retry intervals, initialization/connection time-out period, initialization retry count, initializing data number designation, connection data number designation, GPPW connection designation, no-communication interval time, RS-CS control yes/no selection, DR signal enable/disable selection for modem initialization, notice waiting time

Note 1: The buffer memory is interfacing volatile memory designed to transfer data between the CPU module and QJ71C24. At power-off or system reset, data are all erased and the initial values are set from the flash memory in the QJ71C24. To make the contents set on QSCU valid at every power-on, the set contents must have been registered to the nonvolatile flash memory.

Telephone number setting screen sample



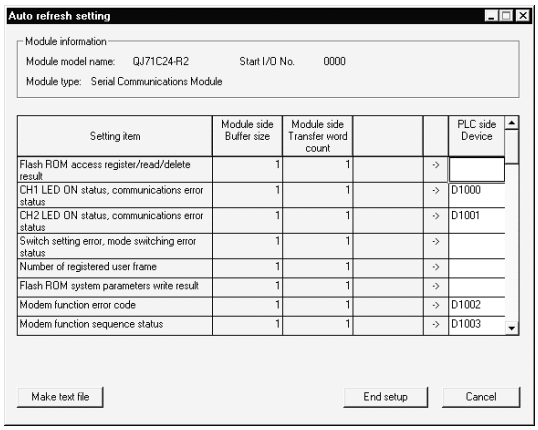
CPU status monitoring function setting screen sample



Automatic Refresh Setting

QSCU has an automatic refresh setting function. Automatic refresh is a function to automatically read the data of the QJ71C24 buffer memory, which stores the operating status, error codes and others, to the internal device memory of the CPU module. With this function, you need not create sequence programs for reading. Automatically refreshed data are various error codes, LED ON states, modem connection status, PLC CPU monitoring function, RS-232 signal status, mode setting status, transmission control setting states, etc. Automatic refresh cannot be set for the transfer of data communicated in the No protocol, bidirectional protocol, etc. which occurs irregularly.

Automatic refresh setting screen sample



Overview

The Q series I/O modules are compatible with the bus of the high-function/high-performance Q series CPU modules (Q mode only). They have the world's smallest unit size to meet the Q series, and are designed to be compact/power-saving in consideration of the environment.

Features

■ Ultracompact

These I/O modules are the smallest in the world for building block type units.
98mm (3.86inch) height × 27.4mm (1.08inch) width × 90mm (3.55inch) depth

Note 1: The Q series I/O modules are designed to be used with Q3□B or Q6□B. They cannot be used with QA1S3□B or QA1S6□B. They cannot be used with the A mode, either.

■ Multi-functional

(1) The DC input modules allow the input time constant to be changed (1/5/10/20/70ms). The input time constant can be set from GPPW. It can be decreased if fast input is needed, and be increased for use in a hostile environment (e.g. noise).

(2) The lineup of the DC transistor output modules have a short-circuit protective function.
The short-circuit protective function prevents transistors from being damaged by a short circuit, etc.

■ Wiring capability improvement

(1) The relay output modules do not require external supply power.

■ Maintainability improvement

(1) The modules can be loaded/unloaded with a single motion (screwing not needed).
∗ Screwing may be needed under some operating conditions.

(2) For a CPU error, output hold/clear setting can be made per output module.

(3) The loaded module configuration can be confirmed on the programming software screen making it very useful for maintenance.

■ Energy-saving

(1) Reduction in input current of DC input modules

Type	Input Current
QX40	Approx. 4mA
A1SX40	Approx. 7mA

(2) Reduction in 5VDC current consumption of transistor output modules

Type	Input Current
QY81P	Approx. 95mA
A1SY81EP	Approx. 500mA

■ Safety

(1) The 100/200VAC rated modules are enhanced in insulation between the external hazardous voltage and internal circuit.

■ Compatibility

(1) Since the connector shape and pin layout of the 32- and 64-point modules are the same as those of the A/AnS series, the connector terminal block conversion modules of the A/AnS series and the connectors wired for the AnS series I/O modules can be used.

Instructions

(1) Note that the screw terminal block layout is different between the MELSEC-Q series 16-point I/O modules and MELSEC-AnS series 16-point I/O modules.

(2) The external wiring connectors of the 32- and 64-point modules are not provided for the products. Please purchase them after confirming the external wiring applicable connector types given in the specification field of the corresponding modules. The external wiring terminal blocks of the 16-point modules are provided for (fitted to) the products.

(3) When using the 16-point modules, use wires of 0.3 to 0.75mm^2 core and 2.8mm (0.11inch) OD max.
It is also recommended to cover the power connections of the crimping terminals with insulation or mark tubes. (Use the insulation or mark tubes which are compatible with the crimping terminals used.)

Input Derating (Temperature-Dependent Input ON Ratio Restriction)

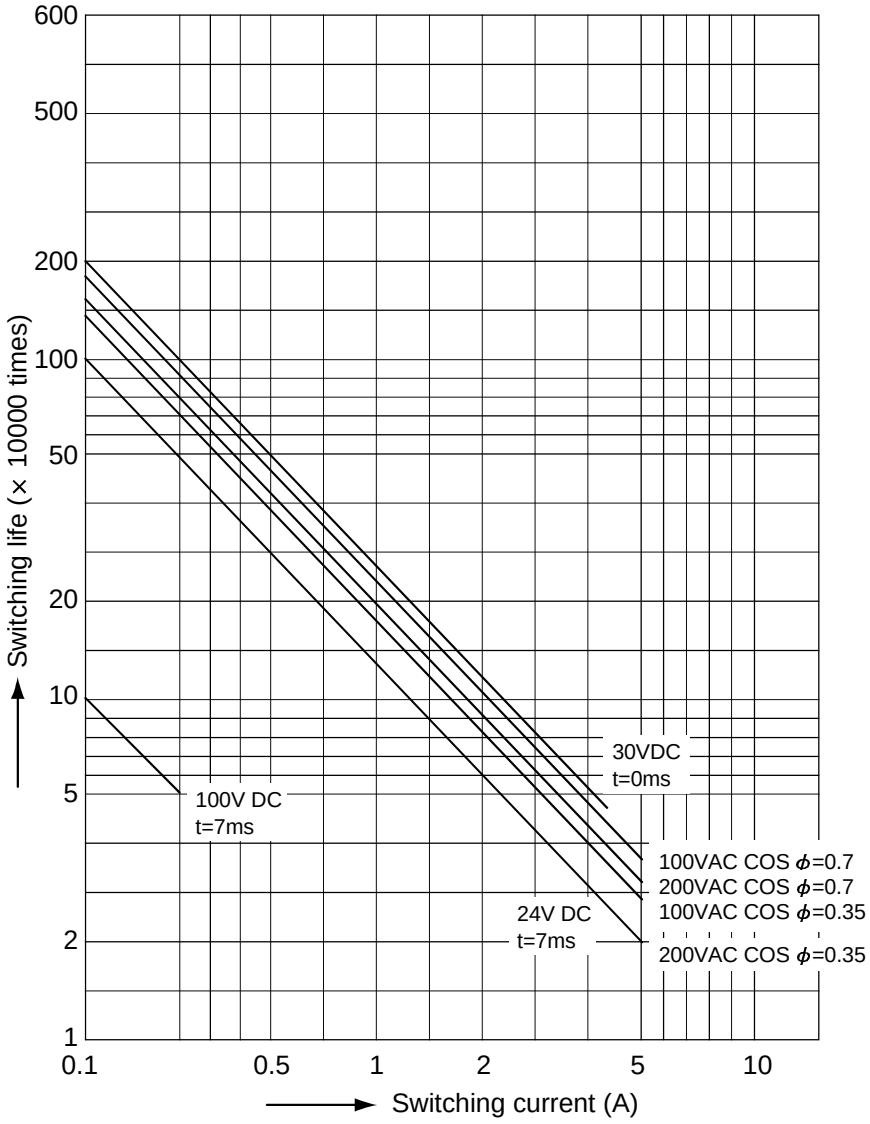
Some input module models may require their input specifications to be derated. This restriction is provided to prevent a failure due to excessive heat generated in the input section, and is influenced by the ambient temperature, input voltage, number of input ON points, and input ON time.

The derating diagrams are provided for the modules which require derating of the input specifications. Use them within those ranges.

Relay Life of Relay Output Module

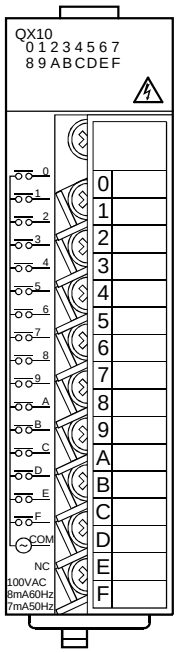
The following chart shows the service life of a relay output module relay.

Applicable module.....QY10

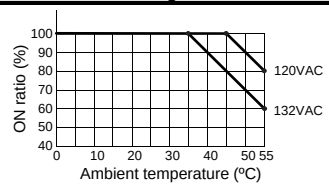


t: time constant, COS ϕ : power factor

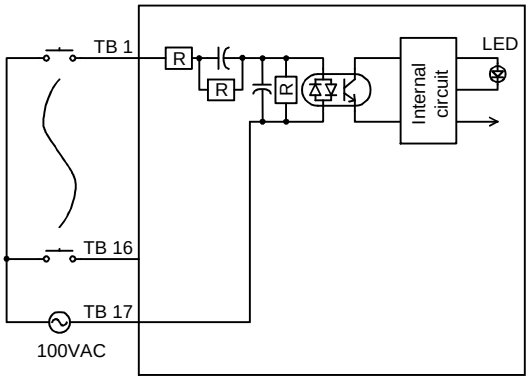
■ QX10 AC input module

Specifications \ Type		AC Input Module	
		QX10	Appearance
Number of input points		16 points	
Isolation method		Photocoupler	
Rated input voltage, frequency		100-120VAC (+10/-15%) 50/60Hz (±3Hz) (distortion factor within 5%)	
Rated input current		Approx. 8mA (100VAC, 60Hz), approx. 7mA (100VAC, 50Hz)	
Input derating		Refer to the derating chart.	
Inrush current		Max. 200mA within 1ms (at 132VAC)	
ON voltage/ON current		80VAC or higher/5mA or higher (50Hz, 60Hz)	
OFF voltage/OFF current		30VAC or lower/1mA or lower (50Hz, 60Hz)	
Input impedance		Approx. 15kΩ (60Hz), approx. 18kΩ (50Hz)	
Response time	OFF→ON	15ms or less (100VAC 50Hz, 60Hz)	
	ON→OFF	20ms or less (100VAC 50Hz, 60Hz)	
Dielectric withstand voltage		1780VAC rms/3 cycles (altitude 2000m (6557.38feet))	
Insulation resistance		10MΩ or more by insulation resistance tester	
Noise immunity		By noise simulator of 1500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		Fast transient noise IEC61000-4-4: 1kV	
Common terminal arrangement		16 points/common (common terminal: TB17)	
Operation indicator		ON indication (LED)	
External connections		18-point terminal block (M3×6 screws)	
Applicable wire size		Core: 0.3 to 0.75mm^2, OD: 2.8mm (0.11inch) max.	
Applicable crimping terminal		R1.25-3 (sleeved crimping terminals cannot be used.)	
5VDC internal current consumption (A)		50mA	
Weight (kg (lb))		0.17 (0.37)	

Derating Chart



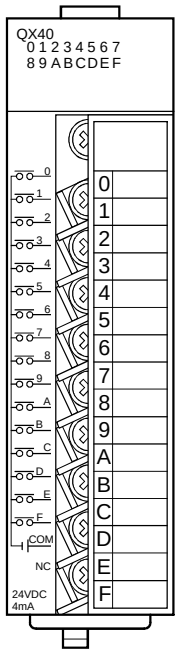
External Connections

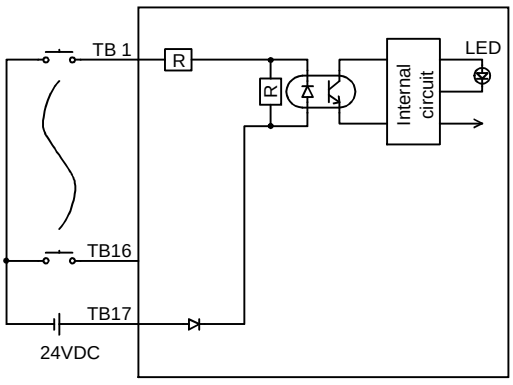


Terminal Block Number	Signal Name
TB1	X00
TB2	X01
TB3	X02
TB4	X03
TB5	X04
TB6	X05
TB7	X06
TB8	X07
TB9	X08
TB10	X09
TB11	X0A
TB12	X0B
TB13	X0C
TB14	X0D
TB15	X0E
TB16	X0F
TB17	COM
TB18	NC

Input Modules

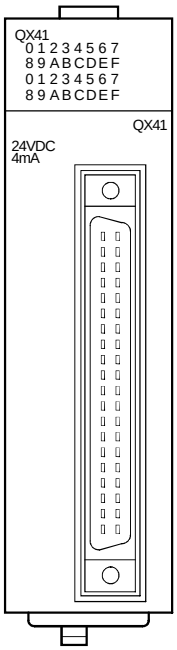
■ QX40 DC input module (positive common type)

Specifications \ Type		DC Input Module (Positive Common Type) QX40	Appearance
Number of input points		16 points	
Isolation method		Photocoupler	
Rated input voltage		24VDC (+20/-15%, ripple ratio within 5%)	
Rated input current		Approx. 4mA	
Input derating		No	
ON voltage/ON current		19V or higher/3mA or higher	
OFF voltage/OFF current		11V or lower/1.7mA or lower	
Input resistance		Approx. 5.6kΩ	
Response time	OFF→ON	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting, default value: 10ms)＊	
	ON→OFF	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting, default value: 10ms)＊	
Dielectric withstand voltage		560VAC rms/3 cycles (altitude 2000m (6557.38feet))	
Insulation resistance		10MΩ or more by insulation resistance tester	
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		Fast transient noise IEC61000-4-4: 1kV	
Common terminal arrangement		16 points/common (common terminal: TB17)	
Operation indicator		ON indication (LED)	
External connections		18-point terminal block (M3×6 screws)	
Applicable wire size		Core: 0.3 to 0.75mm^2, OD: 2.8mm (0.11inch) max.	
Applicable crimping terminal		R1.25-3 (sleeved crimping terminals cannot be used.)	
5VDC internal current consumption (A)		50mA	
Weight (kg (lb))		0.16 (0.35)	

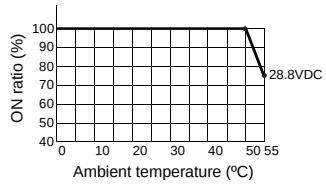
External Connections	Terminal Block Number	Signal Name
	TB1	X00
	TB2	X01
	TB3	X02
	TB4	X03
	TB5	X04
	TB6	X05
	TB7	X06
	TB8	X07
	TB9	X08
	TB10	X09
	TB11	X0A
	TB12	X0B
	TB13	X0C
	TB14	X0D
	TB15	X0E
	TB16	X0F
	TB17	COM
	TB18	NC

＊: For the setting method, refer to the SW5D5C-GPPW-E Operating Manual.
Note that OFF→ON and ON→OFF response times cannot be set separately.

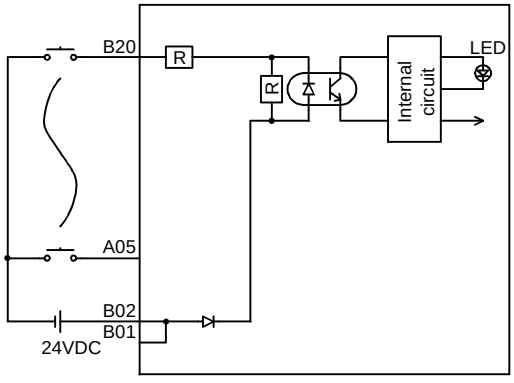
■ QX41 DC input module (positive common type)

Specifications \ Type		DC Input Module (Positive Common Type) QX41	Appearance
Number of input points		32 points	
Isolation method		Photocoupler	
Rated input voltage		24VDC (+20/-15%, ripple ratio within 5%)	
Rated input current		Approx. 4mA	
Input derating		Refer to the derating chart.	
ON voltage/ON current		19V or higher/3mA or higher	
OFF voltage/OFF current		11V or lower/1.7mA or lower	
Input resistance		Approx. 5.6kΩ	
Response time	OFF→ON	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting, default value: 10ms)＊	
	ON→OFF	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting, default value: 10ms)＊	
Dielectric withstand voltage		560VAC rms/3 cycles (altitude 2000m (6557.38feet))	
Insulation resistance		10MΩ or more by insulation resistance tester	
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		Fast transient noise IEC61000-4-4: 1kV	
Common terminal arrangement		32 points/common (common terminal: B01, B02)	
Operation indicator		ON indication (LED)	
External connections		40-pin connector	
Applicable wire size		0.3mm^2	
External wiring connector		A6CON1, A6CON2, A6CON3 (optional)	
Applicable connector/terminal block conversion module		A6TBXY36, A6TBXY54, A6TBX70	
5VDC internal current consumption (A)		75mA	
Weight (kg (lb))		0.15 (0.33)	

Derating Chart



External Connections

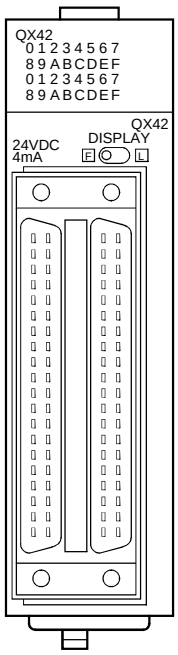


Signal Name	Pin Number	Signal Name	Pin Number
B20	X00	A20	X10
B19	X01	A19	X11
B18	X02	A18	X12
B17	X03	A17	X13
B16	X04	A16	X14
B15	X05	A15	X15
B14	X06	A14	X16
B13	X07	A13	X17
B12	X08	A12	X18
B11	X09	A11	X19
B10	X0A	A10	X1A
B09	X0B	A09	X1B
B08	X0C	A08	X1C
B07	X0D	A07	X1D
B06	X0E	A06	X1E
B05	X0F	A05	X1F
B04	NC	A04	NC
B03	NC	A03	NC
B02	COM	A02	NC
B01	COM	A01	NC

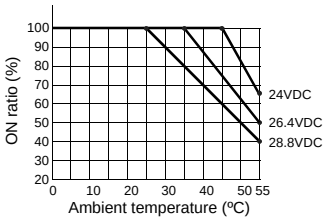
＊: For the setting method, refer to the SW5D5C-GPPW-E Operating Manual.
Note that OFF→ON and ON→OFF response times cannot be set separately.

■ QX42 DC input module (positive common type)

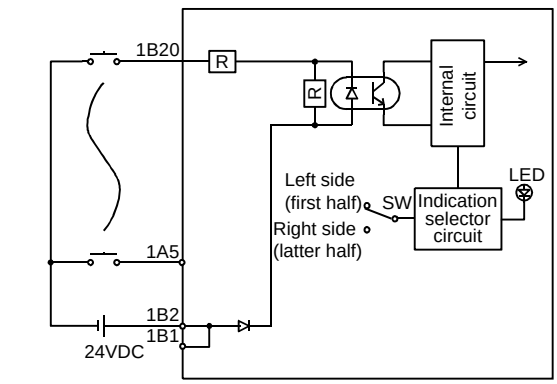
Specifications \ Type		DC Input Module (Positive Common Type) QX42	Appearance
Number of input points		64 points	
Isolation method		Photocoupler	
Rated input voltage		24VDC (+20/-15%, ripple ratio within 5%)	
Rated input current		Approx. 4mA	
Input derating		Refer to the derating chart.	
ON voltage/ON current		19V or higher/3mA or higher	
OFF voltage/OFF current		11V or lower/1.7mA or lower	
Input resistance		Approx. 5.6kΩ	
Response time	OFF→ON	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting, default value: 10ms) ∗	
	ON→OFF	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting, default value: 10ms) ∗	
Dielectric withstand voltage		560VAC rms/3 cycles (altitude 2000m (6557.38feet))	
Insulation resistance		10MΩ or more by insulation resistance tester	
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		Fast transient noise IEC61000-4-4: 1kV	
Common terminal arrangement		32 points/common (common terminal: 1B01, 1B02, 2B01, 2B02)	
Operation indicator		ON indication (LED), 32 point switch-over using switch	
External connections		40-pin connector	
Applicable wire size		0.3mm^2	
External wiring connector		A6CON1, A6CON2, A6CON3 (optional)	
Applicable connector/terminal block conversion module		A6TBXY36, A6TBXY54, A6TBX70	
5VDC internal current consumption (A)		90mA	
Weight (kg (lb))		0.18 (0.40)	



Derating Chart



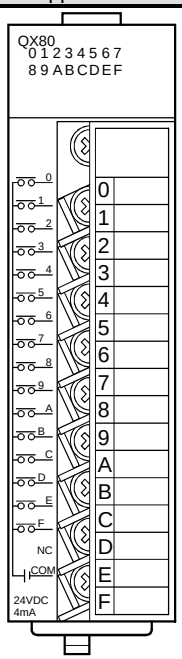
External Connections

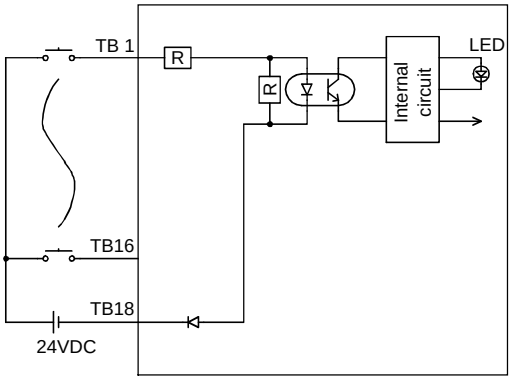


Pin Number	Signal Name	Pin Number	Signal Name	Pin Number	Signal Name	Pin Number	Signal Name
1B20	X00	1A20	X10	2B20	X20	2A20	X30
1B19	X01	1A19	X11	2B19	X21	2A19	X31
1B18	X02	1A18	X12	2B18	X22	2A18	X32
1B17	X03	1A17	X13	2B17	X23	2A17	X33
1B16	X04	1A16	X14	2B16	X24	2A16	X34
1B15	X05	1A15	X15	2B15	X25	2A15	X35
1B14	X06	1A14	X16	2B14	X26	2A14	X36
1B13	X07	1A13	X17	2B13	X27	2A13	X37
1B12	X08	1A12	X18	2B12	X28	2A12	X38
1B11	X09	1A11	X19	2B11	X29	2A11	X39
1B10	X0A	1A10	X1A	2B10	X2A	2A10	X3A
1B09	X0B	1A09	X1B	2B09	X2B	2A09	X3B
1B08	X0C	1A08	X1C	2B08	X2C	2A08	X3C
1B07	X0D	1A07	X1D	2B07	X2D	2A07	X3D
1B06	X0E	1A06	X1E	2B06	X2E	2A06	X3E
1B05	X0F	1A05	X1F	2B05	X2F	2A05	X3F
1B04	NC	1A04	NC	2B04	NC	2A04	NC
1B03	NC	1A03	NC	2B03	NC	2A03	NC
1B02	COM1	1A02	NC	2B02	COM2	2A02	NC
1B01	COM1	1A01	NC	2B01	COM2	2A01	NC

∗: For the setting method, refer to the SW5D5C-GPPW-E Operating Manual.
Note that OFF→ON and ON→OFF response times cannot be set separately.

■ QX80 DC input module (negative common type)

Specifications \ Type		DC Input Module (Negative Common Type)	
		QX80	Appearance
Number of input points		16 points	
Isolation method		Photocoupler	
Rated input voltage		24VDC (+20/-15%, ripple ratio within 5%)	
Rated input current		Approx. 4mA	
Input derating		No	
ON voltage/ON current		19V or higher/3mA or higher	
OFF voltage/OFF current		11V or lower/1.7mA or lower	
Input resistance		Approx. 5.6kΩ	
Response time	OFF→ON	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting, default value: 10ms)＊	
	ON→OFF	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting, default value: 10ms)＊	
Dielectric withstand voltage		560VAC rms/3 cycles (altitude 2000m (6557.38feet))	
Insulation resistance		10MΩ or more by insulation resistance tester	
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		Fast transient noise IEC61000-4-4: 1kV	
Common terminal arrangement		16 points/common (common terminal: TB18)	
Operation indicator		ON indication (LED)	
External connections		18-point terminal block (M3×6 screws)	
Applicable wire size		Core: 0.3 to 0.75mm^2, OD: 2.8mm(0.11inch) max.	
Applicable crimping terminal		R1.25-3 (sleeved crimping terminals cannot be used.)	
5VDC internal current consumption (A)		50mA	
Weight (kg (lb))		0.16 (0.35)	

External Connections	Terminal Block Number	Signal Name
	TB1	X00
	TB2	X01
	TB3	X02
	TB4	X03
	TB5	X04
	TB6	X05
	TB7	X06
	TB8	X07
	TB9	X08
	TB10	X09
	TB11	X0A
	TB12	X0B
	TB13	X0C
	TB14	X0D
	TB15	X0E
	TB16	X0F
	TB17	NC
	TB18	COM

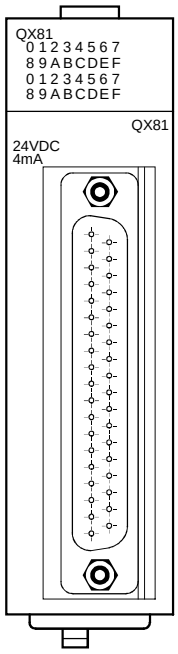
＊: For the setting method, refer to the SW5D5C-GPPW-E Operating Manual.
Note that OFF→ON and ON→OFF response times cannot be set separately.

Input Modules

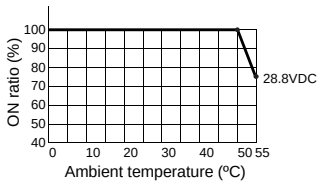
■ QX81 DC input module (negative common type)

Specifications \ Type		DC Input Module (Negative Common Type) QX81
Number of input points		32 points
Isolation method		Photocoupler
Rated input voltage		24VDC (+20/-15%, ripple ratio within 5%)
Rated input current		Approx. 4mA
Input derating		Refer to the derating chart.
ON voltage/ON current		19V or higher/3mA or higher
OFF voltage/OFF current		11V or lower/1.7mA or lower
Input resistance		Approx. 5.6kΩ
Response time	OFF→ON	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting, default value: 10ms)∗
	ON→OFF	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting, default value: 10ms)∗
Dielectric withstand voltage		560VAC rms/3 cycles (altitude 2000m (6557.38feet))
Insulation resistance		10MΩ or more by insulation resistance tester
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency
		Fast transient noise IEC61000-4-4: 1kV
Common terminal arrangement		32 points/common (common terminal: 17, 18, 36)
Operation indicator		ON indication (LED)
External connections		37-pin D-sub connector
Applicable wire size		0.3mm^2
External wiring connector		A6CON1E, A6CON2E, A6CON3E (optional)
Applicable connector/terminal block conversion module		A6TBX36-E, A6TBX54-E, A6TBX70-E
5VDC internal current consumption (A)		75mA
Weight (kg (lb))		0.16 (0.35)

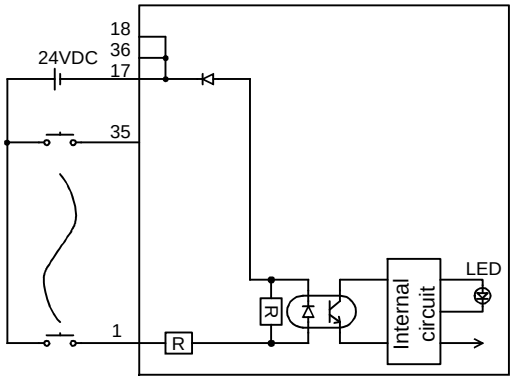
Appearance



Derating Chart



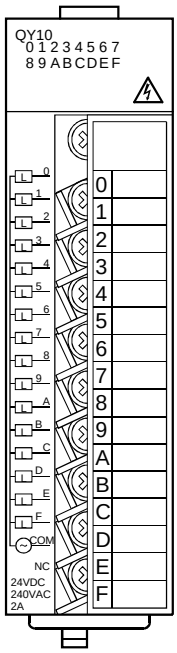
External Connections

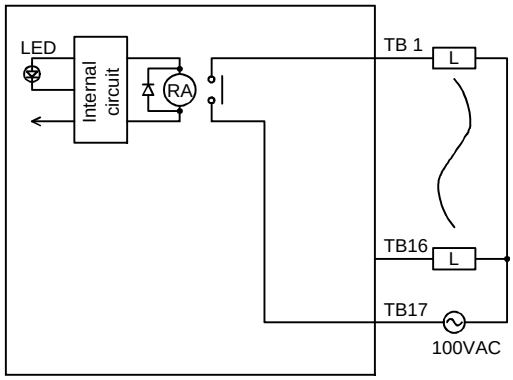


Pin Number	Signal Name	Pin Number	Signal Name
1	X00	9	X10
20	X01	28	X11
2	X02	10	X12
21	X03	29	X13
3	X04	11	X14
22	X05	30	X15
4	X06	12	X16
23	X07	31	X17
5	X08	13	X18
24	X09	32	X19
6	X0A	14	X1A
25	X0B	33	X1B
7	X0C	15	X1C
26	X0D	34	X1D
8	X0E	16	X1E
27	X0F	35	X1F
17	COM	37	NC
36	COM	19	NC
18	COM		

∗: For the setting method, refer to the SW5D5C-GPPW-E Operating Manual.
Note that OFF→ON and ON→OFF response times cannot be set separately.

■ QY10 contact output module

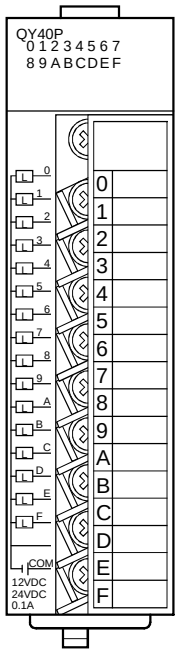
Specifications \ Type		Contact Output Module	
		QY10	Appearance
Number of output points		16 points	
Isolation method		Relay	
Rated switching voltage, current		24VDC 2A (resistive load) /point, 8A/common 240VAC 2A (COS ϕ =1)	
Minimum switching load		5VDC 1mA	
Maximum switching load		264VAC 125VDC	
Response time	OFF→ON	10ms or less	
	ON→OFF	12ms or less	
Life	Mechanical	20 million times or more	
	Electrical	Rated switching voltage/current load More than 100 thousand times or more	
		200VAC 1.5A, 240VAC 1A (COS ϕ =0.7) 100 thousand times or more 200VAC 0.4A, 240VAC 0.3A (COS ϕ =0.7) 300 thousand times or more	
		200VAC 1A, 240VAC 0.5A (COS ϕ =0.35) 100 thousand times or more 200VAC 0.3A, 240VAC 0.15A (COS ϕ =0.35) 300 thousand times or more	
		24VDC 1A, 100VDC 0.1A (L/R=7ms) 100 thousand times or more 24VDC 0.3A, 100VDC 0.03A (L/R=7ms) 300 thousand times or more	
Maximum switching frequency		3600 times/hour	
Surge suppressor		No	
Fuse		No	
Dielectric withstand voltage		2830VAC rms/3 cycles (altitude 2000m (6557.38feet))	
Insulation resistance		10MΩ or more by insulation resistance tester	
Noise immunity		By noise simulator of 1500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		Fast transient noise IEC61000-4-4: 1kV	
Common terminal arrangement		16 points/common (common terminal: TB17)	
Operation indicator		ON indication (LED)	
External connections		18-point terminal block (M3×6 screws)	
Applicable wire size		Core: 0.3 to 0.75mm^2, OD: 2.8mm (0.11inch) max.	
Applicable crimping terminal		R1.25-3 (sleeved crimping terminals cannot be used.)	
5VDC internal current consumption (A)		430mA	
Weight (kg (lb))		0.22 (0.48)	

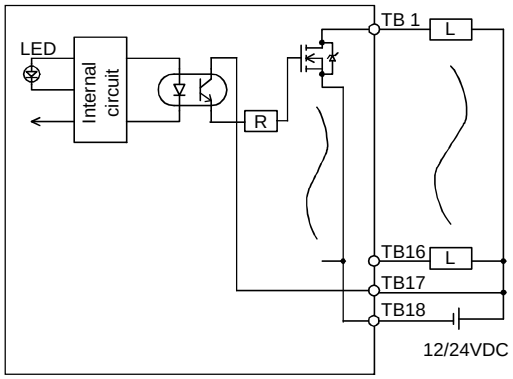
External Connections	Signal Name	Pin Number
	TB1	Y00
	TB2	Y01
	TB3	Y02
	TB4	Y03
	TB5	Y04
	TB6	Y05
	TB7	Y06
	TB8	Y07
	TB9	Y08
	TB10	Y09
	TB11	Y0A
	TB12	Y0B
	TB13	Y0C
	TB14	Y0D
	TB15	Y0E
	TB16	Y0F
	TB17	COM
	TB18	NC

Output Modules

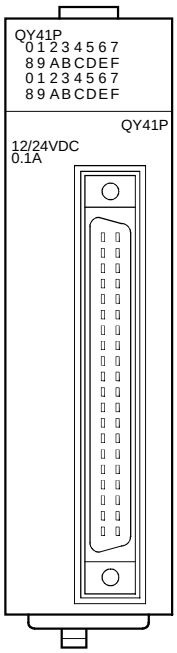
■ QY40P transistor output module (sink type)

Specifications \ Type		Transistor Output Module (Sink Type) QY40P	Appearance
Number of output points		16 points	
Isolation method		Photocoupler	
Rated load voltage		12-24VDC (+20/-15%)	
Maximum load current		0.1A/point, 1.6A/common	
Maximum inrush current		0.7A, 10ms or less	
Leakage current at OFF		0.1mA or less	
Maximum voltage drop at ON		0.1VDC (TYP.) 0.1A, 0.2VDC (MAX.) 0.1A	
Response time	OFF→ON	1ms or less	
	ON→OFF	1ms or less (rated load, resistive load)	
Surge suppressor		Zener diode	
Fuse		No	
External supply power	Voltage	12-24VDC (+20/-15%) (ripple ratio within 5%)	
	Current	10mA (at 24VDC) (Max. all points ON)	
Dielectric withstand voltage		560VAC rms/3 cycles (altitude 2000m (6557.38feet))	
Insulation resistance		10MΩ or more by insulation resistance tester	
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		Fast transient noise IEC61000-4-4: 1kV	
Common terminal arrangement		16 points/common (common terminal: TB18)	
Short circuit protection		Yes (thermal protection, short circuit protection) • Thermal protection is activated in increments of 1 point. • Short circuit protection is activated in increments of 1 point.	
Operation indicator		ON indication (LED)	
External connections		18-point terminal block (M3×6 screws)	
Applicable wire size		Core: 0.3 to 0.75mm^2, OD: 2.8mm (0.11inch) max.	
Applicable crimping terminal		R1.25-3 (sleeved crimping terminals cannot be used.)	
5VDC internal current consumption (A)		65mA	
Weight (kg (lb))		0.16 (0.35)	

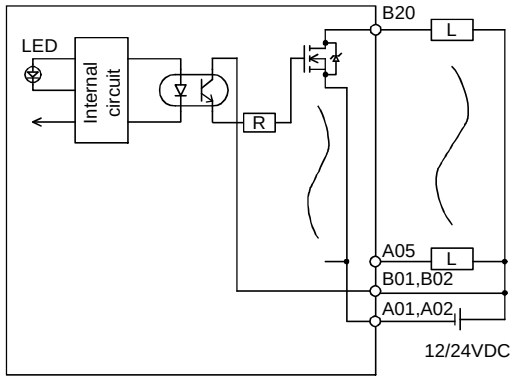


External Connections	Terminal Block Number	Signal Name
	TB1	Y00
	TB2	Y01
	TB3	Y02
	TB4	Y03
	TB5	Y04
	TB6	Y05
	TB7	Y06
	TB8	Y07
	TB9	Y08
	TB10	Y09
	TB11	Y0A
	TB12	Y0B
	TB13	Y0C
	TB14	Y0D
	TB15	Y0E
	TB16	Y0F
	TB17	12/24VDC
	TB18	COM

■ QY41P transistor output module (sink type)

Specifications \ Type		Transistor Output Module (Sink Type) QY41P	Appearance
Number of output points		32 points	
Isolation method		Photocoupler	
Rated load voltage		12-24VDC (+20/-15%)	
Maximum load current		0.1A/point, 2A/common	
Maximum inrush current		0.7A, 10ms or less	
Leakage current at OFF		0.1mA or less	
Maximum voltage drop at ON		0.1VDC (TYP.) 0.1A, 0.2VDC (MAX.) 0.1A	
Response time	OFF→ON	1ms or less	
	ON→OFF	1ms or less (rated load, resistive load)	
Surge suppressor		Zener diode	
Fuse		No	
External supply power	Voltage	12-24VDC (+20/-15%) (ripple ratio within 5%)	
	Current	20mA (at 24VDC) (Max. all points ON)	
Dielectric withstand voltage		560VAC rms/3 cycles (altitude 2000m (6557.38feet))	
Insulation resistance		10MΩ or more by insulation resistance tester	
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		Fast transient noise IEC61000-4-4: 1kV	
Common terminal arrangement		32 points/common (common terminal: A01, A02)	
Short circuit protection		Yes (thermal protection, short circuit protection) • Thermal protection is activated in increments of 1 point. • Short circuit protection is activated in increments of 1 point.	
Operation indicator		ON indication (LED)	
External connections		40-pin connector	
Applicable wire size		0.3mm²	
External wiring connector		A6CON1, A6CON2, A6CON3 (optional)	
Applicable connector/terminal block conversion module		A6TBXY36, A6TXY54	
5VDC internal current consumption		105mA	
Weight (kg (lb))		0.15 (0.33)	

External Connections



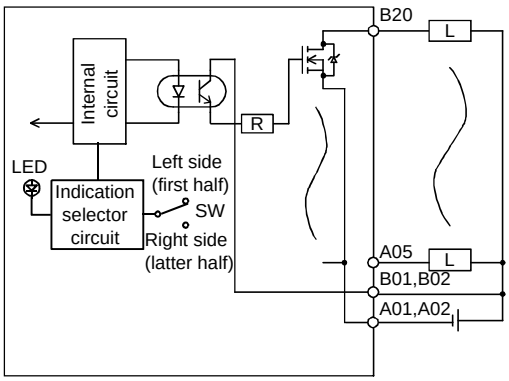
Pin Number	Signal Name	Pin Number	Signal Name
B20	Y	A20	Y10
B19	Y	A19	Y11
B18	Y	A18	Y12
B17	Y	A17	Y13
B16	Y	A16	Y14
B15	Y	A15	Y15
B14	Y	A14	Y16
B13	Y	A13	Y17
B12	Y	A12	Y18
B11	Y	A11	Y19
B10	Y	A10	Y1A
B09	Y	A09	Y1B
B08	Y	A08	Y1C
B07	Y	A07	Y1D
B06	Y	A06	Y1E
B05	Y	A05	Y1F
B04	NC	A04	NC
B03	NC	A03	NC
B02	12/24VDC	A02	COM1
B01	12/24VDC	A01	COM1

Output Modules

■ QY42P transistor output module (sink type)

Specifications \ Type		Transistor Output Module (Sink Type) QY42P	Appearance
Number of output points		64 points	
Isolation method		Photocoupler	
Rated load voltage		12-24VDC (+20/-15%)	
Maximum load current		0.1A/point, 2A/common	
Maximum inrush current		0.7A, 10ms or less	
Leakage current at OFF		0.1mA or less	
Maximum voltage drop at ON		0.1VDC (TYP.) 0.1A, 0.2VDC (MAX.) 0.1A	
Response time	OFF→ON	1ms or less	
	ON→OFF	1ms or less (rated load, resistive load)	
Surge suppressor		Zener diode	
Fuse		No	
External supply power	Voltage	12-24VDC (+20/-15%) (ripple ratio within 5%)	
	Current	20mA (at 24VDC)/common (Max. all points ON)	
Dielectric withstand voltage		560VAC rms/3 cycles (altitude 2000m (6557.38feet))	
Insulation resistance		10MΩ or more by insulation resistance tester	
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		Fast transient noise IEC61000-4-4: 1kV	
Common terminal arrangement		32 points/common (common terminal: 1A01, 1A02, 2A01, 2A02)	
Short circuit protection		Yes (thermal protection, short circuit protection) • Thermal protection is activated in increments of 1 point. • Short circuit protection is activated in increments of 1 point.	
Operation indicator		ON indication (LED), 32 point switch-over using switch	
External connections		40-pin connector	
Applicable wire size		0.3mm²	
External wiring connector		A6CON1, A6CON2, A6CON3 (optional)	
Applicable connector/terminal block conversion module		A6TBXY36, A6TBXY54	
5VDC internal current consumption		150mA	
Weight (kg (lb))		0.17 (0.37)	

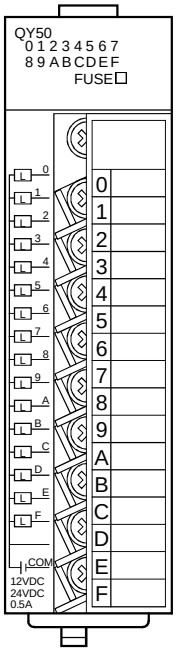
External Connections

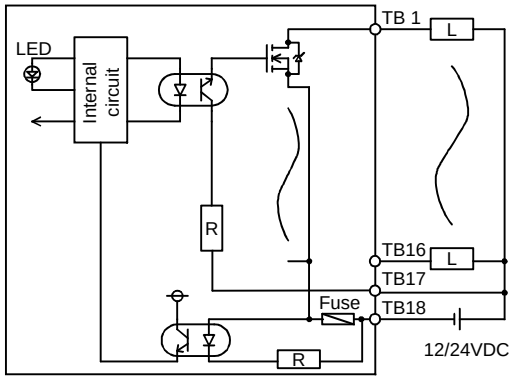


The above diagram shows the first half of 32 points (F).
The latter half of 32 points (L) are similar.

Pin Number	Signal Name	Pin Number	Signal Name	Pin Number	Signal Name	Pin Number	Signal Name
1B20	Y00	1A20	Y10	2B20	Y20	2A20	Y30
1B19	Y01	1A19	Y11	2B19	Y21	2A19	Y31
1B18	Y02	1A18	Y12	2B18	Y22	2A18	Y32
1B17	Y03	1A17	Y13	2B17	Y23	2A17	Y33
1B16	Y04	1A16	Y14	2B16	Y24	2A16	Y34
1B15	Y05	1A15	Y15	2B15	Y25	2A15	Y35
1B14	Y06	1A14	Y16	2B14	Y26	A14	Y36
1B13	Y07	1A13	Y17	2B13	Y27	2A13	Y37
1B12	Y08	1A12	Y18	2B12	Y28	2A12	Y38
1B11	Y09	1A11	Y19	2B11	Y29	2A11	Y39
1B10	Y0A	1A10	Y1A	2B10	Y2A	2A10	Y3A
1B09	Y0B	1A09	Y1B	2B09	Y2B	2A09	Y3B
1B08	Y0C	1A08	Y1C	2B08	Y2C	2A08	Y3C
1B07	Y0D	1A07	Y1D	2B07	Y2D	2A07	Y3D
1B06	Y0E	1A06	Y1E	2B06	Y2E	2A06	Y3E
1B05	Y0F	1A05	Y1F	2B05	Y2F	2A05	Y3F
1B04	NC	1A04	NC	2B04	NC	2A04	NC
1B03	NC	1A03	NC	2B03	NC	2A03	NC
1B02	12/24VDC	1A02	COM1	2B02	12/24VDC	2A02	COM2
1B01	12/24VDC	1A01	COM1	2B01	12/24VDC	2A01	COM2

■ QY50 transistor output module (sink type)

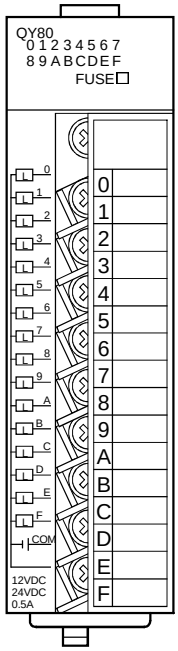
Specifications \ Type		Transistor Output Module (Sink Type)	
		QY50	Appearance
Number of output points		16 points	
Isolation method		Photocoupler	
Rated load voltage		12-24VDC (+20/-15%)	
Maximum load current		0.5A/point, 4A/common	
Maximum inrush current		4A, 10ms or less	
Leakage current at OFF		0.1mA or less	
Maximum voltage drop at ON		0.2VDC (TYP.) 0.5A, 0.3VDC (MAX.) 0.5A	
Response time	OFF→ON	1ms or less	
	ON→OFF	1ms or less (rated load, resistive load)	
Surge suppressor		Zener diode	
Fuse		4A × 2pcs connected in parallel (6.7A equivalent). (unchangeable) (fuse blow capacity: 50A)	
Fuse blow indication		Yes (When fuse blows, LED indicates it and signal is output to CPU)	
External supply power	Voltage	12-24VDC (+20/-15%) (ripple ratio within 5%)	
	Current	20mA (at 24VDC) (Max. all points ON)	
Dielectric withstand voltage		560VAC rms/3 cycles (altitude 2000m (6557.38feet))	
Insulation resistance		10MΩ or more by insulation resistance tester	
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		Fast transient noise IEC61000-4-4: 1kV	
Common terminal arrangement		16 points/common (common terminal: TB18)	
Operation indicator		ON indication (LED)	
External connections		18-point terminal block (M36 screws)	
Applicable wire size		Core: 0.3 to 0.75mm², OD: 2.8mm max.	
Applicable crimping terminal		R1.25-3 (sleeved crimping terminals cannot be used.)	
5VDC internal current consumption		80mA	
Weight (kg (lb))		0.17 (0.37)	

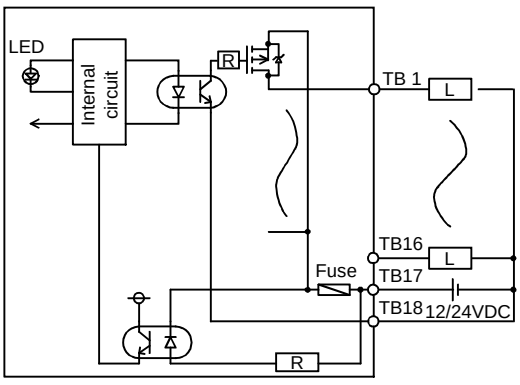
External Connections	Terminal Block Number	Signal Name
	TB1	Y00
	TB2	Y01
	TB3	Y02
	TB4	Y03
	TB5	Y04
	TB6	Y05
	TB7	Y06
	TB8	Y07
	TB9	Y08
	TB10	Y09
	TB11	Y0A
	TB12	Y0B
	TB13	Y0C
	TB14	Y0D
	TB15	Y0E
	TB16	Y0F
	TB17	12/24VDC
	TB18	COM

Output Modules

■ QY80 transistor output module (source type)

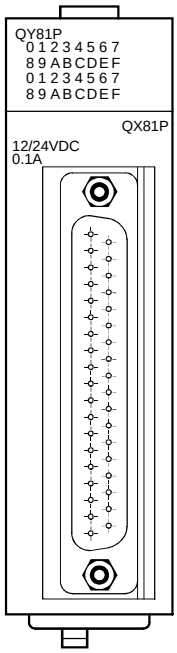
Specifications \ Type		Transistor Output Module (Source Type) QY80	Appearance
Number of output points		16 points	
Isolation method		Photocoupler	
Rated load voltage		12-24VDC (+20/-15%)	
Usable load voltage range		10.2VDC to 28.8VDC	
Maximum load current		0.5A/point, 4A/common	
Maximum inrush current		4A, 10ms or less	
Leakage current at OFF		0.1mA or less	
Maximum voltage drop at ON		0.2VDC (TYP.) 0.5A, 0.3VDC (MAX.) 0.5A	
Response time	OFF→ON	1ms or less	
	ON→OFF	1ms or less (rated load, resistive load)	
Surge suppressor		Zener diode	
Fuse		4A × 2pcs connected in parallel (6.7A equivalent). (unchangeable) (fuse blow capacity: 50A)	
Fuse blow indication		Yes (When fuse blows, LED indicates it and signal is output to CPU)	
External supply power	Voltage	12-24VDC (+20/-15%) (ripple ratio within 5%)	
	Current	20mA (at 24VDC) (Max. all points ON)	
Dielectric withstand voltage		560VAC rms/3 cycles (altitude 2000m (6557.38feet))	
Insulation resistance		10MΩ or more by insulation resistance tester	
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		Fast transient noise IEC61000-4-4: 1kV	
Common terminal arrangement		16 points/common (common terminal: TB17)	
Operation indicator		ON indication (LED)	
External connections		18-point terminal block (M3 × 6 screws)	
Applicable wire size		Core: 0.3 to 0.75mm^2, OD: 2.8mm (0.11inch) max.	
Applicable crimping terminal		R1.25-3 (sleeved crimping terminals cannot be used.)	
5VDC internal current consumption		80mA	
Weight (kg (lb))		0.17 (0.37)	



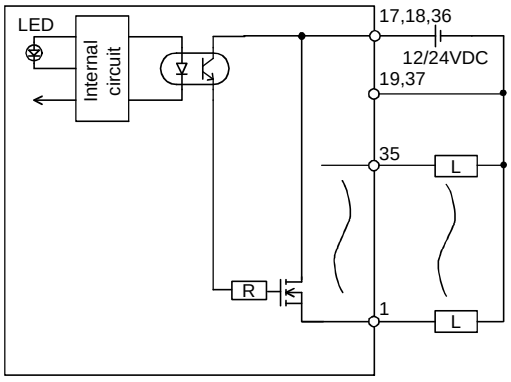
External Connections	Terminal Block Number	Signal Name
	TB1	Y00
	TB2	Y01
	TB3	Y02
	TB4	Y03
	TB5	Y04
	TB6	Y05
	TB7	Y06
	TB8	Y07
	TB9	Y08
	TB10	Y09
	TB11	Y0A
	TB12	Y0B
	TB13	Y0C
	TB14	Y0D
	TB15	Y0E
	TB16	Y0F
	TB17	COM
	TB18	0V

■ QY81P transistor output module (source type)

Specifications \ Type		Transistor Output Module (Source Type) QY81P	Appearance
Number of output points		32 points	
Isolation method		Photocoupler	
Rated load voltage		12-24VDC (+20/-15%)	
Usable load voltage range		10.2VDC to 28.8VDC	
Maximum load current		0.1A/point, 2A/common	
Maximum inrush current		0.7A, 10ms or less	
Leakage current at OFF		0.1mA or less	
Maximum voltage drop at ON		0.1VDC (TYP.) 0.1A, 0.2VDC (MAX.) 0.1A	
Response time	OFF→ON	1ms or less	
	ON→OFF	1ms or less (rated load, resistive load)	
Surge suppressor		Zener diode	
Fuse		No	
External supply power	Voltage	12-24VDC (+20/-15%) (ripple ratio within 5%)	
	Current	40mA (at 24VDC) (Max. all points ON)	
Dielectric withstand voltage		560VAC rms/3 cycles (altitude 2000m (6557.38feet))	
Insulation resistance		10MΩ or more by insulation resistance tester	
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		Fast transient noise IEC61000-4-4: 1kV	
Common terminal arrangement		32 points/common (common terminal: 17, 18, 36)	
Short circuit protection		Yes (thermal protection, short circuit protection) • Thermal protection is activated in increments of 2 points. • Short circuit protection is activated in increments of 1 point.	
Operation indicator		ON indication (LED)	
External connections		37-pin D-sub connector	
Applicable wire size		0.3mm^2	
External wiring connector		A6CON1E, A6CON2E, A6CON3E (optional)	
Applicable connector/terminal block conversion module		A6TBX36-E, A6TBX54-E, A6TBX70-E	
5VDC internal current consumption		95mA	
Weight (kg (lb))		0.15 (0.33)	



External Connections



Pin Number	Signal Name	Pin Number	Signal Name
1	Y00	9	Y10
20	Y01	28	Y11
2	Y02	10	Y12
21	Y03	29	Y13
3	Y04	11	Y14
22	Y05	30	Y15
4	Y06	12	Y16
23	Y07	31	Y17
5	Y08	13	Y18
24	Y09	32	Y19
6	Y0A	14	Y1A
25	Y0B	33	Y1B
7	Y0C	15	Y1C
26	Y0D	34	Y1D
8	Y0E	16	Y1E
27	Y0F	35	Y1F
17	COM	37	0V
36	COM	19	0V
18	COM		

Analog-to-Digital Conversion Modules: Q64AD, Q68ADV, Q68ADI

Overview

External analog voltage or current signals are converted into digital values and read by the CPU module. With the analog data, e.g. voltage, pressure, temperature, current and speed, of external devices such as sensors converted into digital data, they can be processed by the CPU module.

Features

● Model selection according to applications

1) Q64AD ..... 4 channels. Voltage or current input can be chosen per channel.
2) Q68ADV..... 8 channels, voltage input
3) Q68ADI ..... 8 channels, current input

● Fast conversion processing

Conversion speed is as high as 80μs/channel.
Also, the temperature drift compensation is achieved in the processing time of all-channel conversion time + 160μs.

● High accuracy

Conversion accuracy is as high as ±0.1% (operating ambient temperature 25±5ºC).

● Input range switching

Input range (Note 1) switching can be set easily from the GPPW.

Note 1: The input range indicates the offset/gain setting type. The types generally often used are provided as defaults, and the user can use others by offset/gain setting.

● Simple setting by utility package

The optional SW0D5C-QADU-E utility package is available. The use of the utility package is not required, but using the utility package allows initial setting and automatic refresh setting to be made on the screen to reduce sequence programs, and facilitate the checking of the setting status and operating status.

Functions

● Averaging function

This function averages analog-to-digital conversion data per channel in terms of count or time and outputs an average value in digital form. (Sequential digital output processing is called sampling.)

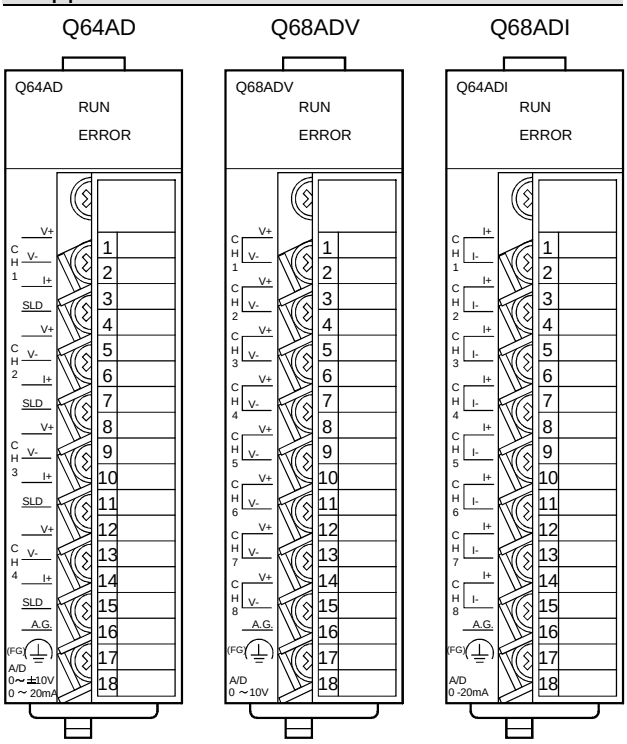
● Temperature drift compensation function

This function automatically compensates for an error due to a change in ambient temperature of the module to improve conversion accuracy.

● Maximum and minimum value holding function

This function holds the maximum and minimum values of a digital output value within the module. The maximum and minimum values can be detected without creation of sequence programs.

Appearance



Equipment

<Q64AD, Q68ADV, Q68ADI accessories>

Product	Description
Manual	Q64AD, Q68ADV, Q68ADI User's Manual (Hardware)

<Separately prepared products>
The following manual must be prepared separately.

Product	Description
Manual	Q64AD, Q68ADV, Q68ADI User's Manual (Details)

<Software>

Type	Description	Remarks
SW4D5C-GPPW-E or later	For sequence programming	○
SW0D5C-QADU-E	Analog-to-digital module utility package	△

○: Must be prepared. △: Prepared as required.
Note: The software of the above products or later version are usable.

Analog-to-Digital Conversion Modules: Q64AD, Q68ADV, Q68ADI

Performance Specifications

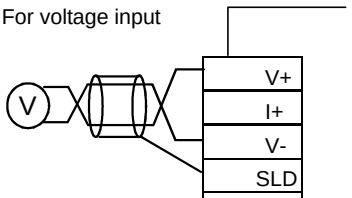
Item \ Type		Q64AD	Q68ADV	Q68ADI
Number of analog input points		4 points (4 channels)	8 points (8 channels)	8 points (8 channels)
Analog input	Voltage	-10 to 10VDC (input resistance value 1MΩ)		—
	Current	0 to 20mADC (input resistance value 250Ω)	—	0 to 20mADC (input resistance value 250Ω)
Digital output		-4096 to 4095		
I/O characteristics Max. resolution		See table below		
Accuracy (accuracy to full-scale)	Ambient temperature 25±5°C	±0.1%		
	Ambient temperature 0 to 55°C	With temperature drift compensation: ±0.3%, without: ±0.4%		
Conversion time		80μs/channel (With temperature drift compensation, time is increased by 160μs independently of the number of channels used.)		
Absolute max. input		Voltage: ±15V, current: ±30mA		
Insulation system		Across I/O terminals and PLC power supply: Photocoupler insulation Across channels: No insulation		
Number of points occupied		16 points		
Connection terminal		18-point terminal block		
Applicable wire size		Core: 0.3 to 0.75mm², OD: 2.8mm (0.11inch) max.		
Applicable crimping terminal		RAV 1.25-3 R1.25-3 (sleeved crimping terminal cannot be used)		
Internal current consumption (5VDC)		630mA	640mA	640mA
Weight (kg (lb))		0.14 (0.31)	0.19 (0.42)	0.19 (0.42)

Input	Analog input range	Max. resolution	Digital output value
Voltage	0 to 10V	2.5mV	0 to 4000
	0 to 5V	1.25mV	
	1 to 5V	1.0mV	
	-10 to 10	2.5mV	-4000 to 4000
Current	0 to 20mA	5μA	0 to 4000
	4 to 20mA	4μA	

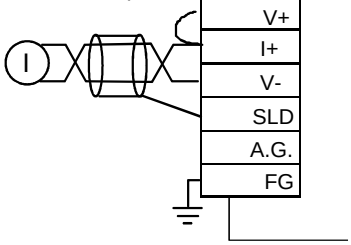
External Wiring

Q64AD

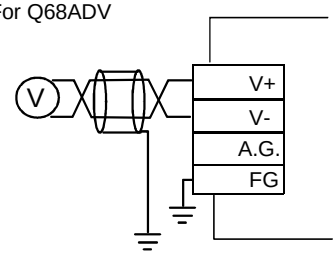
For voltage input



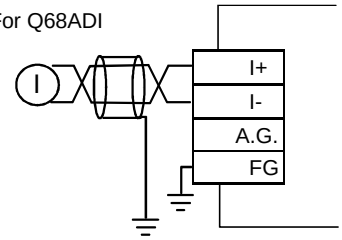
For current input



For Q68ADV



For Q68ADI



Terminal Number	Signal Name					
	Q64AD		Q68ADV		A68ADI	
1	CH1	V+	CH1	V+	CH1	I+
2		V-		V-		I-
3		I+	CH2	V+	CH2	I+
4		SLD		V-		I-
5	CH2	V+	CH3	V+	CH3	I+
6		V-		V-		I-
7		I+	CH4	V+	CH4	I+
8		SLD		V-		I-
9	CH3	V+	CH5	V+	CH5	I+
10		V-		V-		I-
11		I+	CH6	V+	CH6	I+
12		SLD		V-		I-
13	CH4	V+	CH7	V+	CH7	I+
14		V-		V-		I-
15		I+	CH8	V+	CH8	I+
16		SLD		V-		I-
17	A.G (ANALOG GND)					
18	FG					

Analog-to-Digital Conversion Modules: Q64AD, Q68ADV, Q68ADI

I/O and Buffer Memory Lists

■ I/O list

Device No.	Signal Name	Device No.	Signal Name
X00	Module ready	Y00 to Y08	Not used
X01	Temperature drift compensation status flag		
X02 to X08	Not used		
X09	Operating condition setting completion flag	Y09	Operating condition setting request
X0A	Offset/gain setting mode status flag	Y0A	User range write request
X0B	Channel changing completion flag	Y0B	Channel changing request
X0C to X0D	Not used	Y0D	Max/minimum value reset request
X0E	Analog-to-digital conversion completion flag	Y0C, 0E	Not used
X0F	Error occurrence flag	Y0F	Error clear request

■ Buffer memory list

Address	Description	Address	Description	Address	Description	Address	Description
0	Analog-to-digital conversion enable/disable setting	11	CH1. digital output value	21	Setting range check (CH.5 to CH.8)	35	CH.3 minimum value
1	CH1 average time, average count	12	CH2. digital output value	22	Offset/gain setting mode Offset designation	36	CH.4 maximum value
2	CH2 average time, average count	13	CH3. digital output value			37	CH.4 minimum value
3	CH3 average time, average count	14	CH4. digital output value	23	Offset/gain setting mode Offset designation	38	CH.5 maximum value
4	CH4 average time, average count	15	CH5. digital output value			39	CH.5 minimum value
5	CH5 average time, average count	16	CH6. digital output value	24 to 29	Reserved for system	40	CH.6 maximum value
6	CH6 average time, average count	17	CH7. digital output value	30	CH.1 maximum value	41	CH.6 minimum value
7	CH7 average time, average count	18	CH8. digital output value	31	CH.1 minimum value	42	CH.7 maximum value
8	CH8 average time, average count	19	Error code	32	CH.2 maximum value	43	CH.7 minimum value
9	Averaging designation	20	Setting range (CH.1 to CH.4)	33	CH.2 inimum value	44	CH.8 maximum value
10	Analog-to-digital conversion completion flag			34	CH.3 maximum value	45	CH.8 minimum value

Note 1: The Q64AD having 4 channels of analog inputs does not have the areas corresponding to CH.5 to CH.8.

● Analog-to-digital conversion enable/disable setting

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
								CH 8	CH 7	CH 6	CH 5	CH 4	CH 3	CH 2	CH 1

0: analog-to-digital conversion enable, 1: analog-to-digital conversion disable
(Defaults to analog-to-digital conversion enable of all channels.)

● CH□ average time, average count

For count-based averaging, set within the range 4 to 62500 times.

For time-based averaging, set within the range 2 to 5000ms.

● CH□ digital output value, CH□ maximum value, CH□ minimum value

16-bit signed binary values are stored.

● Setting range check

Area used to check the setting ranges set from GPPW.

b15 b14 b13 b12	b11 b10 b9 b8	b7 b6 b5 b4	b3 b2 b1 b0	
CH4	CH3	CH2	CH1	Address 20
CH8	CH7	CH6	CH5	Address 21

0H: 4～20mA, 1H: 0～20mA, 2H: 1～5V, 3H: 0～5V,
4H: -10～+10V, 5H: 0～10V, FH: user setting range

● Averaging designation

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
CH 8	CH 7	CH 6	CH 5	CH 4	CH 3	CH 2	CH 1	CH 8	CH 7	CH 6	CH 5	CH 4	CH 3	CH 2	CH 1
Averaged channel designation 0: sampling, 1: averaging								Time/count designation 0: count designation,1: time designation							

(Defaults to sampling.)

● Conversion completion flag

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
								CH 8	CH 7	CH 6	CH 5	CH 4	CH 3	CH 2	CH 1

1: analog-to-digital conversion completion, 0: analog-to-digital conversion incompletion

● Offset/gain setting mode designation

Specify the channels where offset/gain selection will be set by the user.

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	
								CH 8	CH 7	CH 6	CH 5	CH 4	CH 3	CH 2	CH 1	Address 22

Specify the channels to which offset setting is made.

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	
								CH 8	CH 7	CH 6	CH 5	CH 4	CH 3	CH 2	CH 1	Address 23

Specify the channels to which gain setting is made.

Utility Package for Analog-to-Digital Conversion Modules: SW0D5C-QADU-E

Overview

SW0D5C-QADU-E is a utility package designed to set initial data needed to use the Q64AD, Q68ADV or Q68ADI analog-to-digital conversion module and to set automatic reading of analog-to-digital converted data to the CPU device memory. It is used by adding it onto SW4D5C-GPPW-E or later.

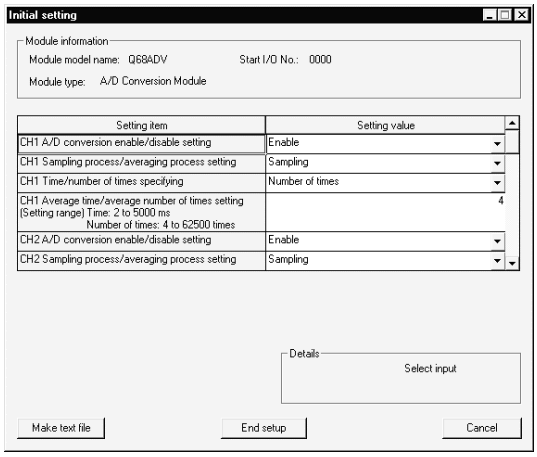
When using the Q64AD, Q68ADV or Q68ADI, QADU is not required as initial value setting and others can be made in sequence programs, but using QADU can reduce sequence programs and facilitate the checking of the setting status and operating status.

Initial Data Setting

Initial value setting necessary to use the analog-to-digital conversion module can be made on the screen. The following table lists the types of initial values that may be set.

Item	Description
Analog-to-digital conversion enable/disable	Specifies the channel where analog-to-digital conversion will be made.
Sampling/averaging	Chooses sampling or averaging.
Time average/count average selection	Chooses time average or count average for averaging selection.
Time/count	Specifies average count or average time.

Initial value setting screen sample

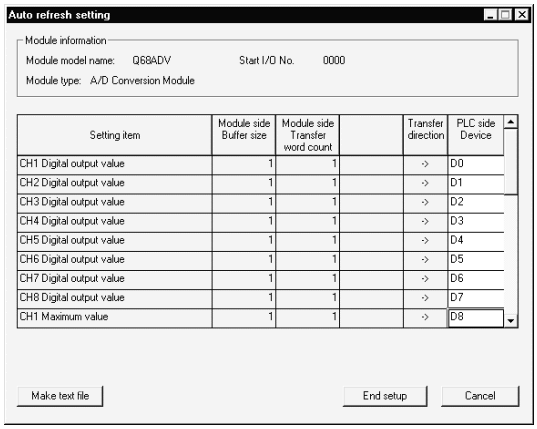


Automatic Refresh Setting

By making automatic refresh setting, you can automatically read analog-to-digital converted data, etc. from the analog-to-digital conversion module into the CPU, reducing programs. In automatic refresh setting, assignment is made to set the CPU devices to which the analog-to-digital conversion module data will be read. The following data can be refreshed automatically.

- Analog-to-digital converted value of each channel
- Error code detected by the analog-to-digital conversion module
- Maximum and minimum values of the analog-to-digital converted value of each channel

Automatic refresh setting screen sample



Monitoring and Testing Functions

The monitoring and testing functions are designed to monitor the data states and operating status in the analog-to-digital conversion module to force the set values to be changed as required. Since you can acquire the operating status without needing to know the addresses in the analog-to-digital conversion module, these functions are effective for system adjustment and troubleshooting. The following data can be monitored and tested.

Target	Item
Analog-to-digital converted value	Module ready Analog-to-digital conversion completion flag Analog-to-digital converted value of each channel Temperature drift compensation status flag Maximum/minimum value of each channel Maximum/minimum value reset request
Error	Error code Error occurrence flag Error clear request
Operating condition	Analog-to-digital conversion enable/disable setting Sampling/averaging setting Averaging condition
Input range	Input range setting status Offset/gain setting

Digital-to-Analog Conversion Modules: Q62DA, Q64DA

Overview

Digital data given by the CPU module are converted into analog signals and output to an external device. With the CPU module-processed data converted into analog data, information can be sent to equipment which handles analog data, e.g. an inverter.

Features

● Model selection according to applications

1) Q62DA ..... 2 channels. Voltage or current output can be chosen per channel.
2) Q64DA ..... 4 channels. Voltage or current output can be chosen per channel.

● Fast conversion processing

Conversion speed is as high as 80μs/channel.

● High accuracy

Conversion accuracy is as high as ±0.1% (operating ambient temperature 25±5ºC).

● Output range switching

Output range (Note 1) switching can be set easily from the GPPW function software package.

Note 1: The output range indicates the offset/gain setting type. The types often used are provided as defaults, and the user can use others by offset/gain setting.

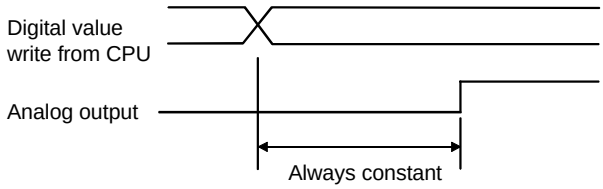
● Simple setting by utility package

The optional SW0D5C-QDAU-E utility package is available. The use of the utility package is not required, but using the utility package allows initial setting and automatic refresh setting to be made on the screen to reduce sequence programs and facilitate the checking of the setting status and operating status.

Functions

● Synchronous output function

This function sets a constant time (120μs) between CPU's digital value write and analog value output. This function can be used with the constant scan function of the PLC CPU to exercise precision analog control.

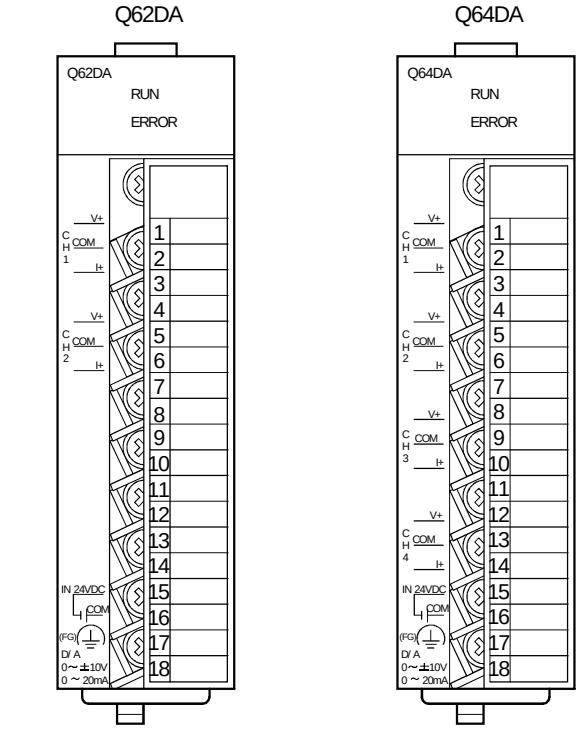


Note 2: Using this function makes only one channel available and the other channels unavailable.

● Analog output hold/clear function

When the CPU module is in error or STOP status, this function allows the analog value to be held or cleared. (Setting can be made per channel.)

Appearance



Equipment

<Q62DA, Q64DA accessories>

Product	Description
Manual	Q62DA, Q64DA User's Manual (Hardware)

<Separately prepared products>

The following manual must be prepared separately.

Product	Description
Manual	Q62DA, Q64DA User's Manual (Details)

<Software>

Type	Description	Remarks
SW4D5C-GPPW-E or later	For sequence programming	○
SW0D5C-QDAU-E	Digital-to-analog module utility package	△

○: Must be prepared. △: Prepared as required.

Note 3: The software of the above products or later version are usable.

Digital-to-Analog Conversion Modules: Q62DA, Q64DA

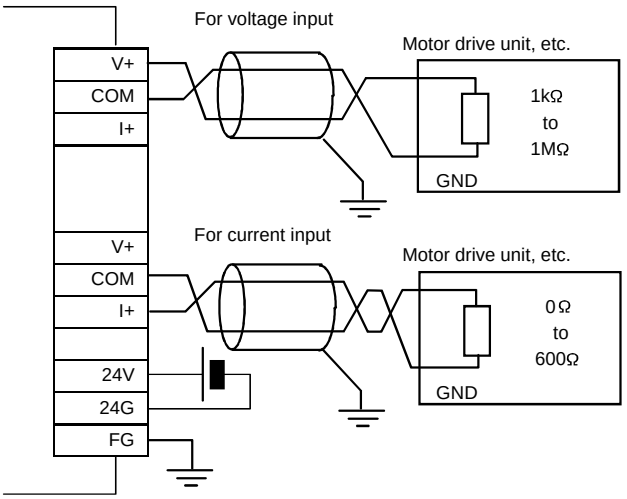
Performance Specifications

Item \ Type		Q62DA	Q64DA
Number of analog output points		2 points (2 channels)	4 points (4 channels)
Digital input		-4096 to 4095	
Analog output	Voltage	-10 to 10VDC (external load resistance 1k to 1MΩ)	
	Current	0 to 20mADC (external load resistance 0 to 600Ω)	
I/O characteristics Max. resolution		See table below	
Accuracy (accuracy to full-scale)	Ambient temperature 25±5°C	±0.1%	
	Ambient temperature 0 to 55°C	±0.3%	
Conversion time		80μs/channel	
Absolute max. output	Voltage	±12V	
	Current	21mA	
Output short circuit protection		Yes	
Insulation system		Across I/O terminals and PLC power supply: Photocoupler insulation Across output channels: No insulation Across external supply power and analog output: No insulation	
Number of points occupied		16 points	
Connection terminal		18-point terminal block	
Applicable wire size		Core: 0.3 to 0.75mm², OD: 2.8mm (0.11inch) max.	
Applicable crimping terminal		R1.25-3 (sleeved crimping terminal cannot be used)	
External supply power		24VDC+20%, -15%	
		Ripple, spike, 500mVp-p max.	
		125mA	180mA
Internal current consumption (5VDC)		330mA	345mA
Weight (kg (lb))		0.19 (0.42)	

Input	Digital input value	Analog output range	Max. resolution
Voltage	0 to 4000	0 to 5V	1.25mA
		1 to 5V	1.0mV
	-4000 to 4000	-10 to 10V	2.5mV
Current	0 to 4000	0 to 20mA	5μA
		4 to 20mA	4μA

External Wiring

Q62DA,Q64DA



Terminal Number	Signal Name			
	Q62DA		Q64DA	
1	CH1	V+	CH1	V+
2		COM		COM
3		I+		I+
4	Vacant		Vacant	
5	CH2	V+	CH2	V+
6		COM		COM
7		I+		I+
8	Vacant		Vacant	
9	Vacant		CH3	V+
10	Vacant			COM
11	Vacant			I+
12	Vacant		Vacant	
13	Vacant		CH4	V+
14	Vacant			COM
15	Vacant			I+
16	24V			
17	24G			
18	FG			

Digital-to-Analog Conversion Modules: Q62DA, Q64DA

I/O and Buffer Memory Lists

■ I/O list

Device No.	Signal Name	Device No.	Signal Name
X00	Module ready	Y00	Vacant
X01 to X08	Not used	Y01	CH.1 output enable/disable flag
		Y02	CH.2 output enable/disable flag
		Y03	CH.3 output enable/disable flag
		Y04	CH.4 output enable/disable flag
		Y05 to Y08	Not used
X09	Operating condition setting completion flag	Y09	Operating condition setting request
X0A	Offset/gain setting mode status flag	Y0A	User range write request
X0B	Channel changing completion flag	Y0B	Channel changing request
X0C	Set value changing completion flag	Y0C	Set value changing request
X0D	Synchronous output mode status flag	Y0D	Synchronous output request
X0E	Not used	Y0E	Not used
X0F	Error occurrence flag	Y0F	Error clear request

Note 1: Signals to CH.3 and CH.4 are valid for the 4-channel output Q64DA.

■ Buffer memory list

Address	Description	Address	Description	Address	Description
0	Digital-to-analog conversion enable/disable	11	CH.1 set value check code	21	Vacant
1	CH.1 digital value	12	CH.2 set value check code	22	Offset/gain setting mode Offset designation
2	CH.2 digital value	13	CH.3 set value check code		
3	CH.3 digital value	14	CH.4 set value check code	23	Offset/gain setting mode Gain designation
4	CH.4 digital value	15 to 18	Vacant		
5 to 9	Vacant	19	Error code	24	Offset/gain adjustment value designation
10	Vacant	20	Setting range		

Note 1: Data for CH3 and CH4 are valid for the 4-channel output Q64DA.

● Digital-to-analog conversion enable/disable setting

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
–	–	–	–	–	–	–	–	–	–	–	–	CH4	CH3	CH2	CH1

0: digital-to-analog conversion enable, 1: digital-to-analog conversion disable
(Defaults to digital-to-analog conversion disable of all channels.)

● CH□ set value check code

The range check result of the written digital value is stored.

000FH: The digital value written is more than the setting range.
00F0H: The digital value written is less than the setting range.
00FFH: The digital value written is outside the setting range.

● Offset/gain setting mode designation

Specify the channels where offset/gain selection will be set by the user.

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	
												CH4	CH3	CH2	CH1	Address 22

Specify the channels for offset setting.

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	
												CH4	CH3	CH2	CH1	Address 23

Specify the channels for gain setting.

● CH□ digital value

Write the digital value as a 16-bit signed binary value.

Setting range
For voltage output: -4096 to 4095
For current output: 0 to 4095

● Setting range check

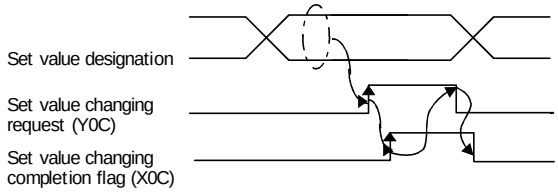
Area used to check the setting ranges set from GPPW.

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
CH4				CH3				CH2				CH1			

0H: 4～20mA, 1H: 0～20mA, 2H: 1～5V, 3H: 0～5V,
4H: - 10～+10V, FH: user setting range

● Offset/gain adjustment value designation

To adjust the analog output value in the offset/gain selection mode, write a digital value of -3000 to 3000 to determine the offset or gain value.



Utility Package for Digital-to-Analog Conversion Modules: SW0D5C-QDAU-E

Overview

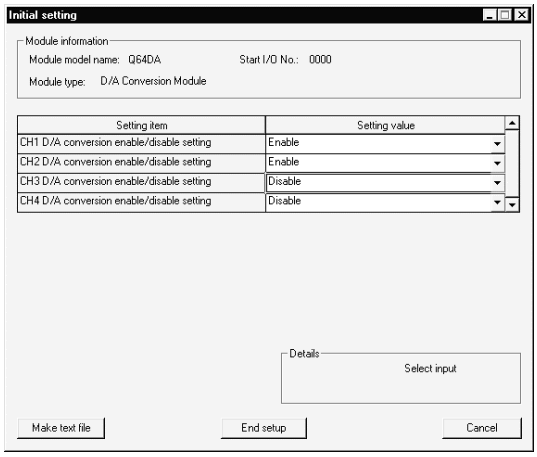
SW0D5C-QDAU-E is a utility package designed to set initial data needed to use the Q62DA or Q64DA digital-to-analog conversion module and to set automatic writing of digital-to-analog converted data from the CPU device memory to the digital-to-analog conversion module, and is used by adding it onto SW4D5C-GPPW-E or later.
When using the Q62DA or Q64DA, the use of QDAU is not required and initial value setting and others can be made in sequence programs, but using QDAU can reduce their sequence programs and facilitate the checking of the setting status and operating status.

Initial Data Setting

Initial value setting necessary to use the digital-to-analog conversion module can be made on the screen. The following table lists the types of initial values that may be set.

Item	Description
Digital-to-analog conversion enable/disable	Specifies the channel where digital-to-analog conversion will be made.

Initial value setting screen sample

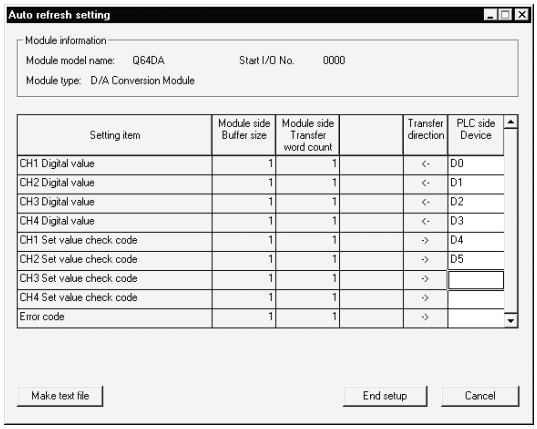


Automatic Refresh Setting

By making automatic refresh setting, you can automatically write digital-to-analog converted data, etc. from the CPU to the digital-to-analog conversion module, reducing programs. In automatic refresh setting, assignment is made to set the CPU device data which will be written to the digital-to-analog conversion module and the CPU devices to which the digital-to-analog conversion module data will be read. The following data can be refreshed automatically.

- Digital-to-analog converted value of each channel
- Range check code for digital-to-analog converted digital value
- Error code detected by the digital-to-analog conversion module

Automatic refresh setting screen sample

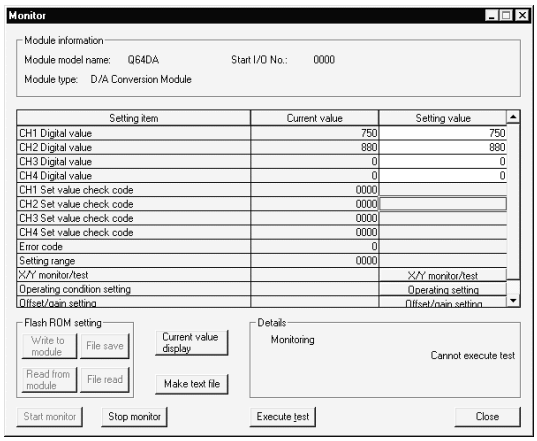


Monitoring and Testing Functions

The monitoring and testing functions are designed to monitor the data states and operating status in the digital-to-analog conversion module to force the set values to be changed as required. Since you can acquire the operating status without needing to know the addresses in the digital-to-analog conversion module, these functions are effective for system adjustment and troubleshooting. The following data can be monitored and tested.

Target	Item
Digital-to-analog conversion	Module ready Synchronous output mode status flag Synchronous output request Digital-to-analog converted value of each channel Each channel output enable/disable flag
Error	Digital value check code Error code Error occurrence flag Error clear request
Operating condition	Digital-to-analog conversion enable/disable setting
Output range	Output range setting status Offset/gain setting

Monitoring/testing screen sample



High-Speed Counter Modules: QD62, QD62E, QD62D

Overview

The QD62, QD62E and QD62D are high-speed counter modules designed to count high-speed pulse trains. They can be used with external encoders to exercise control such as positioning. These three modules differ as indicated below and are selected according to your applications.

Item	QD62	QD62E	QD62D
I/O type	DC input Sink output	DC input Source output	Differential input Sink output
Max. counting speed	200kPPS		500kPPS

Features

● 32-bit counting range

There are two input channels which are independent and can count signed 32-bit binary values (-2147483648 to 2147483647), respectively.

● Counting speed switching function

The max. counting speed can be changed to count a wide range of pulses from high-speed pulses to low-frequency pulses of slow leading/trailing edge.

● Input system selection

The input system can be selected from among single-phase multiplied by one, single-phase multiplied by two, two-phase multiplied by one, two-phase multiplied by two, two-phase multiplied by four, and CW/CCW.

● Counter type selection

You can choose either of the linear counter and ring counter types.

● CPU module interrupt function

When the preset count value is reached, an interrupt signal is output to the CPU module to start an interrupt program.

● Counter selection function

One function can be chosen for use from among four different counter functions.

● Function control from external terminal

The preset or counter function can be selected by applying a voltage to the external preset terminal or function start terminal.

● Maintainability improvement

The X input signal and module indicator LED indicate that a fuse blown in the external output section is detected.

● Ease of setting by utility package

The optional utility package (SW0D5C-QCTU-E) is available. The use of the utility package is not required, but using the utility package allows initial setting and automatic refresh setting to be made on the screen to reduce sequence programs and facilitate the checking of the setting status and operating status.

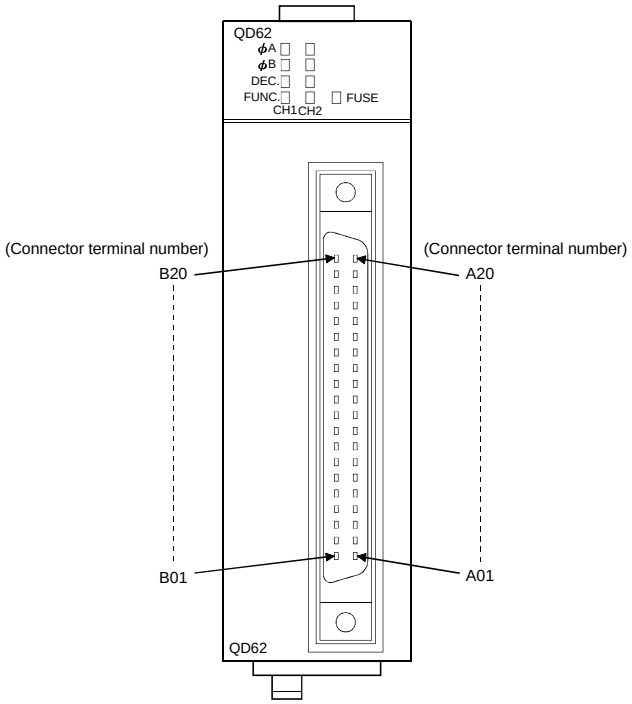
Function List

Name		Description
Linear counter function		• Can count in the range -2147483648 to 2147483647. Detects overflow if this range is exceeded.
Ring counter function		• Counting alternates between the maximum and minimum values of the ring counter.
Coincidence output function		• Outputs an ON/OFF signal after comparing the preset coincidence detection point of any channel with the present value of the counter. • On detection of coincidence, produces a PLC CPU interrupt signal to start an interrupt program.
Preset function		• Changes the present value of the counter to any value. • Preset operation can be done either by a sequence program or by an external preset input.
Counter selection function	Count disable	• Stops counting pulses while the count enable command is ON.
	Latch counter	• Stores the present value of the counter when the signal of the counter function selection start command is input.
	Sampling counter	• After the counter function selection start command is input, input pulses are counted during a preset sampling period and stored in the buffer memory.
	Periodic pulse counter	• While the signal of the counter function selection start command is input, the present value is stored in the buffer memory at preset intervals.

These functions can be used together. However, you can choose only one of the linear counter and ring counter functions. Also, you can choose and use only one of the four counter function selection functions.

High-Speed Counter Modules: QD62, QD62E, QD62D

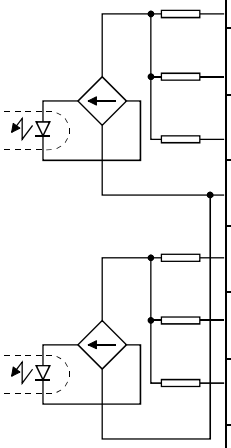
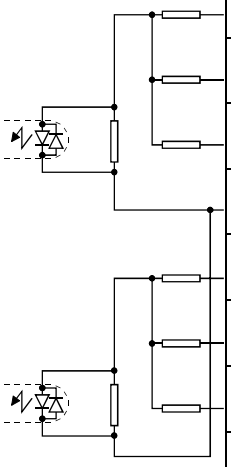
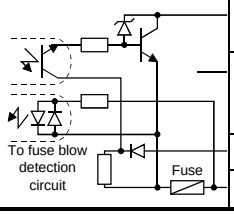
Appearance



Indicator LED	Description
φ A	A-phase pulse input indication
φ B	B-phase pulse input indication
DEC.	Counter down-counting indication
FUNC.	Function start input indication
FUSE.	Coincidence signal output section fuse blow indication

External I/O Terminals

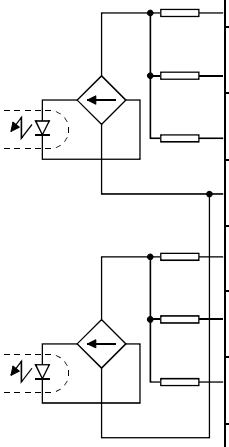
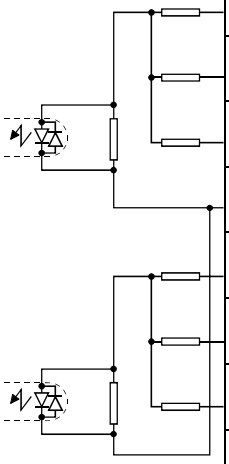
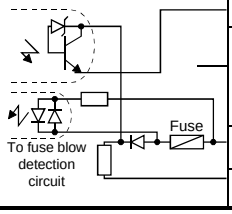
QD62 external I/O terminals

Internal Circuit	Terminal Numbers CH1	Terminal Numbers CH2	Signal Name
	A20	A13	A-phase pulse input 24V
	B20	B13	A-phase pulse input 12V
	A19	A12	A-phase pulse input 5V
	B19	B12	ABCOM
	A18	A11	B-phase pulse input 24V
	B18	B11	B-phase pulse input 12V
	A17	A10	B-phase pulse input 5V
	—	—	—
	B17	B10	Preset input 24V
	A16	A09	Preset input 12V
	B16	B09	Preset input 5V
	A15	A08	CTRLCOM
	B15	B08	Function start input 24V
	A14	A07	Function start input 12V
	B14	B07	Function start input 5V
	—	—	—
	A06	A05	EQU1 Coincidence output point No. 1
	B06	B05	EQU2 Coincidence output point No. 2
	B02, B01		12/24V
	A02, A01		0V

Terminal numbers A03, A04, B03 and B04 are not used.

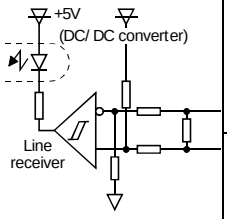
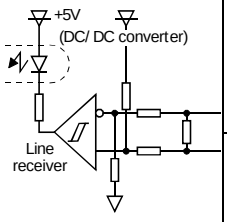
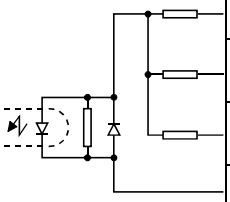
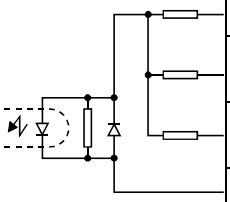
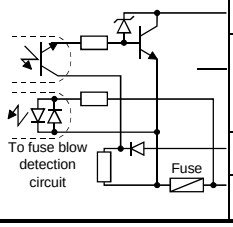
High-Speed Counter Modules: QD62, QD62E, QD62D

QD62E external I/O terminals

Internal Circuit	Terminal Numbers CH1	Terminal Numbers CH2	Signal Name
	A20	A13	A-phase pulse input 24V
	B20	B13	A-phase pulse input 12V
	A19	A12	A-phase pulse input 5V
	B19	B12	ABCOM
	A18	A11	B-phase pulse input 24V
	B18	B11	B-phase pulse input 12V
	A17	A10	B-phase pulse input 5V
	—	—	—
	B17	B10	Preset input 24V
	A16	A09	Preset input 12V
	B16	B09	Preset input 5V
	A15	A08	CTRLCOM
	B15	B08	Function start input 24V
	A14	A07	Function start input 12V
	B14	B07	Function start input 5V
	—	—	—
	A06	A05	EQU1 Coincidence output point No. 1
	B06	B05	EQU2 Coincidence output point No. 2
	B02, B01		12/24V
	A02, A01		0V

Terminal numbers A03, A04, B03 and B04 are not used.

QD62D external I/O terminals

Internal Circuit	Terminal Numbers CH1	Terminal Numbers CH2	Signal Name
	A20	A14	A-phase pulse input
	B20	B14	A-phase pulse input
	A19	A13	B-phase pulse input
	B19	B13	B-phase pulse input
	A18	A12	Preset input 24V
	B18	B12	Preset input 12V
	A17	A11	Preset input 5V
	B17	B11	PRSTCOM
	A16	A10	Function start input 24V
	B16	B10	Function start input 12V
	A15	A09	Function start input 5V
	B15	B09	FUNCCOM
	A06	A05	EQU1 Coincidence output point No. 1
	B06	B05	EQU2 Coincidence output point No. 2
	B02, B01		12/24V
	A02, A01		0V

Terminal numbers A08, A07, A04, A03, B08, B04 and B03 are not used.

High-Speed Counter Modules: QD62, QD62E, QD62D

Performance Specifications

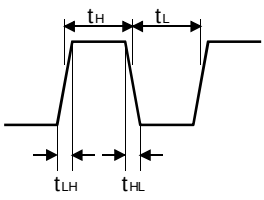
Item			QD62	QD62E	QD62D
Counting speed changing setting			200k (100k to 200kPPS) 100k (10k to 100kPPS) 10k (10kPPS max.)		500k (200k to 500kPPS) 200k (100k to 200kPPS) 100k (10k to 100kPPS) 10k (10kPPS max.)
Number of channels			2 channels		
Count input signal	Phase		Single-phase multiplied by one/single-phase multiplied by two/two-phase multiplied by one/two-phase multiplied by two/two-phase multiplied by four/CW/CCW		
	Rated input voltage		5/12/24VDC (positive or negative common)		EIA Standard RS-422-A Differential line driver (Note 1) level
	ON/OFF characteristics	5V	ON: 4.5 to 5.5V/2 to 5mA, OFF: 2V max./0.1mA max.		
		12V	ON: 10.8 to 13.2V/2 to 5mA, OFF: 4V max./0.1mA max.		
		24V	ON: 21.6 to 26.4V/2 to 5mA, OFF: 5V max./0.1mA max.		
	Counting range		32-bit signed binary (-2147483648 to 2147483647)		
	Type		UP/DOWN preset counter + ring counter functions		
	Counting speed		Refer to the separate list: counting speeds.		
External input	Rated input voltage		5/12/24VDC (positive or negative common)		5/12/24V (Note 2)
	ON/OFF characteristics	5V	ON: 4.5 to 5.5V/2 to 5mA, OFF: 2V max./0.1mA max.		ON: 2.5 to 5.5V/2 to 5mA, OFF: 1V max./0.1mA max.
		12V	ON: 10.8 to 13.2V/2 to 5mA, OFF: 4V max./0.1mA max.		
		24V	ON: 21.6 to 26.4V/2 to 5mA, OFF: 5V max./0.1mA max.		
	Response time		OFF→ON: 0.5ms max., ON→OFF: 1ms max.		
Coincidence output	Comparison range		32-bit signed binary (-2147483648 to 2147483647)		
	Comparison system		Set value<count value, set value=count value, set value>count value		
	Number of points		2 points/channel	2 points/channel	2 points/channel
	Output rating		Transistor (sink) 12/24VDC 0.5A/point 2A/common	Transistor (source) 12/24VDC 0.1A/point 0.4A/common	Transistor (sink) 12/24VDC 0.5A/point 2A/common
	Max. voltage drop		1.5V		
	Response time	OFF→ON	0.1ms max.	0.3ms max.	0.1ms max.
		ON→OFF	0.1ms max. (rated load, resistive load)	0.3ms max. (rated load, resistive load)	0.1ms max. (rated load, resistive load)
	External supply power		Voltage range: 10.2 to 30V, current consumption: 8mA (typ @24VDC)		
	External wiring protection		Fuse protection		
Number of I/O points occupied			16 points (I/O assignment: 16 intelligent points)		
5VDC internal current consumption (A)			0.30	0.33	0.38
Weight (kg (lb))			0.11 (0.24)		0.12 (0.26)
External dimensions (mm (inch))			27.4 (1.08)(W) × 98 (3.86)(H) × 90 (3.55)(D)		

Note 1: Japan Texas Instruments make Am216LS31 or equivalent

Note 2: EIA Standard RS-422-A differential line driver may also be used.

Separate list: counting speeds

Counting Speed Setting		10kPPS	100kPPS	200kPPS	500kPPS
Counting speed range (PPS)	For 1-phase input	10k max.	10k to 100k	100k to 200k	200k to 500k
	For 2-phase input	10k max.	10k to 100k	100k to 200k	200k to 500k
Minimum input pulse width t_L, t_H (μs)		50	5	2.5	1
Minimum input phase difference (for 2-phase input) (μs)		25	2.5	1.25	0.5
Permissible rise/fall time t_{LH}, t_{HL} (μs) (Note 3)		25 @10kPPS 500 @500PPS	2.5 @100kPPS 25 @10kPPS	1.25 @200kPPS 2.5 @100kPPS	0.5 @500kPPS 1.25 @200kPPS



Note 3: Inputting a waveform of long rise/fall time may cause false input. Enter a waveform within permissible rise/fall time.

High-Speed Counter Modules: QD62, QD62E, QD62D

I/O Signals to/from PLC CPU

Input Signals (Signal Direction QD62(E/D)→CPU)			Output Signals (Signal Direction CPU→QD62(E/D))		
Device No.	Signal name		Device No.	Signal name	
X00	Module ready		Y00	CH1	Coincidence signal No. 1 reset command
X01	CH1	Counter value greater (point No. 1)	Y01		Preset command
X02		Counter value coincidence (point No. 1)	Y02		Coincidence signal enable command
X03		Counter value less (point No. 1)	Y03		Down count command
X04		External preset request detection	Y04		Count enable command
X05		Counter value greater (point No. 2)	Y05		External preset detection reset command
X06		Counter value coincidence (point No. 2)	Y06		Counter function selection start command
X07		Counter value less (point No. 2)	Y07		Coincidence signal No. 2 reset command
X08	CH2	Counter value greater (point No. 1)	Y08	CH2	Coincidence signal No. 1 reset command
X09		Counter value coincidence (point No. 1)	Y09		Preset command
X0A		Counter value less (point No. 1)	Y0A		Coincidence signal enable command
X0B		External preset request detection	Y0B		Down count command
X0C		Counter value greater (point No. 2)	Y0C		Count enable command
X0D		Counter value coincidence (point No. 2)	Y0D		External preset detection reset command
X0E		Counter value less (point No. 2)	Y0E		Counter function selection start command
X0F	Fuse blown detection flag		Y0F		Coincidence signal No. 2 reset command

The I/O numbers (X/Y) and I/O addresses listed above assume that the QD62(E/D) is loaded in I/O slot 0 of the main base unit.

Buffer Memory Relative to PLC CPU

Address				Setting		Setting Range and Read Value Range	Initial Value ＊1	Access from CPU
CH1		CH2						
Hex.	Dec.	Hex.	Dec.					
0H	0	20H	32	Preset value setting	(L)	-2147483648 to 2147483647	0	Read/write
1H	1	21H	33		(H)			
2H	2	22H	34	Present value	(L)	-2147483648 to 2147483647	0	Read only
3H	3	23H	35		(H)			
4H	4	24H	36	Coincidence output point No. 1 setting	(L)	-2147483648 to 2147483647	0	Read/write
5H	5	25H	37		(H)			
6H	6	26H	38	Coincidence output point No. 2 setting	(L)	-2147483648 to 2147483647		
7H	7	27H	39		(H)			
8H	8	28H	40	Overflow detection		0: no detection, 1: during detection	0	Read only
9H	9	29H	41	Counter function selection setting		0: count disable function 1: latch counter function 2: sampling counter function 3: periodic pulse counter function	0	Read/write
AH	10	2AH	42	Sampling/periodic time setting		1 to 65535, increments: 10ms		
BH	11	2BH	43	Sampling/periodic counter flag		0: during stop, 1: during operation	0	Read only

(Continued on next page)

(Continued)

Address CH1 Hex.	Address CH1 Dec.	Address CH2 Hex.	Address CH2 Dec.	Setting		Setting Range and Read Value Range	Initial Value ＊1	Access from CPU
CH	12	2CH	44	Latch count value	(L)	-2147483648 to 2147483647	0	Read only
DH	13	2DH	45		(H)			
EH	14	2EH	46	Sampling count value	(L)	-2147483648 to 2147483647		
FH	15	2FH	47		(H)			
10H	16	30H	48	Periodic pulse count last value	(L)	-2147483648 to 2147483647		
11H	17	31H	49		(H)			
12H	18	32H	50	Periodic pulse count present value	(L)	-2147483648 to 2147483647		
13H	19	33H	51		(H)			
14H	20	34H	52	Ring counter lower limit value setting	(L)	-2147483648 to 2147483647	0	Read/write
15H	21	35H	53		(H)			
16H	22	36H	54	Ring counter upper limit value setting	(L)	-2147483648 to 2147483647		
17H	23	37H	55		(H)			
18H to 1FH	24 to 31	38H to 3FH	56 to 63	Reserved		—	—	—

＊1: Initial values set at power-on or PLC CPU reset.

Equipment

<QD62, QD62E, QD62D accessories>

Product	Description
Manual	QD62, QD62E, QD62D User's Manual (Hardware)

<Separately prepared products>

Product	Description
Manual	QD62, QD62E, QD62D User's Manual (Details)
Connector	External wiring connector A6CON1, A6CON2, A6CON3

Note 1: As the external wiring connector is not packed with the module, always prepare it separately.

<Software>

Type	Description	Remarks
SW4D5C-GPPW-E or later	For sequence programming	○
SW0D5C-QCTU-E	High-speed counter module utility package	△

○: Must be prepared. △: Prepared as required.

Note: The software of the above products or later version are usable.

Utility Package for High-speed Counter Modules: SW0D5C-QCTU-E

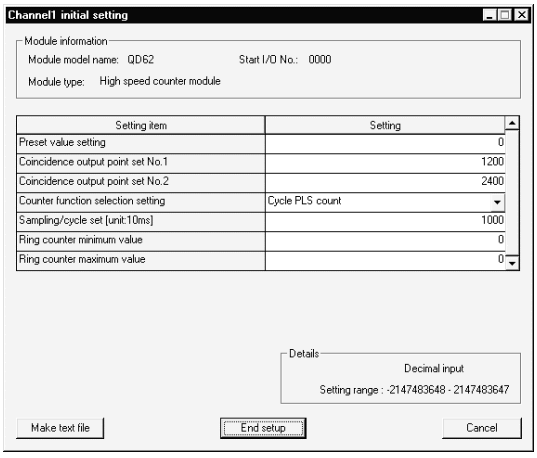
Overview

SW0D5C-QCTU-E is a utility package designed to set initial data needed to use the QD62, QD62E or QD62D high-speed counter module and to set automatic reading of count values to the CPU device memory, and is used by adding it onto SW4D5C-GPPW-E or later.
When using the QD62, QD62E or QD62D, the use of QCTU is not required and initial value setting and others can be made in sequence programs, but using QCTU can reduce sequence programs and facilitate the checking of the setting status and operating status.

Initial Data Setting

Initial value setting necessary to use the high-speed counter module can be made on the screen. The following table lists the types of initial values that may be set.
(1) Preset value
(2) Coincidence output point No. 1 setting
(3) Coincidence output point No. 2 setting
(4) Counter function selection setting
(5) Sampling/periodic time setting
(6) Ring counter upper limit value
(7) Ring counter lower limit value

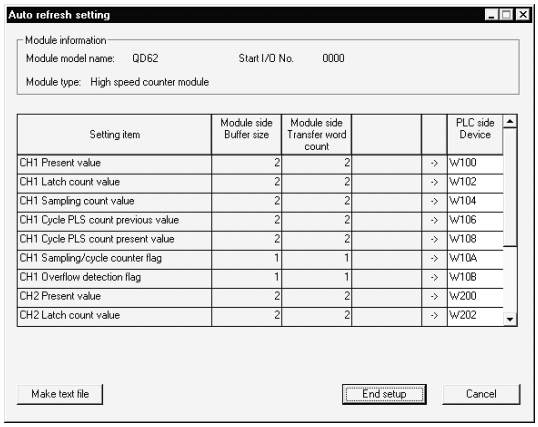
Initial value setting screen sample



Automatic Refresh Setting

By making automatic refresh setting, you can automatically read count values, etc. from the high-speed counter module into the CPU, reducing programs. The following data can be refreshed automatically.
(1) Present value
(2) Latch count value
(3) Sampling count value
(4) Periodic pulse count present value
(5) Periodic pulse count last value
(6) Sampling/periodic counter flag
(7) Overflow detection

Automatic refresh setting screen sample

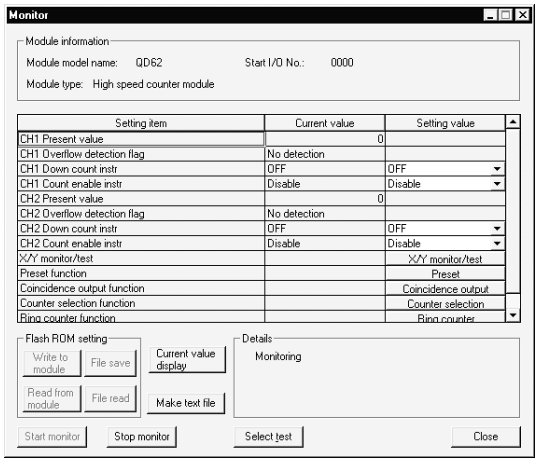


Monitoring and Testing Functions

The monitoring and testing functions are designed to monitor the data states and operating status in the high-speed counter module to force the set values to be changed as required. Since you can acquire the operating status without needing to know the addresses in the high-speed counter module, these functions are effective for system adjustment and troubleshooting. The following data and functions can be monitored and tested.

(1) X/Y device
(2) Preset function
(3) Coincidence output function
(4) Counter function selection function
(5) Ring counter function
(6) Present value
(7) Overflow detection
(8) Down count command
(9) Count enable command

Monitoring/testing screen sample



Positioning Module: QD75P1, QD75P2, QD75P4, QD75D1, QD75D2, QD75D4

Overview

The QD71P1, QD75P2, QD75P4, QD75D1, QD75D2 and QD75D4 (hereafter referred to as the "QD75") are modules used with stepping motors or servo amplifiers to exercise machine position or speed control.

Features

● Two different output systems

Two different output systems, open collector and differential driver systems, are available as command signals to a stepping motor or servo amplifier.
QD71P1, QD75P2, QD75P4: Open collector system
QD75D1, QD75D2, QD75D4: Differential driver system
The differential driver system can increase the distance from the QD75 to the servo amplifier and exercise fast, precision control.

● Max. 1Mpps high-speed command

The differential driver system can give a max. 1Mpps high-speed command, achieving fast, precision control.
The command pulse for the open collector system is max. 200kpps.

● Assortment of 1-, 2- and 4-axis products

1-, 2- and 4-axis models are available in terms of the number of axes per module.
QD75P1, QD75D1: 1 axis
QD75P2, QD75D2: 2 axes
QD75P4, QD75D4: 4 axes
Also, since there are no restrictions on the number of modules loaded, multiple modules can be loaded and used if more than four control axes are needed.

● Fast start

The QD75 can be started as fast as approx. 6ms after the CPU module has given it a start command, reducing the machine tact time.

● 4-axis linear interpolation, 2-axis circular interpolation

You can exercise 2-, 3- or 4-axis linear interpolation control and 2-axis circular interpolation control.

Note 1: Interpolation control can be performed when multiple axes are used on the same QD75 module.

● Wide selection of control systems

You have a choice of control systems such as PTP (Point to Point) control, fixed-feed control, equal-speed control and speed-position switching control.

Function List

Main Function			Description
Zeroing control	Machine zero return control		Sets up a positioning start point mechanically using a zeroing dog, stopper or like.
	Fast zeroing control		Performs positioning to zero address stored in QD75 by machine zero return.
Major positioning control	Position control	Linear control Linear interpolation control	Performs positioning in linear path to a position specified by address or travel.
		Fixed-feed control Fixed-feed control (interpolation)	Performs positioning of specified travel. In 2-, 3- or 4-axis, fixed-feed control, fixed-feed is performed in linear path by interpolation.
		2-axis circular interpolation control	Performs positioning in circular path to position specified by address, travel, sub point, center point, etc.
	Speed control	Linear control Linear interpolation control	Outputs consecutive pulses according to command speed.
	Speed-position switching control		First exercises speed control, and then turns on "speed-position switching signal" to perform position control (positioning of specified travel).
	Position-speed switching control		First exercises position control, and then turns on "position-speed switching signal" to perform speed control (output of consecutive pulses according to specified command speed).
	Other control	Current value changing	Changes current feed value into address set in positioning data (mechanical feed value unchangeable).
		NOP instruction	No-operation control mode. Shifts to operation of next data when this instruction has been set.
		JUMP instruction	Makes an unconditional or conditional jump to specified positioning data No.
		FOR (count) ~ NEXT	Repeats FOR~NEXT loop control.
High-level positioning control	Block start (Ordinary start)		Performs multiple positioning processings by a single start.
	Conditional start		Judges conditions of "condition data" and executes "start block data". If conditions do not hold, executes "start block data" of next point.
	Wait start		Waits until conditions of "condition data" hold to execute "start block data".
	Simultaneous start		Performs positioning of axes specified in "condition data" simultaneously (output of pulses at the same timing).
	Repeated start (FOR loop)		Repeats positioning processing of start block data across "FOR~NEXT" by the preset number of times.
	Repeated start (FOR condition)		Repeats positioning processing of start block data across "FOR~NEXT" until "condition data" hold.

Positioning Module: QD75P1, QD75P2, QD75P4, QD75D1, QD75D2, QD75D4

Main Function		Description
High-level positioning control	Restart	Gives stop signal to suspend positioning processing being executed, and then resumes positioning to move over remaining travel.
	Continuous operation suspension function	During continuous positioning processing, processing of positioning data being executed when suspension command is given is suspended on completion of its processing.
Manual control	Jog operation	Outputs pulses only while jog start signal is on.
	Inching operation	Outputs one shot pulses for slight travel in manual operation. (Makes fine adjustment with jog start signal.)
	Manual pulse generator operation	Outputs to servo amplifier the pulses commanded by manual pulse generator. (Makes fine adjustment, etc. on pulse level.)
Operation pattern	Independent positioning control (Positioning end)	Executes only specified positioning data and ends positioning.
	Continuous positioning control	After executing specified positioning data, makes a stop, and then executes next continuous positioning data.
	Continuous path control	Executes specified positioning data, and without deceleration to stop, executes next continuous positioning data.

Sub Function		Description
OPR	OPR retry function	Makes OPR possible if axis is not returned to position before near point dog by jog operation, etc.
	Home position shift function	After machine OPR, compensates for position over specified distance from machine OPR position to use that position as OPR address.
Compensation function	Backlash compensation function	Compensates for mechanical system backlash (looseness).
	Electronic gear function	Sets travel per pulse.
Limit function	Speed limit function	Limits command speed to within setting range of "speed limit value".
	Torque limit function	Limits servo motor-generated torque to within setting range of "torque limit value". Note that digital-to-analog conversion module is also needed for torque limit.
	Software stroke limit function	Does not execute positioning to outside the setting range of upper and lower stroke limits set in parameters.
	Hardware stroke limit function	Makes deceleration to stop using limit switch connected to external input connector of QD75.
	Speed changing function	Changes speed during positioning operation.
	Override function	Varies speed during positioning operation at the ratio of 1 to 300%.

Sub Function		Description
Limit function	Acceleration/deceleration time changing function	Changes acceleration/deceleration time at speed change.
	Torque changing function	Changes "torque limit value" during control.
	Absolute position restoration function	Restores absolute value of specified axis.
Others	Step function	Can make a stop per "automatic deceleration" or "positioning data".
	Skip function	Suspends (decelerates to stop) currently executed positioning at entry of skip signal and starts next positioning.
	M code output function	Can set number between 0 and 65535 per positioning data as M code.
	Teaching function	Registers address positioned by manual control as address of positioning data.
	Target position changing function	Changes target position during positioning. Can also change speed.
	Command in-position function	Sets "command in-position flag" when remaining distance up to positioning address has become less than preset distance at end of positioning.
	Acceleration/deceleration processing function	Adjusts acceleration/deceleration of control.
	Multiple-axis simultaneous start function	Starts multiple axes simultaneously. (Equivalent to simultaneous start in special start)

Other Function	Description
Parameter initialization function	Returns "set data" stored in flash ROM of QD75 to factory settings. The following two methods are available. 1) Using sequence program 2) Using QD75 software package
Executed data backup function	Stores (backs up) currently executed "set data" in flash ROM. The following two methods are available. 1) Using sequence program 2) Using QD75 software package
I/O logic switching function	Switches signal logic according to externally connected device.

● Main-sub function combination list

Main Function \ Sub Function			Combination with operation pattern	OPR retry function	Home position shift function	Backlash compensation function	Electronic gear function	Speed limit function	Torque limit function	Software stroke limit function	Hardware stroke limit function	Speed changing function	Override function	Acceleration time changing function	Torque changing function	Step function	Skip function	M code output function	Teaching function	Command in-position function	Acceleration/deceleration processing function
OPR	Machine OPR return		×	○	○	○	○	○	○	×	◎	△	△	×	○	×	×	×	×	×	○
	Fast OPR		×	—	—	○	○	○	○	×	◎	○	○	○	○	×	×	×	×	×	○
Positioning control	Position control	Linear Linear interpolation	○	—	—	○	○	○	○	○	◎	○	○	○	○	○	○	○	×	○	○
		Fixed-feed Fixed-feed interpolation	△ (Continuous path control setting disallowed)	—	—	○	○	○	○	○	◎	○	○	○	○	○	○	○	×	○	○
		Circular interpolation	○	—	—	○	○	○	○	○	◎	○	○	○	○	○	○	○	×	○	○
	Speed control		△ (Only independent positioning control may be set)	—	—	○	○	○	○	○	◎	○	○	○	○	×	○	○	×	×	○
	Speed-position switching control Position-speed switching control		△ (Continuous path control setting disallowed)	—	—	○	○	○	○	○	◎	○	○	○	○	○	○	○	×	○	○
	Other	Current value changing	△ (Continuous path control setting disallowed)	—	—	—	—	—	—	—	◎	—	—	—	—	—	—	—	—	—	—
		NOP	×																		
		JUMP																			
		FOR ~ NEXT																			
Manual	Jog operation			—	—	○	○	○	○	○	◎	○	○	○	○	×	×	×	○	×	○
	Inching operation			—	—	○	○	○	○	○	◎	×	×	×	○	×	×	×	○	×	×
	Manual pulse generator			—	—	○	○	○	○	○	◎	×	×	×	○	×	×	×	○	×	×

◎ : Must be combined, ○ : May be combined, △ : Restrictions on combination, × : Must not be combined, — : Setting invalid.

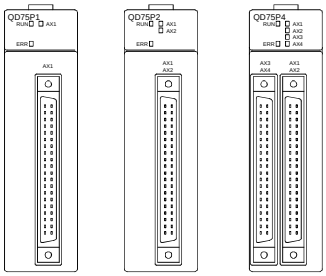
Positioning Module: QD75P1, QD75P2, QD75P4, QD75D1, QD75D2, QD75D4

Overview

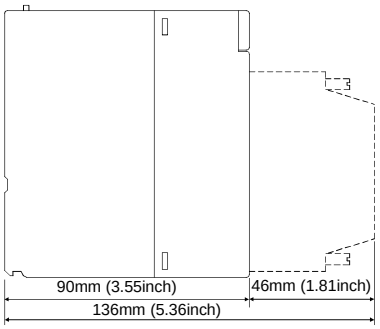
The following QD75 dedicated instructions may be used to create sequence programs for the QD75.

Dedicated Instruction Name	Instruction Specifications
ABRST1, ABRST2, ABRST3, ABRST4	Used to restore the absolute position of the specified axis.
PSTRT1, PSTRT2, PSTRT3, PSTRT4	Used to start positioning of the specified axis.
TEACH1, TEACH2, TEACH3, TEACH4	Used to teach the specified axis.
PFWRT	Used to write the parameters and positioning data on the QD75 buffer memory to the flash ROM built in the QD75.
PINIT	Initializes the parameters and positioning data on the buffer memory and flash ROM.
ERRCLR	Clears an error and extinguishes the ERROR LED.
ERRRD	Read the error code.

Appearance



Note 1: For the QD71D1, QD75D2 and QD75D4, the type name printed is different from the one in the above diagram.



External I/O Terminals

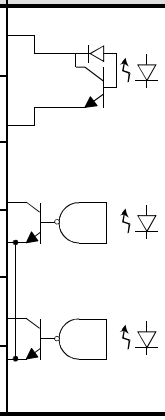
Input terminals

Signal Name		Internal Circuit	Wiring
Near point dog signal	DOG		△
Upper limit switch signal	FLS		○
Lower limit switch signal	RLS		○
Stop signal	STOP		△
Speed-position switching	CHG		△
Common	COM		○
	COM		
Manual pulse generator A phase	PULSER A+		△
	PULSER A–		
Manual pulse generator B phase	PULSER B+		
	PULSER B–		
Drive unit ready	READY		○
Common	RDY COM		○
Zero signal	PG0 (24V)		△
	PG0 (5V)		
Common	PG0 COM		

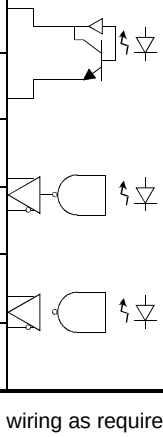
Wiring: ○ : wiring required, △ : wiring as required.

Positioning Module: QD75P1, QD75P2, QD75P4, QD75D1, QD75D2, QD75D4

Output terminals (QD71P1, QD75P2, QD75P4)

Signal Name		Internal Circuit	Wiring
Deviation counter clear	CLEAR		○
Common	CLEAR COM		
CW/A-phase/pulse	PULSE F		○
	PULSE COM		
CCW/B-phase/sign	PULSE R		
	PULSE COM		

Output terminals (QD71D1, QD75D2, QD75D4)

Signal Name		Internal Circuit	Wiring
Deviation counter clear	CLEAR		○
Common	CLEAR COM		
CW/A-phase/pulse	PULSE F+		○
	PULSE F-		
CCW/B-phase/sign	PULSE R+		
	PULSE R-		

Wiring: ○ : wiring required, △ : wiring as required.

Performance Specifications

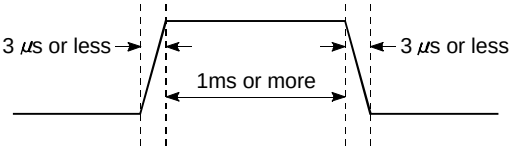
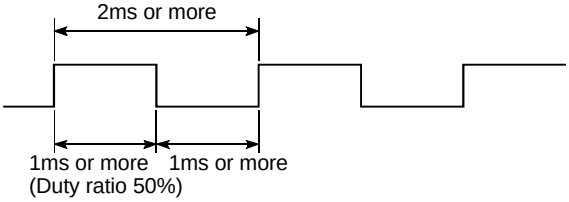
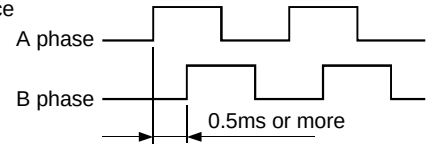
Item		Model: QD75P1 QD75D1	QD75P2 QD75D2	QD75P4 QD75D4
Number of control axes		1 axis	2 axes	4 axes
Interpolation function		No	2-axis linear interpolation 2-axis circular interpolation	2-, 3-, 4-axis linear interpolation 2-axis circular interpolation
Control system		PTP (Point To Point) control, path control (can be set for both linear and circular), speed control, speed-position switching control, position-speed switching control		
Control unit		mm, inch, degree, pulse		
Positioning data		600 pieces of data (positioning data No.: 1 to 600)/axis (Can be set using peripheral device or sequence program)		
Backup		Parameters and positioning data can be saved in flash ROM (without battery).		
Positioning	Positioning system	PTP control : Incremental/absolute system Speed-position, position-speed switching control : Incremental system Path control : Incremental/absolute system		
	Positioning range	In absolute system • -214748364.8 to 214748364.7 (μm) • -21474.83648 to 21474.83647 (inch) • 0 to 359.99999 (degree) • -2147483648 to 2147483647 (pulse) In incremental system • -214748364.8 to 214748364.7 (μm) • -21474.83648 to 21474.83647 (inch) • -21474.83648 to 21474.83647 (degree) • -2147483648 to 2147483647 (pulse) In speed-position switching control/position-speed switching control • 0 to 214748364.7 (μm) • 0 to 21474.83647 (inch) • 0 to 21474.83647 (degree) • 0 to 2147483647 (pulse)		
	Speed command	0.01 to 20000000.00 (mm/min) 0.001 to 2000000.000 (inch/min) 0.001 to 2000000.000 (degree/min) 1 to 1000000 (pulse/s)		
	Acceleration/ deceleration processing	Automatic trapezoidal acceleration/deceleration, automatic S-pattern acceleration/deceleration		
	Acceleration/ deceleration time	1 to 8388608 (ms) Four patterns can be set for both acceleration and deceleration times.		
	Sudden-stop deceleration time	1 to 8388608 (ms)		

Positioning Module: QD75P1, QD75P2, QD75P4, QD75D1, QD75D2, QD75D4

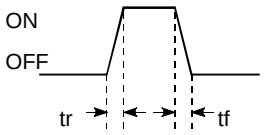
Item \ Model	QD75P1 QD75D1	QD75P2 QD75D2	QD75P4 QD75D4
Applicable connector	A6CON1, A6CON2, A6CON3		
Applicable wire size	0.3mm^2		
Max. output pulse	For connection to differential driver: 1Mbps For connection to open collector: 200kbps		
Max. connection distance from servo	For connection to differential driver: 10m (32.79ft.) For connection to open collector: 2m (6.56ft.)		
Internal current consumption (5VDC)	QD75P1: 0.40A, QD75P2: 0.46A, QD75P4: 058A, QD75D1: 0.52A, QD75D2: 0.56A, QD75D4: 0.82A		
Number of I/O points occupied	32 points (I/O assignment: intelligent function module 32 points)		
External dimensions (mm (inch))	QD75P □ /QD75D □ : 98 (3.86) (H) × 27.4 (1.08) (W) × 90 (3.55) (D)		
Weight (kg (lb))	QD75P1/P2/D1/D2: 0.15kg, QD75P4/D4: 0.16kg		

External I/O Specifications

● Input specifications

Signal Name	Rated Input Voltage	Rated Input Current	ON Voltage/Current	OFF Voltage/Current	Input Resistance	Response Time
Drive unit ready (READY) Stop signal (STOP) Upper limit signal (FLS) Lower limit signal (RLS)	24VDC (-20/+10%)	5mA	17.5VDC or more/3.5mA or more	7VDC or less/1.7mA or less	Approx. 4.7kΩ	4ms max.
Zero signal (Z24/Z5)	5VDC (-10/+22%)	5mA	2VDC or more/ 2mA or more	0.5VDC or less/ 0.5mA or less	Approx. 0.3kΩ	1ms max.
	24VDC (-50/+10%)	5mA	10VDC or more/ 3mA or more	3VDC or less/ 0.2mA or less	Approx. 4.7kΩ	1ms max.
						
Manual pulse generator A phase (PULSER A) Manual pulse generator B phase (PULSER B)	5VDC (-10/+22%)	5mA	2.5VDC or more/ 2mA or more	1VDC or less/ 1mA or less	Approx. 1.5kΩ	1ms max.
	1) Pulse width  2) Phase difference  When A phase leads B phase, positioning address (current value) increases.					
Near point dog signal (DOG) External command signal (CHG)	24VDC (-10/+22%)	5mA	17.5VDC or more/ 3.5mA or more	7VDC or less/ 1.7mA or less	Approx. 4.3kΩ	1ms max.

● Output specifications (QD75P1, QD75P2, QD75P4)

Signal Name	Rated Load Voltage	Max. Load Current	Max. Inrush Current	ON-Time Max. Voltage Drop	OFF-Time Leakage Current	Response Time
Pulse output (CW/PULSE/A phase) Pulse sign (CCW/SIGN/B phase)	5-24VDC (-5/+25%)	50mA/point	200mA 10ms max.	0.5V (TYP)	0.1mA max.	—
	For open collector, rise/fall time and duty ratio are as given in the following table. ✻  Note 1: See the following table for rise/fall time.					
Deviation counter clear (CLEAR)	5-24VDC (-5/+25%)	0.1A/point	0.4A 10ms max.	1VDC (TYP) 2.5VDC (MAX)	0.1mA max.	2ms max. (resistive load)

Note 1: Pulse rise/fall time on QD75P (unit tr, tf: μs Duty: %) ... When ambient temperature is room temperature

Load voltage(V)		26.4						4.75					
Cable length(m)		1			2			1			2		
Load current (mA)	Pulse speed (kpps)	tf (Rise)	tr (Fall)	Duty	tf (Rise)	tr (Fall)	Duty	tf (Rise)	tr (Fall)	Duty	tf (Rise)	tr (Fall)	Duty
2	200	0.08	2.33	6.6	0.08	0.20	14.6	0.07	0.57	44.8	0.07	0.95	39.0
	100	0.09	2.42	34.7	0.10	4.44	12.6	0.07	0.57	47.5	0.08	1.01	45.3
	10	0.09	2.44	48.7	0.10	4.52	47.7	0.07	0.60	49.7	0.08	1.04	49.5
5	200	0.09	1.00	39.8	0.11	1.77	24.5	0.07	0.32	48.4	0.08	0.45	45.8
	100	0.09	1.01	45.3	0.10	1.76	40.3	0.07	0.31	49.2	0.08	0.45	48.7
	10	0.10	1.00	49.6	0.10	1.72	49.2	0.08	0.33	49.9	0.08	0.49	49.8
20	200	0.10	0.27	50.1	0.11	0.44	48.0	0.08	0.15	50.7	0.08	0.15	51.3
	100	0.10	0.29	49.8	0.11	0.48	49.1	0.08	0.15	50.4	0.08	0.18	50.4
	10	0.10	0.30	49.9	0.12	0.48	49.9	0.08	0.17	50.1	0.08	0.18	49.9
50	200	0.11	0.19	50.5	0.12	0.24	50.6	0.10	0.15	51.8	0.11	0.14	51.7
	100	0.11	0.19	50.4	0.12	0.24	50.4	0.10	0.14	50.7	0.10	0.15	50.8
	10	0.12	0.18	50.0	0.13	0.22	50.1	0.10	0.14	50.1	0.12	0.15	50.1

● Output specifications (QD75D1, QD75D2, QD75D4)

Signal Name	Rated Load Voltage	Max. Load Current	Max. Inrush Current	ON-Time Max. Voltage Drop	OFF-Time Leakage Current	Response Time
Pulse output (CW/PULSE/A phase) Pulse sign (CCW/SIGN/B phase)	Am26LS31 or equivalent differential driver (ON/OFF level ON: 1.8V or more, OFF: 0.6V or less)					
Deviation counter clear (CLEAR)	5-24VDC (-5/+25%)	0.1A/point	0.4A 10ms max.	1VDC (TYP) 2.5VDC (MAX)	0.1mA max.	2ms max. (resistive load)

Positioning Module: QD75P1, QD75P2, QD75P4, QD75D1, QD75D2, QD75D4

I/O Signals to/from PLC CPU

QD75 to PLC CPU			PLC CPU to QD75		
X0	QD75 ready		Y0	PLC ready	
X1	Must not be used.		Y1	Must not be used.	
X2			Y2		
X3			Y3		
X4	Axis 1	M code ON	Y4	Axis 1	Axis stop
X5	Axis 2		Y5	Axis 2	
X6	Axis 3		Y6	Axis 3	
X7	Axis 4		Y7	Axis 4	
X8	Axis 1	Error detection	Y8	Axis 1	Forward rotation jog start
X9	Axis 2		Y9	Axis 1	Reverse rotation jog start
XA	Axis 3		YA	Axis 2	Forward rotation jog start
XB	Axis 4		YB	Axis 2	Reverse rotation jog start
XC	Axis 1	BUSY	YC	Axis 3	Forward rotation jog start
XD	Axis 2		YD	Axis 3	Reverse rotation jog start
XE	Axis 3		YE	Axis 4	Forward rotation jog start
XF	Axis 4		YF	Axis 4	Reverse rotation jog start
X10	Axis 1	Start completion	Y10	Axis 1	Positioning start
X11	Axis 2		Y11	Axis 2	
X12	Axis 3		Y12	Axis 3	
X13	Axis 4		Y13	Axis 4	
X14	Axis 1	Positioning completion	Y14	Must not be used.	
X15	Axis 2		Y15		
X16	Axis 3		Y16		
X17	Axis 4		Y17		
X18	Axis 1	Must not be used.	Y18		
X19	Axis 2		Y19		
X1A	Axis 3		Y1A		
X1B	Axis 4		Y1B		
X1C	Axis 1		Y1C		
X1D	Axis 2		Y1D		
X1E	Axis 3		Y1E		
X1F	Axis 4		Y1F		

Equipment

<Accessories>

Product	Description
Manual	QD75P/QD75D User's Manual (Hardware)

<Separately prepared products>

Product	Description
Manual	QD75P/QD75D User's Manual (Details)
Connector	External wiring connector A6CON1, A6CON2, A6CON3
External wiring cable	Cables having external wiring connectors (A6CON1, A6CON2, A6CON3) with wiring for specific servo amplifiers and stepping motors are also available. Refer to "MODEL SELECTION-ACCESSORIES".

Note 1: As the external wiring connector is not packed with the module, always prepare it separately.

<Software>

Product	Description	Remarks
SW4D5C-GPPW-E or later	For sequence programming	◯
SW0D5C-QD75P-E	Software for QD75	△

◯ : Must be prepared. △: Prepared as required.

Note 2: The software of the above products or later version are usable.

Positioning Module Software: SW0D5C-QD75P-E

Overview

SW0D5C-QD75P-E is a software package for QD75 positioning module which allows various parameters and positioning data to be set to the QD75, the control status of the QD75 to be monitored, and the QD75 to be test-operated. Simple operation in Windows permits you to fully utilize a wide range of functions of the QD75.

Features

● Windows compatibility ensures outstanding operability

You can cut, copy and paste positioning data and start block data efficiently. You can also copy Microsoft Excel- or Word-created data for use as positioning data.

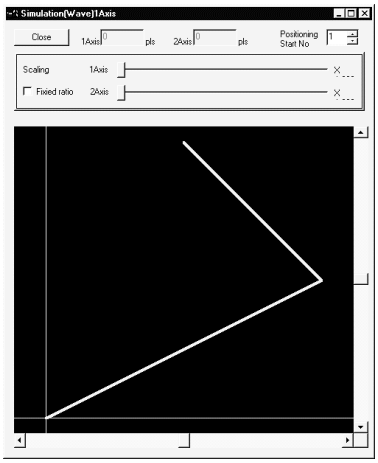
● Ease of checking wiring connections

In the software, you can check the status of I/O wiring connected to the QD75. You can also start the system efficiently by initializing the QD75 or performing jog operation.

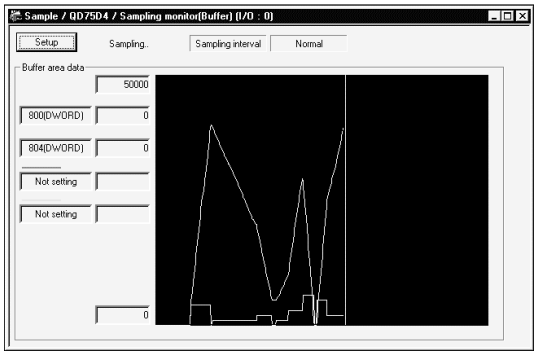
● Full line of functions assists debugging and maintenance

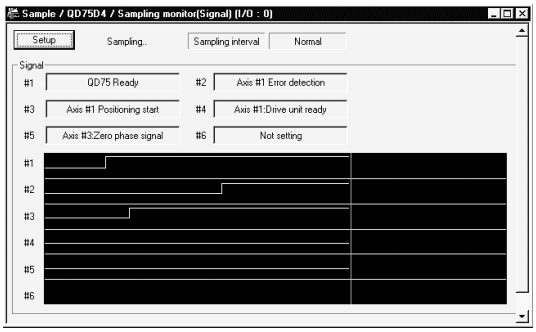
The module has a full line up of functions, e.g. function to perform (offline) simulation based on the preset positioning data, and monitoring functions useful for debugging and maintenance, such as sampling monitoring which shows the positioning module I/O signals, external I/O signals and buffer memory status in the form of a timing chart.

<Offline simulation example>



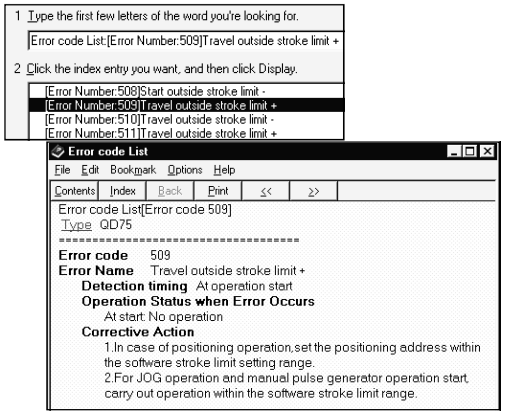
<Sampling monitoring examples>





● Ease of checking error and warning causes

The online help function ensures ease of checking the cause and corrective action of the error or warning code displayed by positioning system operation monitoring or error history monitoring.

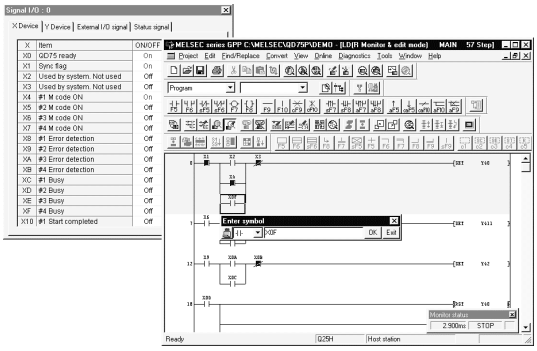


● Simultaneous monitoring of sequence programs

When used with the GPPW function software package, this software can perform efficient debugging.

<Example of simultaneously starting SWD5C-QD75P-E and GPPW>

Positioning Module Software: SW0D5C-QD75P-E



Function List

Function		Description
Edit	Parameter setting	Sets parameters of each axis.
	Positioning data setting	Sets positioning data.
	Positioning data monitoring	Monitors data of positioning being executed.
	Positioning data test	Performs test operation of positioning control.
	Teaching	Sets axis to address of positioning data by teaching operation.
	M code comment setting	Sets comment to M code.
	Simulation	Performs offline/real-time simulation.
	Block start data setting	Sets block start data.
	Block start data monitoring	Monitors point under positioning control.
	Block start data test	Performs test operation of positioning control from block start point.
	Condition data setting	Sets start conditions of start block data.
Monitoring	Running monitoring	Monitors running states such as feed current value, axis feedrate and axis status.
	History monitoring	Monitors error, warning, start and error-time start history.
	Signal monitoring	Monitors X/Y devices, external signals and status signals.
	Operation monitoring	Monitors control status, preset parameters, etc.
	Operation test	Tests positioning data number-specified start, current value changing, speed changing, zeroing, jog operation and manual pulse generator operation.
	Sampling monitoring	Simultaneously samples and monitors specified signals and buffer memory.
Connection diagnostics	Connection check	Initializes QD75 and displays signals from external devices. Also performs initial operation test by jog operation.

Operating Environment

Item	Description
Peripheral device	Pentium 133MHz or more (recommended) personal computer on which Windows operates
Operating system software	Microsoft Windows 95/98, Microsoft Windows NT workstation 4.0
Required memory	Recommended 32MB or more
Hard disk	40Mbyte or more free space needed
Disk drive	CD-ROM drive required
Display	Resolution 800 × 600 pixels or more

Connection with QD75

When set data is downloaded to the QD75 or the operating status is monitored, SW0D5C-QD75P-E is not directly connected to the QD75. Since SW0D5C-QD75P-E and QD75 make data communications via the Q mode CPU module, the SW0D5C-QD75P–E installed personal computer is connected to the Q mode CPU module by RS-232 or USB.

For the RS-232 and USB cables, refer to the explanation section of "Programming"-"Peripheral Devices".

Separately Prepared Product

Product	Description
Manual	SW0D5C-QD75P-E Operating Manual

Note 1: The PDF format data of the same contents as those of the above separately prepared manual are included in the CD-ROM of SW0D5C-QD75P-E.

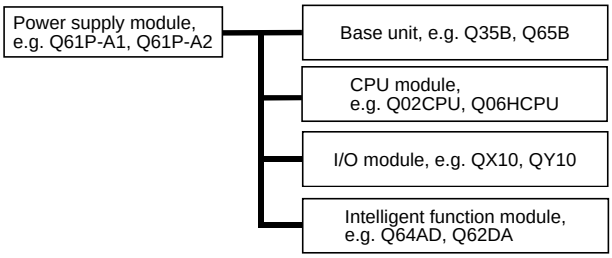
Current Consumption Calculation

Overview

The PLC system operates on 5VDC supplied from the power supply module.
The sum of 5VDC current consumption values of the CPU, I/O, intelligent function and network modules loaded on one base unit should not exceed the rated output current of the power supply module. If so, the number of modules loaded on the base unit must be reduced.

Calculation Method

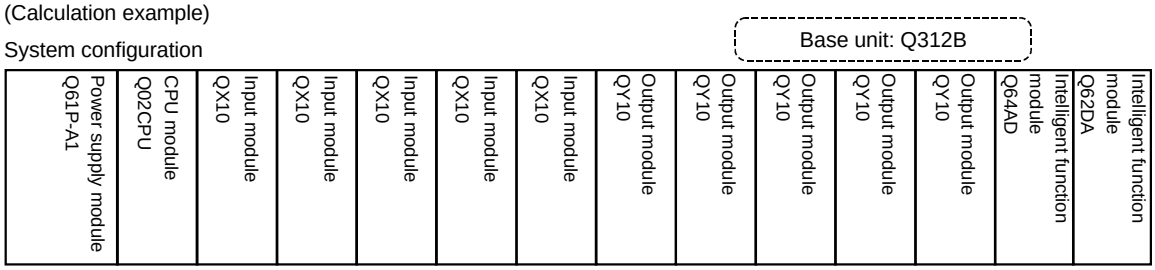
Make sure that the current consumption is as indicated in the following relational expression.
(Rated output current of power supply module) ≥ (sum of 5VDC current consumption values of modules)



Refer to "Applicable Equipment List" for the current consumption value of each module.

(Calculation example)

System configuration



Rated output current of power supply module

Type	Rated Output Current (A)
Q61P-A1	6

5VDC current consumption of each module

Type	Module Type	5VDC Current Consumption (A)
Q02CPU	CPU module	0.500
Q312B	Base unit	0.121
QX10	Input module	0.050
QY10	Output module	0.430
Q64AD	Analog-to-digital conversion module	0.550
Q62DA	Digital-to-analog conversion module	0.375

Sum of 5VDC current consumption values
=0.500+0.121+(0.050×5)+(0.430×5)+0.55+0.375
=3.946(A)

Rated output current of Q61P-A1 [6(A)]
> sum of 5VDC current consumption values [3.946(A)]

Hence, this system has no current consumption problem.

Power Supply Modules: Q61P-A1, Q61P-A2, A1S61PN, A1S62PN, A1S63P

Overview

The power supply module is designed to supply 5VDC to each PLC module loaded on the base unit.
Note that the power supply module type that may be loaded depends on the base unit. Use the Q61P-A □ power supply modules with the Q3 □ B and Q6 □ B where the Q series modules will be loaded. Use any of the AnS series A1S61PN, A1S62PN and A1S63PN power supply modules with the QA1S3 □ B or QA1S6 □ B where the AnS series modules will be loaded.

Performance Specifications

■ Performance specifications

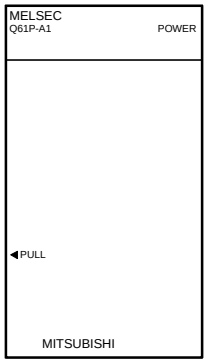
Item		Q61P-A1	Q61P-A2	A1S61PN	A1S62PN	A1S63P
Applicable base unit		Q3 □ B, Q6 □ B		QA1S3 □ B, QA1S6 □ B		
Input power supply		100-120VAC +10%/-15%	200-240VAC +10%/-15%	100-120VAC +10%/-15%		24VDC +30%/-35%
Input frequency		50/60Hz±3Hz				—
Input voltage distortion factor		5% or less				
Input max. apparent power		105VA				41W
Inrush current		20A within 8ms				81A within 1ms
Rated output current	5VDC	6A		5A	3A	5A
	24VDC	—			0.6A	—
Over-current protection	5VDC	6.6A or more		5.5A or more	3.3A or more	5.5A or more
	24VDC	—			0.66A or more	—
Overvoltage protection		5.5 to 6.5V				
Efficiency		65% or more				
Permissible instantaneous power failure time		Within 20ms				Within 10ms
Dielectric withstand voltage		Across inputs/LG-outputs/FG 2,830VAC rms/3 cycles (altitude 2000m (6557.38ft.))				500VAC across primary-5VDC
Insulation resistance		Inputs-outputs (LG/FG separated), inputs-LG/FG, outputs-LG/FG 10MΩ or more by 500VDC insulation resistance tester				5MΩ or more by 500VDC insulation resistance tester
Noise immunity		By noise simulator of 1,500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency				By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency
Operation indication		LED indication (Lit at 5VDC output)				
Fuse		Built-in (unchangeable by user)				
Contact output section	Application	ERR contact (Contact turned off (opened: normally closed contact) at CPU error stop)		—	—	—
	Rated switching voltage/current	24VDC, 0.5A		—	—	—
	Minimum switching load	5VDC 1mA		—	—	—
	Response time	OFF → ON: 10ms or less ON → OFF: 12ms or less		—	—	—
	Life	Mechanical: 20 million times or more Electrical: Rated switching voltage/current, 100 thousand times or more		—	—	—
	Surge suppressor	No		—	—	—
	Fuse	No		—	—	—

Power Supply Modules: Q61P-A1, Q61P-A2, A1S61PN, A1S62PN, A1S63P

Item	Q61P-A1	Q61P-A2	A1S61PN	A1S62PN	A1S63P
Terminal screw size	M3.5 × 7				
Applicable wire size	0.3 to 2mm^2				
Applicable crimping terminal	RAV1.25-3.5, RAV2-3.5				
Applicable tightening torque	59 to 88N•cm				
Weight (kg (lb))	0.3 (0.66)	0.3 (0.66)	0.6 (1.32)	0.6 (1.32)	0.5 (1.1)

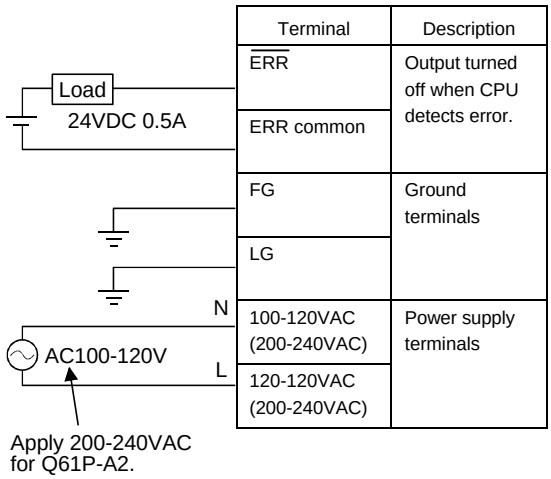
Appearance and Wiring/Q61P-A1, Q61P-A2

Appearance



Wiring

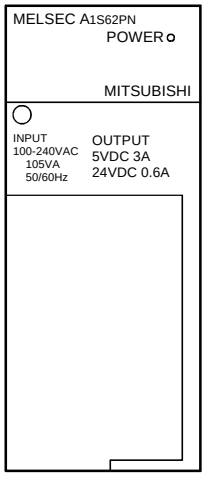
External wiring



Terminal	Description
$\overline{\text{ERR}}$	Output turned off when CPU detects error.
ERR common	
FG	Ground terminals
LG	
100-120VAC (200-240VAC)	Power supply terminals
120-120VAC (200-240VAC)	

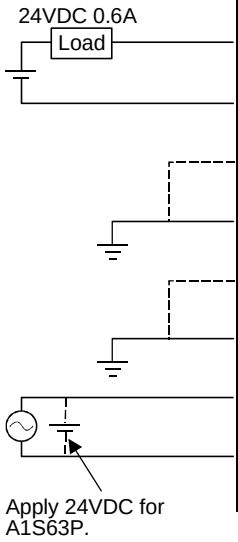
Appearance and Wiring/A1S61PN, A1S62PN, A1S63P

Appearance



Wiring

External wiring



Terminal	Description
+24V	24VDC 0.6A output terminals. Provided for A1S62PN only. Vacant for A1S61PN and A1S63P.
24G	
FG	Ground terminals
FG	
LG	
LG	
100-120VAC (24VAC (+))	Power supply terminals
120-120VAC (24VAC (-))	

Power Supply Modules: Q61P-A1, Q61P-A2, A1S61PN, A1S62PN, A1S63P

Instructions

(1) Always earth the LG and FG ground terminals to the protective earth conductor.
(2) Wire the power supply module properly after checking the rated voltage and terminal layout of the product.
(3) Tighten the terminal screws to the specified torque.
(4) The fuse cannot be changed by the user. Consult your sales representative.
(5) The sum of the 5VDC current consumption values of the modules loaded in the base unit should not exceed the rated output current of the power supply module.
(6) Use the $\overline{\text{ERR}}$ contact as required. It need not be wired if the external output of $\overline{\text{ERR}}$ is unnecessary.
(7) The $\overline{\text{ERR}}$ contact is valid for only the power supply module on the main base unit. The $\overline{\text{ERR}}$ contact of the power supply module on the extension base is always OFF.
(8) Do not apply 200-240VAC to the Q61P-A1 and 100-120VAC to the Q61P-A2.

Base Units: Q3 □ B, Q6 □ B, QA1S6 □ B

Overview

The base unit serves to supply the CPU, I/O and intelligent function modules with 5VDC generated by the power supply module. It also serves to exchange control data among the CPU, I/O and intelligent function modules.

Function List

● Main base unit

Type		Q33B	Q35B	Q38B	Q312B
Number of I/O modules loaded		3	5	8	12
Applicable I/O modules		I/O modules for Q			
Mounting hole size		5 ϕ pear-shaped hole (for M4 screw)			
External dimensions (mm (inch))	W	189 (7.44)	245 (9.65)	328 (12.92)	439 (17.30)
	H	98 (3.86)			
Weight (kg (lb))		0.23 (0.51)	0.25 (0.55)	0.35 (0.77)	0.45 (0.99)
Accessories		4- M4 × 14 base unit mounting screws			

● Extension base unit

Type		Q63B	Q65B	Q68B	Q612B
Number of I/O modules loaded		3	5	8	12
Applicable I/O modules		I/O modules for Q			
Mounting hole size		5 ϕ pear-shaped hole (for M4 screw)			
External dimensions (mm (inch))	W	189 (7.44)	245 (9.65)	328 (12.92)	439 (17.30)
	H	98 (3.86)			
Weight (kg (lb))		0.23 (0.51)	0.25 (0.55)	0.35 (0.77)	0.45 (0.99)
Accessories		4- M4 × 14 base unit mounting screws			

Type	QA1S65B	QA1S68B
Number of I/O modules loaded	5	8
Applicable I/O modules	I/O modules for AnS	
Mounting hole size	6 ϕ pear-shaped hole (for M5 screw)	
External dimensions (mm (inch))	315 (12.41) (W) × 130 (5.12) (H)	420 (16.55) (W) × 130 (5.12) (H)
Weight (kg (lb))	0.75 (1.65)	1.0 (2.2)
Accessories	4- M5 × 25 base unit mounting screws	

Handling instructions

(1) The right-hand side mounting screws of the base unit cannot be removed when an I/O module is loaded in its rightmost slot. Remove the mounting screws after unloading the I/O module.

(2) When mounting the base unit into a control panel, etc., leave a 30mm (1.18inch) or more clearance between its top and the structure or parts to ensure ease of module replacement and reduce the influence of radiated noise or heat. (When the wiring duct is not more than 50mm (1.97inch) in height. 40mm (1.58inch) or more clearance for other cases.)
Also leave 5mm (0.20inch) or more clearances in the left-to-right direction. (20mm (0.79inch) or more clearance on the left-hand side when an extension cable is plugged without removal of an adjacent unit.

(3) Mount the base unit on a flat surface to prevent possible flexing of the printed circuit boards.

Accessories

The Q3 □ B main base unit is provided with "Q02/Q02H/Q06H/Q12H/Q25HCPU User's Manual (Hardware)".

DIN Rail Mounting Adaptors

When mounting the Q3 □ B or Q6 □ B onto a DIN rail, the optional DIN rail mounting adaptor is needed.

Type	Applicable Base
Q6DIN1	Q38B, Q312B, Q68B, Q612B
Q6DIN2	Q35B, Q65B
Q6DIN3	Q33B, Q63B

Note that the QA1S6 □ B can be mounted onto a DIN rail as it is.

Accessories: Batteries, Cables, Connectors

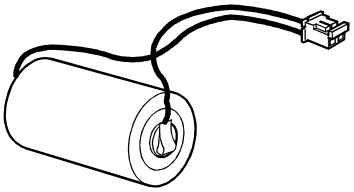
Batteries

■ Overview

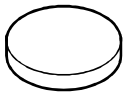
The Q6BAT battery is loaded into a CPU module and used to back up the built-in RAM memory of the CPU module at a power failure.
The Q2MEM-BAT battery is used to back up the Q2MEM-1MBS memory card at a power failure.

■ Appearance

Q6BAT



Q2MEM-BAT



■ Specifications

Type	Q6BAT	Q2MEM-BAT
Nominal voltage	3VDC	3VDC
Battery type	Manganese dioxide lithium battery	Graphite fluoride lithium battery
Current capacity	1800mAh	48mAh
Storage life	10 years (Note 1)	4 years (Note 1)
Applicable model	Q02/Q02H/Q06H/ Q12H/Q25HCPU	Q2MEM-1MBS

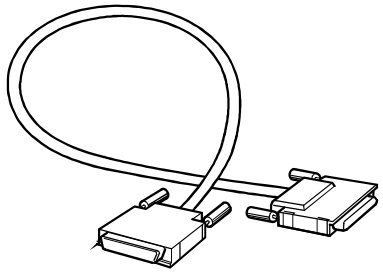
Note 1: The storage life indicates the life during which the battery can be used independently of how much battery current is consumed.

Extension Base Cables

● Overview

An extension cable is used for connection between the main and extension base units, or between the extension base units.

● Appearance



● Model list

Type	QC06B	QC12B	QC30B	QC50B	QC100B
Cable length (m (ft.))	0.6 (1.97)	1.2 (3.93)	3 (9.84)	5 (16.39)	10 (32.79)
Usable base unit	Main base unit (Q35B, Q38B, Q312B) Extension base unit (Q65B, Q68B, Q612B, QA1S65B, QA1S68B)				
Weight (kg (lb))	0.16 (0.35)	0.22 (0.48)	0.40 (0.88)	0.60 (1.32)	1.11 (2.44)

● Directions for use

When the above extension cables are used together, the overall distance of the extension cables should be within 13.2m (43.28ft.).

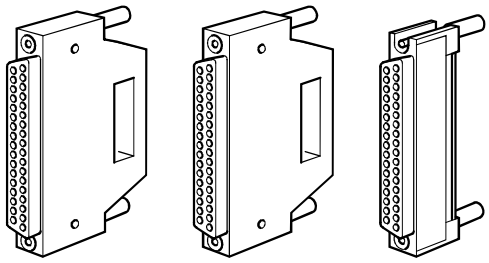
External Wiring Connectors for I/O Modules

● Overview

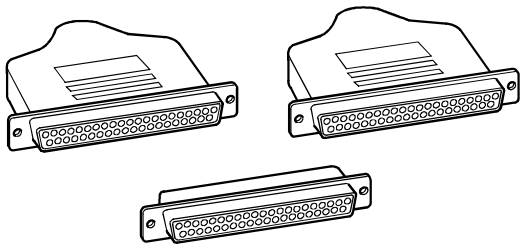
Loaded onto a connector type I/O module and used for wiring an external device. These connectors are classified into six different types according to the used connector and I/O module types.

● Appearance

A6CON1, A6CON2, A6CON3



A6CON1E, A6CON2E, A6CON3E



● Model list

Type	A6CON1	A6CON2	A6CON3
Connector type	Soldering type	Crimp-contact type	Pressure-displacement type
Applicable module	Positive common (sink) type input module, sink type output module		
Applicable wire size	0.3mm^2	AWG#24 to 28	AWG#28, AWG#30

• Crimp-contact tool for A6CON2

FCN-363T-T005/H

• Pressure-displacement tool for A6CON3

FCN-367T-T012/H (locator plate)
FCN-707T-T001/H (cable cutter)
FCN-707T-T101/H (hand press)

• Contact for crimp-contact and pressure-displacement tools

Type	A6CON1E	A6CON2E	A6CON3E
Connector type	Soldering type	Crimp-contact type	Pressure-displacement type
Applicable module	Negative common (source) type input module, source type output module		
Applicable wire size	0.3mm^2	AWG#20 to 24	AWG#28, AWG#30

• Crimp-contact tool for A6CON2E

• Pressure-displacement tool for A6CON3E

91257-1 (die set)
91220-1 (cable cutter)
91085-2 (hand mini-press)

• Contact for crimp-contact and pressure-displacement tools

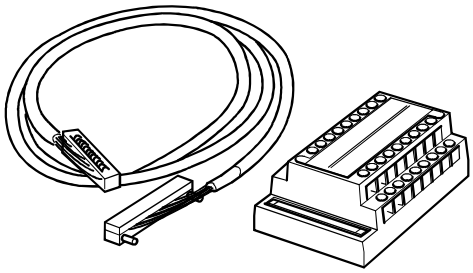
Connector/Terminal Block Convertor Modules, Cables

● Overview

The connector/terminal block converter module is designed to convert the connector of a connector type I/O module into a terminal block to ensure ease of external wiring.

To use this module, plug a dedicated cable to the connector of an I/O module and plug the opposite side of that cable to the connector/terminal block convertor module. Perform external wiring at the terminal block of the connector/terminal block convertor module.

● Appearance



● Model list

(1) Connector/terminal block convertor modules

Type	Description	Weight (kg (lb))
A6TBXY36	For positive common (sink) type input modules and sink type output modules (standard type)	0.4 (0.88)
A6TBXY54	For positive common (sink) type input modules and sink type output modules (2-wire type)	0.5 (1.1)
A6TBX70	For positive common (sink) type input modules (3-wire type)	0.6 (1.32)
A6TBX36-E	For negative common (source) type input modules (standard type)	0.4 (0.88)
A6TBY36-E	For source type output modules (standard type)	0.4 (0.88)
A6TBX54-E	For negative common (source) type input modules (2-wire type)	0.5 (1.1)
A6TBY54-E	For source type output modules (2-wire type)	0.5 (1.1)
A6TBX70-E	For negative common (source) type input modules (3-wire type)	0.6 (1.32)

Accessories: Batteries, Cables, Connectors

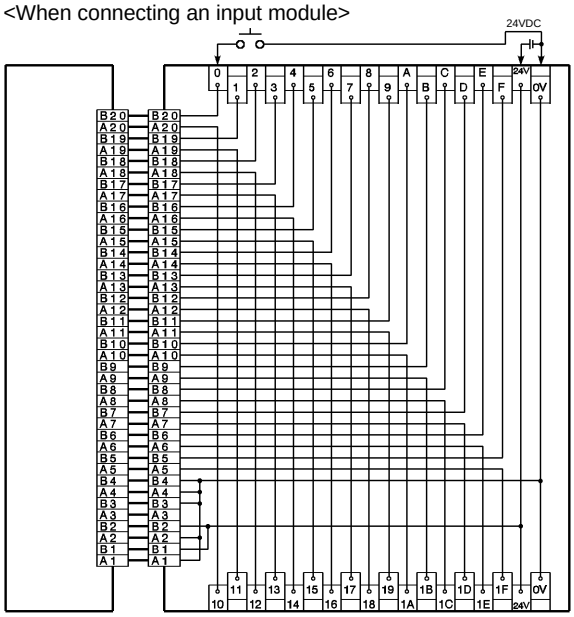
(2) Cables

Type	Description	Weight (kg (LB))	Applicable Model
AC05TB	0.5m (1.64ft.) for sink modules	0.17 (0.37)	A6TBXY36 A6TBXY54 A6TBX70
AC10TB	1m (3.28ft.) for sink modules	0.23 (0.51)	
AC20TB	2m (6.56ft.) for sink modules	0.37 (0.81)	
AC30TB	3m (9.84ft.) for sink modules	0.51 (1.12)	
AC50TB	5m (16.39ft.) for sink modules	0.76 (1.67)	
AC80TB	8m (26.23ft.) for sink modules (common current not exceeding 0.5 A)	1.2 (2.64)	
AC100TB	10m (32.79ft.) for sink modules (common current not exceeding 0.5 A)	1.5 (3.3)	
AC05TB-E	0.5m (1.64ft.) for source modules	0.17 (0.37)	A6TBX36-E A6TBY36-E A6TBX54-E A6TBY54-E A6TBX70-E
AC10TB-E	1m (3.28ft.) for source modules	0.23 (0.51)	
AC20TB-E	2m (6.56ft.) for source modules	0.37 (0.81)	
AC30TB-E	3m (9.84ft.) for source modules	0.51 (1.12)	
AC50TB-E	5m (16.39ft.) for source modules	0.76 (1.67)	

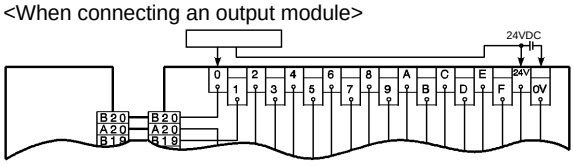
● Connector/terminal block convertor module connection diagrams

(1) A6TBXY36

<When connecting an input module>

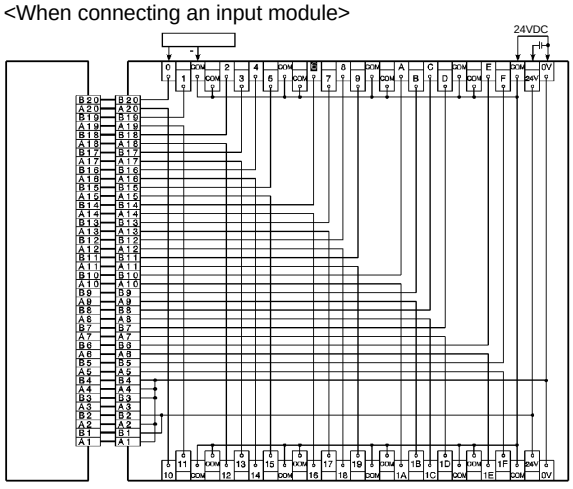


<When connecting an output module>

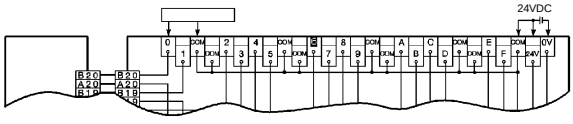


(2) A6TBXY54

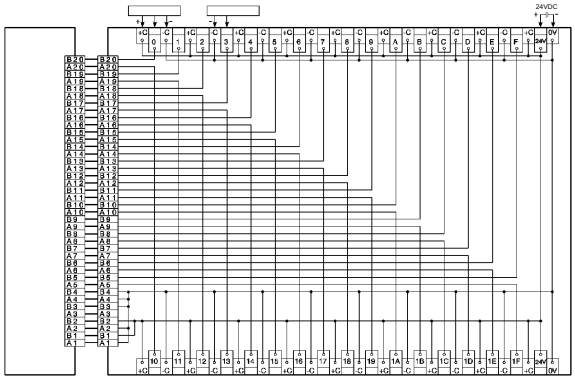
<When connecting an input module>



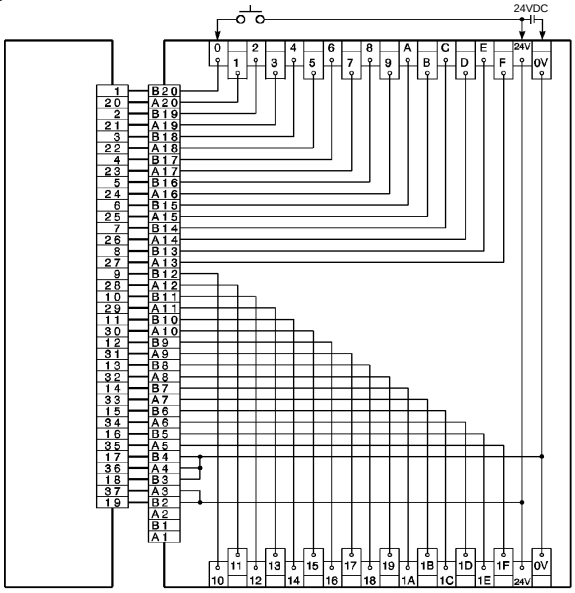
<When connecting an output module>



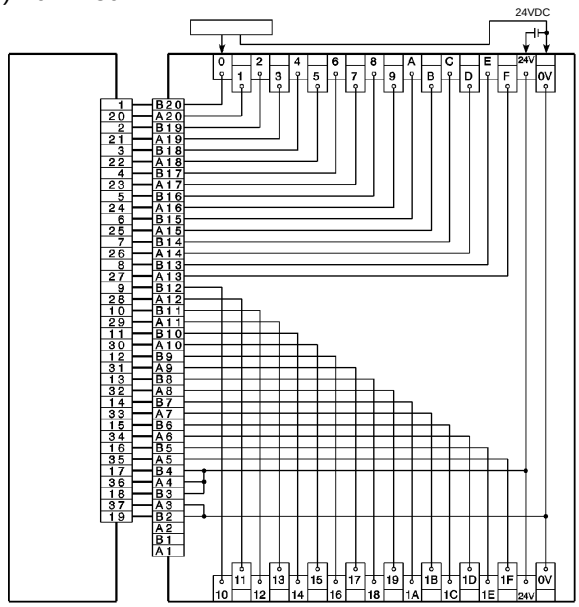
(3) A6TBXY70



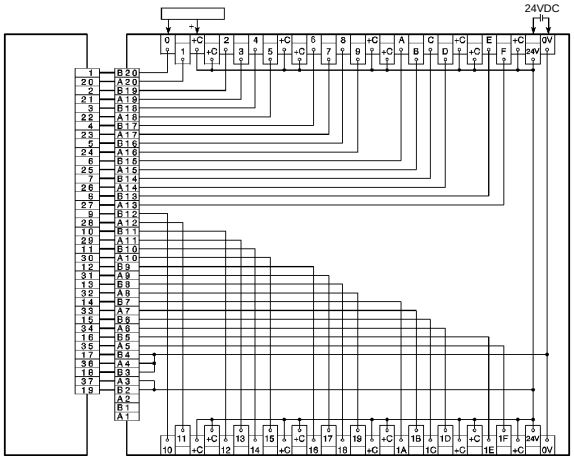
(4) A6TBX36-E



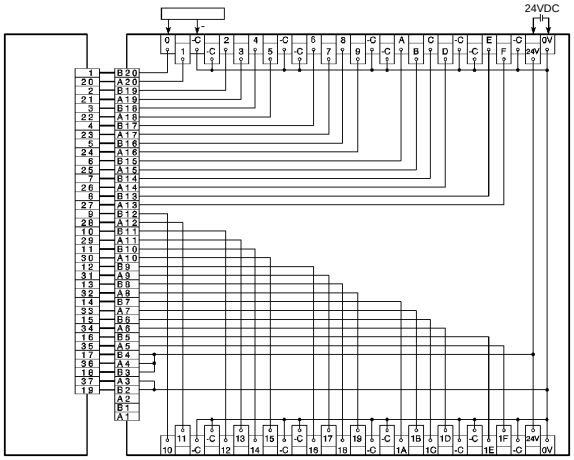
(5) A6TBY36-E



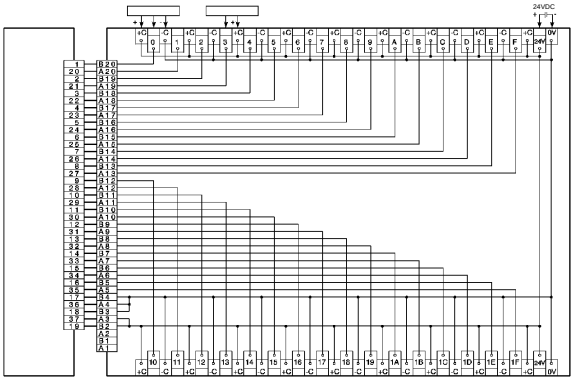
(6) A6TBX54-E



(7) A6TBY54-E



(8) A6TBX70-E



● Directions for use

The tightening torque of the terminal screws (M3.5 screws) of the terminal blocks is 78.4N•cm.

Accessories:
Batteries, Cables, Connectors

Terminal Block Convertor Modules

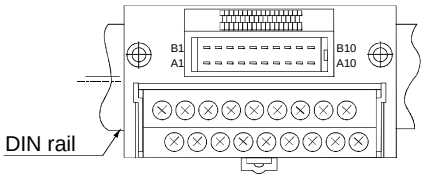
The terminal block convertor module available is designed to facilitate wiring by drawing the wiring to the terminal block out of the Q series 16-point I/O module (terminal block type).

● Features

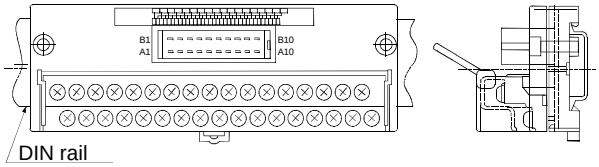
(1) Usable with both AC and DC 16-point I/O modules.
(2) Single-wire and two-wire type (with common terminal per point) terminal blocks are available.
(3) The lead-out cable is printed with wire numbers for ease of wiring.
(4) The terminal block uses self-tapping screws for ease of wiring round crimping terminals.
(5) Can be mounted using a DIN rail or screws.

● Appearance

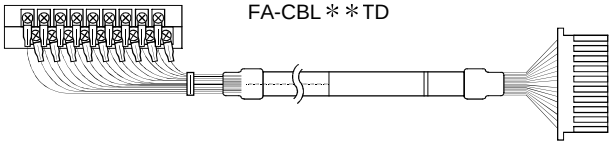
FA-TB161



FA-TB161ACC1/2,-TB162ACC



FA-CBL＊＊TD

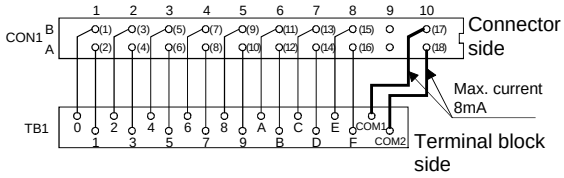


Type	Description
FA-TB161AC	Terminal block convertor module, 1-wire type Applicable I/O modules: QX10, QX40, QY10, QY80, QX80, QY40P, QY50
FA-TB161ACC2	Terminal block convertor module, 2-wire type Applicable I/O modules: QX10, QX40, QY10, QY80
FA-TB161ACC1	Terminal block convertor module, 2-wire type Applicable I/O modules: QX80, QY40P, QY50
FA-CBL05TD	Dedicated cable 0.5m (1.64ft.)
FA-CBL07TD	Dedicated cable 0.7m (2.30ft.)
FA-CBL10TD	Dedicated cable 1m (3.28ft.)
FA-CBL15TD	Dedicated cable 1.5m (4.92ft.)
FA-CBL20TD	Dedicated cable 2m (6.56ft.)
FA-CBL25TD	Dedicated cable 2.5m (8.20ft.)
FA-CBL30TD	Dedicated cable 3m (9.84ft.)

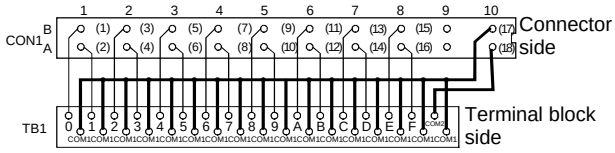
● Connection diagrams

(1) 16-point, 1-common module

FA-TB161AC

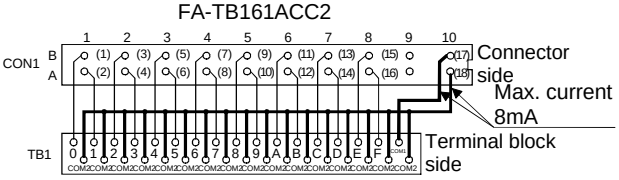


FA-TB161ACC1

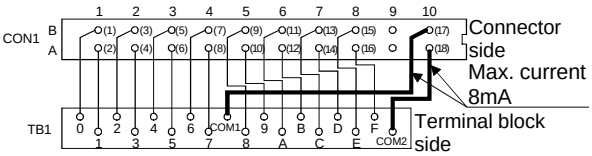


(2) 16-point, 2-common module

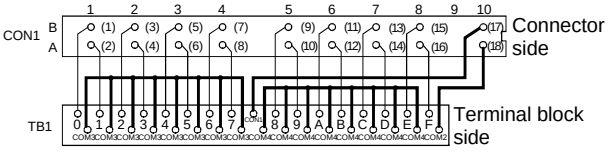
FA-TB161ACC2



FA-TB162AC



FA-TB162ACC



External Wiring Cables for Positioning Modules (QD75)

Control signal cable for connection between the positioning module (QD75) and servo amplifier or stepping motor driver. (With external device connection cable)
These cables can save time and trouble for cable fabrication, noise reduction shielding, etc. on the user side for easy use of the QD75.

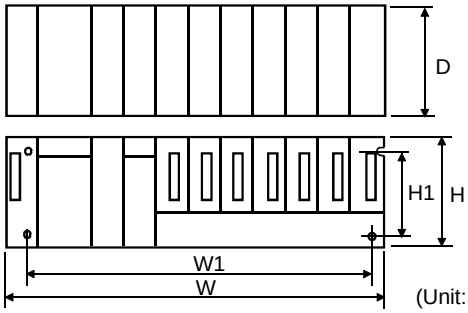
Type	Description
FA-CBLQ75M2H	For Mitsubishi Electric MR-HA series
FA-CBLQ75M2J2	For Mitsubishi Electric MR-J2A/J2SA series
FA-CBLQ75M2C	For Mitsubishi Electric MR-C series
FA-CBLQ75Y2 Σ II	Yaskawa Electric Σ -II series
FA-CBLQ75P2A	For Matsushita Electric Industrial MINAS A series
FA-CBLQ75S2PY	Sanyo Electric PY0 series
FA-CBLQ75G2	Loose-wire type mating side for QD75P For connection of Oriental's stepping motor, etc.

A single cable of 2m (6.56ft.) length is compatible with up to two axes.
Cables other than the FA-CBLQ75G2P are for use with the QD75D (differential output).

External Dimensions

External Dimensions

■ Q3□B, Q6□B, QA1S6□B structural dimensions

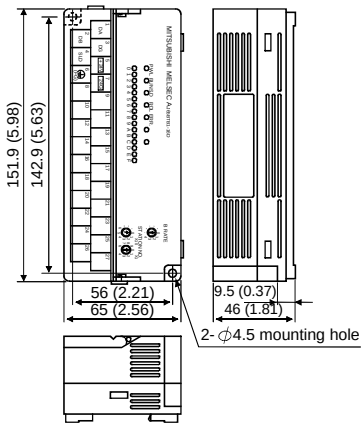


(Unit: mm (inch))

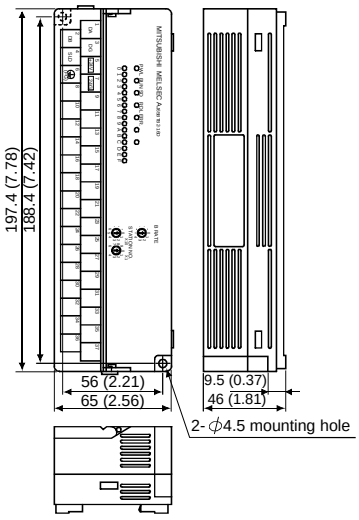
Base module	Dimensions			Dimensions between mounting holes	
	H	W	D	H1	W1
Q33B	98 (3.86)	189 (7.44)	98 (3.86)	80 (3.15)	169 (6.65)
Q35B		245 (9.65)			225 (8.87)
Q38B		328 (12.92)			308 (12.14)
Q312B		439 (17.30)			419 (16.51)
Q63B		189 (7.44)			167 (6.57)
Q65B		245 (9.65)			223 (8.79)
Q68B		328 (12.92)			306 (12.06)
Q612B		439 (17.30)			417 (16.43)
QA1S65B	130 (5.12)	315 (12.41)	110 (4.33)	110 (4.33)	295 (11.62)
QA1S68B		420 (16.55)			400 (15.76)

■ CC-Link remote I/O dimensions

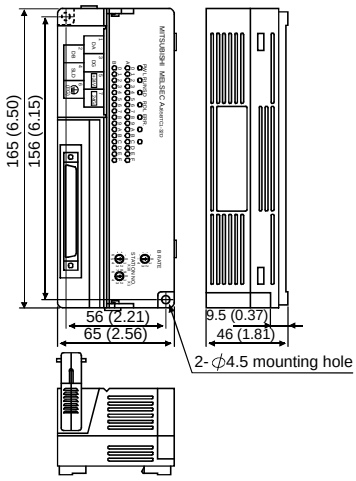
● AJ65BTB1-16 ⛶



● AJ65BTB2-16 ⛶

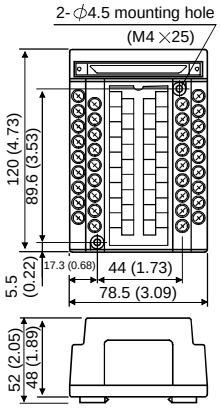


● AJ65BTC1-32 ⛶

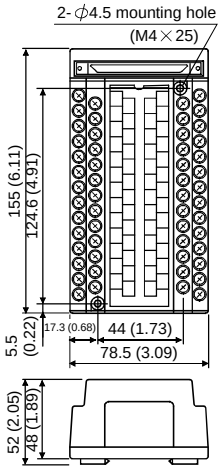


■ Connector/terminal block convertor modules

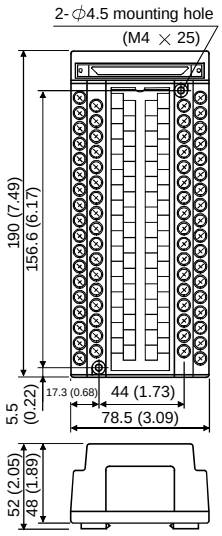
● A6TB36



● A6TB54

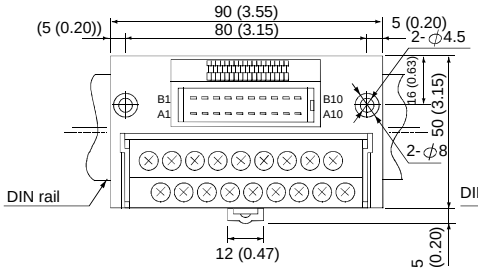


● A6TBX70

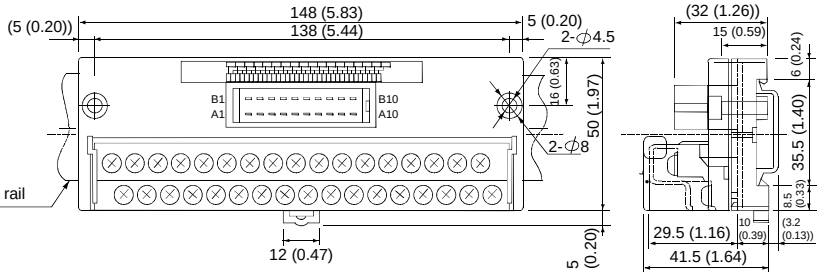


■ Terminal block convertor modules

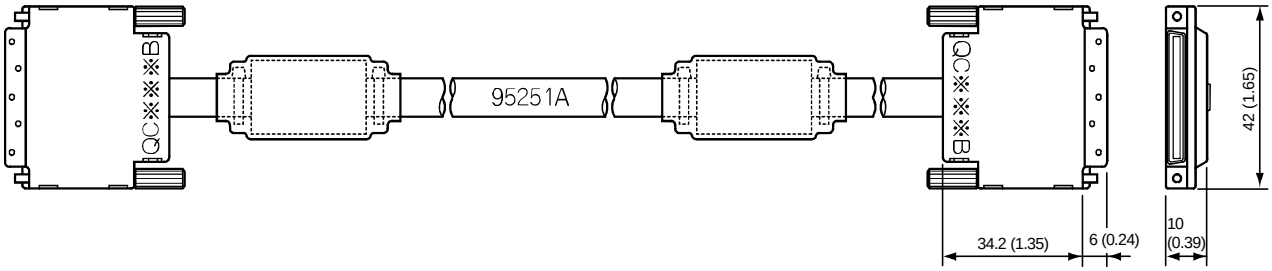
FA-TB161/162AC



FA-TB161ACC1/2,-TB162ACC

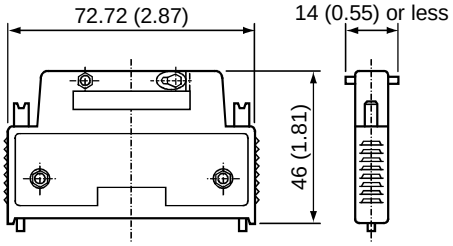


■ Extension base cable

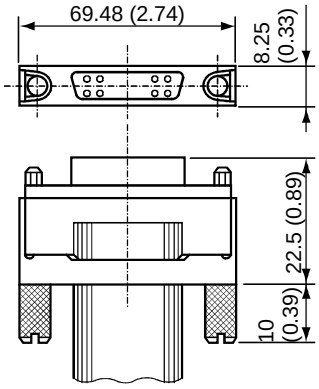


■ Connectors/A6CON1, A6CON2, A6CON3, A6CON1E, A6CON2E, A6CON3E

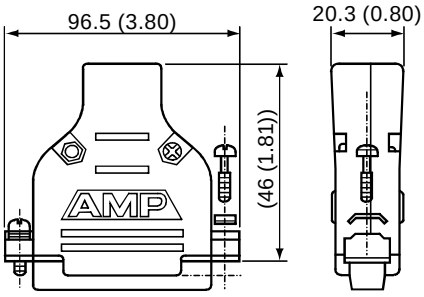
● A6CON1/A6CON2



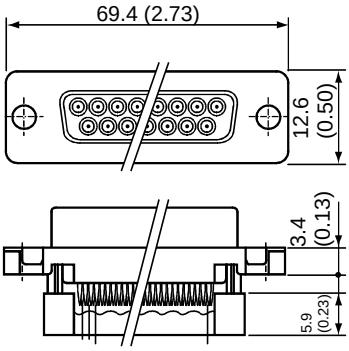
● A6CON3



● A6CON1E/A6CON2E



● A6CON3E



Q mode

Sequence Programs

Programming Software/SW5D5C-GPPW-E

Q mode sequence programs use SW5D5C-GPPW-E GPP function software package for Windows (hereafter referred to as "GPPW"). GPPW permits sequence programming in ladder, list and SFC (sequential function chart) languages, entry of comments to the I/O/CPU module internal relays, registers and others, network parameter setting, sequence program operating status monitoring, network operating status monitoring, forced data changes, I/O signal ON/OFF, and others.

Note 1: The product of the above type is allowed to be installed into a personal computer only once. As there are also versions which allow 5 or 10 installations on different personal computers, confirm their types in the model list given at the end of this manual.

The ladder logic test tool used to simulate designed sequence programs, the utility packages for setting data of various intelligent function modules such as analog-to-digital converter and digital-to-analog converter modules, and other software programs can be added in (additionally installed in) GPPW for use. GPPW is an easy-to-understand, easy-to-operate software environment since various software programs can be used in the same operating environment with similar operability.

Function List

The chief functions of GPPW are listed below.

Compatible series	FX, A, QnA, Q (Q mode/A mode) series
Connection method	USB, RS232C, Ethernet, MELSECNET/10, CC-Link, serial communication module (including via modem)
Programming language	Ladder, list, SFC
File format conversion	Read/write of GPPA, GPPQ, FXGP (DOS/WIN) format files
Program editing	Editing of ladder, list, SFC
Program conversion	A/FX conversion, A/QnA conversion, A/Q conversion, Q/QnA conversion
Comment editing	Device comment, note, statement editing
Network setting	Ethernet, MELSECNET/10, CC-Link parameter settings
Monitoring	Ladder/SFC monitoring, program monitoring, network monitoring, CPU module internal device data monitoring
Test	Timer/counter set value changing, CPU module internal device data changing
Help	CPU module error, special relay/ register, key operation

Operating Environment

GPPW operates on Windows 95, Windows 98 and Windows NT. Its operating environment is as follows.

OS		Windows95, Windows98, WindowsNT4.0
CPU		Pentium 133MHz or more recommended
Memory		32MB or more recommended
Hard disk free space	At installation	50MB or more
	At execution	50MB or more
Display		800 × 600 pixels or more

Programming Languages

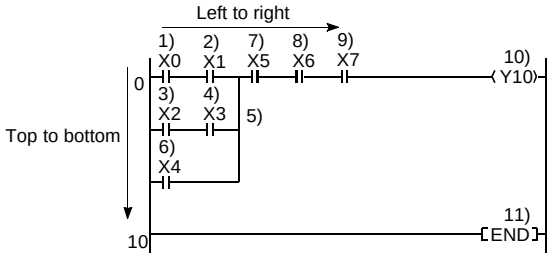
The Q mode can be programmed in the ladder, list and SFC (MELSAP3) languages.

■ Ladder mode

The ladder mode is a programming method based on the concept of a relay control circuit and allows programming in representations close to the sequence circuit of relay control.

Programming is done by placing contacts, coils and other symbols and used device numbers on the screen. The ladder programmed on the screen is converted into a sequence program executable in the Q mode by conversion operation.

● Relay symbolic language



∗ 1) to 11) indicate the order of sequence program operations.

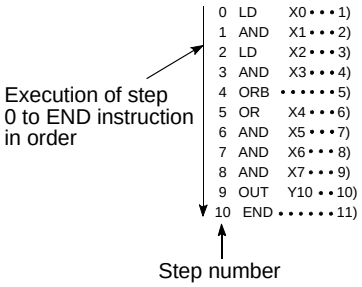
■ List mode

The list mode is a programming method in which Q mode instructions are described in execution order in a list format.

Contacts, coils and other symbols are replaced by Q mode instructions for programming.

The sequence program created in the list mode can be displayed in the ladder mode for confirmation.

● Logic symbolic language



SFC Programming

In addition to programming in the ladder and list languages, the Q mode PLC allows programming in the SFC (Sequential Function Chart) language. SFC is a language suitable to structure and standardize programs, and enhances ease of understanding since the operation sequence of the object to be controlled is represented as-is in program form. The features of the SFC as compared to those of the ladder are described below.

■ Features of SFC

● Complicated interlocks in the ladder

Processing in ladder programs uses the scanning system which repeats all steps from the first to the last in a program corresponding to all operation processes of equipment to be controlled. Namely, whichever process the equipment is operating in, this system manipulates the steps of the pre- and post-processes concurrently. Hence, a program is designed to include many interlock signals to prevent the pre- and post-process steps from being manipulated. To define interlocks, you must fully understand what devices are used in the pre- and post-processes. If you do not understand or examine them sufficiently, meaningless or duplex interlock signals may be defined, causing a program to be more difficult to understand.

As opposed to this, SFC processes only the program step corresponding to the present operation process of the equipment and does not execute the steps of the pre- and post-processes. Therefore, only interlock signals in the currently executed process are needed, simplifying program description.

● Operation sequence cannot be represented by ladder

A ladder is basically represented by combinations of contacts and coils and its program does not have representations corresponding to the operation sequence of the equipment. For example, if the equipment has stopped due to some fault, the whole program must be examined to find where the step corresponding to the process at a stop is described.

In contrast, an SFC chart is represented in a flowchart format and basically matches the operation processes of the equipment. Hence, if an aforementioned fault has occurred, once the process which stopped is found you will know where in the program the corresponding step is described.

● High freedom of design in the ladder

A ladder is designed in accordance with the rule that a closed contact turns on a coil. In other words, it is extremely high in program design freedom and a single operation process of equipment may be programmed in multiple ways. This enables different programs to be written by different engineers, making it difficult to standardize programs. It also hinders other persons than the designer from understanding that program.

Compared to this, SFC creates an SFC chart which matches the operation processes of equipment. Hence, the freedom of program design is limited, but it is limited to match the operation processes, and therefore, persons other than the designer can understand the program easily, producing program standardizing effect.

● Unsequential control is enabled in the ladder

Since an operation sequence is not described in a ladder, it may also be applied to programs designed to perform operations using external interrupt signals and to perform monitoring continuously, for example.

Oppositely, a sequence is described in an SFC chart and SFC is not appropriate for such controls that require processing independently of the sequence.

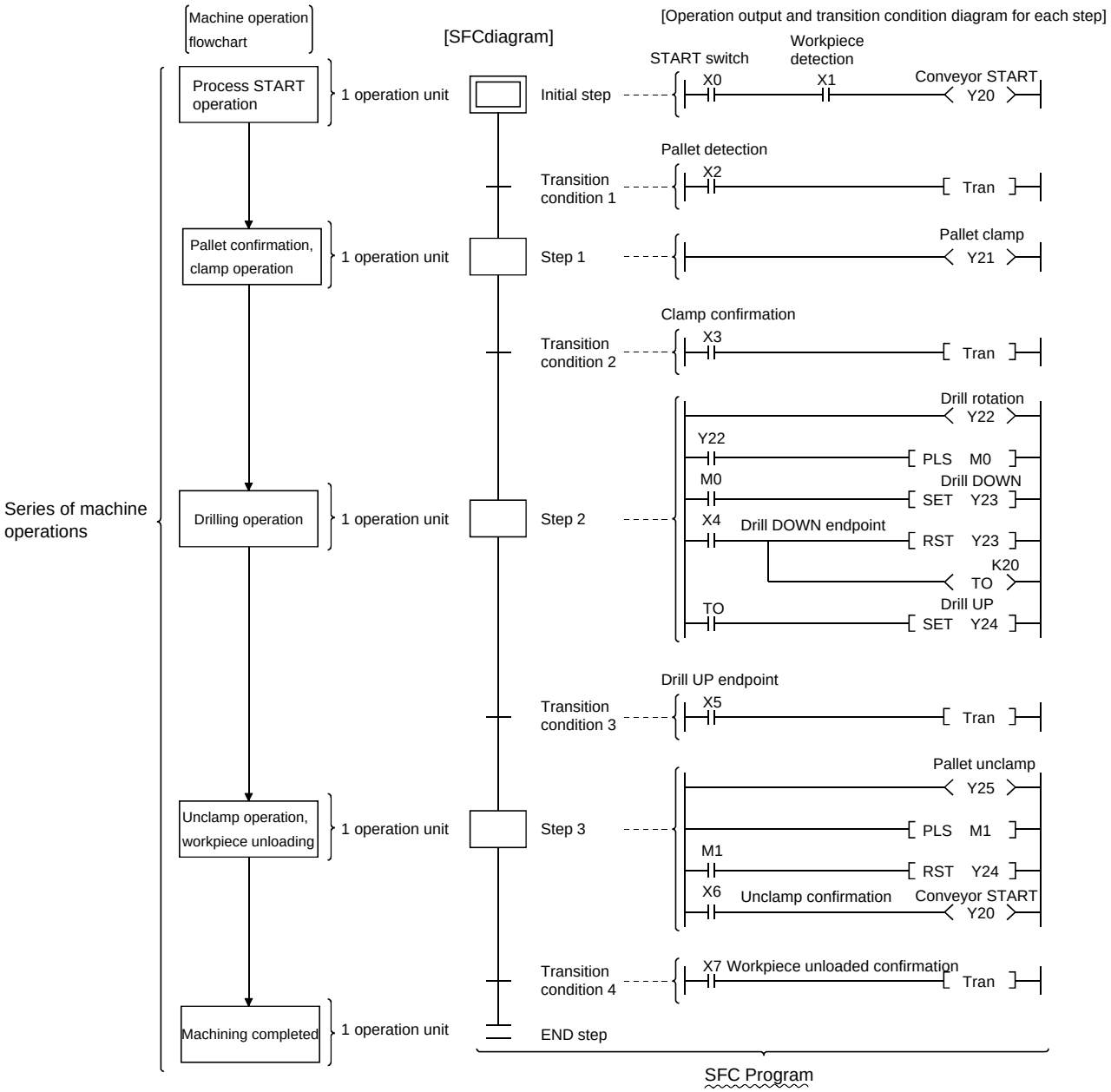
The Q mode PLC allows use of both the SFC and ladder programs, either of which can therefore be used as necessary.

Basics of SFC

An SFC chart consists of a "step" which describes the processing of each operation process in a series of machine operation processes and a "transition condition" which describes the transition condition from one process to another. Also, a fine operation in each step and each transition condition are described in ladders.

The operation of an SFC program starts at an initial step, the next step is executed every time a transition condition holds, a series of operations ends at an end step, and the program is restarted at the initial step (Note 1).

Note 1: Only the SFC program in block 0 is restarted at the initial step, and the SFC programs in and after block 1 terminate processing at the end step and wait to be restarted from another block.



■Performance Specifications of SFC

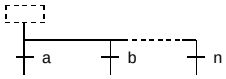
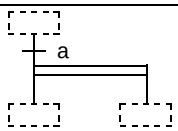
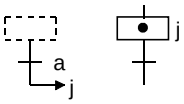
Item	Specifications
Number of files	1 file (Note 1)
Number of blocks	Max. 320 blocks (0 to 319)
Number of SFC steps	Max. 8192 steps in all blocks Max. 512 steps in one block
Number of branches	Max. 32
Number of simultaneously activated steps	Max. 1280 steps in all blocks Max. 256 steps in one block
Number of operation output sequence steps	Max. 2K steps in one block No restrictions per step
Number of transition condition sequence steps	Max. 2K steps in one block No restrictions per transition condition

Note 1: The other "program execution controlling SFC program" may be created. The "program execution controlling SFC program" indicates an SFC program designed to control the start/stop of a program file necessary to match the operation process of equipment.

■ Operations in SFC Chart

Name	Symbol	Function
Main functions		
Step	□	A step is an equipment process unit, and is processed until the transition condition described next to that step holds. Note that when a transition to the next step is made, the current step is deactivated and the coil described in the OUT instruction automatically turns off.
Initial step	▣	A step at the beginning of each block is called an initial step. Its operation is the same as that of a step.
Dummy step	⊠	As the name indicates, this step is a dummy and does not include a ladder program.
Block start step (With end check)	⊟	Starts another block and waits for the started block to reach its end step.
Block start step (Without end check)	⊟	Starts another block. Transits to the next step when the transition condition holds, independently of whether the started block has reached its end step or not.

Name	Symbol	Function
Optional functions		
Coil holding	SC	Providing the SC option transits execution to the next step with a coil described in the OUT instruction being kept ON.
Operation holding (Without transition check)	SE	Providing the SE option holds the current step active to continue program processing if the transition condition holds and the next step is activated. Note that if the transition condition holds again, the next step is not activated again.
Operation holding (With transition check)	ST	Providing the ST option holds the current step active to continue program processing if the transition condition holds and the next step is activated. Note that if the transition condition holds again, the next step is activated again.
Reset	R	Providing the R step allows the coil held by the SC option to be reset or the step kept activated by the SE or ST option to be deactivated, in addition to the operation in an ordinary step.

Name	SFC Symbol	Function
Series transition		Transits execution to the next step when the transition condition holds.
Selective branch		Executes only the step whose condition occurs first among multiple transition conditions arranged in parallel.
Parallel branch		Simultaneously executes all of multiple steps arranged in parallel.
Jump		Causes a jump to the step specified within the same block.
Block end		Terminates a series of processings in that block.

Q mode

Memory Capacity

How to calculate the memory capacity of an SFC program is indicated below.

SFC program capacity = (Step)	2 + 8 × (largest block number + 1) + capacity of block 0 + capacity of block 1 + ... + capacity of block n
Capacity of one block =	2 + number of SFC chart steps (refer to the following table) + number of ladder program steps within one SFC step + number of ladder program steps within one transition condition

Number of SFC chart steps

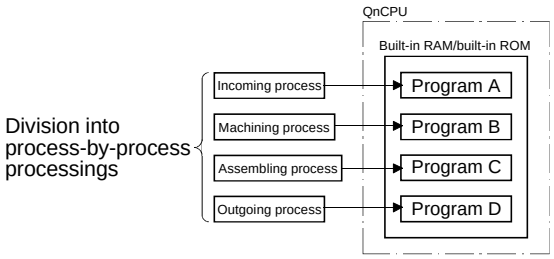
Symbol	Number of Steps
Step (initial, dummy), block start	3
Series transition, selective branch, selective coupling	4 × number of transition conditions
Parallel branch	2 + 2 × number of branches
Parallel coupling	2 + 2 × (number of coupling branches - 1) + 2 × number of re-branches after coupling
Block end, jump	0

Multiple Programs

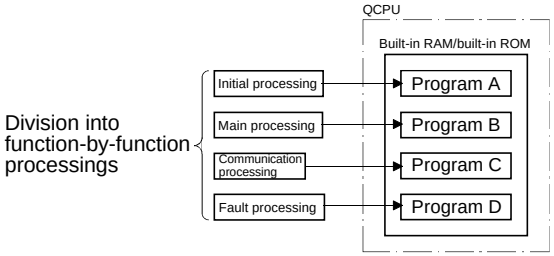
In a PLC, control is generally exercised with a single program. Hence, facility initialization processing, automatic operation, manual operation, data collection, communication-related processing and others are described in one program, resulting in a large program for a complex system thus making it difficult to create, debug and maintain the program. This will also make it difficult for maintenance staff members other than the engineer who created it to understand the operations of that program.

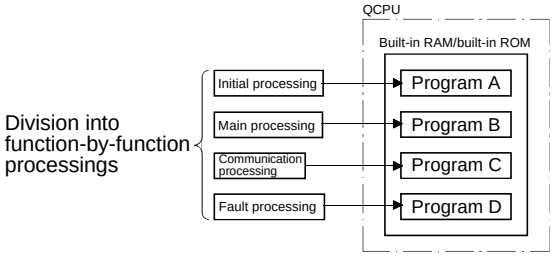
The Q mode allows a program to be divided into multiple programs and processed function-by-function or process-by-process. It has such advantages that program division by purposes makes individual programs smaller and clear purposes make programs easy to understand. In addition, purpose-based program division will increase program utilization efficiency, standardizing the programs.

● Creation of programs process-by-process



● Creation of programs function-by-function





For programs to be controlled by the Q mode, specify "which program will be run" and "how it will be run" in the parameters.

■ Specifying "which program will be run"

In the Q mode, every program is managed under a program name.

Use a program name to specify "which program will be run".

Set a program name with 8 characters.

Since the program name and registration time are written when registering the program in the CPU module, you will know the program contents and correction time, improving maintainability.

■ Specifying "how program will be run"

The program execution types of the Q mode available are the initial execution type, scan execution type, low-speed execution type, cyclic execution type, and standby type.

To determine "how program will be run", specify any of the above execution types in the parameters.

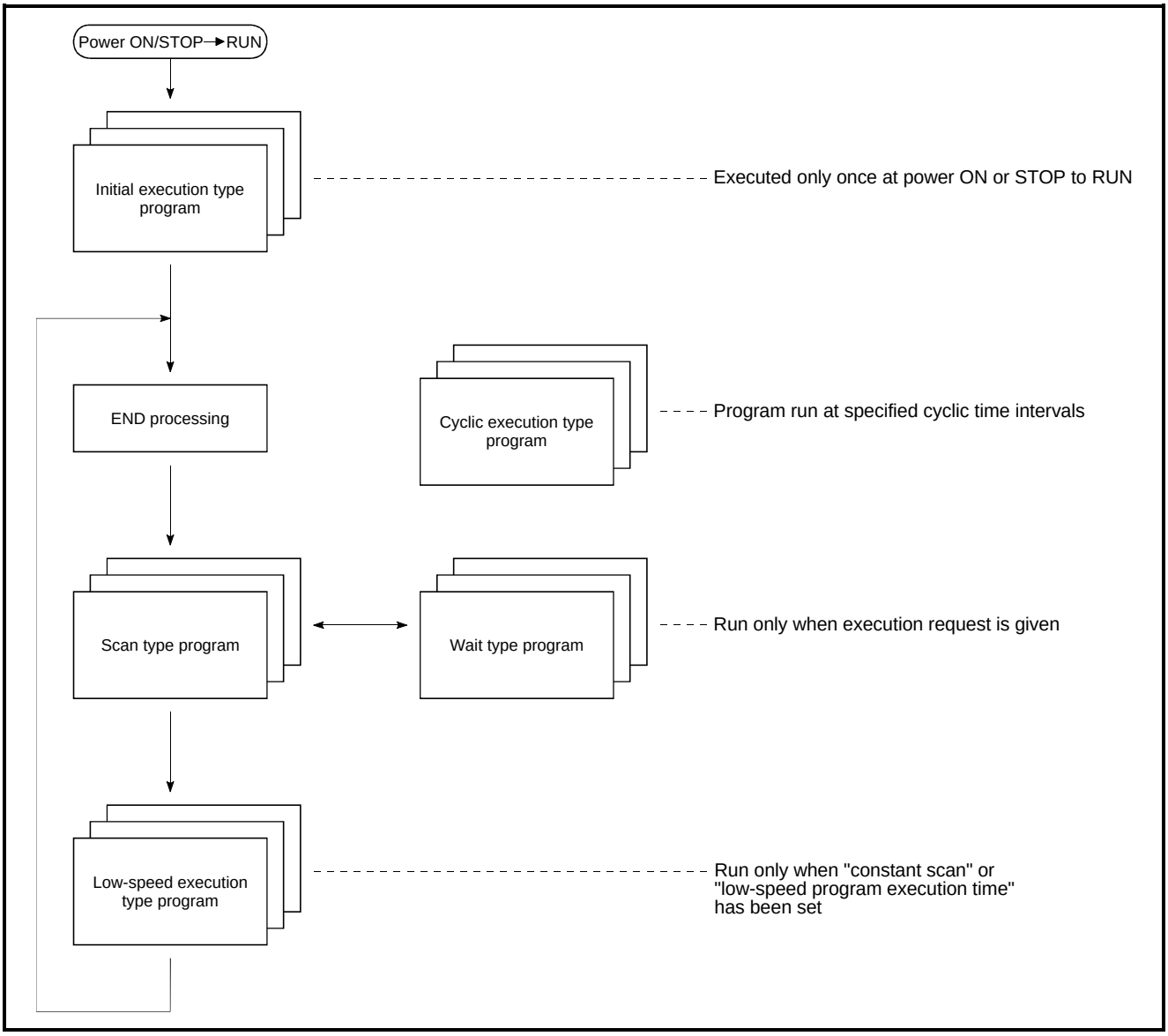
Sequence Programs

Program Execution Types

The following five different execution types can be specified for the Q mode.

(1) Initial execution type
(2) Scan execution type
(3) Low-speed execution type
(4) Cyclic execution type
(5) Standby type

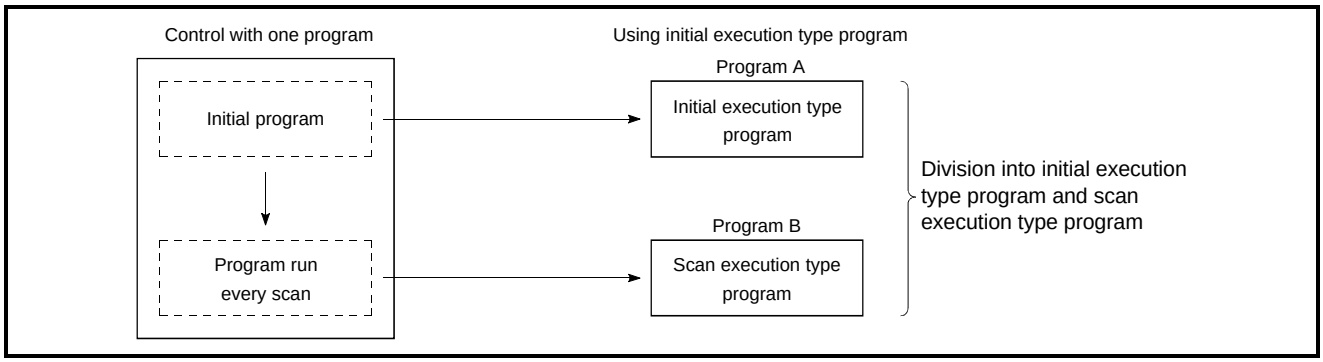
When running multiple programs on the CPU module, any of these execution types must be set for each program. It should be noted that at least one scan execution type program must be set. When there is only one program, it need not be set. (A program written to the CPU module is run as the "scan execution type".)



■Initial execution type

An initial execution type program is run only once when the PLC is powered on or switched from STOP to RUN.
A program that may be run only once to fulfill its purpose, e.g. the initial processing for an intelligent function module, can be set as an initial execution type. Removal of a program to be run only once from scan execution programs reduces the processing time of the scan execution programs.

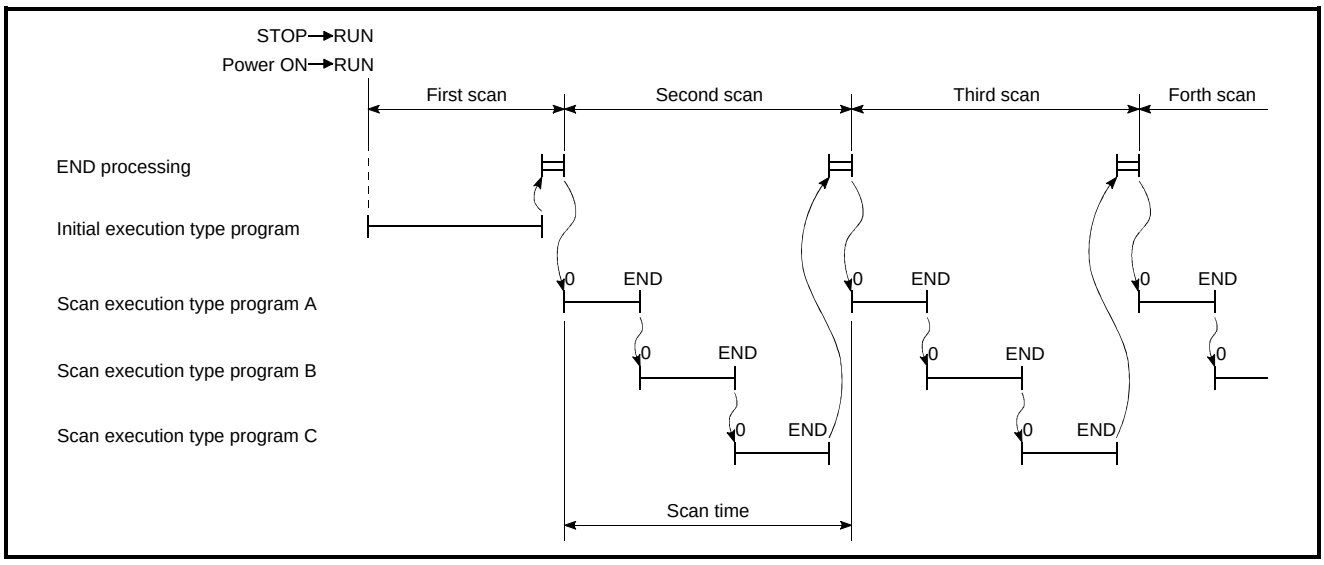
When multiple programs have been set as "initial execution type", they are run in order of lower to higher program numbers, and END processing is performed when all initial execution type programs are run.
In initial execution type programs, you cannot use instructions which specify completion devices (instructions which need several scans until completion of program run, e.g. network-dedicated instructions).



■Scan execution type

This program is run every scan after the scan where the initial execution type program has been run, and exercises actual control.
In the absence of the initial execution type program, the scan execution type program is run when the PLC is powered on or switched from STOP to RUN.

When multiple programs have been set to the "scan execution type", they are run in order of lower to higher program numbers.
END processing is performed when all scan execution type programs are run.



Q mode

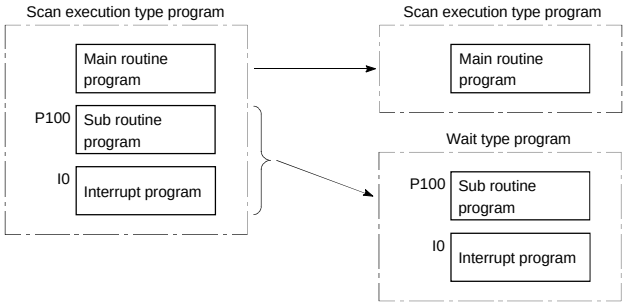
■ Low-speed execution type

A low-speed execution type program is run only during "constant scan surplus time" or preset "low-speed program execution time".
If it cannot be completed in the "constant scan surplus time" or "low-speed program execution time", the program is suspended once and the remainder of that program is run at the next scan. This type can be used as a processing program which need not be run every scan, e.g. output to printer and data transmission to host personal computer or the like.
When multiple programs have been set to the "low-speed execution type", they are run in order of lower to higher program numbers, and low-speed END processing is performed when all low-speed execution type programs are run.

Note 1: The constant scan function is designed to keep the program operation processing time (i.e. scan time) constant so that the signal input - program operation processing - signal output delay time is constant to increase the control accuracy of a device. When the constant scan function is used, the scan time which normally varies per scan is fixed to a given period. If the scan time is shorter than that fixed period, surplus time is produced and can be used to process a low-speed execution program.

■ Wait type

A wait type program is run only when an execution request is given.
A subroutine program may be described in each scan program, but may be independent of the scan program and be used as a wait program. When used as a wait program, that subroutine can be called not only from that scan program but also from other scan programs.
Interrupt may take place during execution of any scan program. An interrupt program will be easier to understand when it is managed as a wait program.



■ Cyclic execution type

A cyclic execution type program is run every user-set time (execution cycle).
The execution cycle can be set to each cyclic execution type program within the range 0.5ms to 60s.
When multiple cyclic execution type programs have reached their execution cycles at the same time, they are run in order of lower to higher program numbers until all of them are run.

Program Run Control Instructions

Program run control instructions are used to change the program execution type when the CPU module is during RUN (during program execution).
These instructions cannot change the execution types of the programs stored in the built-in flash ROM and memory card which are not read to the program memory.
There are four different program run control instructions.
(1) PSCAN instruction
(2) PLOW instruction
(3) POFF instruction
(4) PSTOP instruction

■ PSCAN instruction

Changes an initial execution type program, low-speed execution type program or wait type program into a scan execution type program at END processing.

■ PLOW instruction

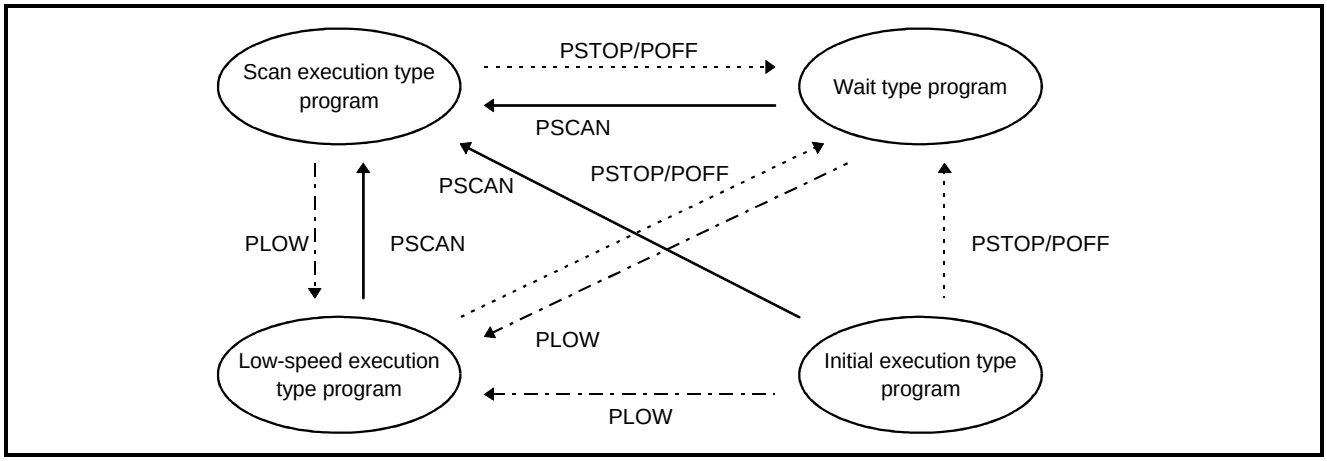
Changes an initial execution type program, scan execution type program or wait type program into a low-speed execution type program at END processing.

■ PSTOP instruction

Changes an initial execution type program, scan execution type program or low-speed execution type program into a wait type program at END processing.
When any program is changed into the wait type program, the external output (Y) is held. Use the POFF instruction to ensure that the external output (Y) is switched off at a change to wait type program.

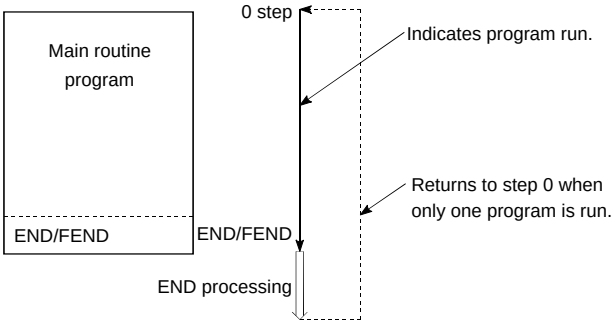
■ POFF instruction

Turns off the output of an initial execution type program, scan execution type program or low-speed execution type program at END processing and changes that program into a wait type program at the END processing of the next scan.
This instruction is used to ensure that the external output (Y) is switched off at a change to wait type program.



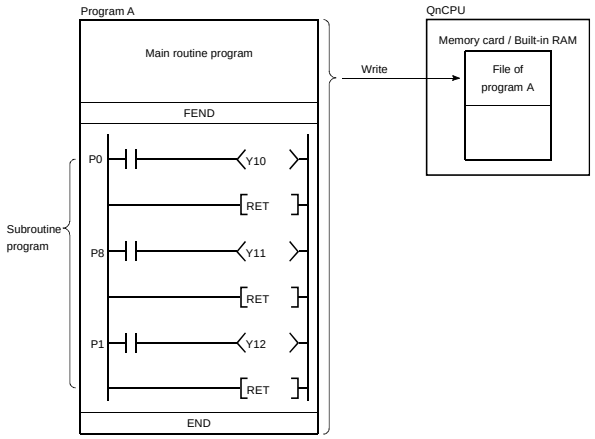
Main Routine Program

A main routine program is any of the initial execution, scan, wait, cyclic and other programs which start at its beginning (step 0) and ends at END/FEND.
(FEND is used when creating a subroutine program or interrupt program after a main program.)
When the run condition of a program holds, operation is performed from step 0 to END/FEND.
If multiple programs have been set to the same execution type, END processing is performed when the END/FEND instruction of the last run program is executed.



Subroutine Program

A subroutine program is run when it is called by CALL P □ , and starts at a pointer (P □) and ends at the RET instruction.
The number of steps can be reduced if a program executed several times during one scan or a program executed only when a condition holds is written as a subroutine program. Create a subroutine program after any of the main routine programs such as initial execution, scan, wait and cyclic programs (after FEND) or create them together as wait programs.
Pointers used in subroutine programs are local and common pointers. For use in a wait program, the common pointers must be assigned. When creating a subroutine in any of the initial execution, scan, wait, cyclic and other programs, assign the common or local pointers. The subroutine program having local pointers described in any of the initial execution, scan, wait, cyclic and other programs cannot be called from the other initial execution, scan, wait and cyclic programs.



Interrupt Program

An interrupt program is run after a temporary suspension of a main or sub routine program when an interrupt condition holds, and starts at an interrupt pointer (I □) and ends at the IRET instruction.
This program can respond quickly without influencing of the scan time of a sequence program.
Create an interrupt program after any of the main routine programs such as initial execution, scan, wait and cyclic programs (after FEND) or create them together as wait programs.
For interrupt pointers used in interrupt programs, the same interrupt pointer cannot be specified in any of the initial execution, scan, wait, cyclic and other programs.
An interrupt program can be run by
(1) Interrupt request from interrupt module (A1SI61)
(2) Interrupt request from intelligent function or network module
(3) Interrupt request by internal timer
(4) Interrupt request due to error occurrence

● Interrupt from A1SI61 interrupt module

An interrupt program is run under an external interrupt condition.
Only one A1SI61 module may be used with one CPU module and one module can run 16 different interrupt programs (I0 to I15).

● Interrupt from intelligent function or network module

The Q series intelligent function and network modules have predetermined interrupt channels (SI) and applications, and parameters are used to assign interrupt programs to interrupt pointers (I50 to I255).
For example, SI0 is assigned to CH1 count value coincidence interrupt and SI1 to CH2 count value coincidence interrupt on the QD61, and setting I50 and I51 to the QD61 assigns I50 to SI0 and I51 to SI1, allowing the I50 or I51 interrupt program to be run on count value match.

● Interrupt request by internal timer

An interrupt program can be run at intervals of 10ms, 20ms, 40ms or 100ms (these are default values and can be changed in increments of 0.5ms between 0.5ms and 100ms).

● Interrupt request due to error occurrence

An interrupt program can be run when an error is detected by the self-diagnosis of the CPU module.

Macro Instructions

The macro instruction function is designed to register a ladder pattern often used by the user as a single instruction to utilize it any number of times (macro utilization), i.e. the user can create an original instruction.
Using a macro instruction allows a ladder pattern made up of multiple instructions to be represented as a single-line instruction, producing effects on program viewability improvement and program standardization.
In macro registration, registering the devices to be changed for utilization (variables) as VD0 to VD9 ensures ease of device changes.
By setting actual devices to variables VD0 to VD9 for macro utilization, the preset devices are used for conversion into a sequence program.

Note 1: In the QnA PLC, reading a program created using a macro instruction will cause that macro instruction to be disassembled into and displayed as individual instructions, reducing the viewability of the program. In the Q mode PLC, this disadvantage has been corrected so that reading a program from the PLC will display a macro instruction in its original form.

Device Type List

■ Device type list

The following table lists the device names usable with the Q mode and their numbers of points (default values).
Note that the devices can be changed according to the number of points and user application.

Class	Type	Device Name	Default Value		Parameter Setting Range
			Number of points	Range of use	
Internal user device	Bit device	Input	8192 points	X0 to X1FFF	
		Output	8192 points	Y0 to Y1FFF	
		Step relay	8192 points	S0 to S511/block	
		Link special relay	2048 points	SB0 to SB2047	
		Internal relay	8192 points	M0 to M8191	Changeable within 28.8k words
		Latch relay	8192 points	L0 to L8191	
		Annunciator	2048 points	F0 to F2047	
		Edge relay	2048 points	V0 to V2047	
		Link relay	8192 points	B0 to B8191	
	Word device	Timer	2048 points	T0 to T2047	
		Retentive timer	0 points	(ST0 to ST2047)	
		Counter	1024 points	C0 to C1023	
		Data register	12288 points	D0 to D12287	
		Link register	8192 points	W0 to W8191	
		Link special register	2048 points	SW0 to SW2147	
Internal system device	Bit device	Function input	5 points	FX0 to FX4	Fixed
		Function output	5 points	FY0 to FY4	
		Special relay	2048 points	SM0 to SM2047	
	Word device	Function register	5 points	FD0 to FD4	
		Special register	2048 points	SD0 to SD2047	
	Other	Macro instruction argument	10 points	VD0 to VD9	
Index register	Word device	Index register	16 points	Z0 to Z15	
File register	Word device	File register	0 points	—	0 to 1018K points (1k point increments)
Nesting	—	Nesting	15 points	N0 to N14	Fixed
Pointer	—	Pointer	4096 points	P0 to P4095	
		Interrupt pointer	256 points	I0 to I255	
Others	Bit device	SFC block	320 points	BL0 to BL319	
		SFC transition device	512 points	TR0 to TR511	
	—	Network No. setting	—	J1 to J255	
		I/O No. setting	—	U0 to UFF	
Constant	—	Decimal constant	K-2147483648 to K2147483647		
		Hexadecimal constant	H0 to HFFFFFFFF		
		Real number constant	E ± 1.17549-38 to E ± 3.40282+38		
		Character string constant	“ABC”, “123”		

Note 1: The contacts and coils of the timers, retentive timers and counters are bit devices and their current values are word devices.
Note 2: The inputs, outputs, step relays, link special relays and link special registers cannot be changed from their default values.

■ Device explanations

● Inputs (X)

Inputs are designed to give commands and data from external devices, such as pushbuttons, select switches, limit switches and digital switches, to the PLC.
Inputs are available as "refresh inputs" and "direct access inputs".

(1) Refresh inputs

Input signals batch-imported from all input modules at the refresh of END processing.
These inputs are specified as X □ in a sequence program.

(2) Direct access inputs

Input signal imported from an input module every time a contact instruction is executed.
These inputs are specified as DX □ in a sequence program.
(They cannot be used with digit-specified instructions or as inputs used for MELSECNET/10.)

● Outputs (Y)

Outputs are used to provide the control results of a program to external solenoids, signal lamps, digital displays, etc.
Outputs are available as "refresh outputs" and "direct access outputs".

(1) Refresh outputs

Output signals batch-exported from all output modules at the refresh of END processing.
These outputs are specified as Y □ in a sequence program.

(2) Direct access outputs

Output signal exported from an output module every time a coil instruction is executed.
These outputs are specified as DY □ in a sequence program.
(They cannot be used with digit-specified instructions or as outputs used for MELSECNET/10.)

● Internal relays (M)

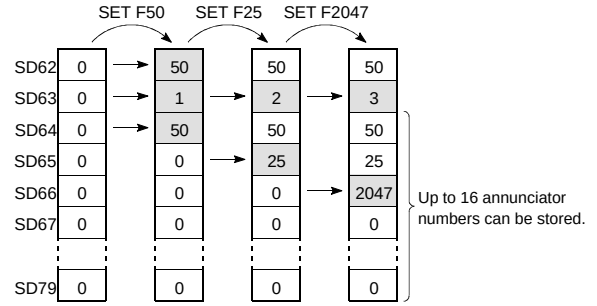
Internal relays are auxiliary relays used in a CPU module and not latched (not backed up at power failure).
(They turn off at power-on, QnCPU reset or latch clear operation.)
Outputs (Y) are used to export the control results of a program.

● Latch relays (L)

Latch relays are auxiliary relays used in a CPU module and latched (backed up at power failure).
(Operation results are held at power-on or CPU reset.)
They turn off when latch clear operation is performed.
Outputs (Y) are used to export the control results of a program.

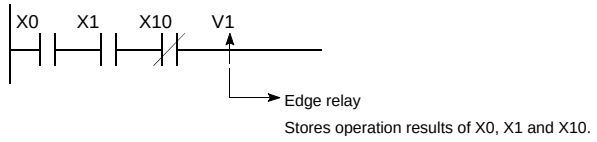
● Annunciators (F)

Annunciators are internal relays convenient for equipment fault/failure detection.
When annunciators are turned on, the special relay (SM62) turns on and the quantity of annunciators turned on and their numbers are stored in the special registers (SD62 to SD79). Therefore, using annunciators in a failure detection program allows you to check for equipment faults/failures and their definitions by monitoring the special registers (SD62 to SD79) after the special relay (SM62) has turned on.
Note that turning any annunciator on lights up the USER LED.



● Edge relays (V)

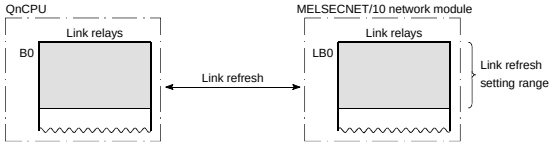
Edge relays are devices which record operation results, starting at the beginning of a ladder block, and can be used as contacts only.
An edge relay is used to perform operation on its leading edge (OFF → ON) in an index-qualified structured program.



● Link relays (B)

Link relays are CPU module side devices (relays) used to refresh link relays (LB) in an MELSECNET/10 network module to the CPU module or to refresh the CPU module data to the link relays (LB) in the network module.

Use the refresh parameters in the network parameters to set the refresh ranges of LB and B.



● Link special relays (SB)

Link special relays are internal relays which indicate the communication states/fault detections of MELSECNET/10 network modules.

● Step relays (S)

Step relays are devices for SFC.

● Timers (T)

Timers are up-timing type, they start timing when its coil turns on, and times out with its contact turned on when its current value reaches or exceeds its set value.

There are low-speed, high-speed, low-speed retentive and high-speed timers, which are different in specifying method.

A retentive timer is designed to hold its current value if its coil turns off, and resumes timing from the held current value when the coil turns on again.

A timer turns on/off its coil, updates its current value, and turns on/off its contact when the OUT T □ or OUTH T □ instruction is executed.

(Current value updating and contact on/off are not executed in END processing.)

Instructions for use of timers

(1) Do not describe the same timer in multiple OUT T □ or OUTH T □ instructions during one scan.

(2) Do not use a CJ instruction or the like to jump the coil processing of a timer while the coil of the timer is on.

(3) Do not use timers in an initial execution, wait, cyclic and interrupt programs.

● Specifying methods and timing ranges of timers

	Specifying Method	Timing Range		Timing Range
		Default	Setting range	
Low-speed timer	OUT T□	100ms	1ms to 1000ms (1ms increments)	Setting increments on the left × 32767
High-speed timer	OUTH T□	10ms	0.1ms to 100ms (0.1ms increments)	
Low-speed retentive timer	OUT ST□	100ms	1ms to 1000ms (1ms increments)	
High-speed retentive timer	OUTH ST□	10ms	0.1ms to 100ms (0.1ms increments)	

● Counters (C)

Counters are up-counting type, they count out and the contact turns on when its current value reaches its set value.

A counter turns on/off its coil, updates its current value, and turns on its contact when the OUT C □ instruction is executed.

Use RST C □ to reset the count value of a counter.

● Interrupt counters

An interrupt counter is designed to count the number of interrupts that occurred, and updates its current value when an interrupt factor is generated.

Set in the parameters the first counter number used with interrupt counters. (256 points are occupied, starting with the first counter number.)

An interrupt counter does not count out. Therefore, when using it for control, read the current value of the interrupt counter using the MOV or similar instruction, compare it with the set value using comparison instructions (=, <=, etc.), and turn on/off the internal relay (M), etc.

Use RST C □ to reset the count value of an interrupt counter.

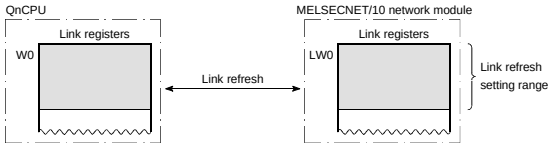
● Data registers (D)

Data registers are devices designed to handle numerical data in a CPU module.

One data register can store 16-bit data (-32768 to 32767 or 0H to FFFFH) and two consecutive points (e.g. D0 and D1) can store 32-bit data (-2147483648 to 2147483647 or 0H to FFFFFFFFH).

● Link registers (W)

CPU module side devices for refreshing the data of link registers (LW) in an MELSECNET/10H network module. One link register can store 16-bit data (-32768 to 32767 or 0H to FFFFH) and two consecutive points (e.g. W0 and W1) can store 32-bit data (-2147483648 to 2147483647 or 0H to FFFFFFFFH).



● Link special registers (SW)

Link special registers are designed to store the communication states and fault definitions of an MELSECNET/10H network module.

● Function devices (FX, FY, FD)

Function devices are used in a subroutine program provided with arguments.

As devices used in each subroutine program call source can be determined by use of the function devices, you can use the same subroutine program without needing to know the other subroutine program call sources.

(1) Function inputs (FX)

Used to pass ON/OFF data to a subroutine program.

(2) Function output (FY)

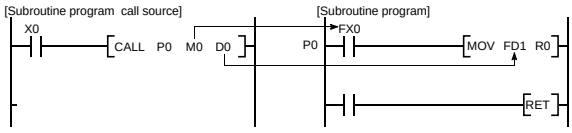
Used to pass the operation result (ON/OFF data) of a subroutine program to a subroutine program call source.

(3) Function register (FD)

Used to transfer data between a subroutine call source and subroutine program.

Example

When FX0 and FD1 are used in a subroutine program, specifying the subroutine program call instructions M0 and D0 passes ON/OFF data of M0 to FD0 and data of D0 to FD1.



● Special relays (SM)

Special relays store the states (failure diagnoses, system information, etc.) of a CPU module.

● Special registers (SD)

Special registers store the states (failure diagnoses, system information, etc.) of a CPU module.

● Link direct devices (J □ \ □)

Link direct devices are a way to specify direct access to link devices in a network module of an MELSECNET/10H network system.

Link direct devices can access only one network module with a single network number. When multiple network modules are loaded with the same network number, the network module with the lowest first I/O number is the target of access.

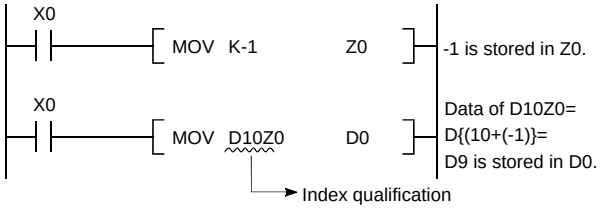
● Intelligent function module devices (U □ \G □)

Intelligent function module devices are a way to specify direct access from a CPU module to the buffer memory of an intelligent function module loaded in a main or extension base unit. Intelligent function modules loaded in remote stations of an MELSECNET/10H network system can not be the target of access.

● Index registers (Z)

An index register is used for index qualification (indirect designation) of a device used in a sequence program.

Index qualification uses one index register and is specified by 16-bit data (-32768 to 32767 or 0H to FFFFH).



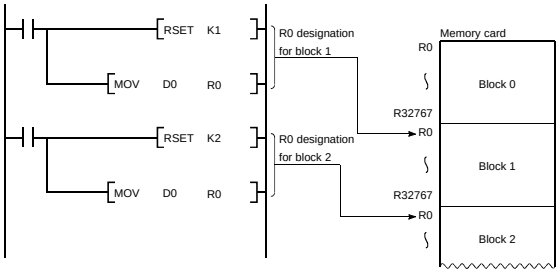
● File registers (R)

File registers are devices for constant data storage application or data register expansion application and are stored in the CPU module built-in standard RAM (drive 3), memory card (RAM) (drive 1) or memory card (ROM) (drive 2). Note that the file registers stored in the memory card (ROM) are read-only. When the ATA card is used as a memory card (ROM), file registers cannot be stored in the memory card (ROM). Unlike those of the data registers (D), the stored values of the file registers are not cleared at power-on/key reset.

File registers can be "designated by block changing" or "designated consecutively".

(1) Designation by block changing

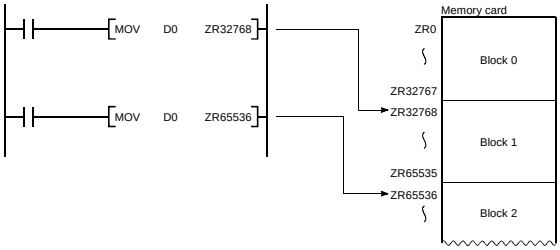
The file registers used are specified by separating them in increments of 32k points (R0 to R32767). When more than 32k points are used, use the RSET instruction to select the block used. (Specify file registers with R0 to R32767 in any block.)



(2) Consecutitve designation

The device symbol ZR is used to specify file registers beyond 32k points without changing blocks.

File registers in multiple blocks can be managed as a single series of file registers.



The file register capacity is not fixed. For the register capacity that may be secured, refer to the explanation section of "MODEL SELECTION", "MEMORY".

● Nestings (N)

Nestings are devices used with master control (MC, MCR instructions).

● Pointers

Pointers are devices used with branch instructions and 4096 points can be used in all programs run by a CPU module.

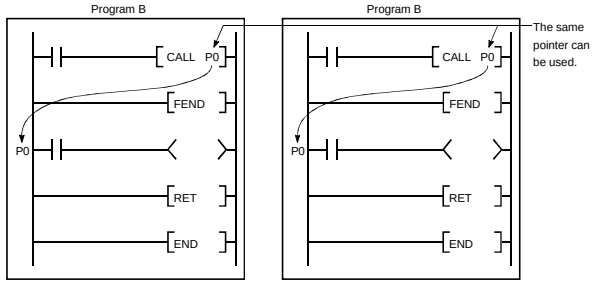
The pointers are used in the following applications.

(1) Designation of jump destination of jump instruction (CJ, SCJ, JMP)

(2) "Local pointers" and "common pointers" are available as the call destination designating pointers of the subroutine call instruction (CALL, CALLP).

● Local pointers

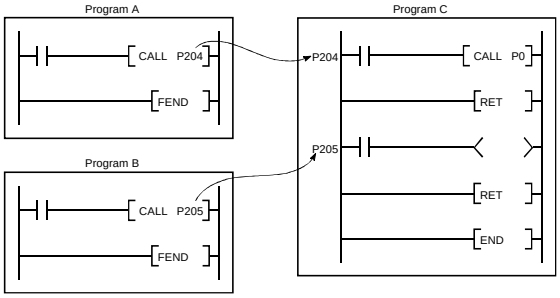
Local pointers are used for a jump and subroutine program call in each program. A call can only be made from the program of the program file where that pointer is described.



● Common pointers

Common pointers are used in a subroutine program called from multiple programs.

Common pointers cannot be used to jump to other programs.



● Interrupt pointers (I)

An interrupt pointer is a device used as a label at the beginning of an interrupt program and 256 points (I0 to I255) can be used in all programs. (The same interrupt pointer number cannot be used.) The interrupt pointer numbers and interrupt factors are as follows.

Q mode

I No.	Interrupt Factor		Priority	I No.	Interrupt Factor		Priority
I0	Interrupt by A1SI61	First point	237	I32 (Note 2)	Error occurrence interrupt (Note 3)	General stopping error	1
I1		Second point	238	I33		Vacant	—
I2		Third point	239	I34		UNIT VERIFY ERR. FUSE BREAK OFF SP. UNIT ERROR	2
I3		Fourth point	240				
I4		Fifth point	241				
I5		Sixth point	242	I35		OPERATION ERROR SFCP OPE. ERROR SFCP EXE. ERROR	3
I6		Seventh point	243				
I7		Eighth point	244				
I8		Ninth point	245	I36		ICM. OPE ERROR FILE OPE. ERROR	4
I9		Tenth point	246				
I10		Eleventh point	247	I37		WXTEND INS. ERROR	5
I11		Twelfth point	248	I38		PRG. TIME OVER	6
I12		Thirteenth point	249	I39		CNK instruction execution Annunciator detection	7
I13		Fourteenth point	250				
I14		Fifteenth point	251	I40 to I46		Vacant	—
I15		Sixteenth point	252				
I16	Interrupt generated by sequence start generating module	First module	224	I47	—	PRASET instruction label	—
I17		Second module	225	I48 to I49		Vacant	—
I18		Third module	226				
I19		Fourth module	227	I50 to I255	Intelligent function module interrupt	Using parameter, set which intelligent function module will use.	18 to 223
I20		Fifth module	228				
I21		Sixth module	229				
I22		Seventh module	230				
I23		Eighth module	231				
I24		Ninth module	232				
I25		Tenth module	234				
I26		Eleventh module	235				
I27		Twelfth module	236				
I28	Interrupt by internal timer (Note 1)	100ms	256				
I29		40ms	255				
I30		20ms	254				
I31		10ms	253				

Note 1: The internal timer time limits indicated are default values. They can be changed using the parameters between 0.5ms and 1000ms in 0.5ms increments.

Note 2: When a stopping error occurs, the CPU module stops after performing I32 processing.

Note 3: Error occurrence interrupt is disabled at power-on or reset. When using I32 to I255, enable interrupt with the IMASK instruction.

● SFC block devices (BL)

An SFC block device is used to check whether the specified block of an SFC program is activated or not.

● SFC transition devices (TR)

An SFC transition device is used to check whether the specified transition condition of an SFC program is designated for forced transition or not.

● Network number designation devices (J)

A network number designation device is a symbol used to specify a network number in a data link instruction.

● Macro instruction argument devices (VD)

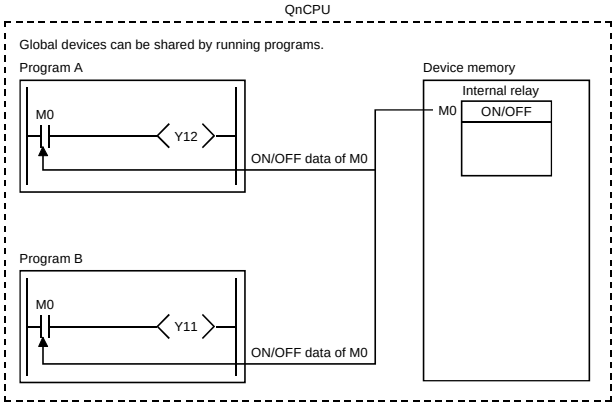
Macro instruction argument devices are used for macro registration.

Global Devices and Local Devices

Among the CPU module devices, "local device" range assignment can be made to the internal relays M, edge relays V, timers T, retentive timers ST, counters C and data registers D. Note that the ranges and devices where local device assignment is not made are global devices.

■ Global devices

Global devices mean devices which can be shared by all programs when there are multiple programs. Normally, the ranges where local device assignment has not been made and the devices where local device assignment cannot be made are all global devices and they can be used from any program.



■ Local devices

Local devices can be used exclusively in each of multiple programs, and local devices in a certain program cannot be accessed by other programs. Hence, using local devices allows you to do programming without being concerned with other programs.

Local device data are stored into the CPU module built-in standard RAM (drive 3) or memory card (RAM) (drive 1).

The devices usable as local devices are the internal relays (M), edge relays (V), timers (T, ST), counters (C) and data registers (D) and their ranges are set in parameters.

In the QnACPU module, the devices set as local devices act as local devices in all programs. In the Q mode, however, you can select whether local devices are used or not per program.

Using local devices exchanges the local device data of the memory card (RAM) or standard RAM and the device data of the CPU module after program run, increasing the scan time by the exchange time.

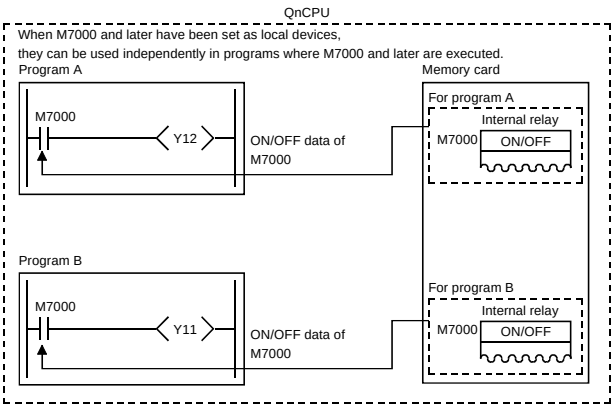
In a program which does not use local devices, data exchange is not made and program switching time is shortened.

Exchange time

(when the number of local device points is 1k word)

CPU Type	Exchange Time (ms)	
	Standard RAM	Memory card (RAM)
Q02CPU	0.35	1.2
Q02HCPU, Q06HCPU, Q12HCPU, Q25HCPU	0.15	0.9

Note 1: Exchange time differs from the above when both the memory card (RAM) and standard RAM are selected as the save areas of local devices.



Q mode

Comparison between Q Mode and QnA/Q2AS

As compared to the QnA/Q2AS series instructions, the following instructions and others have been changed.

■ Common instructions

● Added instructions

The following instructions have been added to the Q mode.

Class	Instruction Name
Module data read	UNIRD
Trace set	TRACE
Trace reset	TRACER
Binary data write	S.FWRITE
Binary data read	S.FREAD
Program loading from RAM card	PLOAD
Program unloading from SPM	PUNLOAD
Loading and unloading	PSWAP
High-speed file register block transfer	PBMOV

● Deleted instructions

The following instructions have been deleted from the Q mode.

Class	Instruction Name
Write to EEPROM	EROMWR
Sampling trace set (Note 1)	STRA
Sampling trace reset (Note 1)	STRAR
Status latch set	SLT
Status latch reset	SLTR
Program trace trigger	PTRA
Program trace reset	PTRAR
Program trace execution	PTRAEXE, PTRAEXEP
LED indication of ASCII code	LED
LED indication of comment	LEDC

The above instructions have been deleted since the Q mode CPU does not have the corresponding functions, LEDs, etc.
Note 1: Can be replaced by TRACE and TRACER instructions.

● Instructions to be noted for utilization

The following instructions must be noted when a program is utilized because there usage methods are different from those of QnA/Q2AS.

Class	Instruction Name
Annunciator output, set, reset	OUT, SET, RST
Device comment data read	COMRD
ASCII code print	PRC
Error/annunciator display reset	LEDR
BCD 4 digit to BIN data conversion	BIN
BCD 8 digit to BIN data conversion	DBIN
Clock data read	DATERD
Clock data registration	DATEWR
Interrupt mask	IMASK
Refresh	COM
Network refresh	ZCOM
Routing data read	RTREAD
Routing data write	RTWITE
PID control data setting	PIDINT
PID control	PIDCONT
1/2-phase input up/down counter	UDCNT1, UDCNT2
Pulse density measurement	SPD
Cyclic pulse output	PLSY
Pulse width modulation	PWM

■ Instructions for intelligent function modules/special function modules

When using a QnA series program after conversion into a Q mode program, the following should be noted if the conversion source QnA series program includes special function module-dedicated instructions.

● When continuously using AnS series special function modules/network modules with Q mode

The Q mode CPU is not compatible with the A/AnS series special function module/network module-dedicated instructions. Rewrite all corresponding instructions using the FROM/TO instruction.

● When changing QnA/Q2AS/A/AnS series special function modules/network modules for Q series intelligent function modules/network modules

Dedicated instructions may be used with some of the Q series intelligent function modules/network modules. Usable dedicated instructions are given in the explanation sections of the corresponding intelligent function modules/network modules.

Comparison between Q Mode and A/AnS

As compared to the A/AnS series instructions, the following instructions and others have been changed.

■ Common instructions

● Added instructions

As compared to the A/AnS series, a large number of instructions have been added to the Q mode. Use the most appropriate instructions from among the great variety of instructions available for programming.

● Instructions to be corrected for utilization

The following instructions must be corrected when a program is utilized because they are different in usage method from those of the A/AnS.

Class	Instruction Name
Main/subprogram switching	CHG
Failure check	CHK
Carry reset	CLC
Index qualification circuit	IX
LED indication instruction	LEDA, LEDB
Local station data read	LRDP
Local station data write	LWTP
Remote I/O station data read	RFRP
Remote I/O station data write	RTOP
Partial refresh	RFS
Carry set	STC
Microcomputer program call	SUB
Extended file register 1-word increment read	ZRRD
Extended file register 1-word increment write	ZRWR
Extended file register 1-byte increment read	ZRRDB
Extended file register 1-byte increment write	ZRWRB
Extended file register block transfer	BMOVR
Extended file register block change	BXCHR
16-bit integer=>real number conversion	FLOAT
32-bit integer=>real number conversion	DFLOAT
Direct output, set, reset	DOUT, DSET, DRST
Retentive timer	OUT T
Rotation	RCL, RCR, ROL, ROR, DRCL, DRCR, DROL, DROR
Direct reset	DRST
Bit check	SUM, DSUM
Character string data coupling	SADD
Character string data transfer	SMOV
ASCII character string conversion	ASC
Character string data comparison	SCMP
Search	SER
Other AnA/AnU dedicated instructions	LEAD/LEDB

● Differences in timer and counter processing systems

Since the timer and counter processing systems are different between the A/AnS and Q mode CPUs, note the following when utilizing a program.

Instruction	Processing
Timer	Current value updating and contact ON/OFF, which were performed at END processing, are executed when OUT T □ instruction is executed.
Counter	Current value updating and contact ON/OFF, which were performed at END processing, are executed when OUT C □ instruction is executed.

■ Instructions for intelligent function modules/special function modules

When using an AnS series program after conversion into a Q mode program, the following should be noted if the conversion source A series program includes special function module-dedicated instructions.

● When continuously using AnS series special function modules/network modules with Q mode

The Q mode CPU is not compatible with the A/AnS series special function module/network module-dedicated instructions. Rewrite all corresponding instructions using the FROM/TO instruction.

● When changing A/AnS series special function modules/network modules for Q series intelligent function modules/network modules

Dedicated instructions may be used with some of the Q series intelligent function modules/network modules. Usable dedicated instructions are given in the explanation sections of the corresponding intelligent function modules/network modules.

Online Write, Online File Write

Online write is a function to make partial correction or entire change to a program which is being executed by the CPU module (during RUN). As a program can be corrected without stopping equipment operation, this function is convenient for use during equipment adjustment.

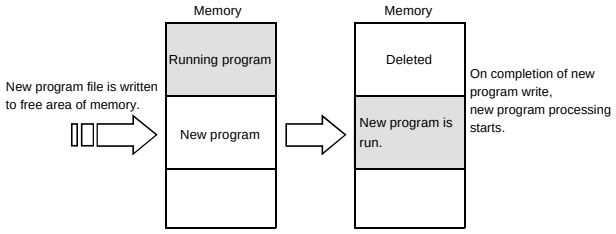
■ Online write

When partial correction is made to a program, there are no restrictions on the size of the program that can be corrected by online write. Online write can be performed if the program size after correction is within the program memory size that can be secured by the CPU module.

■ Online file write

This function is not used to make partial correction but allows a program to be exchanged on a file basis. When performing this function, the CPU continues the processing of the original program file and simultaneously writes a new program file to the free area (Note 1) of the memory. On completion of new program write, the CPU suspends the processing of the original program and starts the processing of the new program. To perform the above processing, the memory must have the free space where the new program file can be written.

Note 1: You can use the free area of the program memory (drive 0), RAM card (drive 1) or ROM card (drive 2) (only the ATA card may be used as a ROM card).



In this system, you can exchange not only program files but also device comment files or file register files.

Note 2: When a device comment file or file register file is stored in the RAM card (drive 1) or ROM card (drive 2), it must not be accessed by a program to perform online file write.

Note 3: Performing online write or online file write causes a delay in program scan time. Depending on the program file size to be online-written, a significant delay may take place, so fully ensure safety when performing this operation.

Remote Operation

Remote operation is executed from GPPW to the CPU module to perform RUN, STOP, PAUSE, reset or latch clear of the CPU module, without operating the RUN-STOP switch of the CPU module. Remote operation can be done to the CPU module connected with GPPW or to the CPU module connected by MELSECNET/10H, MELSECNET/10, Ethernet, CC-Link or serial communication.

■ Remote run

Performing remote run causes the CPU module put in the STOP/PAUSE mode by remote stop/pause to go into the RUN mode.

■ Remote stop

Performing remote stop causes the CPU module in the RUN/PAUSE mode to go into the STOP mode (output (Y) is switched off and operation stopped).

■ Remote pause

Performing remote pause causes the CPU module in the RUN mode to go into the PAUSE mode (output (Y) is held and operation stopped).

■ Remote reset

Performing remote reset causes the CPU module in the STOP mode or being stopped by the self-diagnostic function to be reset (initialized). Device data other than the latch-specified data are cleared.

■ Remote latch clear

Performing remote latch clear causes the CPU module in the STOP mode to clear the latch-specified/non-latched device data.

Network Setting: SW5D5C-GPPW-E

Overview

With MELSECNET/10H, Ethernet and CC-Link placed as major networks of the Q mode, network-compatible functions are incorporated in the GPP function software package for Windows (hereafter referred to as the "GPPW") to enhance the functions and performance capabilities and ensure ease of use.

Network Parameter Setting

In the network parameter settings of MELSECNET/10H, Ethernet and CC-Link, the following settings can be made on the GPPW screen without programming.

■ MELSECNET/10H

Parameter Name	Function
Type	Used to choose operating mode of MELSECNET/10(H).
Refresh parameter	Used to assign devices in CPU module as transfer destination of communication data in network module and CPU module device data to be transferred to network module as communication data.
Common parameter	Used to allocate LB/LW/LX/LY link device range to each station.
Station-specific parameter	Needed to assign parameters different from common parameters to a certain station. Normally not needed.
Inter-link transfer parameter	Used to exchange communication data partially between two or more networks using CPU module connected to two or more networks.
Routing parameter	Used to determine message sending path when accessing remote CPU module which spans networks.
Event interrupt	Used to set condition for generating interrupt signal to CPU module to start interrupt program.

■ Ethernet

Parameter Name	Function
Initial setting	Used to set various watchdog timer values of TCP and IP address of DNS server.
Open setting	Used to set TCP/UDP protocol selection, open system, connection target IP address/port number, etc.
Operation setting	Used to set host station IP address, communication data ASCII/BIN selection, etc.
E-mail setting	Used to set host station e-mail address, mail server, etc.
Transmission mail address	Used to set mail address for sending e-mail.
Notice setting	Used to set notice condition, etc. for use of notice function.
MNET/10 routing	Used to set communication path needed to access CPU module connected to MELSECNET/10(H) via Ethernet.
FTP parameter	Used to set parameters necessary to use FTP (file transfer) function.
Routing data	Used to set sub-net mask and router IP address for communication via Ethernet router.
Event interrupt	Used to set condition for generating interrupt signal to CPU module to start interrupt program.

■ CC-Link

Parameter Name	Function
Operation setting	Used to select CC-Link between high-speed remote I/O network mode consisting of remote I/O only and ordinary mode.
Network parameter	Used to set the number of modules connected to CC-Link, refresh devices, etc.
Station data	Used to set type of each remote station.
Initial processing setting	Used to set initial processing performed for remote device stations.
Event interrupt	Used to set condition for generating interrupt signal to CPU module to start interrupt program.

Network Monitoring

In GPPW, you can monitor the network operating status of MELSECNET/10(H) and CC-Link. For MELSECNET/10(H), you can monitor the network line status, operating/communication status of each station, link scan time indicating communication frequencies, and other data. For CC-Link, you can monitor the link scan time, communications status of each station, and error status.

Data Conversion Software: SW0D5C-CNVW-E

Overview

The SW0D5C-CNVW-E data conversion software package for Windows (hereafter referred to as the "CNVW") is software designed to make mutual data conversion between other format data (text format data, CSV format data) and GPPW-handled data (instruction list, device comment). It allows CAD-created data to be utilized on GPPW for facility design or GPPW-created data to be utilized for design on CAD, increasing design efficiency.

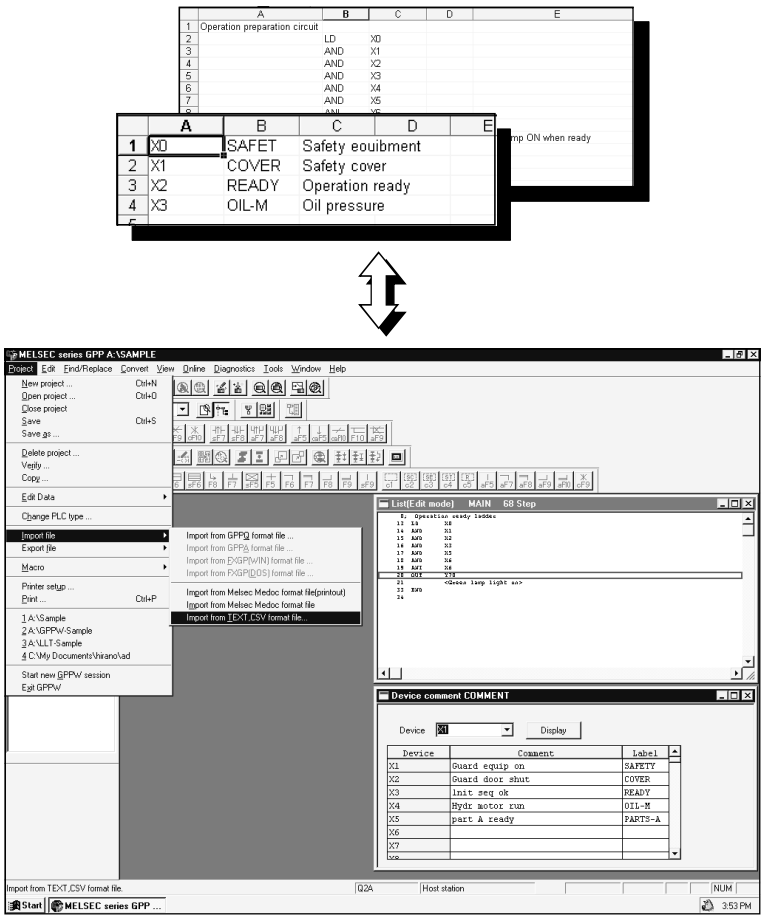
■ Operating environment

Since CNVW is used by adding it to GPPW (SW3D5F/C-GPPW-E or later), GPPW must be installed in advance.

■ Data conversion function

The following data can be converted by CNVW.

Conversion Factor	Conversion Data
CSV format data → GPPW format data	Instruction list Device comment
Text format data → GPPW format data	Instruction list Device comment
GPPW format data → text format data	Instruction list Device comment
GPPW format data → CSV format data	Instruction list Device comment



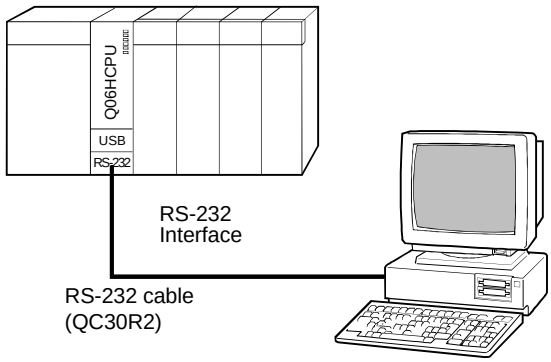
Overview

The Q mode PLC is programmed on a Windows personal computer and connected to the CPU module via the COM port (RS-232) or USB port of the personal computer.
The Q mode CPU module is equipped with an RS-232 interface operable at up to 115.2kbps and a USB interface operating at 12MBps.
Note: The USB interface is not provided for the Q02CPU.

RS-232 Connection

■ Connection configuration diagram

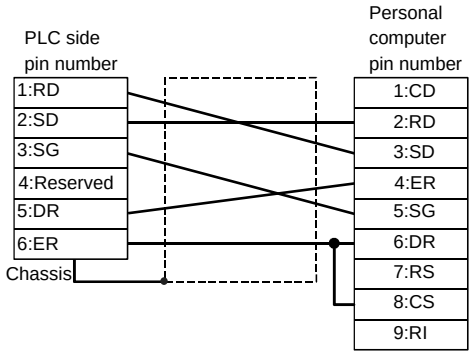
The following diagram shows a configuration for connection with a personal computer by an RS-232 interface.



■ RS-232 cable

Type	QC30R2
Length	3m (9.84ft.)
Connector shape	Personal computer side: 9-pin D-Sub PLC side: 6-pin Mini-DIN

■ RS-232 cable connection example



Note: Do not make connection to the PLC side pin number 4.

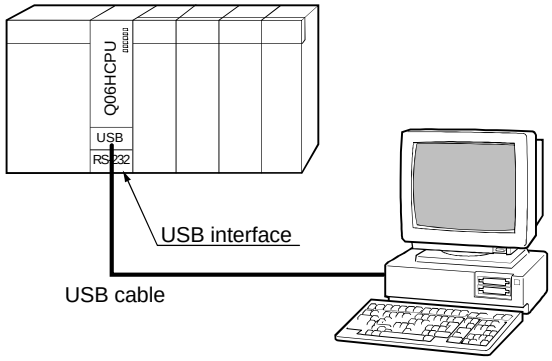
■ Instructions

(1) The Q mode CPU can communicate at up to 115.2kbps, but depending on the performance of the personal computer connected, it may not be able to communicate at 115.2kbps. If so, choose any of 57.6k, 38.4k, 19.2k and 9.6kbps communication speeds.
(2) When using the QC30RC (3m (9.84ft.) cable), we have confirmed that communication can be made at 115.2kbps.
(3) The usable communication speed and distance of the cable fabricated by the user should be checked by the user.
(4) When fast, long-distance communication is needed, consider using RS-232 optical cable converters (FA OPT232).

USB Connection

■ Connection configuration diagram

The following diagram shows a configuration for connection with a personal computer by a USB interface.



■ Usable USB cables

Please choose a cable that complies with USB Standard Rev.1.1, and examine operability with the CPU module and the computer.

■ Instructions

(1) The longest usable distance of USB is 5m (16.39ft.).
(2) USB may be used with Windows 98 only.

Other Connection Systems

When using SW5D5C-GPPW-E, you can use the following connection systems in addition to the RS-232 port and USB connection of the CPU module.

Personal Computer Side Port	Communication System	Q Mode PLC Side Module
COM	RS-232	QJ71C24 QJ71C24-R2
Ethernet board	Ethernet	QJ71E71 QJ71E71-B2
A70BDE-J71QLP23(GE) (Note 1) A70BDE-J71QBR13 (Note 1)	MELSECNET/10	QJ71LP21 QJ71BR11
A80BDE-J61BT13 A80BDE-J61BT11 (Note 2)	CC-Link	QJ61BT11

Note 1: SW3DNF-MNET10 driver is necessary.
Note 2: SW3DNF-CCLINK driver is necessary.

Sequence Program Simulation

Software

The SW5D5C-LLT-E ladder logic test tool (hereafter reffered to as “LLT”) is software designed to add simulation functions onto GPPW. This comprehensive software is compatible with the A series, QnA series, FX series and motion controller, in addition to the Q series, to allow GPPW created sequence programs to be simulated on a personal computer without writing them to the PLC. If the intelligent function module software packages have also been added, you can simulate the initial parameter setting and automatic refresh parameter setting states of intelligent function modules (such as analog-to-digital converter module, digital-to-analog converter module and communication module).

Features

Program run can be checked on a personal computer, making debugging efficient.

(1) Without connection of a PLC, program run can be checked on the personal computer where that program was created.

(2) The target PLC type (MELSEC-A/QnA/FX/Q/motion controller) of the program created is judged automatically and the corresponding virtual CPU is started.

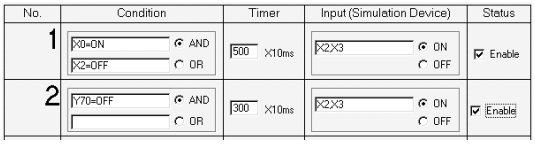
(3) Simple setting allows the machine side I/O to be operated simulatively. (Example: X0 turns on 10 seconds after Y10 has turned on.)

(4) Debugging is enabled in the stage of program design. When used with the program modularization function (multiple programs can be created per control purpose for operation) of the Q series CPU, the software permits debugging on a module basis, further increasing debugging efficiency and reducing on-the-spot adjustment time.

(5) PLC, basic and application instructions are supported.

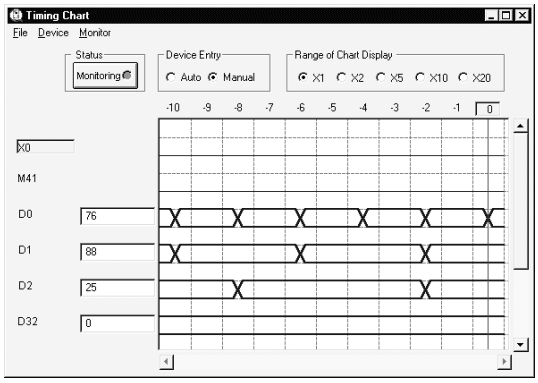
I/O System Setting Function

The I/O system setting function allows external input generated for the PLC output to be given simulatively by simple setting. The following No. 1 indicates the setting that X2 and X3 are turned on 5 seconds after X0 has turned on and X2 turned off.



Monitoring and Testing Functions

The monitoring and testing functions are designed to monitor the statuses of the device memory and buffer memory in a virtual CPU, and also permits forced ON/OFF and current value changing as well as device ON/OFF state and value monitoring, like the device batch-monitoring and buffer memory batch-monitoring functions of GPPW. In addition, the monitoring and testing functions of the ladder logic test tool include a function to display ON/OFF states and values in a timing chart format. It enables time-series operation to be acquired.

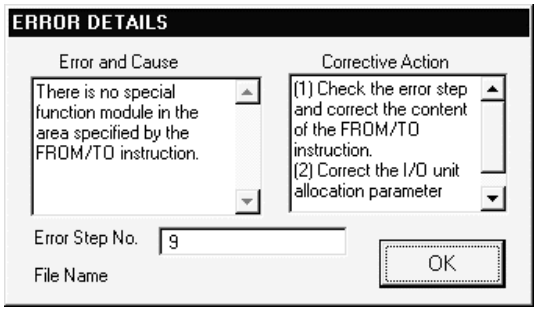


Tool Function

The tool function is designed to temporarily save the data of the virtual CPU device memory and special function module buffer memory and read and use the saved data when resuming debugging work.

Error Detail Display Function

Error detail explanation appears when an operation or similar error occurs during simulation made LLT.
This function saves time and trouble to refer to the manuals, etc. and facilitates finding the error occurrence cause.



Differences and Restrictions

As compared to the operation of the Q mode CPU, LLT has the following restrictions.

(1) LLT cannot support SFC programs.

(2) LLT does not support interrupt programs. No operation will be performed if a sequence program is created.

(3) The operation result in any instruction that uses a floating point value is not equal to the actual operation result of the CPU because of a rounding error.

(4) LLT cannot simulate the functions of intelligent function/network modules. However, it has a buffer memory area of 64k points × 64 modules for intelligent function/network modules. Data write/read can be performed to/from this area.

(5) For the timing of LLT, processing time taken for one scan is calculated as 100ms (default value). By changing the constant scan setting, you can change the time taken for one scan.

(6) In LLT, the timing method of the timer changes with the scan time (= constant scan setting) of the logic test function. At a scan time of 100ms, the current value of the 100ms timer is incremented by 1 every scan and the current value of the 10ms timer is incremented by 10 every scan. At a scan time of 10ms, the current value of the 100ms timer is incremented by 10 every scan and the current value of the 10ms timer is incremented by 1 every scan.

(7) In LLT, one low-speed execution program is always run after a scan execution program, independently of whether the constant scan setting and low-speed execution program running time setting have been made or not.

(8) A cyclic execution program is run if its cyclic time interval has been reached on completion of the processing of scan execution program and cyclic program.

(9) LLT can use all device memories of the Q mode CPU. Note that it cannot use the link direct devices JnXn, JnYn, JnBn, JnWn, JnSBn and JnSWn (resulting in no operation).

(10)"OPERATION ERROR" occurs if a device range is exceeded in indirect designation using the index register.

(11)In real number processing instructions, the ladder logic test tool (LLT) checks their real number ranges strictly. "OPERATION ERROR" occurs if any value entered cannot be evaluated as a real number.

(12)The following parameters are invalid if set.

Parameter	Setting Item
PLC name setting	All invalid.
PLC system setting	Items except "timer time limit setting", "STOP-RUN/output mode" and "common pointer No." are invalid.
PLC file setting	• "Target memory" of "file register" is invalid. • "Comment file used for instructions" is invalid. • "Target memory" of "device initial value" is invalid. • "Target memory" of "file for local devices" is invalid.
PLC RAS setting	• "Error check" is invalid. • Items other than "operation error" and "special function module access error" in "error-time operation mode" are invalid. • "Fault history" and "low-speed program running time" are invalid.
I/O assignment	"Type", "switch setting" and "detail setting" of "I/O assignment" are invalid. "Basic setting" (base, power supply module, extension cable) is invalid.
Device setting	"Latch range" is invalid.
Program setting	"Comment" of "file using method setting" is invalid. "I/O refresh setting" is invalid.
Boot file setting	All invalid.
SFC setting	All invalid.
Network parameters	All invalid.

(13)The following SM devices are supported by LLT.

The unsupported SM devices not given below can be accessed since their device areas are secured, but they do not have inherent SM functions.

In addition, the unsupported SM devices have the initial values of OFF.

Device Name	Remarks	Device Name	Remarks	Device Name	Remarks	Device Name	Remarks
SM0	Diagnostic error	SM409 (＊1)	0.01 sec. clock	SM434	User clock No. 9	SM1021	User clock No. 1
SM1	Self-diagnostic error	SM410 (＊1)	0.1 sec. clock	SM510	Low-speed program run	SM1022	User clock No. 2
SM5	Error common information	SM411 (＊1)	0.2 sec. clock	SM620	Card B use flag normally OFF	SM1023	User clock No. 3
SM16	Error individual information	SM412 (＊1)	1 sec. clock	SM621	Card B protect flag normally OFF	SM1024	User clock No. 4
SM50	Error reset	SM413 (＊1)	2 sec. clock	SM622	Drive 3 flag normally ON	SM1030	0.1 sec. clock
SM56	Operation error	SM414 (＊1)	2n sec. clock	SM623	Drive 4 flag normally ON	SM1031	0.2 sec. clock
SM62	Annunciator detection	SM415 (＊1)	2n millisec. clock	SM640	File register use	SM1032	1 sec. clock
SM203	STOP contact	SM420	User clock No. 0	SM700	Carry flag	SM1033	2 sec. clock
SM205	STEP-RUN contact	SM421	User clock No. 1	SM703	Sort order	SM1034	2n sec. clock
SM213	Clock data read request	SM422	User clock No. 2	SM704	Block comparison	SM1036	Normally ON
SM400	Normally ON	SM423	User clock No. 3	SM715	EI flag	SM1037	Normally OFF
SM401	Normally OFF	SM424	User clock No. 4	SM722	BIN/DBIN error processing switch-over	SM1038	ON only 1 scan after RUN
SM402	ON only 1 scan after RUN	SM430	User clock No. 5	SM1008	Self-diagnostic error	SM1039	OFF only 1 scan after RUN
SM403	OFF only 1 scan after RUN	SM431	User clock No. 6	SM1009	Annunciator detection	SM1042	STOP contact
SM404	ON only 1 scan after RUN	SM432	User clock No. 7	SM1010	Operation error	SM1054	STEP-RUN contact
SM405	OFF only 1 scan after RUN	SM433	User clock No. 8	SM1020	User clock No. 0		

＊1: Derived from the constant scan setting and scan count. The time set as a constant scan is the time of 1 scan. Therefore, 1 scan time = constant scan time.

(14)The following SD devices are supported by LLT.

The unsupported SD devices not given below can be accessed since their device areas are secured, but they do not have inherent SD functions.

In addition, the unsupported SD devices have the initial values of 0 (zero).

Device Name	Remarks	Device Name	Remarks	Device Name	Remarks	Device Name	Remarks
SD0	Diagnostic error	SD67	Detection table	SD295	Device assignment		
SD1	Error occurrence time	SD68	Detection table	SD296	Device assignment		
SD2	Error occurrence time	SD69	Detection table	SD297	Device assignment		
SD3	Error occurrence time	SD70	Detection table	SD298	Device assignment		
SD4	Error information segment	SD71	Detection table	SD299	Device assignment	SD647	File register capacity
SD5	Error common information	SD72	Detection table	SD300	Device assignment	SD648	R block No.
SD6	Error common information	SD73	Detection table	SD301	Device assignment		
SD7	Error common information	SD74	Detection table	SD302	Device assignment		
SD8	Error common information	SD75	Detection table	SD303	Device assignment		
SD9	Error common information	SD76	Detection table	SD304	Device assignment		
SD10	Error common information	SD77	Detection table	SD412 (＊2)	1 sec. counter		
SD11	Error common information	SD78	Detection table	SD414 (＊2)	2n sec. clock setting		
SD12	Error common information	SD79	Detection table	SD415 (＊2)	2n millisec. clock setting		
SD13	Error common information	SD200	CPU switch status	SD420	Scan counter		
SD14	Annunciator number	SD201	LED status	SD430	Low-speed scan counter		
SD15	Error common information	SD203	CPU operation status	SD500	Run program No.	SD1008	Diagnostic error
SD16	Error individual information	SD210	Clock year, month	SD510	Low-speed program No.	SD1009	Annunciator detection
SD17	Error individual information	SD211	Clock day, hour	SD520 (＊1)	Current scan time	SD1015	CPU operation status
SD18	Error individual information	SD212	Clock minute, second	SD521 (＊1)	Current scan time	SD1017 (＊1)	Minimum scan time
SD19	Error individual information	SD213	Year, day of the week	SD522 (＊1)	Initial scan time	SD1018 (＊1)	Current scan time
SD20	Error individual information	SD220	Display data	SD523 (＊1)	Initial scan time	SD1019 (＊1)	Maximum scan time
SD21	Error individual information	SD221	Display data	SD524 (＊1)	Minimum scan time	SD1021 (＊1)	Current scan time
SD22	Error individual information	SD222	Display data	SD525 (＊1)	Minimum scan time	SD1022 (＊2)	1 sec. counter
SD23	Error individual information	SD223	Display data	SD526 (＊1)	Maximum scan time	SD1035	R block No.
SD24	Error individual information	SD224	Display data	SD527 (＊1)	Maximum scan time	SD1124	Annunciator quantity
SD25	Error individual information	SD225	Display data	SD528 (＊1)	Current scan time	SD1125	Annunciator number
SD26	Error individual information	SD226	Display data	SD529 (＊1)	Current scan time	SD1126	Annunciator number
SD50	Error reset	SD227	Display data	SD532 (＊1)	Minimum scan time	SD1127	Annunciator number
SD62	Annunciator No.	SD290	Device assignment	SD533 (＊1)	Minimum scan time	SD1128	Annunciator number
SD63	Annunciator quantity	SD291	Device assignment	SD534 (＊1)	Maximum scan time	SD1129	Annunciator number
SD64	Detection table	SD292	Device assignment	SD535 (＊1)	Maximum scan time	SD1130	Annunciator number
SD65	Detection table	SD293	Device assignment			SD1131	Annunciator number
SD66	Detection table	SD294	Device assignment			SD1132	Annunciator number

＊1: Same as all constant scan settings. Default is 100ms.

＊2: Derived from the constant scan setting and scan count. The time set as a constant scan is the time of 1 scan.

(15)LLT supports the instructions of the Q25H. However, some instructions have restrictions or are not supported. No operation is performed for unsupported instructions. The following instructions are not operated or have processing restrictions.
When a no-operation instruction is executed, the logic test function screen lamp is lit, and that no-op instruction and its step number can be displayed.

● Non-operated and processing-restricted instruction list

Class	Instruction Symbol	Processing
Output instruction	DELTA (P)	No operation
Program run control instruction	DI	No operation
	EI	No operation
	IMASK	No operation
	IRET	No operation
Refresh instruction	RFS	No operation
	RFRDB	No operation
	RFRDW	No operation
	RFRDDB	No operation
	RFRDDW	No operation
	COM	No link refresh
Display instruction	PR	No operation
	PRC	
Debugging, troubleshooting instruction	CHKST	No operation
	CHK	No operation
	CHKCIR	No operation
	CHKEND	No operation
	TRACE	No operation
	TRACER	No operation
Clock instruction	DATERD (P)	Personal computer clock data used
	DATEWR (P)	No operation
Peripheral device instruction	MSG	No operation
	PKEY	No operation
PID control instruction	PIDINIT	No operation
	PIDINITP	No operation
	PIDCONT	No operation
	PIDCONTP	No operation
	PIDSTOP	No operation
	PIDSTOPP	No operation
	PIDRUN	No operation
	PIDRUNP	No operation
	PIDRMW	No operation
	PIDPRMWP	No operation
Data link instruction	ZCOM	No operation
	READ	No operation
	SREAD	No operation
	WRITE	No operation
	SWRITE	No operation
	SEND	No operation
	RECV	No operation
	REQ	No operation
	ZNFR	No operation
	ZNTO	No operation
	ZNRD	No operation
	ZNWR	No operation
	RFRP	No operation
	RTDP	No operation
	RTREAD	No operation
	RTWRITE	No operation
Serial communication/computer link module control instruction	PRR	No operation
	INPUT	No operation
	SPBUSY	No operation
	CANCEL	No operation
	PUTE	No operation
	GATE	No operation
	ONDEMAND	No operation
	UTPUT	No operation
	PRR	No operation
	INPUT	No operation
	BIDOUT	No operation
	BIDIN	No operation
	SPBUSY	No operation
CC-LINK control instruction	RIRD	No operation
	RIWT	No operation
	RIFR	No operation
	RITO	No operation
	RDGET	No operation
	RDPUT	No operation
	RDMON	No operation
Other instructions	NOPLF	No operation
	PAGE	No operation
	UDCNT1	No operation
	UDCNT2	No operation
	TTMR	ON time on LLT measured
	STMR	Operation based on time on LLT
	ROTC	No operation
	SPD	No operation
	PLSY	No operation
	PWM	No operation
	UNIRD	No operation
	S.FWRITE	No operation
	S.FREAD	No operation
	PLOAD	No operation
	PUNLOAD	No operation
	PSWAP	No operation
	RBMOV	Processed as BMOV instruction
	WDT (P)	No operation
	KEY	No operation

3. A MODE

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Overview of A Mode

The A mode is designed to improve the CPU processing capabilities of the AnS series systems already in use. You can use the AnS series programs as they are and can use the AnS series hardware products, such as I/O modules, without changing. (Note that the CPU modules, base units and extension base cables must be changed.)
This mode is recommended for those who want to use the current model and improve performance with minimum modifications.

Note: The A mode is designed to improve the CPU processing capabilities of the AnS series, as described above. Namely, note that the functional capabilities of the CPU other than the processing capabilities (refer to the section of CPU modules) are the same as those of the conventional AnS series and you cannot use the functional capabilities extended and developed inherently for the Q series (Q mode). We recommend you to examine the Q mode if you are considering new equipment design, etc.

Comparison between Q Mode and A Mode

Comparison between Q Mode and A Mode

	Q Mode		A Mode	
CPU type	Q02CPU, Q02HCPU, Q06HCPU, Q12HCPU, Q25HCPU		Q02CPU-A, Q02HCPU-A, Q06HCPU-A	
Available functions, modules, etc.				
Program	Inherits the programming and instruction representing methods of the MELSEC. However, because of different internal codes, the programs of the A/AnS/QnA/Q2AS must be used after conversion.		Programs for the current AnS series	
Functions	Functions given in the Chapter of "Features" in this data book are usable.		Basically, there are only functions that are usable with the AnS series though some specifications have been expanded in performance. For expanded specifications, refer to section 2 “CPU modules” in this chapter.	
I/O, special modules	For Q series and AnS series A6SIM-X64Y64 cannot be used.		For AnS series A6SIM-X64Y64 cannot be used.	
Base unit	For using Q series modules: Q3 □ B, Q6 □ B For using AnS series modules: QA1S6 □ B		For using AnS series modules: QA1S3 □ B, QA1S6 □ B	
Extension cable	QC □ □ B		QC □ □ B	
Power supply module	For using with Q series base unit: Q6 □ P-A1/A2 For using with AnS series base unit: A1S6 □ P		A1S6 □ P	
Connectable networks				
Ethernet	Allowed		Allowed	
MELSECNET/10H	Allowed		Disallowed	
MELSECNET/10 (Inter-PC network)	Allowed		Allowed	
MELSECNET/10 (Remote-I/O network)	Disallowed		Allowed	
MELSECNET/II MELSECNET/B	Disallowed		Allowed	
CC-Link	Allowed (with automatic refresh parameter setting)		Allowed (without automatic refresh parameter setting)	
MELSECNET/MINI	Allowed (without automatic refresh parameter setting)		Allowed (with automatic refresh parameter setting)	
RS-232/422/485	Allowed		Allowed	
Other networks	Networks compatible with AnS series		Networks compatible with AnS series	
Usable peripheral devices and software				
Windows personal computer	Allowed	SW4D5C-GPPW-E or later	Allowed	SW2D5C-GPPW-E or later (Note 1)
DOS	Disallowed		Allowed	SW2IVD-GPPA or later (Note 1)
A6GPP/HGP/PHP	Disallowed		Allowed	SW3GP-GPPAEE or later (Note 1)
Usable GOTs and connection method				
Usable GOT	GOT-A900		GOT-A900/800	
Software	SW2D5C-GOTRE-PACK version C or later		SW1D5C-GOTRE-PACK or later, SW0NIW-A8GOTP or later	
Bus connection	Allowed		Disallowed	
CPU RS-232 port connection	Allowed (ladder monitor will be compatible soon)		Allowed (ladder monitor possible)	
CPU USB port connection	Disallowed		Disallowed	
Serial communication (RS-232/422)	Allowed (ladder monitor will be compatible soon)		Allowed (ladder monitor possible)	
MELSECNET/10	Allowed (ladder monitor will be compatible soon)		Allowed (ladder monitor possible)	
MELSECNET/II	Disallowed		Allowed (ladder monitor possible)	
MELSECNET/B	Disallowed		Allowed (ladder monitor possible)	
CC-Link	Allowed (ladder monitor will be compatible soon)		Allowed (ladder monitor possible)	

Note 1: Depending on the software version, there are restrictions on the program capacities, CPU internal device capacities, etc. For details, refer to Programming, A MODE.

Note 2: The above table gives general usability and connectability for comparison of the Q mode and A mode. Since there may be restrictions on usable/connectable products, always check details in the applicable model list and corresponding model explanation sections.

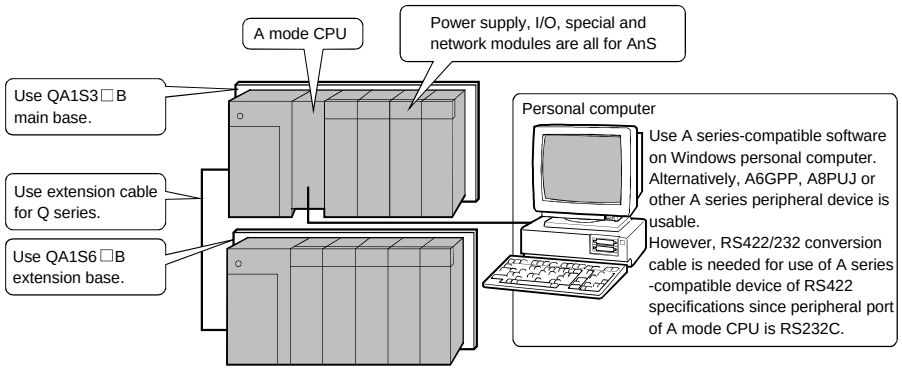
Compatibility of A Mode PLC with Ans

Compatibility of A Mode PLC with AnS

The following table indicates the compatibility between A mode PLC programs and AnS series programs. Note that the following table gives general information only and details should be checked in the corresponding module explanation sections.

Item		Compatibility with AnS
General program		The same programs as in AnS are usable.
Ethernet	Host system side program	The same programs as in AnS are usable.
	PLC side	The same programs as in AnS are usable.
MELSECNET/10		The same network parameters and programs as in AnS are usable.
CC-Link		The same programs as in AnS are usable.
Serial communication	Host system side program	The same programs as in AnS are usable.
	PLC side	The same programs as in AnS are usable.

Other Precautions for Replacing AnS with A Mode

Item	Compatibility
Peripheral device	You can continue to use the A series peripheral devices. However, you cannot load and use a portable peripheral device, e.g. A8UPU, on a CPU module. It should be used via cable connection. The RS-422/232 conversion cable is needed when a device for connection with a CPU by the RS422 interface, e.g. A6GPP, A6PHP, A7PHP, A7HGP, A8PUS or A8UPU, is connected to the CPU. (You cannot use the RS-232/422 conversion cable that is usable for connection of a personal computer to the A series PLC. Confirm the details in the section of peripheral devices.) Though the RS-232/422 conversion cable was conventionally needed for connection of a general-purpose personal computer, e.g. DOS/V or PC98 series, to the CPU, the QC30R2 RS-232 cable can be used for connection to the A mode CPU.
GOT display	You can continue to use the GOT-A900/800 series display. However, it cannot be connected to the PLC of the GOT in a bus connection system. When you selected the CPU RS-422 connection system conventionally, you either need to 1) change the A8GT-RS4/A9GT-RS4 for the A8GT-RS2/A9GT-RS2 or 2) use the RS-422/232 conversion cable to connect the A8GT-RS4/A9GT-RS4 to the CPU.
Simulation module	The A6SIM-X64Y64 cannot be used.
System configuration example	

General Specifications

General Specifications

Item	Specifications			
Operating ambient temperature	0 to 55 °C			
Storage ambient temperature	-20 to 75 °C			
Operating ambient humidity	10 to 90%RH, non-condensing			
Storage ambient humidity	10 to 90%RH, non-condensing			
Vibration resistance	Conforming to JIS B 3502, IEC 61131-2	Under intermittent vibration		Sweep count
		Frequency	Acceleration	Amplitude	10 times each in X, Y, Z directions (for 80 min.)
		10 to 57Hz	—	0.075mm (0.003inch)	
		57 to 150Hz	9.8m/s^2	—	
		Under continuous vibration			
		Frequency	Acceleration	Amplitude	
		10 to 57Hz	—	0.035mm (0.001inch)	
		57 to 150Hz	4.9m/s^2	—	
Shock resistance	Conforming to JIS B 3502, IEC 61131-2 (147 m/s^2, 3 times in each of 3 directions X, Y, Z)			
Operating atmosphere	No corrosive gases			
Operating altitude (Note 3)	2000m (6557.38ft.) max.			
Installation location	Inside control panel			
Overvoltage category (Note 1)	II or less			
Pollution level (Note 2)	2 or less			

Note 1: This indicates the section of the power supply to which the equipment is assumed to be connected between the public electrical power distribution network and the machinery within premises. Category II applies to equipment for which electrical power is supplied from fixed facilities. The surge voltage withstand level for up to the rated voltage of 300 V is 2500 V.

Note 2: This index indicates the degree to which conductive material is generated in the environment where the equipment is used. In pollution level 2, only non-conductive pollution occurs but temporary conductivity may be produced due to condensation.

Note 3: The PLC cannot be used under pressure higher than the atmospheric pressure of altitude 0m (0ft.). Doing so can cause a failure.

Applicable Model List

The following applicable model list gives models usable in an A mode system.

Product	Type	Description	Number of Points Occupied [I/O Allocation]	Current Consumption (A)		Remarks
				5VDC	24VDC	
CPU module	Q02CPU-A	Program capacity: 28k steps, number of I/O points: 4096 points, basic instruction processing speed: 79ns	—	0.600	—	
	Q02HCPU-A	Program capacity: 28k steps, number of I/O points: 4096 points, basic instruction processing speed: 34ns	—	0.640	—	
	Q06HCPU-A	Program capacity: 30k steps, number of I/O points: 4096 points, basic instruction processing speed: 34ns	—	0.640	—	
Memory card	Q2MEM-1MBS	SRAM card: 1M bytes (including usable space of 302k bytes)	—	0.150	—	
Main base unit	QA1S33B	AnS series module loading base, for power supply + 3 slots	—	0.107	—	
	QA1S35B	AnS series module loading base, for power supply + CPU + 5 slots	—	0.117	—	
	QA1S38B	AnS series module loading base, for power supply + CPU + 8 slots	—	0.118	—	
Extension base unit	QA1S65B	AnS series module loading base, for power supply + 5 slots	—	0.117	—	
	QA1S68B	AnS series module loading base, for power supply + 8 slots	—	0.118	—	
Extension cable	QC06B	0.6m (1.97ft.) cable for extension base	—	—		
	QC12B	1.2m (3.93ft.) cable for extension base	—	—		
	QC30B	3m (9.84ft.) cable for extension base	—	—		
	QC50B	5m (16.39ft.) cable for extension base	—	—		
	QC100B	10m (32.79ft.) cable for extension base	—	—		
Battery	Q6BAT	Battery for program memory, standard RAM	—	—	—	
Power supply module	A1S61PN	100-240VAC input, 5VDC 5A output	—	—	—	
	A1S62PN	100-240VAC input, 5VDC 3A/24VDC 0.6A output	—	—	—	
	A1S63P	24VDC input, 5VDC 5A output	—	—	—	
AC input module	A1SX10	100-120VAC input, 16-points, terminal block	16 [16pt X]	0.050	—	
	A1SX10EU	100-120VAC input, 16-points, terminal block	16 [16pt X]	0.050	—	
	A1SX20	200-240VAC input, 16-points, terminal block	16 [16pt X]	0.050	—	
	A1SX20EU	200-240VAC input, 16-points, terminal block	16 [16pt X]	0.050	—	
DC/AC input module	A1SX30	12/24VDC, 12/24VAC input, 16-points, terminal block	16 [16pt X]	0.050	—	
DC input module	A1SX40	12/24VDC input, 16-points, terminal block (sink)	16 [16pt X]	0.050	—	
	A1SX40-S1	24VDC, 16 input points, terminal block, for high-speed input (sink)	16 [16pt X]	0.050	—	
	A1SX40-S2	24VDC, 16 input points, terminal block, for high leakage current sensor (sink)	16 [16pt X]	0.050	—	
	A1SX41	12/24VDC, 32 input points, connector (sink)	32 [32pt X]	0.080	—	
	A1SX41-S1	24VDC, 32 input points, connector, for high-speed input (sink)	32 [32pt X]	0.120	—	
	A1SX41-S2	24VDC, 32 input points, connector, for high leakage current sensor (sink)	32 [32pt X]	0.080	—	
	A1SX42	12/24VDC, 64 input points, connector (sink)	64 [64pt X]	0.090	—	
	A1SX42-S1	24VDC, 64 input points, connector, for high-speed input (sink)	64 [64pt X]	0.160	—	
	A1SX42-S2	24VDC, 64 input points, connector, for high leakage current sensor (sink)	64 [64pt X]	0.090	—	
	A1S42X	12/24VDC dynamic, 64 input points, connector (sink)	64 [64pt X]	0.080	—	
	A1SX71	5/12VDC, 32 input points, connector (sink)	32 [32pt X]	0.075	—	

Symbol examples in Number of Points Occupied (I/O Allocation) field X: input, Y: output, F: special, S: vacant

Applicable Model List

Product	Type	Description	Number of Points Occupied [I/O Allocation]	Current Consumption (A)		Remarks
				5VDC	24VDC	
DC input module	A1SX80	24VDC, 16 input points, terminal block, for high-speed input (sink/source)	16 [16pt X]	0.050	—	
	A1SX80-S1	24VDC, 16 input points, terminal block, for high-speed input (sink/source)	16 [16pt X]	0.050	—	
	A1SX80-S2	24VDC, 16 input points, terminal block, for high leakage current sensor (sink/source)	16 [16pt X]	0.050	—	
	A1SX81	12/24VDC, 32 input points, connector (sink/source)	32 [32pt X]	0.080	—	
	A1SX81-S2	24VDC, 32 input points, connector, for high leakage current sensor (sink/source)	32 [32pt X]	0.080	—	
	A1SX82-S1	24VDC, 64 input points, connector (sink/source)	64 [64pt X]	0.160	—	
Contact output module	A1SY10	240VAC/24VDC 2A, 16 output points, terminal block	16 [16pt Y]	0.120	0.090	
	A1SY10EU	240VAC/24VDC 2A, 16 output points, terminal block	16 [16pt Y]	0.120	0.090	
	A1SY14EU	240VAC/24VDC 2A, 12 output points, terminal block	12 [16pt Y]	0.120	0.100	
	A1SY18A	240VAC/24VDC 2A, 8 independent contact output points, terminal block	8 [16pt Y]	0.240	0.075	
	A1SY18AEU	240VAC/24VDC 2A, 8 output points, terminal block	8 [16pt Y]	0.240	0.075	
Triac output module	A1SY22	100-240VAC 0.6A, 16 output points	4 [16pt Y]	0.270	0.004	
	A1SY28A	100-240VAC 1A, 8 output points, all points independent	8 [16pt Y]	0.130	—	
	A1SY28EU	100-240VAC 0.6A, 8 output points, all points independent	8 [16pt Y]	0.270	—	
Transistor output module	A1SY40	12/24VDC 0.1A, 16 output points, terminal block, with fuse (sink)	16 [16pt Y]	0.270	0.016	
	A1SY41	12/24VDC 0.1A, 32 output points, terminal block, with fuse (sink)	32 [32pt Y]	0.500	0.008	
	A1SY42	12/24VDC 0.1A, 64 output points, terminal block, with fuse (sink)	64 [64pt Y]	0.930	0.016	
	A1SY42Y	12/24VDC dynamic, 64 output points, connector, with fuse (sink)	64 [64pt Y]	0.100	0.008	
	A1SY50	12/24VDC 0.5A, 16 output points, terminal block, with fuse (sink)	16 [16pt Y]	0.120	0.120	
	A1SY60	24VDC 2A, 16 output points, terminal block, with fuse (sink)	16 [16pt Y]	0.120	0.030	
	A1SY60E	5/12/24VDC 2A, 16 output points, terminal block, with fuse (sink)	16 [16pt Y]	0.200	0.020	
	A1SY68A	5/12/24/48VDC 2A, 8 output points (independent common), terminal block	16 [16pt Y]	0.11	—	
	A1SY71	5/12/24/48VDC 2A, 8 output points (independent common), terminal block	32 [32pt Y]	0.400	0.150	
	A1SY80	5/12VDC, 32 output points, 16mA, connector, with fuse	16 [16pt Y]	0.120	0.040	
	A1SY81	12/24VDC 0.8A, 16 output points, terminal block, with fuse (source)	32 [32pt Y]	0.500	0.008	
	A1SY81EP	12/24VDC 0.1A, 32 output points, connector (with short-circuit protection)	32 [32pt Y]	0.500	0.160	
	A1SY82	12/24VDC, 32 output points, connector, with fuse (source)	64 [64pt Y]	0.930	0.016	
I/O composite module	A1SH42	12/24VDC, 32 input points, 0.1A, 32 output points, connector, fuse	32 [32pt Y]	0.500	0.008	
	A1SH42-S1	24VDC, 32 input points, 0.1A, 32 output points, connector, fuse	32 [32pt Y]	0.500	0.008	
	A1SH48Y58	24VDC, 8 input points, transistor 0.5A, 8 output points, terminal block	16 [16pt Y]	0.060	0.060	
DC input, contact output	A1SX48Y18	24VDC, 8 input points, 2A contact, 8 output points, terminal block	16 [16pt Y]	0.085	0.045	
High-speed counter	A1SD61	High-speed counter	32 [32pt F]	0.35	—	
	A1SD62	DC input sink output type	32 [32pt F]	0.14	—	
	A1SD62D	Differential input sink output type (preset DC input)	32 [32pt F]	0.25	—	
	A1SD62D-S1	Differential input sink output type (preset differential input)	32 [32pt F]	0.25	—	
	A1SD62E	DC input source output type	32 [32pt F]	0.14	—	

Symbol examples in Number of Points Occupied (I/O Allocation) field X: input, Y: output, F: special, S: vacant

Applicable Model List

Product	Type	Description	Number of Points Occupied [I/O Allocation]	Current Consumption (A)		Remarks
				5VDC	24VDC	
Analog-to-digital converter module	A1S64AD	Analog input, 4 channels	32 [32pt F]	0.40	—	
	A1S68AD	Analog input, 8 channels	32 [32pt F]	0.40	—	
Digital-to-analog converter module	A1S62DA	Analog output, 2 channels	32 [32pt F]	0.80	—	
	A1S68DAV	0 to ± 10V, analog output, 8 channels	32 [32pt F]	0.65	—	
	A1S68DAI	0 to ± 20mA, analog output, 8 channels	32 [32pt F]	0.85	—	
Temperature-digital converter module	A1S62RD3	Pt100 (3 wire type) input, 2 channels	32 [32pt F]	0.54	—	
	A1S62RD4	Pt100 (4 wire type) input, 2 channels	32 [32pt F]	0.44	—	
	A1S68TD	Thermocouple input, 8 channels	32 [32pt F]	0.32	—	
Analog I/O module	A1S63ADA	Analog input 2 channels, analog output 1 channel	32 [32pt F]	0.80	—	
	A1S66ADA	Analog input 4 channels, analog output 2 channels	64 [64pt F]	0.16	—	
Temperature control module	A1S64TCTT-S1	Thermocouple input, 4 channels	32 [32pt F]	0.42	—	
	A1S64TCTTBW-S1	Thermocouple input, 4 channels, with heater wire breakage detection function	32 [32pt F]	0.42	—	
	A1S64TCRT-S1	Pt100 input, 4 channels	32 [32pt F]	0.42	—	
	A1S64TCRTBW-S1	Pt100 input, 4 channels, with heater wire breakage detection function	32 [32pt F]	0.42	—	
	A1S64TCTT-S2	Thermocouple input, 2 channels	32 [32pt F]	0.28	—	
	A1S64TCTTBW-S2	Thermocouple input, 2 channels, with heater wire breakage detection function	32 [32pt F]	0.28	—	
	A1S64TCRT-S2	Pt100 input, 2 channels	32 [32pt F]	0.28	—	
	A1S64TCRTBW-S2	Pt100 input, 2 channels, with heater wire breakage detection function	32 [32pt F]	0.28	—	
Pulse catch	A1SP60	Pulse catch input	16 [16pt Y]	0.055	—	
Analog timer	A1ST60	8 timer points	16 [16pt Y]	0.055	—	
Interrupt module	A1SI61	Interrupt input, 16 points	32 [32pt F]	0.057	—	
Computer link module	A1SJ71UC24-R2	RS-232 1 channel	32 [32pt F]	0.10	—	
	A1SJ71UC24-R4	RS-422/RS-485 1 channel	32 [32pt F]	0.10	—	
	A1SJ71UC24-PRF	RS-232 1 channel	32 [32pt F]	0.10	—	
Positioning module	A1SD70	Analog output, 1 axis	48 [first half 16pt S , latter half 32pt F]	0.30	—	
	A1SD71-S2	Pulse train output, 2 axes		0.80	—	
	A1SD71-S7	Pulse output, 2 axes, manual pulse generator usable		0.80	—	
	A1SD75M1	SSC network compatible, 1 axis	32 [32pt F]	0.70	—	
	A1SD75M2	SSC network compatible, 2 axes				
	A1SD75M3	SSC network compatible, 3 axes				
	A1SD75P1-S3	Pulse train output, 1 axis	32 [32pt F]	0.70	—	
	A1SD75P2-S3	Pulse train output, 2 axes				
	A1SD75P3-S3	Pulse train output, 3 axes				
	A1SD774M	4 axes, motion control module	32 [32pt F]	0.90	—	
MELSECNET/MINI-S3 master module	A1SJ71PT32-S3	Master module for optical/twisted pair cables	32/48 [32/48pt F]	0.35	—	
	A1S71T32-S3	Master module for twisted pair cables only		0.30	—	
MELSECNET II module	A1SJ71AP21	For master/local, optical SI/QSI cable	32 [32pt F]	0.33	—	
	A1SJ71AP21-S3	For master/local, optical GI cable	32 [32pt F]	0.33	—	
	A1SJ71AR21	For master and local, coaxial cable	32 [32pt F]	0.33	—	
MELSECNET/B module	A1SJ71AT21B	For master/local, twisted pair cable	32 [32pt F]	0.66	—	
MELSECNET/10 module	A1SJ71LP21	SI/QSI Optical Loop, For Control/Normal/Master	32 [32pt F]	0.65	—	
	A1SJ71LP21GE	GI62.5 Optical Loop, For Control/Normal/Master	32 [32pt F]	0.65	—	
	A1SJ71BR11	Coaxial bus, For Control/Normal/Master	32 [32pt F]	080	—	
Ethernet interface module	A1SJ71E71-B2-S3	10BASE2	32 [32pt F]	0.52	—	
	A1SJ71E71-B5-S3	10BASE5	32 [32pt F]	0.35	—	

Symbol examples in Number of Points Occupied (I/O Allocation) field X: input, Y: output, F: special, S: vacant

Applicable Model List

Product	Type	Description	Number of Points Occupied [I/O Allocation]	Current Consumption (A)		Remarks
				5VDC	24VDC	
CC-Link module	A1SJ61BT11	Master station, local station	32 [32pt F]	0.40	—	
Intelligent communication	A1SD51S	BASIC program module	32 [32pt F]	0.40	—	
Position detection module	A1S62LS	Absolute position detection by dedicated sensor	32 [32pt F]	0.55	—	
PLC simple monitoring module	A1SS91	PLC simple monitoring module	16 [16pt Y]	0.080	—	
Memory card interface module	A1SD59J-S2	Memory card interface module	32 [32pt F]	0.05 (Note1)		
ID interface module (Note 2)	A1SJ71ID1-R4	1 connectable reader/writer	32 [32pt F]	0.25	0.1	
	A1SJ71ID2-R4	2 connectable readers/writers	32 [32pt F]	0.25	0.15	
	A1SD32D1	1 connectable reader/writer	32 [32pt F]	0.25	0.15	
	A1SD32D2	2 connectable readers/writers	32 [32pt F]	0.25	0.30	
MELSEC-I/O LINK	A1SJ51T64	Max. 16 master stations, total of 128 I/O points	64 [64pt Y]	0.115	0.09	
B/NET module	A1SJ71B62-S3	For B/NET transmission terminal control	32 [32pt F]	0.08	—	
S-LINK master	A1SJ71SL92	For control of S-LINK equipment, max. 128 control I/O points	32 [32pt F]	0.20	—	
JEMANET (JPCN-1) master module	A1SJ71J92-S3	JEMANET (JPCN-1) interface, for master station	32 [32pt F]	0.40	—	
Profibus	A1SJ71PB96F	Profibus-FMS Client/Server	32 [32pt F]	0.56	—	Yes
	A1SJ71PB92D	Profibus-DP Master	32 [32pt F]	0.56	—	No
DeviceNet	A1SJ71DN91	DeviceNet Master	32 [32pt F]	0.24	—	No
Modbus	A1SJ71UC24-R2-S2	Modbus RTU/ASCII slave, RS-232	32 [32pt F]	0.10	—	Yes
	A1SJ71UC24-R4-S2	Modbus RTU/ASCII slave, RS-422/485	32 [32pt F]	0.10	—	Yes
Blank cover	A1SG60	Blank cover for I/O slot	16 [16pt vacant]	—	—	
	A1SG62	16/32/64-point dummy module	16/32/64 [16/32/64pt X]	0.060	—	

Symbol examples in Number of Points Occupied (I/O Allocation) field X: input, Y: output, F: special, S: vacant

For details of the performance specifications of the AnS series modules, refer to the MELSEC-A small/mid-scale-compatible type catalog.

Note 1: Current consumption is the value when A1SD59J-MIF is loaded.

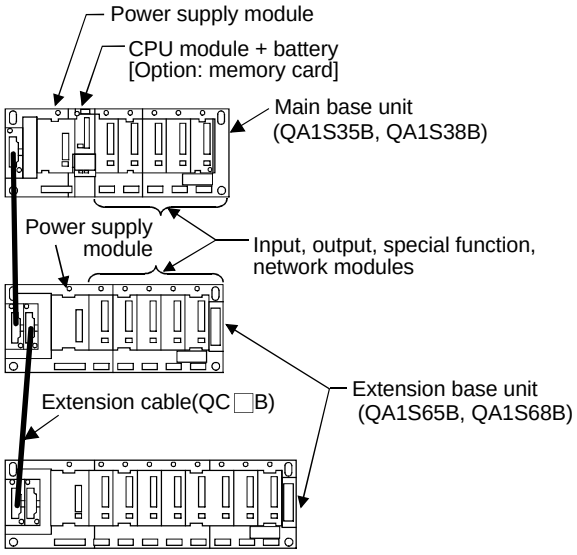
Note 2: Please confirm compliance of the ID products to local laws and regurations for radio transmitting devices.

System Configuration

The A mode uses the AnS series modules.
Use the main and extension bases and extension cables designed for Q series. You cannot use the AnS series main and extension bases and extension cables.

■ Basic configuration

Load the AnS series modules on the QA1S35B or QA1S38B main base unit and QA1S65B and QA1S68B extension base units.



■ Instructions for system configuration

(1) The total number of I/O, special function and network modules that may be loaded into the main and extension bases is up to 64.
(2) Up to 7 extension bases may be connected. (Up to 8 bases including the main)
(3) The overall distance of extension cables is within 13.2m (43.28ft.).
(4) Modules having restrictions on the number of modules loaded

Module	Modules Loaded	
MELSECNET/10 network module: A1SJ71LP21, A1SJ71BR11	Up to 4	Up to a total of 4
MELSECNET(II)/B data link module: A1SJ71AP21, A1SJ71AR21, A1SJ71AT21B	Up to 2	
Interrupt module A1SI61	1	
AnS series special function module (Note 1)	Up to a total of 6	

Note 1: In the AnS series, the following modules have restrictions on the number of modules loaded. The other modules have no restrictions on the number of modules loaded.

AnS modules having restrictions on the number of modules loaded

Product	Type
Ethernet interface module	A1SJ71E71-B2/B5-S3
Computer link module	A1SJ71UC24-R2/R4/PRF
CC-Link module (in intelligent mode)	A1SJ61BT11
Intelligent communication module	A1SD51S
ID interface module	A1SJ71ID1-R4 A1SJ71ID2-R4
Profibus module	A1SJ71PB96F
Modbus module	A1SJ71UC24-R2-S2 A1SJ71UC24-R4-S2
JEMA network (JPCN-1) master module (Only when using GET/PUT service)	A1SJ71J92-S3

(5) When any of the network modules given in the following table is used to read/write the PLC data from an external device, the accessible device ranges are restricted.

Applicable network module

Product	Type
MELSECNET/II	A1SJ71AP21, A1SJ71AR21, A1SJ71AT21B
Ethernet interface module	A1SJ71E71-B2/B5-S3
Intelligent communication module	A1SD51S
ID interface module	A1SJ71ID1-R4 A1SJ71ID2-R4
JEMA network (JPCN-1) master module (Only when using GET/PUT service)	A1SJ71J92-S3

Accessible device ranges

Device Type		Range
X		0-7FF
Y		0-7FF
M/L/S		0-8191
B		0-FFF
Special M		9000-9255
T	Contact	0-2047
	Coil	0-2047
	Current value	0-2047
	Set value	0-2047
C	Contact	0-1023
	Coil	0-1023
	Current value	0-1023
	Set value	0-1023
D		0-6143
W		0-FFF
F		0-2047
R		0-8191
Special D		9000-9255

(6) Among the GOT series graphic operation terminals, the GOT-A900/800 series are usable.
Note that bus connection is not available.

CPU Modules: Q02CPU-A, Q02HCPU-A, Q06HCPU-A

Overview

The A mode CPU modules are designed to improve the processing capabilities of the AnS series system by applying the high-speed, high-performance CPU processing technology developed for the Q series to the conventional AnS series.

Functions and Performance Capabilities Extended in A Mode

The following functions and performance capabilities are extended by changing the AnS series CPU module for the A mode CPU.

■ Increased processing speeds

The instruction processing times have been improved significantly as compared to the AnS series CPU.

● Processing speed comparison

CPU	LD	MOV	PC MIX Value
Q02HCPU-A Q06HCPU-A	34ns	204ns	5.3
Q02CPU-A	79ns	474ns	2.2
A2USHCPU -S1	90ns	540ns	2.2
A2ASCPU-S1 A2ASCPU	200ns	1,200ns	0.9
A2SHCPU	250ns	9,100ns	0.61
A1SHCPU A1SJHCPU	330ns	11,800ns	0.46

The PC MIX value is the average number of instructions such as the basic and data processing instructions executable in 1 μs. A larger value indicates a higher processing speed.

■ Increased program capacities

Using the A mode CPU can increase the program capacities.

● Program capacity comparison

CPU	Program Capacity
Q06HCPU-A	30k step × 2
Q02HCPU-A Q02CPU-A	28k step
A2USHCPU-S1	30k step
A2ASCPU-S1 A2ASCPU	14k step
A2SHCPU	14k step
A1SHCPU A1SJHCPU	8k step

■ Increased number of I/O points

Using the A mode CPU, you can increase the number of I/O points up to 4096 points (8192 points when used with a remote I/O network).

● I/O point comparison

CPU	I/O Points (Note1)	Total I/O Points (Note2)
Q02CPU-A Q02HCPU-A Q06HCPU-A	4096	8192
A2USHCPU-S1 A2ASCPU-S1	1024	8192
A2ASCPU	512	8192
A2SHCPU	512	2048
A1SHCPU A1SJHCPU	256	2048

Note 1: Number of CPU I/O points controlled on the main and extension bases.

Note 2: Total number of CPU I/O points controlled on the main and extension bases and remote I/O points controlled in the remote I/O network.

■ Fast communication with peripheral devices

Though the programming interface of the conventional AnS series CPU was RS422 (9.6k or 19.2kbps), the A mode CPU uses RS-232 to be compatible with the maximum communication speed of 115.2kbps. It facilitates connection with a personal computer, already acting as a general programming device, to shorten program write/read time.

■ Increased number of extension bases

In the conventional AnS series, the number of extension bases allowed was only 1. However, the A mode CPU accepts up to seven extension bases (eight bases including the main and having up to 64 I/O slots). You can increase the I/O points of the current AnS series system. Also, you can increase the overall distance of extension cables up to 13.2m (43.28ft.).

■ Standard-equipped flash ROM

The CPU has a built in flash ROM, allowing easy storage of programs in ROM.

CPU Modules: Q02CPU-A, Q02HCPU-A, Q06HCPU-A

■ Standard-equipped SRAM memory card loading slot

Max. 152k points of extended file register area can be secured in the SRAM card. When it is used with the built-in RAM of max. 64k points, a total of 216k points of file registers are available.

Note 3: The number of file register points that can be secured in the built-in RAM changes with the program size, etc. Check the number of file register points that can be secured in the section of "CPU Built-In Memories/Memory Cards".

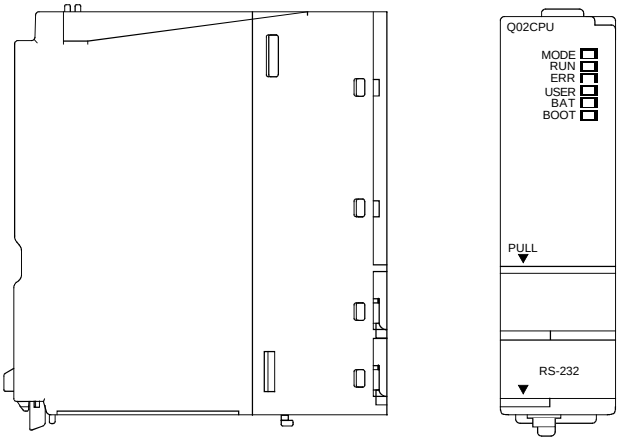
■ 1ms-increment timer instruction usable

Making setting with the new dedicated instruction "ZHTIME" makes the 1ms-increment timer instruction usable.

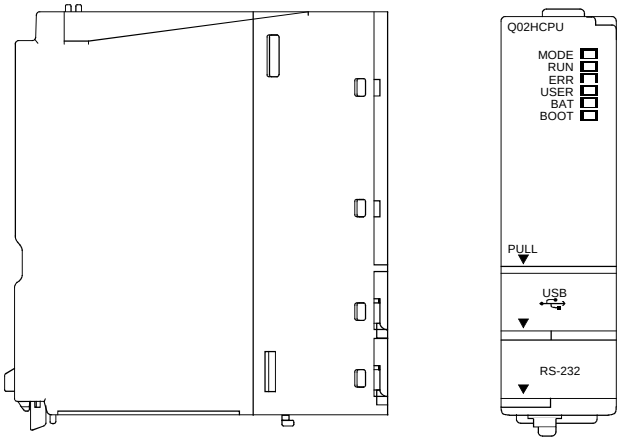
Appearance

The appearances and part names of the CPUs will be described.

■ Q02CPU-A



■ Q02HCPU-A, Q06HCPU-A



Note 1: In the A mode CPU module, the USB port cannot be used.

CPU Modules: Q02CPU-A, Q02HCPU-A, Q06HCPU-A

Performance Specifications

Item		Q02CPU-A	Q02HCPU-A	Q06HCPU-A	Remarks
Control system		Repeated operation using stored program			
I/O control method		Refresh mode (partial refresh possible using program)			
Programming language		Language dedicated to sequence control (ladder, list, SFC)			
Processing speed (LD instruction)		79 (ns/step)	34 (ns/step)		
Memory capacity		144k byte built-in RAM + 144k byte standard ROM (built-in)			
Program capacity	Main program	28k steps		30k steps	
	Subprogram	No		30k steps	
Number of I/O device points		8192 (X/Y0 to 1FFF) (total number of points usable in program including remote I/O)			Note that device usable ranges are limited depending on the programming software used.
Number of I/O points		4096 (points) (number of points controllable on main and extension bases)			
Number of device points	Internal relay [M] (points)	7144 (M0 to M999, M2048 to M8191)		Total of 8192 when M, L and S are shared	
	Latch relay [L] (points)	1048 (L1000 to L2047)			
	Step relay [S] (points)	0 (no initial status)			
	Link relay [B] (points)	8192 (B0 to B1FFF)			
	Timer [T] (points)	2048 (default 256 points) • 100ms timer (T0 to T199)..... Setting time 0.1 to 3276.7S • 10ms timer (T200 to T255)..... Setting time 0.01 to 327.67S • 100ms retentive timer (no initial) .... Setting time 0.1 to 3276.7S • 100ms timer (T256 to T2047)..... Count value setting by word device (D, W, R) • 1ms timer (no initial)..... Setting time 0.001 to 32.767S. Latter half of retentive timers can be used by ZHTIME instruction.			
	Counter [C] (points)	1024 (default 256 points) • Normal counters (C0 to C255) ..... Setting range 1 to 32767 times • Interrupt counters (no initial)..... C224 to C255 by setting • Extended counters (C256 to C1023))..... Count value set by word devices (D, W, R)			
	Data register [D] (points)	8192 (D0 to D8191)			
	Link register [W] (points)	8192 (W0 to W1FFF)			
	Annunciator [F] (points)	2048 (F0 to F2047)			
	File register [R] (points)	Max. built-in 64k points + memory card 152k points			
	Accumulator [A] (points)	2 (A0, A1)			
	Index register [Z] (points)	14 (V, V_1 to V_6, Z, Z_1 to Z_6)			
	Pointer [P] (points)	256 (P0 to P255)			
	Interrupt pointer [I] (points)	32 (10 to 131)			
	Special relay [M] (points)	256 (M9000 to M9255)			
	Special register [D] (points)	256 (D9000 to D9255)			
Comment (points)		Max. 4032 (set in 64 point increments)			
Extended comment (points)		Max. 3968 (set in 64 point increments)			
STOP→RUN output mode switching		Selection between operation status at STOP is re-output (default)/output after operation execution			
Self-diagnostic function		Watchdog error monitor (watchdog timer fixed to 200ms) Memory, CPU, I/O, battery and other error detection			
Operation mode at the time of error		STOP/CONTINUE selection			
Latch (power failure compensation) range		L1000 to L2047 (default) (Latch range setting can be made for L, B, T, C, D, W)			
Remote RUN/PAUSE contact		1 point can be set to each RUN and PAUSE contacts from X0-1FFF.			
Print title registration		Yes (128 characters)			
Keyword registration		Yes			
I/O assignment		Number of I/O points occupied and module type can be registered			
Step run		Sequence program operation execution and stop possible			
Interrupt processing		Interrupt by interrupt module or cyclic interrupt signal			
Constant scan (ms)		10 to 190 (setting can be made in 10ms increments)			

CPU Modules: Q02CPU-A, Q02HCPU-A, Q06HCPU-A

Item	Q02CPU-A	Q02HCPU-A	Q06HCPU-A	Remarks
Clock function	Year, month, day, hour, minute, second, day of week (Automatic leap year judgment) Accuracy –3.18 to +5.25 (TYP +2.12) sec/day at 0°C Accuracy –3.93 to +5.25 (TYP +1.90) sec/day at 25°C Accuracy –14.69 to +3.53 (TYP –3.67) sec/day at 55°C			
5VDC internal current consumption (A)	0.60	0.64		
Weight (kg (lb))	0.20 (0.44)			
External dimensions (mm (inch))	98 (3.86) × 27.4 (1.08) × 90 (3.55)			

Battery

The battery built in the CPU module is used to back up the programs and various data stored in the RAM memory of the CPU module during a power failure and to back up the clock element continuously during a power failure.
The battery is not used while 5VDC is supplied from the power supply module. The battery life depends on the total power failure time when 5VDC is not supplied from the power supply module.
Note that the SRAM card contains a battery in itself and is independent of the consumption of the battery.

● Battery life

CPU Type	Total Power Failure Time (Hours)		Backup Time after Battery Error ON (Hours)
	Guaranteed value	Actual value	
Q02CPU-A	5433	13120	120
Q02HCPU-A Q06HCPU-A	2341	6435	120

Note 1: If the total power failure time is less than the above value, the battery must be changed every 10 years as a guideline.

Manuals

The following manuals are related to the A mode CPU.

Name	Remarks
QCPU-A (A Mode) User's Manual (Hardware)	Packed with QA1S3 B main base
QCPU-A (A Mode) User's Manual (Details)	Optional

Use the ACPU Programming Manual for programming.

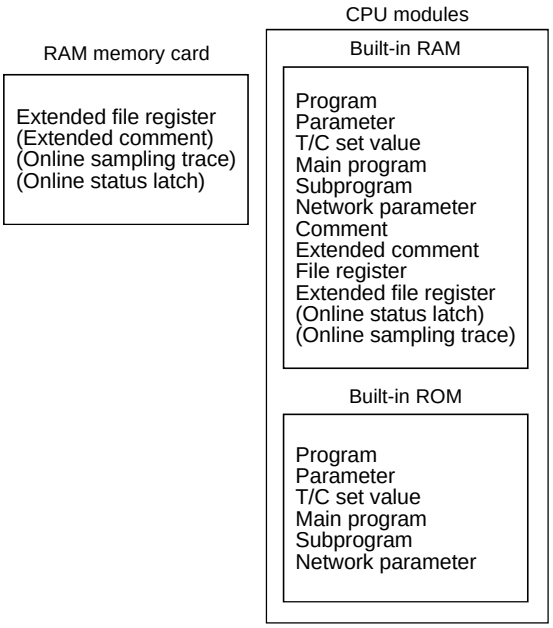
CPU Built-in Memories/Memory Cards

Overview

This section describes the memory capacities of PLC memories which store user-created data, such as programs and device comment files, and how to calculate necessary memory capacities.

Memory Capacities

The A mode CPU contains the RAM memory and ROM memory and allows a RAM memory card to be loaded as external memory. The following diagram shows the memory makeup and stored data.



Note 1: Online status latch and online sampling trace use the memory areas secured as extended file registers.

Note 2: Extended comments are stored in the built-in RAM if it has free space, but if it does not, they use the memory area secured as the extended file registers on the RAM memory card.

Type	Built-In RAM Memory Capacity (Bytes)	Built-In ROM Memory Capacity (Bytes)
Q02CPU-A Q02HCPU-A Q06HCPU-A	144k	144k

■ Built-in RAM

The A mode CPU module has 144k byte user memory RAM, where user data such as programs are stored.

■ Built-in ROM

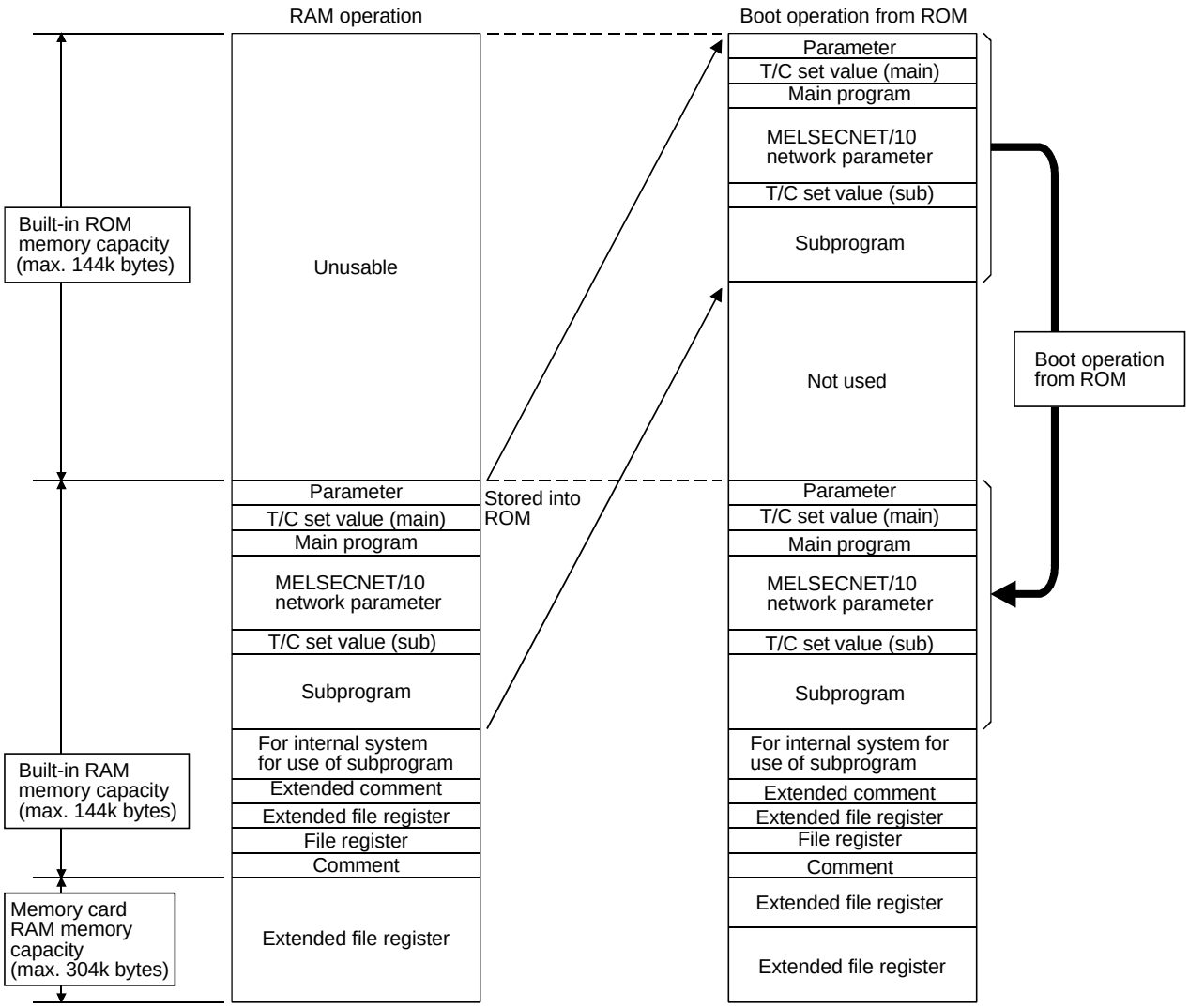
The A mode CPU module has 144k byte user memory ROM to ensure ease of storing programs into ROM. Note that the program stored in ROM is transferred to the built-in RAM at power-on or key reset and run in RAM.

■ RAM memory card (optional)

Memory used in the memory card interface of the CPU. By loading the memory card, the memory capacity can be increased to 448k bytes. The RAM card can be used as extended file registers.

Type	Usable Memory Capacity (Bytes)	Memory Capacity of Standard RAM Memory + Memory Card (Bytes)
Q2MEM-1MBS	304k	448k

■ User memory area makeup example in A mode



Note 1: Subprogram may be used by Q06HCPU-A only.

Memory Capacity Calculation

Use the user memory after determining the stored data types and memory capacities by parameter setting.
Use the following table to calculate the memory capacities.

<For Q02CPU-A/Q02HCPU-A>

Item		Setting Increments	Capacity Calculation Method (Bytes)	Max. Setting Capacity (Bytes)		Remarks
Parameter		—	3k	3k	Total 144k	
Main program	T/C set value	—	1k	1k		
	Sequence program	1k steps	Number of steps × 2	56k	Total 60k	
	Microcomputer program	1k bytes	Set number of bytes	54k		SFC only
MELSECNET/10 parameter		—	Note 1	16k		
Extended comment		1k bytes	Set number of bytes (1k bytes = 64 points)	63k		(Note 3)
Extended file register (built-in)		8k points	Number of file register points × 2	128k		
File register		1k points	Number of file register points × 2	16k		
Comment		1k bytes	Set number of bytes (1k bytes = 64 points)	64k		(Note 3)
Extended file register (memory card)		8k points	Number of file register points × 2	302k		

<For Q06HCPU-A>

Item		Setting Increments	Capacity Calculation Method (Bytes)	Max. Setting Capacity (Bytes)		Remarks
Parameter		—	3k	3k	Total 144k	
Main program	T/C set value	—	1k	1k		
	Sequence program	1k steps	Number of steps × 2	60k	Total 60k	
	Microcomputer program	1k bytes	Set number of bytes	58k		SFC only
MELSECNET/10 parameter		—	Note 1	16k		
	T/C set value	1k bytes	1k	1k		
	Sequence program	1k steps	Number of steps × 2	58k		
	Microcomputer program	—	5k	5k		
Extended comment		1k bytes	Set number of bytes (1k bytes = 64 points)	63k		(Note 3)
Extended file register (built-in)		8k points	Number of file register points × 2	128k		
File register		1k points	Number of file register points × 2	16k		
Comment		1k bytes	Set number of bytes (1k bytes = 64 points)	64k		(Note 3)
Extended file register (memory card)		8k points	Number of file register points × 2	302k		

Note 1: The capacity used changes with the settings of the MELSECNET/10 network parameters. The area of the network parameter capacity is secured in 2k byte increments on the basis of the total capacity of their settings.
The memory capacities of the network parameters are as follows.

Item	Memory Capacity (Bytes)
Internal data	30
Routing parameter	390
Inter-data link transfer parameter	246
Common parameter	2164/module (Note 2)
Refresh parameter	92/module
Station-specific parameter	1490/module

Note 2: 2722 bytes for remote master station.

The MELSECNET/10 network parameter capacity is determined by the above calculated memory capacity total.

Total Capacity of Setting	Capacity of Network Parameter Setting
30 to 2048 bytes	2k bytes
2049 to 4906 bytes	4k bytes
4097 to 6144 bytes	6k bytes
6145 to 8192 bytes	8k bytes
8193 to 10240 bytes	10k bytes
10241 to 12288 bytes	12k bytes
12289 to 14336 bytes	14k bytes
14337 to 16384 bytes	16k bytes

Note 3: When the comment and extended comment capacities are set, 1k bytes are occupied for each capacity for the system.
Note 4: Online sampling trace and online status latch data are stored in the extended file registers.

Network/Special Function Modules I/O Modules

Network

The A mode can use the same network system as the AnS series.
You can use MELSECNET/B, MELSECNET/(II), CC-link and MELSECNET/MINI modules without any changes, to say nothing of MELSECNET/10. Refer to the applicable model list for the usable modules.
The Q2AS/Q series network modules cannot be used with the A mode.

Special Function Modules

Use the AnS series special function modules with the A mode. Refer to the applicable model list for the usable modules.
You cannot use the intelligent function modules designed for Q2AS/Q series.

I/O Modules

Use the AnS series I/O modules with the A mode.
You cannot use the I/O modules designed for Q series.

For the specifications of the AnS series modules, refer to the MELSEC-AnS PLC catalog.

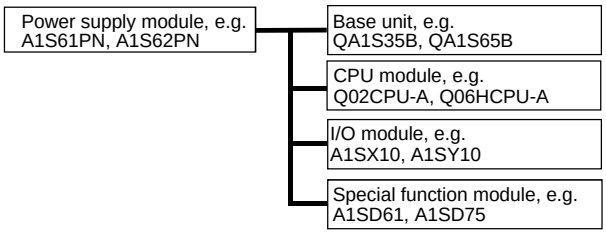
Current Consumption Calculation

Overview

The PLC system operates on 5VDC supplied from the power supply module.
The sum of 5VDC current consumption values of the CPU, I/O, intelligent function and network modules loaded on one base unit should not exceed the rated output current of the power supply module. If so, the number of modules loaded on the base unit must be reduced.

Calculation Method

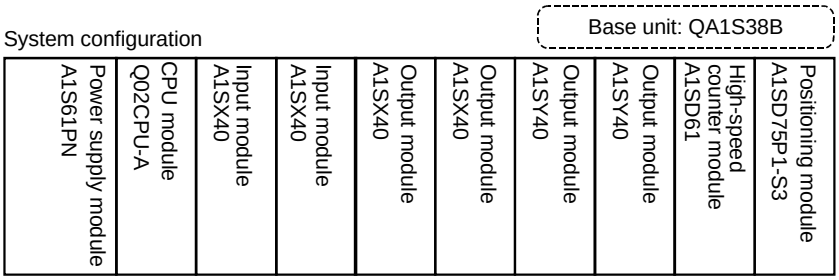
Make sure that the current consumption is as indicated in the following relational expression.
(Rated output current of power supply module) ≥ (sum of 5VDC current consumption values of modules)



Refer to "Applicable Equipment List" for the current consumption value of each module.

(Calculation example)

System configuration



Rated output current of power supply module

Type	Rated Output Current (A)
A1S61PN	5

5VDC current consumption of each module

Type	Module Type	5VDC Current Consumption (A)
Q02CPU-A	CPU module	0.600
QA1S38B	Base unit	0.118
A1SX40	Input module	0.050
A1SY40	Output module	0.270
A1SD61	High-speed counter module	0.350
A1SD75P1-S3	Positioning module	0.700

Sum of 5VDC current consumption values
=0.600+0.118+(0.050×2)+(0.270×4)+0.350+0.700
=2.948(A)

Rated output current of A1S61PN [5(A)] > sum of 5VDC current consumption values [2.948(A)]

Hence, this system has no current consumption problem.

Power Supply Modules: A1S61PN, A1S62PN, A1S63P

Overview

The power supply module is designed to supply 5VDC to each PLC module loaded on the base unit.
Note that the power supply module type that may be loaded depends on the base unit. Use any of the AnS series A1S61PN, A1S62PN and A1S63PN power supply modules with the QA1S3 □ B or QA1S6 □ B where the AnS series modules will be loaded.

Performance Specifications

■ Performance specifications

Item		A1S61PN	A1S62PN	A1S63P
Applicable base unit		QA1S3 □ B, QA1S6 □ B		
Input power supply		100-240VAC + 10%/-15%		24VDC +30%/-35%
Input frequency		50/60Hz ± 3Hz		—
Input voltage distortion factor		Within 5%		
Input max. apparent power		105VA		41W
Inrush current		20A within 8ms		81A within 1ms
Rated output current	5VDC	5A	3A	5A
	24VDC	—	0.6A	—
Overcurrent protection	5VDC	5.5A or more	3.3A or more	5.5A or more
	24VDC	—	0.66A or more	—
Overvoltage protection		5.5 to 6.5V		
Efficiency		65% or more		
Permissible instantaneous power failure time		Within 20ms		Within 10ms
Dielectric withstand voltage		Across inputs/LG-outputs/FG 2,830VAC rms/3 cycles (altitude 2000m (6557.38ft.))		500VAC across primary-5VDC
Insulation resistance		Inputs-outputs (LG/FG separated), inputs-LG/FG, outputs-LG/FG 10MΩ or more by 500VDC insulation resistance tester		5MΩ or more by 500VDC insulation resistance tester
Noise immunity		By noise simulator of 1,500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency
Operation indication		LED indication (Lit at 5VDC output)		
Fuse		Built-in (unchangeable by user)		
Terminal screw size		M3.5 × 7		
Applicable wire size		0.3 to 2mm^2		
Applicable crimping terminal		RAV1.25-3.5, RAV2-3.5		
Applicable tightening torque		59 to 88N / cm		
Weight (kg (lb))		0.60 (1.32)		0.50 (1.1)

Base Units

The base unit serves to supply the CPU, I/O and special function modules with 5VDC generated by the power supply module. It also serves to exchange signal data among the CPU, I/O and special function modules.
For combination for use of the base units, refer to the section of system configuration.

■ Model list

● Main base unit

Type		QA1S33B	QA1S35B	QA1S38B
Number of I/O modules loaded		3	5	8
Applicable I/O modules		AnS series		
External dimensions (mm (inch))	W	255 (10.05)	325 (12.81)	430 (16.94)
	H	130 (5.12)		
Weight (kg (lb))		0.57 (1.25)	0.75 (1.65)	1 (2.2)

<QA1S38B, QA1S35B accessories>

Product	Description
Dustproof cover	For AnS I/O module
Base mounting screw	M5×25 4 pcs.
Manual	QCPU-A (A Mode) User's Manual (Hardware)

● Extension base unit

Type	QA1S35B	QA1S38B
Number of I/O modules loaded	5	8
Applicable I/O modules	AnS series	
External dimensions (mm (inch))	315(12.41)W ×130(5.12)H	420(16.55)W ×130(5.12)H
Weight (kg (lb))	0.75 (1.65)	1 (2.2)

<QA1S65B, QA1S68B accessories>

Product	Description
Base mounting screw	M5×25 4 pcs.

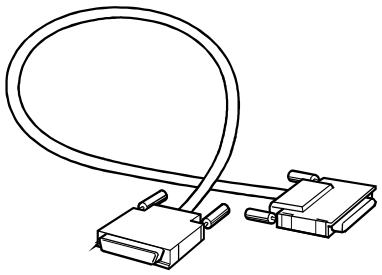
■ Handling instructions

(1) When mounting the base unit into a control panel, etc., leave a 30mm (1.18inch) or more clearance between its top and the panel structure or parts to ensure ease of module replacement and reduce the influence of radiated noise or heat.
Also leave 20mm (0.79inch) or more clearances to the left and right of the PLC.
(2) Mount the base unit on a flat surface to prevent possible flexing of the printed circuit boards.

Extension Cables

An extension cable is used for connection between the main and extension base units, or between the extension base units.
The same extension cables are used for both the Q and A modes.

■ Appearance



■ Model list

Type	QC06B	QC12B	QC30B	QC50B	QC100B
Cable length (m (inch))	0.6 (0.02)	1.2 (0.05)	3 (0.12)	5 (0.20)	10 (0.39)
Usable base unit	Main base unit (QA1S35B, QA1S38B) Extension base unit (QA1S65B, QA1S68B)				
Weight (kg (lb))	0.16 (0.35)	0.22 (0.48)	0.4 (0.88)	0.6 (1.32)	1.11 (2.42)

■ Directions for use

When the above extension cables are used together, the overall distance of the extension cables should be within 13.2m (43.28ft.).

Accessories: Batteries, Connectors

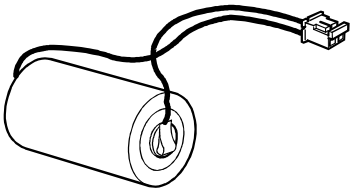
Batteries/Q6BAT

■ Overview

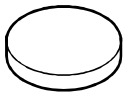
The Q6BAT battery is loaded into a CPU module and used to back up the built-in RAM memory of the CPU module during power failure.
The Q2MEM-BAT battery is used to back up the Q2MEM-1MBS memory card at a power failure.

■ Appearance

Q6BAT



Q2MEM-BAT



■ Specifications

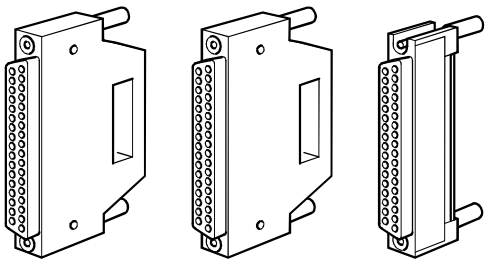
Type	Q6BAT	Q2MEM-BAT
Nominal voltage	3VDC	3VDC
Battery type	Manganese dioxide lithium battery	Graphite fluoride lithium battery
Current capacity	1800mAh	48mAh
Storage life (normal temp.)	10 years	4 years
Applicable model	Q02/Q02H/ Q06HCPU-A	Q2MEM-1MBS

■ Connectors/A6CON

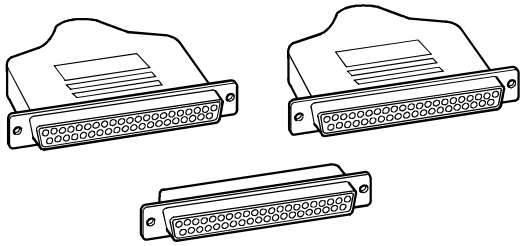
The A6CON is an external wiring connector for connector type I/O module. These connectors are classified into six different types according to the soldering, crimp-contact and pressure-displacement types and I/O module types.

■ Appearance

A6CON1, A6CON2, A6CON3



A6CON1E, A6CON2E, A6CON3E



■ Model list

Type	A6CON1	A6CON2	A6CON3
Connector type	Soldering type	Crimp-contact type	Pressure-displacement type
I/O module type	Positive common (sink) type input module, sink type output module		
Applicable wire size	0.3mm^2	AWG#24 to 28	AWG#28, AWG#30

• Crimp-contact tool for A6CON2:

• Pressure-displacement tool for A6CON3:

FCN-367T-T012/H (locator plate)
FCN-707T-T001/H (cable cutter)
FCN-707T-T101/H (hand press)

Type	A6CON1E	A6CON2E	A6CON3E
Connector type	Soldering type	Crimp-contact type	Pressure-displacement type
I/O module type	Negative common (source) type input module, source type output module		
Applicable wire size	0.3mm^2	AWG#20 to 24	AWG#28, AWG#30

• Crimp-contact tool for A6CON2E

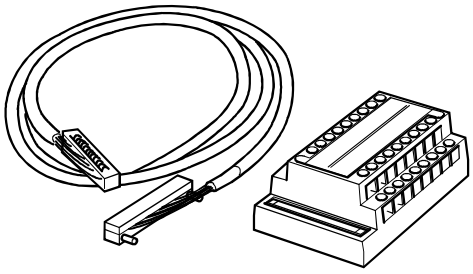
• Pressure-displacement tool for A6CON3E

91257-1 (die set)
91220-1 (cable cutter)
91085-2 (hand mini-press)

Connector/Terminal Block Convertor Modules/A6TB

The connector/terminal block converter module is designed to convert the connector of a connector type I/O module into a terminal block to ensure ease of external wiring.
To use this module, plug a dedicated cable to the connector of an I/O module and plug the opposite side of that cable to the connector/terminal block convertor module. Perform external wiring at the terminal block of the connector/terminal block convertor module.

■ Appearance



■ Model list

(1) Connector/terminal block convertor modules

Type	Description	Weight (kg (lb))
A6TBXY30	For positive common (sink) type input modules and sink type output modules (standard type)	0.4 (0.88)
A6TBXY54	For positive common (sink) type input modules and sink type output modules (2-wire type)	0.5 (1.1)
A6TBX70	For positive common (sink) type input modules (3-wire type)	0.6 (1.32)
A6TBX36-E	For negative common (source) type input modules (standard type)	0.4 (0.88)
A6TBY36-E	For source type output modules (standard type)	0.4 (0.88)
A6TBX54-E	For negative common (source) type input modules (2-wire type)	0.5 (1.1)
A6TBY54-E	For source type output modules (2-wire type)	0.5 (1.1)
A6TBX70-E	For negative common (source) type input modules (3-wire type)	0.6 (1.32)

(2) Cables

Type	Description	Weight (kg (lb))	Applicable Model
AC05TB	0.5m (1.64ft.) for sink modules	0.17 (0.37)	A6TBXY36 A6TBXY54 A6TBX70
AC10TB	1m (3.28ft.) for sink modules	0.23 (0.51)	
AC20TB	2m (6.56ft.) for sink modules	0.37 (0.81)	
AC30TB	3m (9.84ft.) for sink modules	0.51 (1.12)	
AC50TB	5m (16.39ft.) for sink modules	0.76 (1.67)	
AC80TB	8m (26.23ft.) for sink modules (common current not exceeding 0.5 A)	1.2 (2.64)	
AC100TB	10m (32.79ft.) for sink modules (common current not exceeding 0.5 A)	1.5 (3.3)	
AC05TB-E	0.5m (1.64ft.) for source modules	0.17 (0.37)	A6TBX36-E A6TBY36-E A6TBX54-E A6TBY54-E A6TBX70-E
AC10TB-E	1m (3.28ft.) for source modules	0.23 (0.51)	
AC20TB-E	2m (6.56ft.) for source modules	0.37 (0.81)	
AC30TB-E	3m (9.84ft.) for source modules	0.51 (1.12)	
AC50TB-E	5m (16.39ft.) for source modules	0.76 (1.67)	

■ Directions for use

The tightening torque of the terminal screws (M3.5 screws) of the terminal blocks is 78.4N/cm (8kgf/cm).

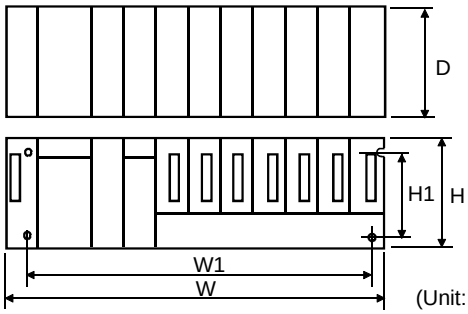
■ Connection diagrams

Refer to "CHAPTER 2 Q MODE" - "MODEL SELECTION" - "Accessories".

External Dimensions

External Dimensions

■ QA1S3□B, QA1S6□B structural dimensions

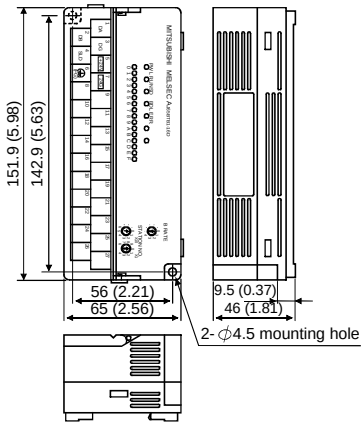


(Unit: mm (inch))

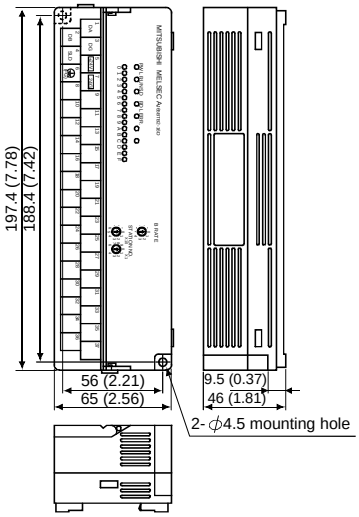
Base module	Dimensions			Dimensions between mounting holes	
	H	W	D	H1	W1
QA1S33B	130 (5.12)	255 (10.05)	110 (4.33)	110 (4.33)	235 (9.26)
QA1S35B		325 (12.81)			305 (12.02)
QA1S38B		430 (16.94)			410 (16.15)
QA1S65B		315 (12.41)			295 (11.62)
QA1S68B		420 (16.55)			400 (16.76)

■ CC-Link remote I/O dimensions

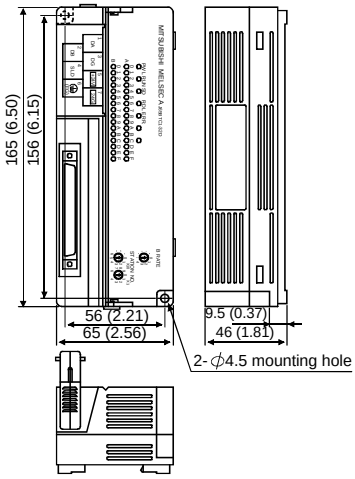
● AJ65BTB1-16 ⛶



● AJ65BTB2-16 ⛶

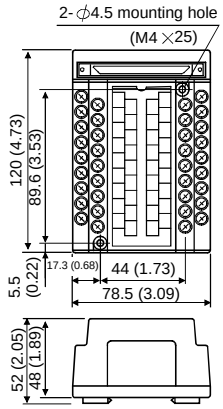


● AJ65BTC1-32 ⛶

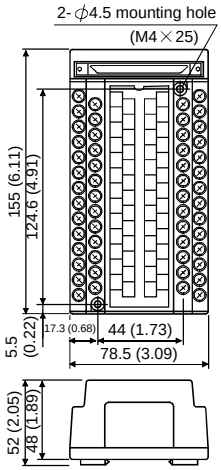


■ Connector/terminal block convertor modules

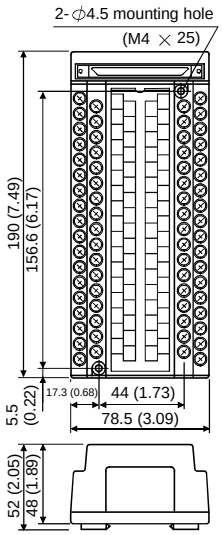
● A6TB36



● A6TB54



● A6TBX70



Software

To create the sequence programs for the A mode CPU, you can continue to use the GPP function software package (hereafter referred to as "GPP") and programming unit (hereafter referred to as the "PU") which could be used with the AnS conventionally.
GPP permits sequence programming in ladder, list and SFC (sequential function chart) languages, entry of comments to the I/O/CPU module internal relays, registers and others, network parameter setting, sequence program operating status monitoring, network operating status monitoring, forced data changes, I/O signal ON/OFF, and others.
The PU allows sequence programming in list, sequence program operating status monitoring, forced data changes, I/O signal ON/OFF, and others.
They can execute the functions which could be performed with the conventional AnS series.

■ Usable GPP and CPU types

The following table lists the usable software and the CPU types selected for use.

Peripheral Device	GPP Function Software Package	CPU Type
A6PHP	SW3-GPPAEE	A3H
	SW4GP-GPPAEE	A3A
	SW5GP-GPPAEE	A3A
A6GPP	SW3-GPPAEE	A3H
	SW4GP-GPPAEE	A3A
	SW5GP-GPPAEE	A3A
A6HGP	SW3-GPPAEE	A3H
DOS	SW □ IVD-GPPA	A4U
Windows personal computer	SW □ D5C/F-GPPW-E (Note 1)	A4U
	SW □ D5C-GPPW-E (Note 2)	Corresponding type

Note 1: For SW2 software or earlier
Note 2: For SW4 software or earlier, the A mode CPU type is listed, so choose the corresponding CPU type.
Note 3: When the CPU type chosen is A3A/A3H, there are restrictions on the device memory capacities usable within programs.

■ Usable GPP and CPU types

Type	Restrictions
A7PU	Hand-held connection possible
A7PUS	

Instructions Different in Specifications

■ Instructions different from those of AnS

The following table lists the instructions that differ between the A mode and AnS.

Class	Instruction Name
Failure check	CHK
Interrupt disable	DI
Interrupt enable	EI
Microcomputer program call (Note 1)	SUB, SUBP

Note 1: When a PID, function arithmetic or other utility program is used, use the instructions after replacing them with the A mode dedicated instructions.

■ Instructions added to the A mode

The following table gives the dedicated instruction added to the A mode.

Class	Instruction Name
1ms timer setting	ZHTIME

Peripheral Devices

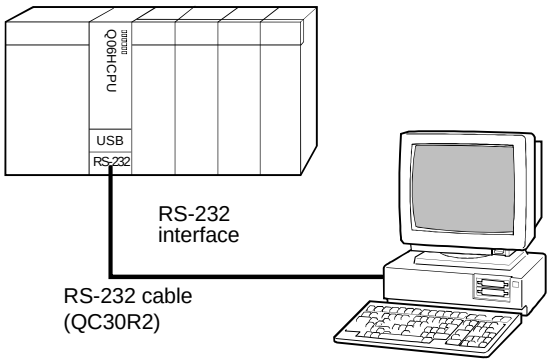
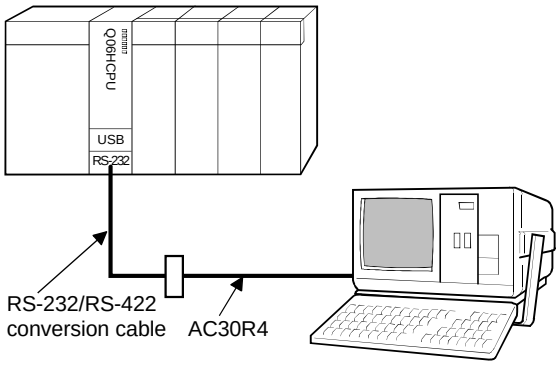
Overview

The A mode CPU module may be programmed with the device used for programming the conventional AnS series or on a Windows personal computer. The A mode CPU module is equipped with an RS-232 interface.

RS-232 Connection

■ Connection configuration diagram

The following diagram shows a configuration for connection with a personal computer by an RS-232 interface.

Peripheral Device	Connection Method	Precaution
Windows personal computer DOS personal computer		Since the personal computer side connector of the QC30R2 is 9-pin D-sub, a conversion connector is needed for the personal computer whose COM port is different in shape. Using SW5D5C-GPPW-E permits communications at communication speed of max. 115.2kbps.
A6GPP A6PHP A6HGP A7PU A7PUS		As the interfaces to these peripheral devices are RS-422, the RS-232/RS-422 conversion cable is needed for connection to the A mode CPU module.

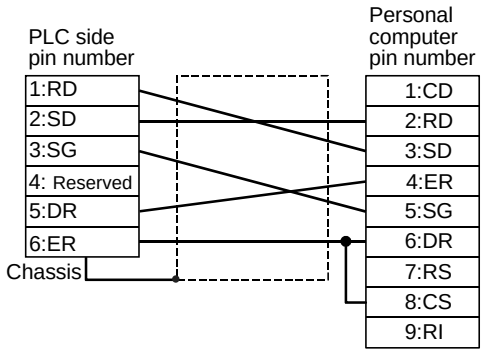
Note 1: In the A mode, the USB port cannot be used.

■ RS-232 cable

Type	QC30R2
Length	3m (9.84ft.)
Connector shape	Personal computer side: 9-pin D-Sub PLC side: 6-pin Mini-DIN

■ RS-232 cable connection example

(For connection of Windows and DOS/V personal computer)



Note: Do not make connection to the PLC side pin number 4.

■ Instructions

(1) The A mode CPU can communicate at up to 115.2kbps, but depending on the performance of the personal computer connected, it may not be able to communicate at 115.2kbps. If so, choose any of 57.6k, 38.4k, 19.2k and 9.6kbps communication speeds.

(2) When using the QC30R2 (3m (9.84ft.) cable), we have confirmed that communication can be made at 115.k2kbps.

(3) The usable communication speed and distance of the cable fabricated by the user should be checked by the user.

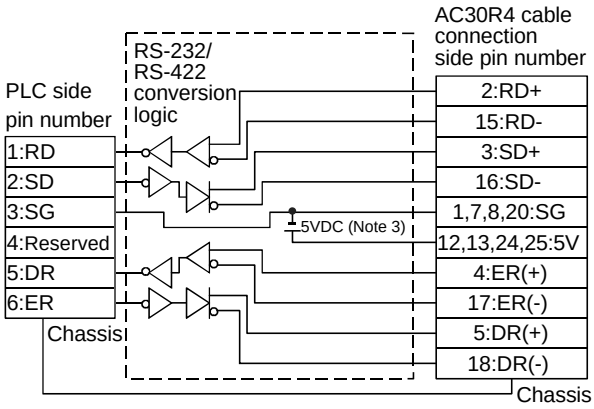
■ RS-232/RS-422 conversion cables (introduced products)

When the dedicated peripheral device such as the A6GPP is used, the RS-232/RS-422 conversion cables given below are usable.

Cable Type	Specifications	Peripheral Device Type
FA-CNV2402CBL	• 0.2m (0.66ft.) • CPU side RS232C mini-DIN 6-pin • AC30R4 side RS422 D-sub 25-pin	A7PU A7PUS A6PHP A6GPP A6HGP
FA-CNV2405CBL	• 0.5m (1.64ft.) • CPU side RS232C mini-DIN 6-pin • AC30R4 side RS422 D-sub 25-pin	

■ RS-232/RS-422 conversion cable connection example

(For connection of A series peripheral device such as A6GPP)



Note 2: Do not make connection to PLC side pin 4.

Note 3: 5V power supply is needed for use of portable peripheral device such as A8PUJ. (Current Capacity: 0.4A or more)

Note 4: Operation of the RS-232/RS-422 conversion circuit manufactured by the user should be confirmed by the user.

Other Connection Systems

When using SW5D5C-GPPW, you can use the following connection systems in addition to the RS-232 port connection of the CPU module.

Personal Computer Side Port	Communication System	A Mode PLC Side Module
COM	RS-232	A1SJ71UC24-R2
	RS-232/422 (Note 5)	AJ65BT-G4
A70BDE-J71QLP23 (GE) A70BDE-J71QBR13 (GE)	MELSECNET/10	A1SJ71LP21 A1SJ71BR11
A80BDE-J61BT13 A80BDE-J61BT11	CC-Link	A1SJ61BT11

Note 5: RS-232/422 converter is needed. Note that CC-Link connections are made between AJ65BT-G4 and A mode PLC.

Note 6: Connections via Ethernet cannot be made for the A mode PLC.

Sequence Program Simulation

Software

The SW5D5C-LLT-E ladder logic test tool (hereafter reffered to as “LLT”) is software designed to add simulation functions to the MELSEC PLC programming function software package (SW5D5C-GPPW-E GPP function software package for Windows, hereafter referred to as "GPPW"). This comprehensive software is compatible with the A series, QnA series, FX series and motion controller, in addition to the Q series, to allow GPPW-created sequence programs to be simulated on a personal computer without writing them to the PLC.

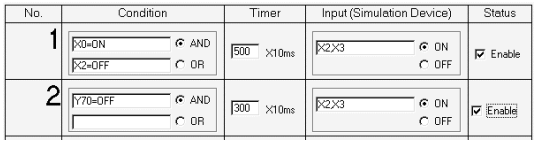
Features

Program run can be checked on a personal computer, making debugging efficient.

(1) Without connection of a PLC, program run can be checked on the personal computer where that program was created.
(2) The target PLC type (MELSEC-A/QnA/FX/Q/motion controller) of the program created is judged automatically and the corresponding virtual CPU is started.
(3) Simple setting allows the machine side I/O to be operated simulatively. (Example: X0 turns on 10 seconds after Y10 has turned on.)
(4) Debugging is enabled in the stage of program design.
(5) PLC, basic and application instructions are supported.

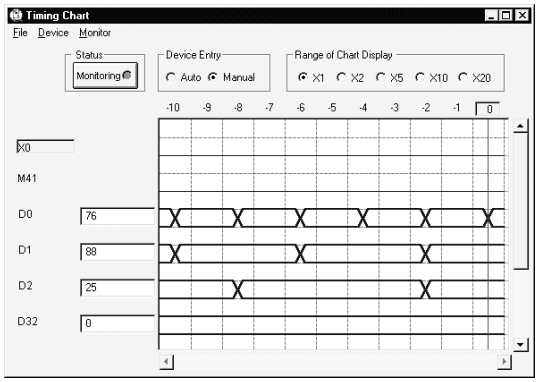
I/O System Setting Function

The I/O system setting function allows external input generated for the PLC output to be given simulatively by simple setting. The following No. 1 indicates the setting that X2 and X3 are turned on 5 seconds after X0 has turned on and X2 turned off.



Monitoring and Testing Functions

The monitoring and testing functions are designed to monitor the status of the device memory and buffer memory in a virtual CPU, and also permits forced ON/OFF and current value changing as well as device ON/OFF state and value monitoring, like the device batch-monitoring and buffer memory batch-monitoring functions of GPPW. In addition, the monitoring and testing functions of the ladder logic test tool include a function to display ON/OFF states and values in a timing chart format. It enables time-series operation to be acquired.



Tool Function

The tool function is designed to temporarily save the data of the virtual CPU device memory and special function module buffer memory and read and use the saved data when resuming debugging work.

Error Detail Display Function

Error detail explanation appears when an operation or similar error occurs during simulation made by LLT. This function saves time and trouble taken to refer to the manuals, etc. and facilitates finding the error occurrence cause.

Differences and Restrictions

As compared to the operation of the A mode CPU, LLT has the following restrictions.

(1) LLT cannot support SFC programs.
(2) LLT does not support interrupt programs. No operation will be performed if a sequence program is created.
(3) The operation result in any instruction that uses a floating point value is not equal to the actual operation result of the CPU since a rounding error is always produced.

(4) LLT cannot simulate the functions of special function/network modules. However, it has a buffer memory area of 64k points × 64 modules for special function/network modules. Data write/read can be performed to/from this area.

(5) For the timing of LLT, processing time taken for one scan is calculated as 100ms (default value). By changing the constant scan setting, you can change the time taken for one scan.

(6) In LLT, the timing method of the timer changes with the scan time (= constant scan setting) of the logic test function. At the scan time of 100ms, the current value of the 100ms timer is incremented by +1 every scan and the current value of the 10ms timer is incremented by +10 every scan. At the scan time of 10ms, the current value of the 100ms timer is incremented by +10 every scan and the current value of the 10ms timer is incremented by +1 every scan.

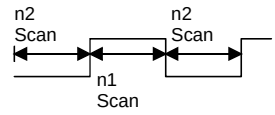
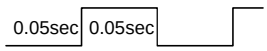
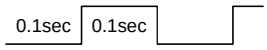
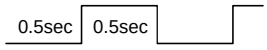
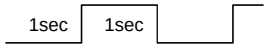
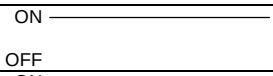
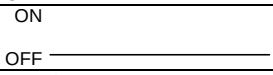
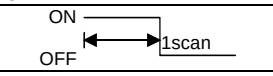
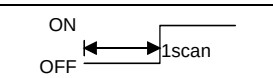
(7) "OPERATION ERROR" occurs if a device range is exceeded in indirect designation using the index register.

(8) In real number processing instructions, the ladder logic test tool (LLT) checks their real number ranges strictly. "OPERATION ERROR" occurs if any value entered cannot be evaluated as a real number.

(9) The following parameters are invalid if set.

Parameter	Setting Item
Memory capacity setting	Items except "sequence" and "file register" in "program capacity" are invalid.
PLC system setting	Items other than "STOP→RUN time output mode" are invalid.
PLC RAS setting	• "Annunciator display mode" is invalid. • Items other than "operation error" and "special function module access error" in "error-time operation mode" are invalid
I/O assignment	All valid.
Device setting	"Latch range" is invalid.
Network parameters	All invalid.

(10)For the A mode CPU function, the following special relays are supported by LLT.

Number	Name	Description
M9008	Self-diagnostic error	OFF: No error ON: Error
M9009	Annunciator detection	OFF: No detection ON: Detection
M9010	Operation error flag	OFF: No error ON: Error
M9011	Operation error flag	OFF: No error ON: Error
M9012	Carry flag	OFF: Carry OFF ON: Carry ON
M9020	User timing clock No. 0	
M9021	User timing clock No. 1	
M9022	User timing clock No. 2	
M9023	User timing clock No. 3	
M9024	User timing clock No. 4	
M9028	Clock data read	OFF: No operation ON: Read request
M9030 (Note 1)	0.1 sec. clock	
M9031 (Note 1)	0.2 sec. clock	
M9032 (Note 1)	1 sec. clock	
M9033 (Note 1)	2 sec. clock	
M9034 (Note 1)	1 min. clock	
M9036	Normally ON	
M9037	Normally OFF	
M9038	ON only 1 scan after RUN	
M9039	RUN flag (OFF only 1 scan after RUN)	
M9042	Stop status contact	OFF: Not during stop ON: During stop
M9051	CHG instruction execution disable	OFF: Enabled ON: Disabled
M9054	STEP RUN flag	OFF: Not during step run ON: During step run
M9091	Instruction error flag	OFF: No error ON: Error

＊1: Derived from the constant scan setting.

(11)For the A mode CPU function, the following special registers are supported by LLT.

Number	Name	Description
D9008	Self-diagnostic error	Self-diagnostic error number
D9009	Annunciator detection	F number at which external failure occurred
D9010	Error step	Step number at which operation error occurred
D9011	Error step	Step number at which operation error occurred
D9015	CPU operating status	CPU operating status
D9016	Program number	Sequence program being run is stored in BIN value
D9017 (Note 2)	Scan time	Minimum scan time (10ms increments)
D9018 (Note 2)	Scan time	Scan time (10ms increments)
D9019 (Note 2)	Maximum scan time	Maximum scan time (10ms increments)
D9020 (Note 3)	Constant scan	Constant scan time (user-set in 10ms increments)
D9021 (Note 2)	Scan time	Scan time (1ms increments)
D9022 (Note 2)	1 sec. counter	Count value in 1s increments
D9025	Clock data	Clock data (year, month)
D9026	Clock data	Clock data (day, hour)
D9027	Clock data	Clock data (minute, second)
D9028	Clock data	Clock data (, day of week)
D9035	Extended file register	Used block number
D9036	For specifying extended file register device number	Device number used to directly access each device of extended file register
D9037		
D9091	Detailed error number	Self-diagnostic error number
D9124	Annunciator detection count	Annunciator detection count
D9125	Annunciator detection count	Annunciator detection count
D9126		
D9127		
D9128		
D9129		
D9130		
D9131		
D9132		

Note 1: Derived from the constant scan setting.
Note 2: Same as all constant scan settings. Default is 100ms.
Note 3: The time set as a constant scan is the time of 1 scan.

(12)LLT is not compatible with the following instructions, and no operation will be performed if they are executed. When a no-operation instruction is executed, the logic test function screen lamp is lit, and that no-op instruction and its step number can be displayed.

● Non-operated and processing-restricted instruction list

Class	Instruction Symbol	Remarks
Program run control instruction	DI	No operation
	EI	No operation
	IRET	No operation
	SUB(P)	No operation
Refresh instruction	COM	No operation
	SEG	No operation
Data link instruction	LRDP	No operation
	LWTP	No operation
	RFRP	No operation
	RTOP	No operation
	ZNFR	No operation
	ZNTO	No operation
	ZNRD	No operation
	ZNWR	No operation
	ZCOM	No operation
Display instruction	PR	No operation
	PRC	No operation
	LEDC	No operation
Other instructions	CHK	No operation
	CHKEND	No operation
	SLT	No operation
	SLTR	No operation
	STRA	No operation
	STRAR	No operation
	IX	No operation
	IXR	No operation
	KEY	No operation
	COMRD	No operation
	DATEWR(P)	No operation
	WDT(P)	No operation

In addition to the above, the following instructions are not operated.

(1) PID control instructions
(2) Special function module dedicated instructions
(3) CC-Link dedicated instructions

4. PERSONAL COMPUTER-RELATED PRODUCTS

CONTENTS

1. OVERVIEW

• Overview 4-2

2. SYSTEM CONFIGURATION

• System Required for Use of Personal Computer-Related Products 4-3

3. SOFTWARE PACKAGES

• Basic Communication Support Tool : SW3D5F-CSKP-E 4-4
• EXCEL Communication Support Tool : SW3D5F-OLEX-E 4-9
• Monitoring Tool : SW3D5F-XMOP-E 4-12
• Graphic Data Package : SW0D5C-PIC-B 4-15

4. NETWORK BOARDS

• MELSECNET/10 Boards: A70BDE-J71QLP23, A70BDE-J71QLP23GE, A70BDE-J71QBR13 4-17
• CC-Link Boards: A80BDE-J61BT11, A80BDE-J61BT13 4-20

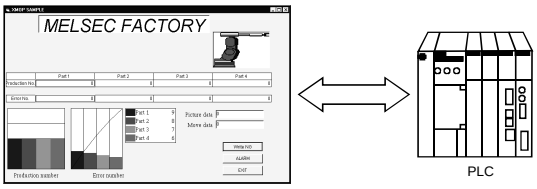
Overview

Overview

In production locations, there are increasing demands for using personal computers for production control, quality control and energy control.
To meet these demands, MELSEC offers a wide variety of methods for communication with PLCs for choice according to the facility scale and data volumes to be controlled and the software tools designed for ease of personal computer program creation.
This chapter provides personal computer-related products which may be used with the Q series PLCs.

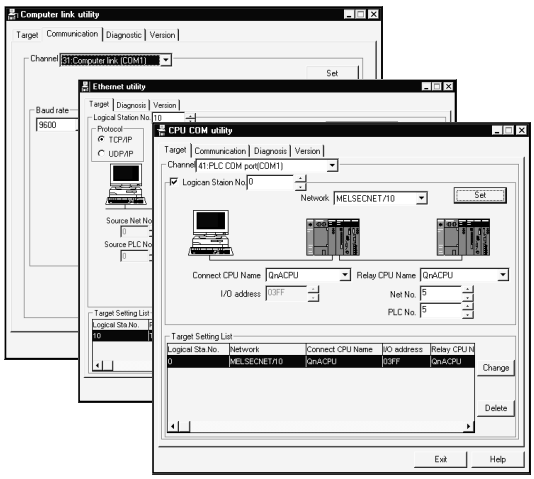
What Tools Can Do

■ Creation of monitoring screen

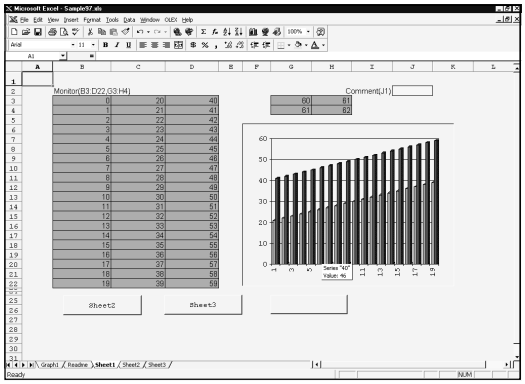


XMOP screen

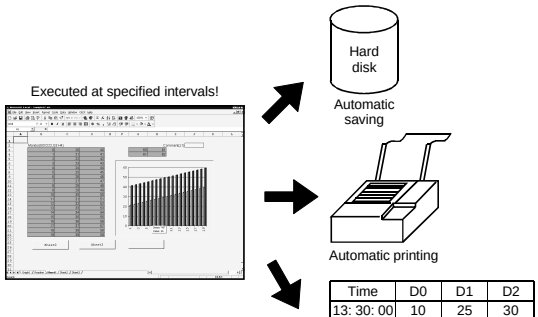
■ Easy setting of communication system



■ Link with applications such as Excel



■ Creation of daily and monthly reports in combination with database

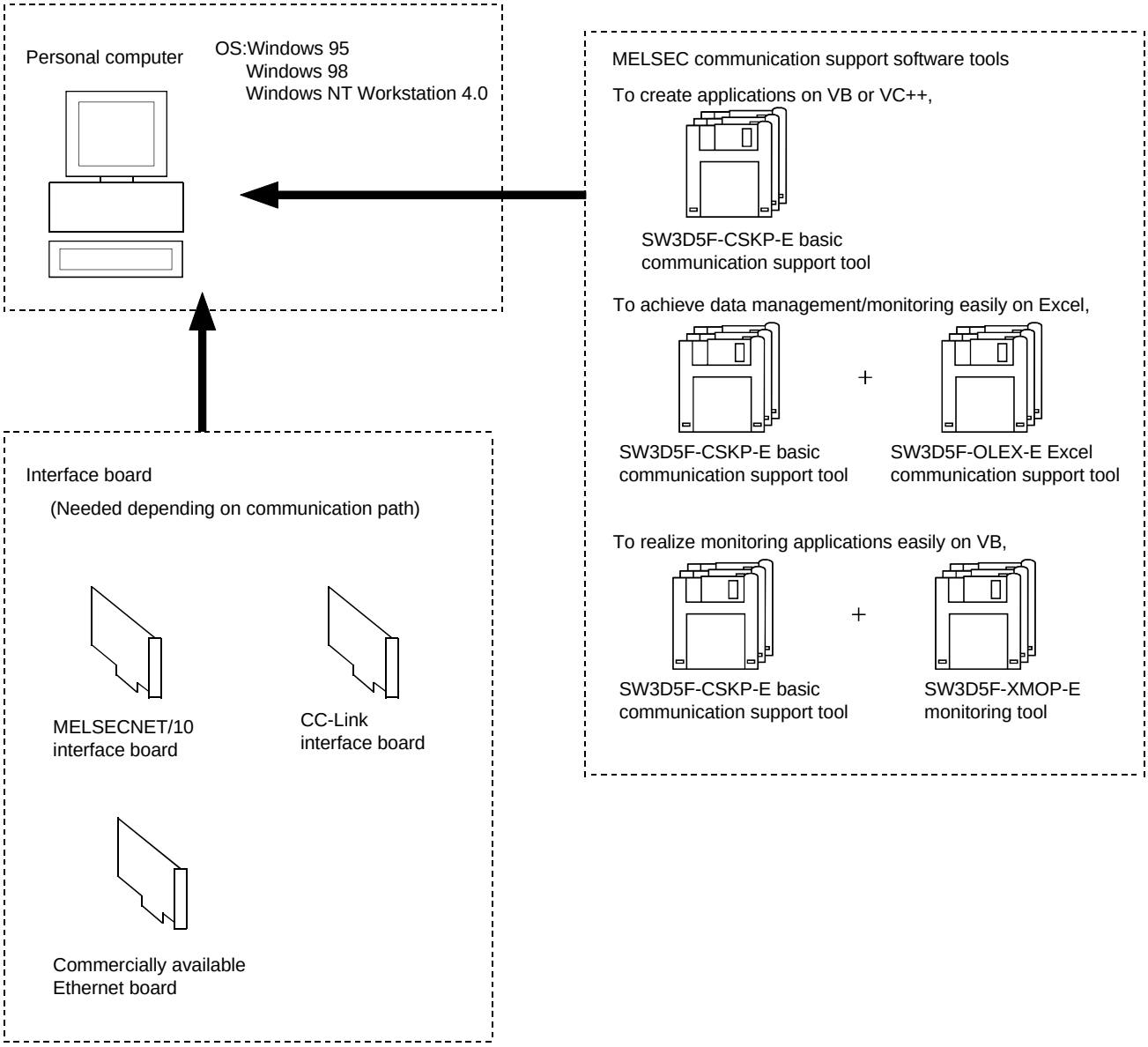


Time	D0	D1	D2
13: 30: 00	10	25	30
13: 35: 00	30	60	23
13: 40: 00	26	40	50

Logging

System Required for Use of Personal Computer-Related Products

System Configuration

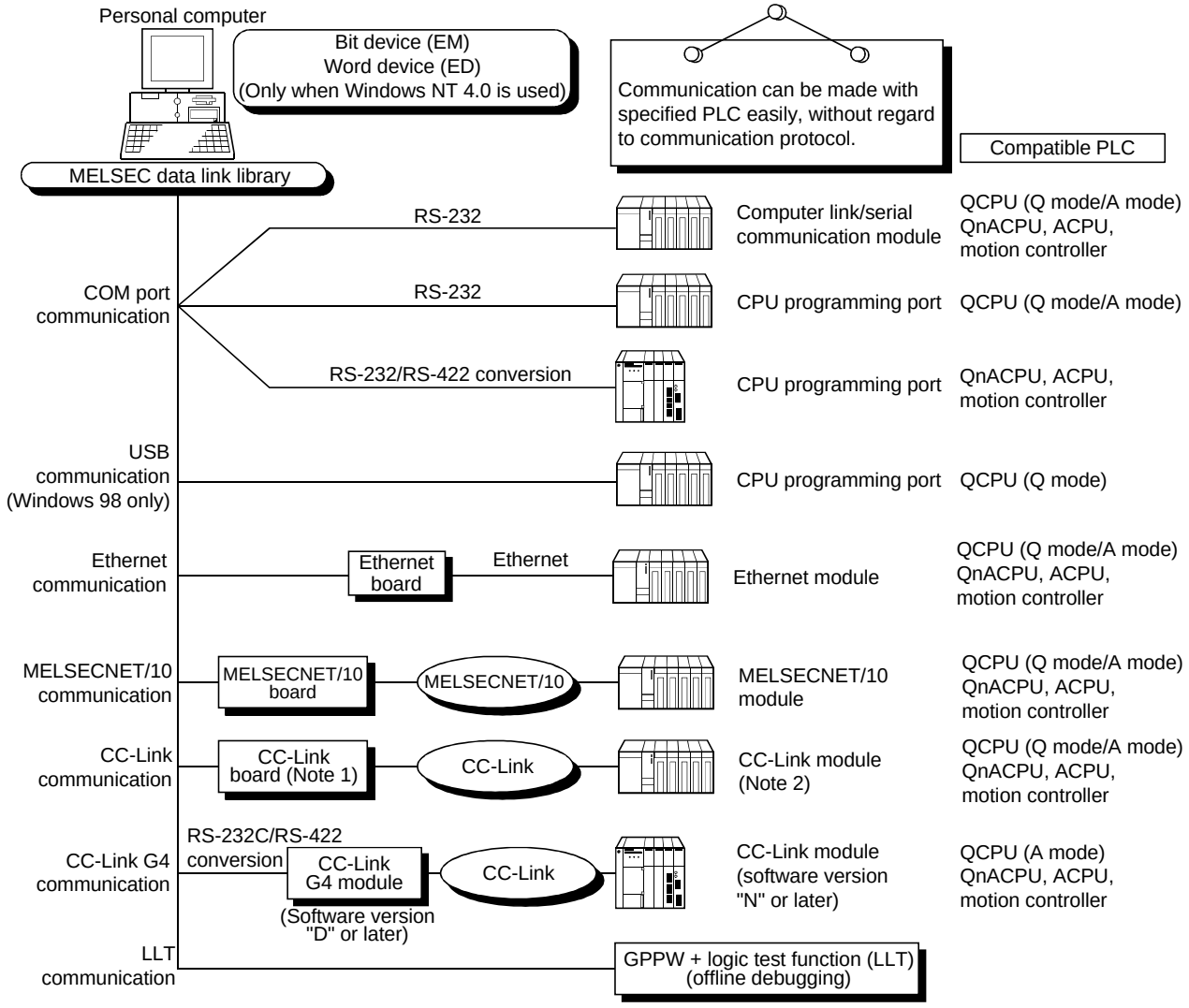


Basic Communication Support Tool: SW3D5F-CSKP-E

Overview

The SW3D5F-CSKP-E basic communication support tool is designed to create a communication program on a personal computer, without regard to the complex communication protocol of a network, for connection of the personal computer and PLC. Since CSKP can handle a number of communication methods for the MELSEC PLC using common functions, you can use a common application program if the communication method is changed according to your application. (Minimum program modification is needed, e.g. communication setting change.)

In addition, the bit and word devices of the PLC can be used in the personal computer so that you can handle data as if you are using the PLC.



Note 1: Q mode CPU connection requires software version "W" or later.
Note 2: The CC-Link modules for A mode, QnACPU, ACPU and motion controller require software version "N" or later.

Basic Communication Support Tool: SW3D5F-CSKP-E

Connection Configuration List

The following table lists the connection configuration and required interfaces.

Connection System	Personal Computer Side Interface	PLC Type (Note 1)	PLC Side Interface	Cable Type	Remarks
Ethernet	General-purpose Windows-compatible Ethernet board/card	QCPU (Q mode)	QJ71E71, QJ71E71-B2	10BASE-2/5/T	
		QnA	AJ71QE71-B5, AJ71QE71	10BASE-2/5	
		Q2AS	A1SJ71QE71-B2, A1SJ71QE71-B5		
		QCPU (A mode) AnSH, A2AS (H)	A1SJ71E71-B2-S3 A1SJ71-E71-B5-S3		
		AnN/AnA/AnU	AJ71E71-S3		
MELSECNET/10	A70BDE-J71LP23 A70BDE-J71QLP23GE A70BDE-J71QBR13	QCPU (Q mode)	QJ71LP21, QJ71BR11	SI/QSI-200/250 optical 75Ω coaxial	Incompatible with MELSECNET/10H mode.
		QnA	AJ71QLP21 (S), AJ71QLP21G, AJ71QBR11	SI/QSI-200/250 optical GI-50/125 optical 75Ω coaxial	
		Q2AS	A1SJ71QLP21 (S), A1SJ71QBR11	SI/QSI-200/250 optical 75Ω coaxial	
		QCPU (A mode) AnSH, A2AS (H)	A1SJ71LP21, A1SJ71BR11		
		AnN/AnA/AnU	AJ71LP21, AJ71LP21G, AJ71BR11	SI/QSI-200/250 optical GI-50/125 optical 75Ω coaxial	
CC-Link	A80BDE-J61BT13 A80BDE-J61BT11	QCPU (Q mode)	QJ61BT11	Twisted pair	
		QnA	AJ61QBT11		
		Q2AS	A1SJ61QBT11		
		QCPU (A mode) /AnSH/A2AS(H)	A1SJ61BT11		
		AnN/AnA/AnU	AJ61BT11		
RS-232/422	Personal computer COM port	QCPU (Q mode)	QJ71C24, QJ71C24-R2	RS-232/422 cable	For RS422 connection, RS232C/422 converter is needed. Because of RS232C interface, Q/A mode CPU does not need RS232C/422 converter.
		QnA	AJ71QC24N, AJ71QC24N-R2, AJ71QC24N-R4		
		Q2AS	A1SJ71QC24N, A1SJ71QC24N-R2		
		QCPU (A mode) /AnSH/A2AS(H)	A1SJ71UC24-R2, A1SJ71UC24-R4		
		AnN/AnA/AnU	AJ71UC24		
		QCPU (Q mode) /QCPU (A mode)	CPU module RS232C		
		QnA/Q2AS/AnN/AnA /AnU/ AnSH/A2AS(H)	CPU module RS422		
		QCPU (A MODE) /QnA/Q2AS /AnN/AnA/AnU/AnSH /A2AS(H)	CC-Link via AJ65BT-G4		
USB	Personal computer USB port	QCPU (Q mode)	CPU module USB	USB cable	
Simulation		LLT	—	—	

Note 1: "AnU" includes motion controller "A273U". "AnSH" includes motion controller "A171SH/172SH".

PC-related

Basic Communication Support Tool: SW3D5F-CSKP-E

Data Link Functions

CSKP offers the functions designed for Visual Basic and Visual C++, to allow you to make communication with the PLC CPU without regard to complex communication protocols.

Programming language
- Visual Basic Ver 4.0
- Visual Basic Ver 5.0
- Visual Basic Ver 6.0
- Visual C++ Ver 4.2
- Visual C++ Ver 5.0
- Visual C++ Ver 6.0

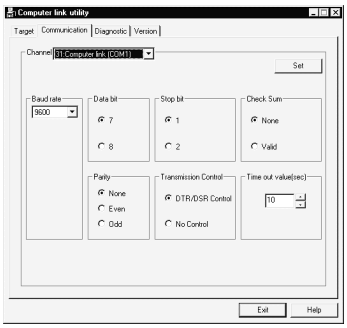
Many Useful Utilities

Setting is easy as communication parameter setting to each communication path can be made on the utility screen. Also, the testing utility designed to check whether settings are proper or not after making settings and the error viewer developed to confirm the error history are available to establish communication easily.

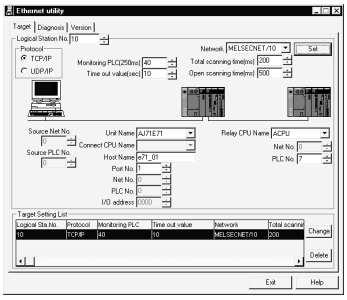
■ Communication setting utilities

Communication parameter setting utilities designed for respective communication systems, e.g. computer link (serial communication) and Ethernet, have a communication test function to set the communication speed, communication target and others and to confirm the settings.

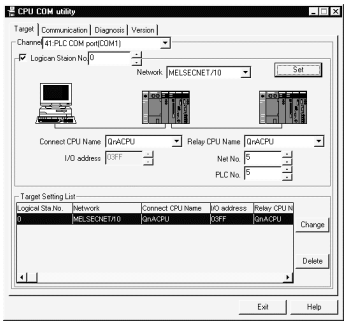
● Computer link utility



● Ethernet utility



● CPU COM utility



■ Shared device utility

Used to make settings required to provide a personal computer with shared device memories EM, which is equivalent to the internal relay of the PLC, and ED, which is equivalent to the data register.

■ Shared device server utility

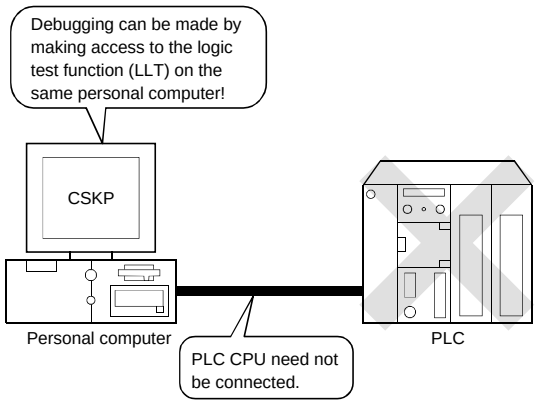
Used to make settings necessary to share devices between personal computers or between personal computer and PLC.

■ Device monitor utility

The set communication system is used to perform batch monitoring and data change (test) of the device memories in the PLC. When debugging an application program created in Visual Basic/Visual C++, this utility can be used to check the device data in the PLC.

Offline Debugging

The ladder logic test function (LLT) starts a virtual PLC on a personal computer. Debugging can be made on the personal computer without connection of the PLC.



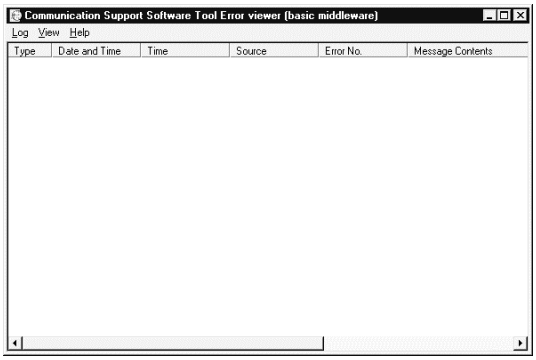
Basic Communication Support Tool: SW3D5F-CSKP-E

● Instruction

To use the ladder logic test function (LLT), GPPW and ladder logic test tool (LLT) are required separately.

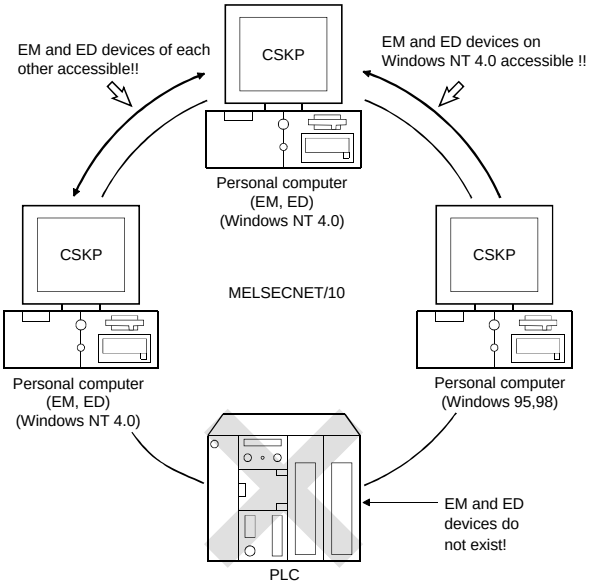
Error Viewer Function

The error viewer gives you a quick view of the errors that occurred.
Also, it leaves a history to tell you when errors had occurred.



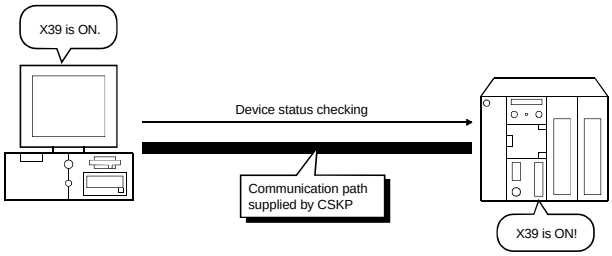
Shared Device Function

Used to set bit and word devices on a personal computer. Via the shared devices, you can make inter-program communication on the same personal computer or make communication between personal computers on the MELSECNET/10.



Device Monitor Function

Use of the device monitor utility allows the monitoring and data changing of the specified devices.



Specifications

■ Operating environment

Item	Description
OS	Windows 95, Windows 98, Windows NT Workstation 4.0 (Note 1)
CPU	Pentium 100MHz or more (multiprocessor incompatible)
Display	Resolution 800 × 600 pixels or more (recommended 1024 × 768 pixels)
Required memory capacity	32MB or more
Hard disk free space	15MB or more
Disk drive	3.5 inch (1.44MB) floppy disk drive (needed for installation)
Programming language	Visual Basic 4.0 (Note 2) Visual Basic 5.0/6.0 Visual C++ 4.2 (Note 2) Visual C++ 5.0/6.0

Note 1: Service Pack 3 or higher is required for use of Windows NT Workstation 4.0.

Note 2: Cannot be used for CC-Link communication.

Basic Communication Support Tool: SW3D5F-CSKP-E

Accessible CPU Device Ranges

		CPU			
		A/AnS Series	QnA/Q2AS Series	Q Series (A Mode)	Q Series (Q Mode)
Input	X	X0 to X1FFF	X0 to X1FFF	X0 to X1FFF	X0 to X1FFF
Output	Y	Y0 to Y1FFF	Y0 to Y1FFF	Y0 to Y1FFF	Y0 to Y1FFF
Latch relay	L	L1000 to L2047	L0 to L8191	L1000 to L2047	L0 to L8191
Internal relay	M	M0 to M999, M2048 to M8191	M0 to M8191	M0 to M999, M2048 to M8191	M0 to M8191
Annunciator	F	F0 to F2047	F0 to F2047	F0 to F2047	F0 to F2047
Timer	T	T0 to T2047	T0 to T2047	T0 to T2047	T0 to T2047
Retentive timer	ST	—	ST0 to ST2047	—	ST0 to ST2047
Counter	C	C0 to C1023	C0 to C1023	C0 to C1023	C0 to C1023
Data register	D	D0 to D8191	D0 to D12287	D0 to D8191	D0 to D12287
Accumulator	A	A0,A1	—	A0,A1	—
Index register	Z	Z,Z1 to Z6	Z,Z1 to Z15	Z,Z1 to Z6	Z,Z1 to Z15
Index register	V	V,V1 to V6	—	V,V1 to V6	—
Edge relay	V	—	V0 to V2047	—	V0 to V2047
File register	R	R0 to R8191	R0 to R32767	R0 to R8191	R0 to R32767
Link relay	B	B0 to B1FFF	B0 to B1FFF	B0 to B1FFF	B0 to B1FFF
Link register	W	W0 to W1FFF	W0 to W1FFF	W0 to W1FFF	W0 to W1FFF
Special link relay	SB	—	SB0 to SB7FF	—	SB0 to SB7FF
Special link register	SW	—	SW0 to SW7FF	—	SW0 to SW7FF
Step relay	S	Parameter setting	S0 to S8191	Parameter setting	S0 to S8191
Special relay	SM/M	M9000 to M9255	SM0 to SM2047	M9000 to M9255	SM0 to SM2047
Special register	SD/D	D9000 to D9255	SD0 to SD2047	D9000 to D9255	SD0 to SD2047

Note 1: The above table lists accessible device ranges of each series. Access cannot be made to the device ranges not supported by the CPU. Confirm the device ranges of the individual CPUs in the corresponding catalogs.

Note 2: There may be restrictions on the accessible device ranges depending on the combination of communication interface and CPU. Example: Accessible device ranges are restricted when the QnACPU and A series Ethernet module are used together.

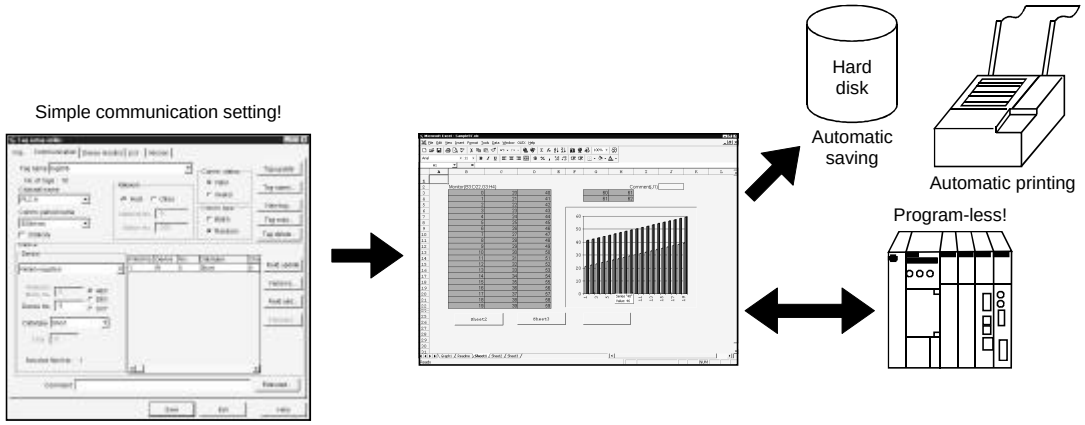
Accessories

Accessory	Product	Description
Manuals	CSKP Operating Manual	Describes how to use each utility, how to make communication setting and other information.
	CSKP Programming Manual	Shows how to use the library.

EXCEL Communication Support Tool: SW3D5F-OLEX-E

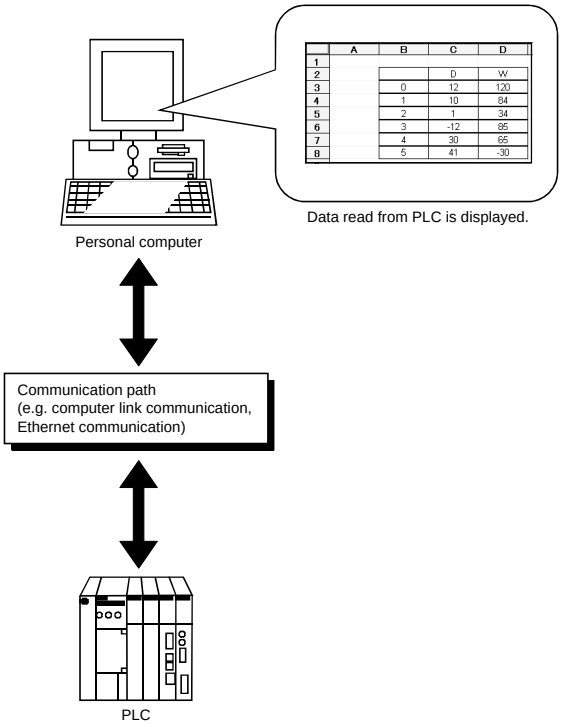
SW3D5F-OLEX-E Excel Communication Support Tool

The SW3D5F-OLEX-E Excel communication support tool is software used by adding it in Microsoft Corporation's spreadsheet software "Excel".
You can read PC data into Excel and write data from Excel to the PLC without worrying about the communication program of the PLC.
To handle the data developed in Excel worksheets, you can use a wide selection of functions of Excel to print and graph them.
To use OLEX as Q series-compatible, SW3D5F-CSKP-E must have been installed in advance.



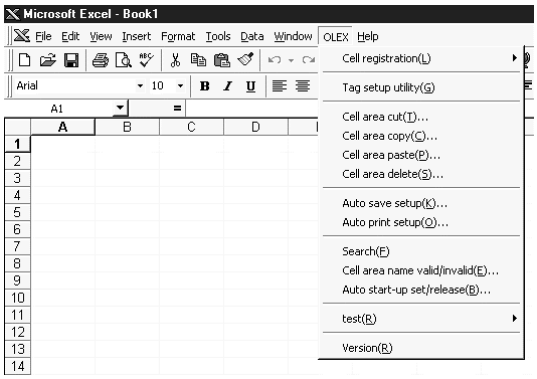
Ease of Setting

By simply connecting a personal computer with the PLC via a communication path supported by SW3D5F-CSKP-E, you can transfer PLC data directly to/from an Excel worksheet without programming.



Excellent Operability

(1) Used as an add-in program in the menu, OLEX can be used easily by those who understand Excel.
(2) The production command data under control of Excel can be written unchanged from the Excel screen onto the specified devices of the PLC, without using a program.
(3) The operation results and quality data set to PLC devices can be read onto an Excel worksheet.
(4) The read data can be printed with the Excel function. For data communication timing, you can set automatic communication such as periodic communication or conditional communication.

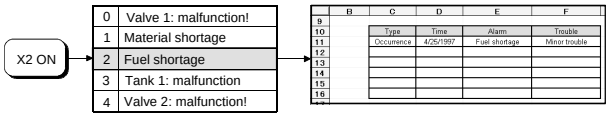


EXCEL Communication Support Tool: SW3D5F-OLEX-E

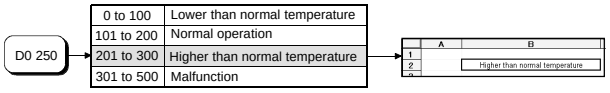
Alarm Summary and Comment Indications

An alarm message preset for error occurrence can be displayed with the date/time and a comment can be shown with the change of the corresponding device value.

<Alarm summary>



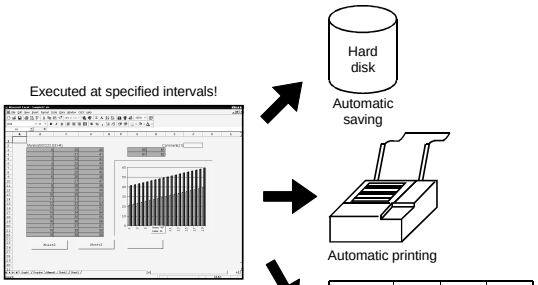
<Comment>



Logging, Automatic Saving, Printing

(1) Logging function accumulates data in more than one cell per collection timing

(2) You can make a daily/monthly reports easily by making use of the function to save/print an Excel worksheet automatically at the set time.



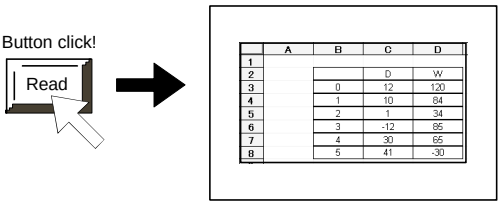
Time	D0	D1	D2
13: 30: 00	10	25	30
13: 35: 00	30	60	23
13: 40: 00	26	40	50

Logging

OLEX Functions

By utilizing the OLEX functions as Excel macros, you can transfer the data of the specified cell area at any timing.

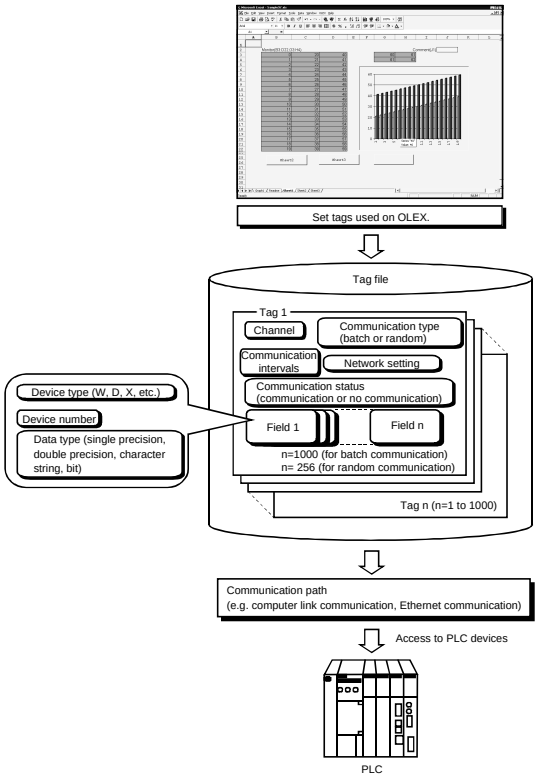
<When OLEX function is set to button (Read)>



Device values are read to the cell area specified with the OLEX function.

Simple Communication using Tags

When OLEX merely uses a tag having such information as the device types and device numbers in the environment where the tag management process is running, you can easily access the devices set to the tag.



EXCEL Communication Support Tool: SW3D5F-OLEX-E

Specifications

■ Operating environment

Operating environment required to use SW3D5F-OLEX-E

Item	Description
OS	Windows 95, Windows 98, Windows NT Workstation 4.0 (Note 1)
CPU	Pentium 100MHz or more (multiprocessor incompatible)
Display	Resolution 800×600 pixels or more (recommended 1024×768 pixels)
Required memory capacity	32MB or more
Hard disk free space	40MB or more
Disk drive (needed for installation)	3.5 inch (1.44MB) floppy disk drive
Corresponding application	Excel 97
Required application	Excel 97, SW3D5F-CSKP-E

Note 1: Service Pack 3 or higher is required for use of Windows NT Workstation 4.0.

Accessories

Accessory	Product	Description
Manual	OLEX Operating Manual	Explains how to set and use OLEX.

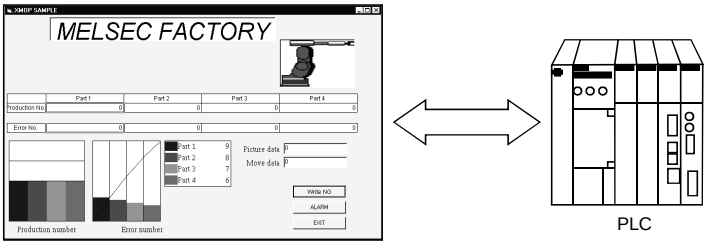
Monitoring Tool: SW3D5F-XMOP-E

SW3D5F-XMOP-E Monitoring Tool

The SW3D5F-XMOP-E monitoring tool offers a Visual Basic custom control group designed to create monitoring programs using Visual Basic.

You can create monitoring control programs by simply pasting input area, display area, check box, menu and other parts and pushbuttons and other controls and setting display conditions, etc. in a form window in Visual Basic.

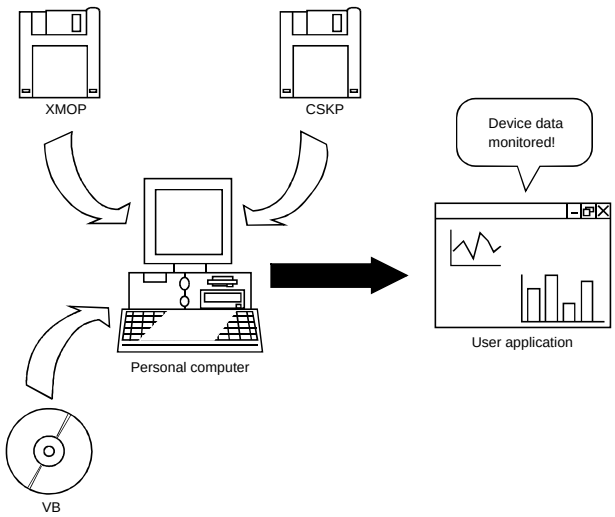
To use XMOP as Q series-compatible, SW3D5F-CSKP-E must have been installed beforehand.



XMOP screen

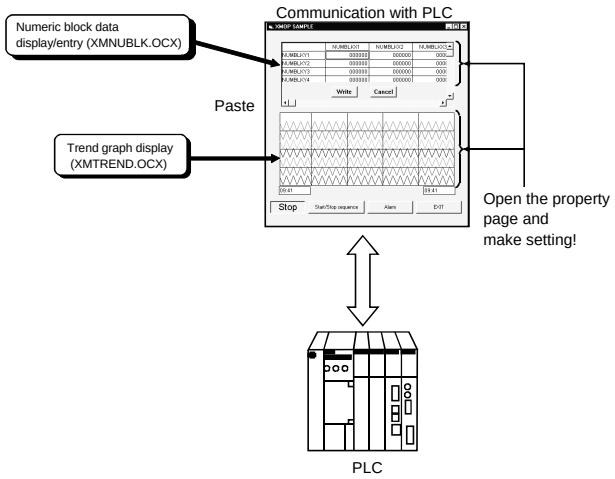
User-friendly Development Environment

Visual Basic is a user-friendly programming language designed to create Windows applications easily.
XMOP is a kind of control (custom control OCX) of Visual Basic and is operated in the same way as Visual Basic.
In addition, a wide variety of commercially available graphic tools for Windows can be utilized to draw a monitor screen. User-friendly development environment is achieved by utilization of the tool you are accustomed to use.



Program-less Run

XMOP offers 23 different custom controls which are needed to exercise Factory Automation equipment monitoring control, e.g. graphic display, numeric display, level display and trend graph.
Without any specific expertise, you can use them like the other standard controls to make communication with the PLC by merely pasting the necessary custom controls to a form and executing them.
(Note that property page setting is required.)

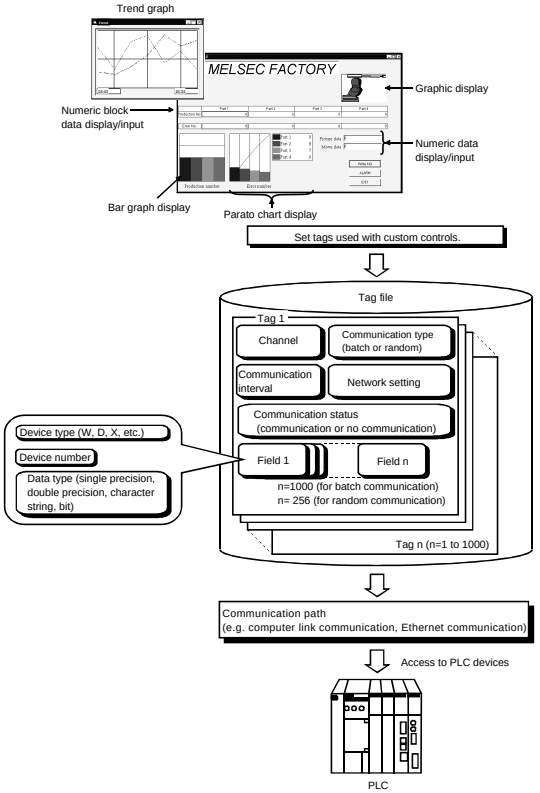


Expansion of Programmed Processing

Since the drawing functions and custom controls have one-for-one correspondence, monitor applications can be created without program. For functions with which the custom control functions are not compatible, programmed processing can be easily added later and monitor applications can be updated flexibly.
While maintaining compatibility with the conventional data, you can easily make modifications such as the addition of new functions.

Simple Communication Using Tags

When tags having such information as the device types and device numbers are used with the controls offered by XMOP in the environment where the tag management process is running, you can easily access the devices set to the tags.



Useful Parts Collection

The SW0D5C-PIC-B graphic data package (optional) includes graphic data usually used on monitor screens.

Monitoring Tool: SW3D5F-XMOP-E

Custom Control List

Function		File Name	Description
Parts display	Graphic display	XMPICTUR.OCX	Shows a graphic file with set values.
	Blink display	XMBLINK.OCX	Provides a blink display when the specified bit device is ON.
	Comment display	XMCMNT.OCX	Shows a comment with the set device value.
Graph display	Level display	XMLEVEL.OCX	Shows a level.
	Line graph display	XMLINGRF.OCX	Shows a line graph.
	Trend graph display	XMTREND.OCX	Shows a trend graph.
	Bar graph display	XMBARGRF.OCX	Shows a bar graph.
	Pareto chart display	XMPALLET.OCX	Shows a Pareto chart.
	Historical trend graph display	XMHSTTRD.OCX	Shows a historical trend graph.
Block display/input	Numeric block data display/input	XMNUMBLK.OCX	Shows/enters numeric values in block.
	Character string block data display/input	XMSTRBLK.OCX	Shows/enters character strings in block.
Display/input	Numeric data display/input	XMNUMDAT.OCX	Shows/enters numeric value data.
	Character string data display/input	XMSTRDAT.OCX	Shows/enters character string data.
	Bit device operation (bit input)	XMBITOPR.OCX	Performs bit device operation.
Input	Word write	XMWRWORD.OCX	Writes data to a word device.
	Bit write	XMWRBIT.OCX	Writes data to a bit device.
Others	Event occurrence	XMEVENT.OCX	Causes an event at the specified timing.
	Snap shot	XMSNPSHT.OCX	Provides output, etc. to a printer.
	Alarm display	XMCATION.OCX	Shows an alarm on the screen on the basis of the set value.
	Alarm sound output	XMALARM.OCX	Provides an alarm sound on the basis of the set value.
	Alarm summary display	XMALMSMR.OCX	Shows an alarm summary.
	Error	XMERROR.OCX	Causes an error event.
	Clock display	XMCLOCK.OCX	Shows a clock on the screen.

Specifications

■ Operating environment

Operating environment required to use SW3D5F-XMOP-E

Item	Description
OS	Windows 95, Windows 98, Windows NT Workstation 4.0 (Note 1)
CPU	Pentium 100MHz or more (multiprocessor incompatible)
Display	Resolution 800 × 600 pixels or more (recommended 1024 × 768 pixels)
Required memory capacity	32MB or more
Hard disk free space	40MB or more
Disk drive (needed for installation)	3.5 inch (1.44MB) floppy disk drive
Corresponding container application	Visual Basic Ver 5.0/6.0
Required application	Visual Basic Ver 5.0 or 6.0, SW3D5F-CSKP-E

Note 1: Service Pack 3 or higher is required for use of Windows NT Workstation 4.0.

Accessories

Accessory	Product	Description
Manual	XMOP Operating Manual	Describes custom control functions of XMOP and how to set control properties.

Graphic Data Package: SW0D5C-PIC-B

Overview

The SW0D5C-PIC-B graphic data package is a collection of graphic parts bitmap data which can be utilized for monitor screen development for Factory Automation. They can be used in Visual Basic, Excel and other software, reducing the number of graphic parts creation processes.

Features

● Wealth of parts

You have a wide choice of 1351 different graphic data such as buttons, tanks, valves, pipes and ISO figures.

● Bitmap format data

Graphic data are available in bitmap format so that you may use them in various application programs, e.g. Visual Basic and Excel.

● No need to install

The graphic data are offered on CD-ROM. You can read the necessary data directly from CD-ROM without installation into the hard disk.

● Supporting two color modes, TrueColor and 256 colors

The package is compatible with two different color modes to correspond to various personal computer environments.

Operating Environment

Item	Description
OS	Windows 95, Windows 98, Windows NT Workstation 4.0
WWW browser	Internet Explorer 4.01 or later or Netscape 4.06 or later
CPU	Pentium 100MHz or more (multiprocessor incompatible)
Display	Resolution 800×600 pixels or more (recommended 1024×768 pixels)
Required memory	32MB or more
Hard disk free space	5MB or more

Graphic Data

The following table lists the number of figures per type.

Type	Number of Figures
ISO figure (Note 1)	348
Box	4
Automobile	16
Conveyor	21
Crane	20
Fan	8
Display frame	6
Keyboard	15
Lamp and pushbutton	361
MELSEC	313
Meter	2
Motor	10
Pipe	41
Pump	8
Robot	114
Speaker	11
Tank	18
Valve	18
Others	17

Note 1: Figures of the following numbers are stipulated in ISO7000 (1989)
1 to 100, 110, 111, 114, 130, 131, 134, 135, 137, 138, 151, 157, 159 to 200, 201 to 400 (except 263, 265, 281, 298, 396)

About the Copyright and Right to Use

The copyright of the figures contained in the SW0D5C-PIC-B graphic data package belongs to Mitsubishi Electric Corporation.

The figures contained in the SW0D5C-PIC-B graphic data package may only be used by those who purchased the software duly and returned the software agreement.

Those who have not purchased it duly or those who have not returned the software agreement cannot use the data package.

You cannot distribute or sell the figures contained in the SW0D5C-PIC-B graphic data package as-is or altered.

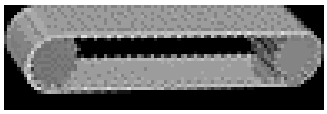
You can distribute or sell the figures after incorporating them on monitor screens, etc.

Graphic Data Package: SW0D5C-PIC-B

Graphic Data Samples

ISO figure

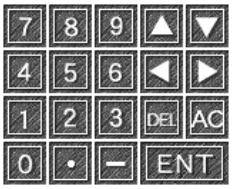
Conveyor



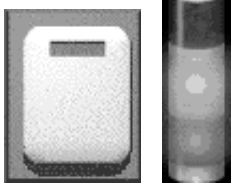
Fan

Display frame

Keyboard

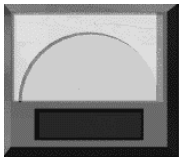


Lamp and pushbutton

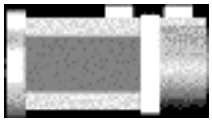


MELSEC

Meter

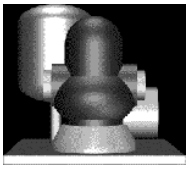


Motor

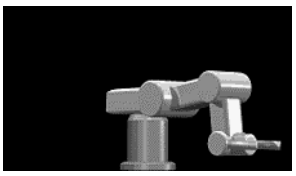


Pipe

Pump

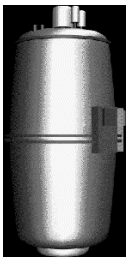


Robot



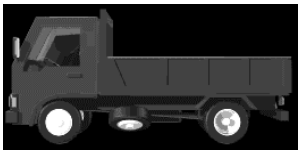
Speaker

Tank



Valve

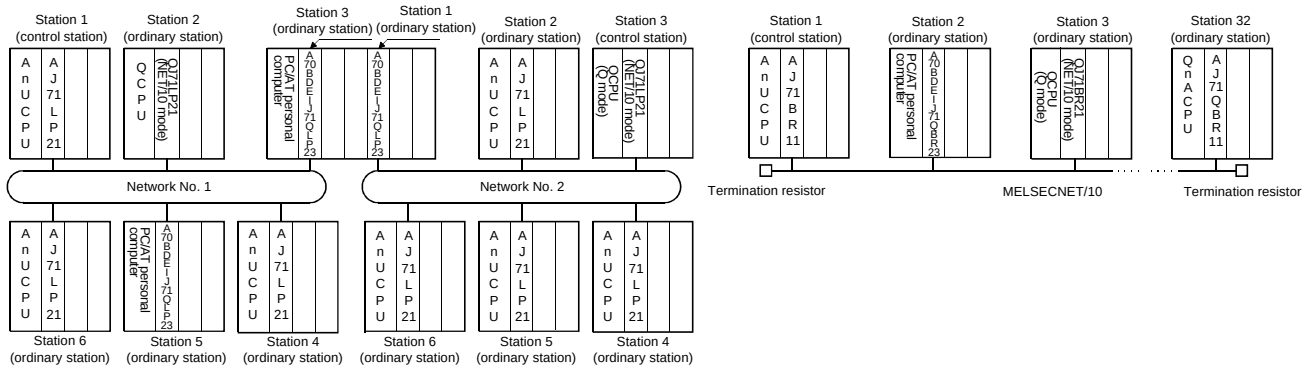
Automobile



Others

MELSECNET/10 Boards: A70BDE-J71QLP23, A70BDE-J71QLP23GE, A70BDE-J71QBR13

Overview



Multi-level system

Coaxial bus system

The MELSECNET/10 board can be loaded into an ISA bus slot as the optional board of a personal computer (Note 1) to connect the personal computer to the MELSECNET/10 (Note 2) network system.

Note 1: IBM PC/AT and its compatibles.
Note 2: Not compatible with MELSECNET/10H mode.

Features

● Personal computer incorporated into MELSECNET/10 network system

You can load the interface board into a personal computer to use the personal computer as an ordinary station of MELSECNET/10.

● Monitoring/testing utility

To check the status of connection to the network, you can confirm the network status and perform the test function on the personal computer screen.

● Cyclic communication and transient communication

The board has two communication functions: cyclic communication in which data is refreshed in accordance with the network parameters set in the control station; and transient communication in which the PLC can be accessed at any timing of a personal computer program.

● Availability of user programming functions

The functions designed for Microsoft Visual C++ and Microsoft Visual Basic allow you to easily create user applications, e.g. those for remote control of PLC and read/write of data from/to devices.

● Availability of drivers according to various operating system

You can configure a system according to your environment using any of the various drivers available.

Compatible OS	Microsoft Windows NT Workstation 4.0
	Microsoft Windows 95
	Microsoft Windows 98
	Microsoft MS-DOS 6.2 (Note 1)

Note 1: The Q mode PLC cannot be accessed by MS-DOS.

MELSECNET/10 Boards: A70BDE-J71QLP23, A70BDE-J71QLP23GE, A70BDE-J71QBR13

Function List

Name	Description
Data communications	Cyclic transmission function, transient transmission function Multiple transmission function (for duplex loop system)
RAS function	Loopback function, automatic return function, loop monitoring function, self-diagnostic function

Performance Specifications

Item	Specifications			
	Optical loop system			Coaxial bus system
	A70BDE-J71QLP23		A70BDE-J71QLP23GE	A70BDE-J71QBR13
Connection cable	S1-200/220	QSI-185/230	GI-50/125	3C-2V, 5C-2V or equivalent
MELSECNET/10 mode	MELSECNET/10 mode (incompatible with MELSECNET/10H mode)			
Communication speed	10MBPS (equivalent to 20MBPS in multiple transmission)			10MBPS
Communication system	Token ring system			Token bus system
Transmission path format	Duplex loop			Simplex bus
Stations connected in one network	64 stations (control station: 1, ordinary stations: 63)			32 stations (control station: 1, ordinary station: 1)
Control station/ordinary station	Ordinary station (does not operate as control station)			
Other network specifications	Other specifications conform to those of MELSECNET/10.			
Loading slot	ISA bus slot			
Number of boards loaded	Max. 4			
Number of slots occupied	1 slot/board			

MELSECNET/10 Boards: A70BDE-J71QLP23, A70BDE-J71QLP23GE, A70BDE-J71QBR13

Operating Environment

Item	Description
Personal computer	Personal computer where Pentium 133MHz or more and ISA bus slot (half size) are installed (Note 3)
Operating system (OS)	Any of • Microsoft Windows 95 • Microsoft Windows 98 • Microsoft Windows NT Workstation 4.0 • Microsoft MS-DOS Ver 6.2
Programming language	Microsoft Visual Basic Ver 4.0/5.0/6.0 Microsoft Visual C++ Ver 4.2/5.0/6.0
Required memory capacity	32MB or more
Hard disk free space	9MB or more
Disk drive (Needed for driver installation)	3.5 inch (1.44MB) floppy disk drive

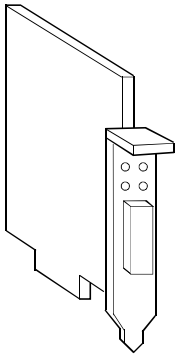
Note 3: A multiprocessor-compatible personal computer cannot be used since the driver is incompatible.
Note 4: The driver for MS-DOS cannot access the Q mode PLC.

Accessories

Product	Description
Software	SWnDNF-MNET10 software (driver)
Connector	BNC F connector × 1 pc. (attached to A70BDE-J71QBR13 only)
Manual	MELSECNET/10 Interface Board User's Manual

CC-Link Boards: A80BDE-J61BT11, A80BDE-J61BT13

Overview



Type: A80BDE-J61BT11, A80BDE-J61BT13

The CC-Link board can be loaded into a PCI bus slot as an optional board of a personal computer (Note 1) to connect the personal computer to the CC-Link system. Two kinds of CC-Link boards are available. A80BDE-J61BT11 supports both master function and local function of CC-Link while A80BDE-J61BT13 only supports local function of CC-Link.

Note 1: IBM PC/AT and its compatibles.

Features

● Personal computer incorporated into CC-Link system

You can load the CC-Link board into a personal computer and connect the personal computer to CC-Link as a local station.

● Adoption of PCI bus

Because of compatibility with the PCI bus, troublesome switching setting is not needed. By merely loading the board into the PCI bus, initial setting is automatically made.

● Monitoring/testing utility

To check the status of connection to the network, you can confirm the network status and perform the test function on the personal computer screen.

● Availability of user programming functions

The functions compatible with Microsoft Visual C++ and Microsoft Visual Basic allow you to easily create user applications, e.g. those for remote control of PLC and read/write of data from/to devices.

● Availability of drivers according to various operating systems

You can configure a system according to your environment using any of the various drivers available.

		Master	Local
Compatible OS	Microsoft Windows NT Workstation 4.0	○	○
	Microsoft Windows 95	×	○
	Microsoft Windows 98	×	○

CC-Link Boards: A80BDE-J61BT11, A80BDE-J61BT13

Function List

Name	Description
Data communications	Cyclic transmission function, transient transmission function
RAS function	Offline test function, automatic return function, self-diagnostic function

Performance Specifications

Item	Specifications	
Type	A80BDE-J61BT11	A80BDE-J61BT13
Transmission speed	Can be selected from among 156kbps, 625bps, 2.5Mbps, 5Mbps and 10Mbps.	
Max. transmission distance	1km (3278.69feet) (depending on transmission speed)Max.	
Number of stations occupied	Master: None Local: 1 or 4 station selectable	1 or 4 stations selectable
Compatible station	Master/Local station	Local station
Number of boards loaded	Max. 4	
Loading slot	PCI bus slot	
Number of slots occupied	1 slot	
Internal current consumption (A)	0.4A	
Weight (kg (lb))	0.16 (0.35)	

Operating Environment

Item		Description
Personal computer		Personal computer where Pentium 133MHz or more and one or more PCI bus slot (half size) are installed and Microsoft Windows 95, Microsoft Windows 98 or Microsoft Windows NT Workstation 4.0 operates (Note 3)
	PCI bus specifications	5VDC, 32-bit bus, system clock: 33MHz
Operating system (OS) (Note 4)		Any of Microsoft Windows 95, Microsoft Windows 98 and Microsoft Windows NT Workstation 4.0
Programming language		Microsoft Visual Basic Ver 5.0/6.0, Microsoft Visual C++ Ver 5.0/6.0
Required memory capacity		32MB or more
Hard disk free space		20MB or more
Disk drive		3.5 inch (1.44MB) floppy disk drive (needed for driver installation)

Note 3: A multiprocessor-compatible personal computer cannot be used as the driver is incompatible.
Note 4: Please use Windows NT Workstation 4.0 when using CC-Link board as master station.

Accessories

Product	Description
Software	SWnDNF-CCLINK software (driver)
Manual	CC-Link Interface Board User's Manual
Termination resistor	110Ω and 130Ω, 2 pcs. each (attached to A80BDE-J61BT11 only)

5. GOT-A900

CONTENTS

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5. Function List 5-17

6. External Dimensions 5-19

This chapter explains the features and functions of the GOT-A900 connected for use with the Q series PLC. For further information on the features, functions, etc. of the GOT-A900 connected for use with the A/QnA series PLC, refer to the "Mitsubishi Graphic Operation Terminal GOT-A900 Series" catalog (L(NA)74108142).

Overview and Features

■ GOT-A900 series

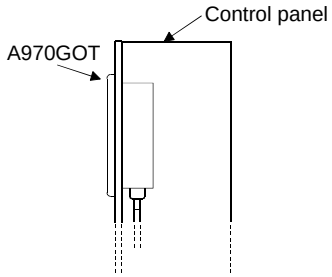
The GOT-A900 (graphic operation terminal) is graphic operation panel which has been achieved by a display device provided with a touch screen instead of the conventional pushbuttons, select switches, lamps and other controls.
Since display data, switch operations, etc. are set by software, operation and display data can be changed/added easily. Also, as multiple screens can be selectively shown on one display, a small operation panel can be achieved independently of the number of display and operation points.
The GOT-A900 series has a high degree of affinity for each MELSEC PLC series and has realized fast communication with other PLCs unachievable by ordinary display devices and a great variety of functions which are needed for maintenance. From a wide selection of models, choose the most adequate GOT-A900 for your equipment.

■ GOT-A900 series lineup

Type		Screen Size (Inch)	Display Section	Display Color (Colors)	Power Supply Type
A985GOT	A985GOT-TBA	12	High-intensity TFT color liquid crystal	256	100 to 240VAC
	A985GOT-TBA-EU				
	A985GOT-TBD				24VDC
A975GOT	A975GOT-TBA	10	Wide-angle vision TFT color liquid crystal		100 to 240VAC
	A975GOT-TBA-B		High-intensity TFT color liquid crystal		
	A975GOT-TBA-EU				
	A975GOT-TBD		Wide-angle vision TFT color liquid crystal		24VDC
	A975GOT-TBD-B		High-intensity TFT color liquid crystal		
A970GOT	A970GOT-TBA		Wide-angle vision TFT color liquid crystal	16	100 to 240VAC
	A970GOT-TBA-B		High-intensity TFT color liquid crystal		
	A970GOT-TBA-EU				
	A970GOT-TBD		Wide-angle vision TFT color liquid crystal		24VDC
	A970GOT-TBD-B		High-intensity TFT color liquid crystal		
	A970GOT-SBA		D-STN color liquid crystal	8	100 to 240VAC
	A970GOT-SBA-EU				
	A970GOT-SBD				24VDC
	A970GOT-LBA		STN Monochrome liquid crystal	2 (monochrome)	100 to 240VAC
	A970GOT-LBA-EU				
	A970GOT-LBD				24VDC
A960GOT	A960GOT-EBA	9	High-intensity EL	2 (yellow/orange, black)	100 to 240VAC
	A960GOT-EBA-EU				
	A960GOT-EBD				24VDC
A950GOT	A950GOT-SBD	6	STN color liquid crystal	8	24VDC (RS-422 communication interface built in)
	A950GOT-SBD-M3				
	A950GOT-LBD		STN Monochrome liquid crystal	2 (monochrome)	
	A950GOT-LBD-M3				
A953GOT	A953GOT-SBD		STN color liquid crystal	8	24VDC (RS-232C communication interface built in)
	A953GOT-SBD-M3				
	A953GOT-LBD		STN Monochrome liquid crystal	2 (monochrome)	
	A953GOT-LBD-M3				
A956GOT	A956GOT-SBD		STN color liquid crystal	8	24VDC (communication module connectable)
	A956GOT-SBD-M3				
	A956GOT-LBD		STN Monochrome liquid crystal2	2 (monochrome)	
	A956GOT-LBD-M3				
A951GOT	A951GOT-QSBD	6	STN color liquid crystal	8	24VDC (Q bus communication interface built in)
	A951GOT-QSBD-M3				
	A951GOT-QLBD		STN Monochrome liquid crystal2	2 (monochrome)	
	A951GOT-QLBD-M3				

■ Compact display

The GOT-A900 series models have extremely small external dimensions and depths, and the A975GOT(-B) and A970GOT(-B) have the smallest in-panel depth of 40mm (1.73inch) in the industry. The 12-inch, large-display A985GOT has the same panel cutting dimension as that of the GP70 series 10-inch color type (the smallest panel cutting dimension as a 12-inch type in the industry), and the 6-inch, mid-sized-display A95□GOT has the same panel cutting dimension as that of the GP70 series and MT260 6-inch types.
Designed to connect cables at its bottom, the GOT needs a minimum depth for connectors and flexing of cables when mounted in a control panel, etc.



■ Compatible with a wide variety of connection forms

To say nothing of bus connection which permits fast communication, the GOT-A900 is compatible with various connection forms such as MELSECNET connection, so you can make the best selection for your system. (Bus connection is not available for the A mode.)

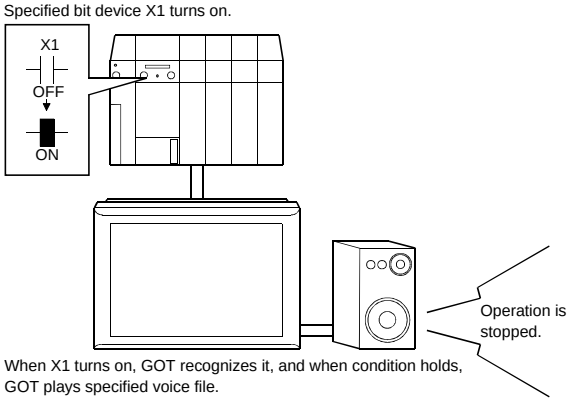
- Bus connection (Q mode only)
- RS-232 connection to CPU module
- MELSECNET connection
- CC-Link connection (remote device station/intelligent device station)
- Serial communication module connection

■ 256-color TFT, high intensity, 8-step brightness adjustment

Capable of providing a 256-color display, the A985GOT and A975GOT (-B) can show clear and high-grade photos as they are.
Also, the high-intensity TFT color liquid crystal models (A985GOT, A975GOT-B, A975GOT-TBA-EU, A970GOT-B, A970GOT-TBA-EU) have the industry's highest class brightness of 350cd/m^2 and are adjustable in eight steps of brightness. Further more, the 40,000-hour, long-life backlight makes it almost maintenance-free. (A958GOT, A975GOT (-B), A970GOT (-B), A95□GOT)

■ Voice output function (A985/A975/A970/A960GOT)

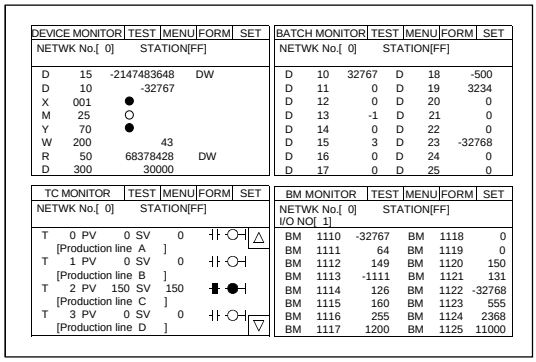
Voice output can be provided by connecting an amplifier built-in speaker to the voice output terminal (standard-equipped). This function can be used for alarm, work directive, etc.



Item	Specifications
File format	Windows WAV
Data format	16-bit PCM
Sampling rate	8,000kHz
Channel	Monaural
Max. playing time/file	8s
Max. number of registrations	100

■ Functions for maintenance

The PLC CPU devices and special function module buffer memory can be monitored and tested.
A device checking maintenance screen need not be created as different PLC devices can be shown/changed at the same time on a four-window display.



The alarm history function supports the failure occurrence counting function, cumulative failure time totalization function, history printing function and so on.

Overview and Features

■ Security function

You can set a 16-step password. This function can protect screen switching, hide a display partially, protect input operation, and protect screen data uploading.

■ Energy-saving mode using human sensor (A985GOT)

The human sensor detects a person within the sensor detection area to automatically turn the backlight on/off, reducing unnecessary power consumption. (Time can be set by the user)

■ Multi-language

The adoption of the uni-code (ISO/IEC10646 compliant), globally compatible character system, makes the GOT compatible as standard with about 26,000 characters in all countries of the world, including Japanese, Korean, Chinese, English, German and French.
By adoption of the high-level uni-code fonts, the GOT can display 32×32 or larger, beautiful characters and support highlighted and shaded characters.

* To use foreign language fonts, Windows which can support and enter those fonts is required. For example, Windows for Korean language is needed to enter Korean fonts.

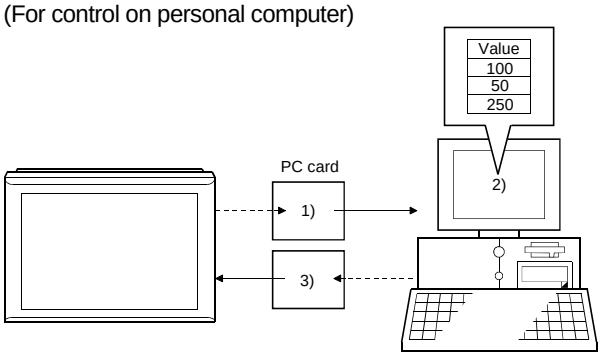
■ Fast data transfer using PC card

Using a PC card, you can write the OS and screen data from a personal computer to the GOT-A900 at high speed.
(Conventional data transfer using RS-232C can also be made.)

* To use the PC card on the A95□GOT, the memory card interface module (A1SD59J-MIF) is required.

■ Recipe function

The GOT-A900 supports the recipe function which holds machining conditions, initial values and other machine data (device values) within the GOT-A900 as recipe data and exchanges necessary data from time to time.
Also, the GOT-A900 serves for process/production control, etc. since PLC data can be read to the PC card for use on the other GOT-A900 or read from Excel or other spreadsheet software on a personal computer for control.
(For control on personal computer)



1) On the personal computer, read the device value data (CSV format file) which were read from the PLC CPU and saved in the PC card in the CSV format file.
2) Read and edit the CSV format file in the PC card using spreadsheet software, etc.
3) Save in the PC card the device value data (CSV format file) edited on the personal computer, and use it on the GOT-A900.

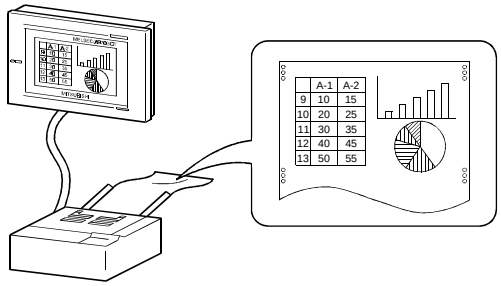
* To use the PC card on the A95□GOT, the memory card interface module (A1SD59J-MIF) is required.

■ Printer function

The GOT-A900 series supports the printer function for alarm history, daily/monthly report (forms), display screen color hard copy, etc. The A985GOT, A975GOT (-B), A970GOT (-B) and A960GOT are standard-equipped with an interface, and the A95□GOT should be fitted with the printer interface (A9GT-50PRF) to use the printer function.

● Connectable printers

(1) ESC/P24-J84 compliant printer (color-compatible)
(2) Hewlett Packard's printer
(PLC command-compatible, color-incompatible)

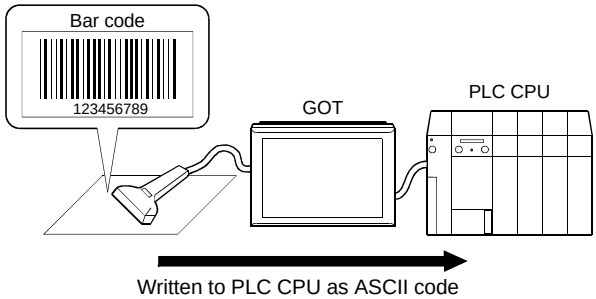


■ Bar-code reader function

By connecting a bar-code reader to the GOT-A900, the data read by the bar-code reader can be written to the PLC CPU.

● Connectable bar-code readers

(1) TCD-6100RMG (Token)
(2) OPT-5125-RS232C(H) (Optoelectronics)
(3) BL-500 series (Keyence)
BL-80R Keyence bar-code reader
BL-100R Keyence bar-code reader
(4) BB-530RS (Aimex)
(5) LSH3502AHV (Olympus Symbol)



■ Compatible with severe environment and operation

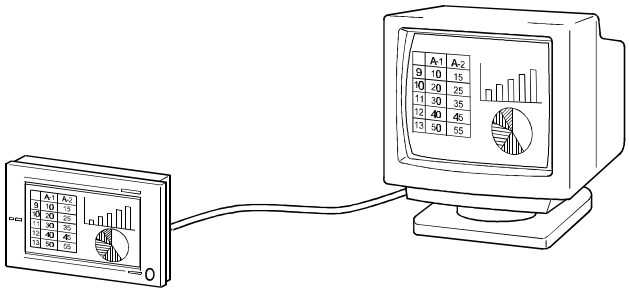
The display section of the GOT-A900 is compatible as standard with the IP65F waterproof, dustproof, oilproof standard for use in a wide variety of environments.

■ EC Directive compliant (A985/A975/A970/A960GOT)

The A985GOT-TBA-EU, A975GOT-TBA-EU, A970GOT-TBA-EU, A970GOT-SBA-EU, A970GOT-LBA-EU and A960GOT-EBA-EU comply with the EC Directives.
The EC Directives are laws stipulated by the European Union (EU).

■ CRT output (A985GOT)

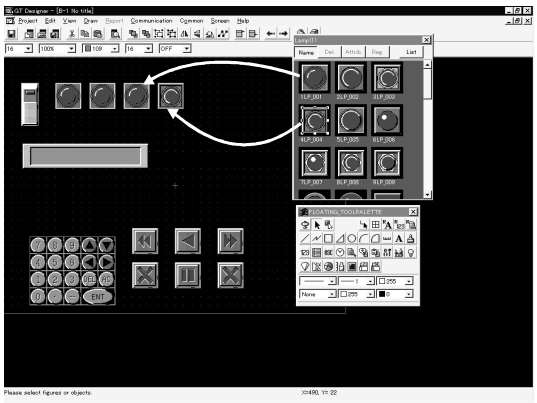
Containing a CRT interface (SVGA 1 channel), the A985GOT can show the same screen as the display screen of the GOT-A985 on its large-screen CRT.



■ Software packages

● Drawing function

A screen can be created by merely choosing objects (moving image function) from among a wide selection of templates and placing them on the screen.
After completion of screen layout, you can set monitor devices, etc.

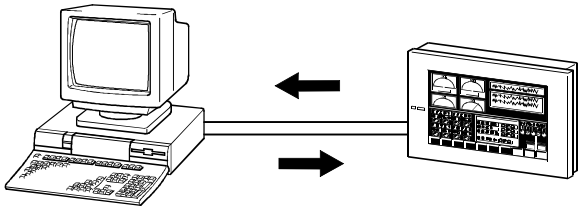


● Project manager

The project manager provides project information and screen information at a glance. Also, it is convenient to manage screen data since screen copy, movement and deletion can be made easily.

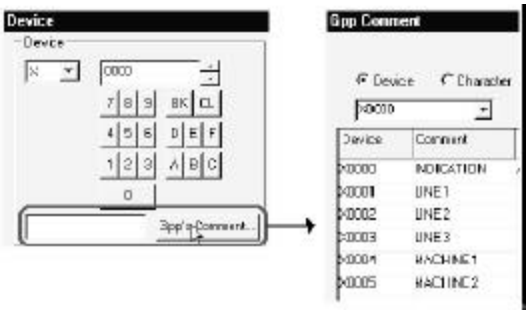
● Debugging function

By connection of a personal computer and GOT-A900, the personal computer acts as a PLC and screen debugging can be made in a place where there is no PLC.



● Effective utilization of data

(1) GPPW comment data
When specifying the device name, you can refer to the comments created on the GPPW function software package and set the monitor device on the GOT-A900. This facilitates device setting, reducing device address setting mistakes.



Device comments created with GPPW are listed.

(2) Character data on a word processor can be utilized.
(3) BMP file data can be read to realize a beautiful, high-grade screen display easily.
(4) Machine drawings and other data can be imported using DXF file (Release 14) CAD drawing data.
(5) You can use the screen data of the GOT800 series 100%. Also, the screen data of Digital's GP (GP PRO/PB III for Windows/DOS) can be used on the GOT-A900 series after conversion is made with the simple converter function. (Some functions cannot be converted.)

GP (GP-PRO/PB III for Windows/DOS) is a trademark of Digital.

System Configuration

Software Packages

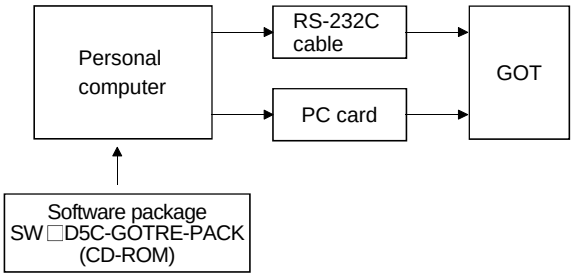
■ Operating environment

Use SW □D5C-GOTRE-PACK on a personal computer in the following operating environment.

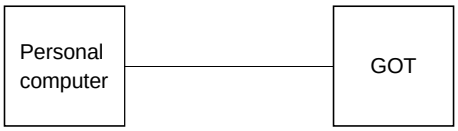
Personal computer	Pentium 133MHz or more (recommended) Personal computer where Windows 95, Windows 98 or Windows NT 4.0 operates
Disk drive	CD-ROM drive required (for installation)
Main memory	32M bytes or more recommended
Hard disk free space	130MB or more (Standard installation capacity: 80MB, free space of 50MB or more for execution)
CRT	One usable with Windows 95, Windows 98 or Windows NT 4.0
Resolution	Resolution 800 × 600 pixels or more
Mouse, keyboard, printer, CD-ROM drive	Ones usable with Windows 95, Windows 98 or Windows NT 4.0

■ Connection with personal computer

An RS-232C cable is used to download screen data from a personal computer to the GOT.
Data transfer can also be made using a PC card.



● Recommended cables for connection between personal computer and GOT



AC30R2-9SS	Mitsubishi Electric
FX-232CAB-1	

Connection Forms Available for GOT-A900

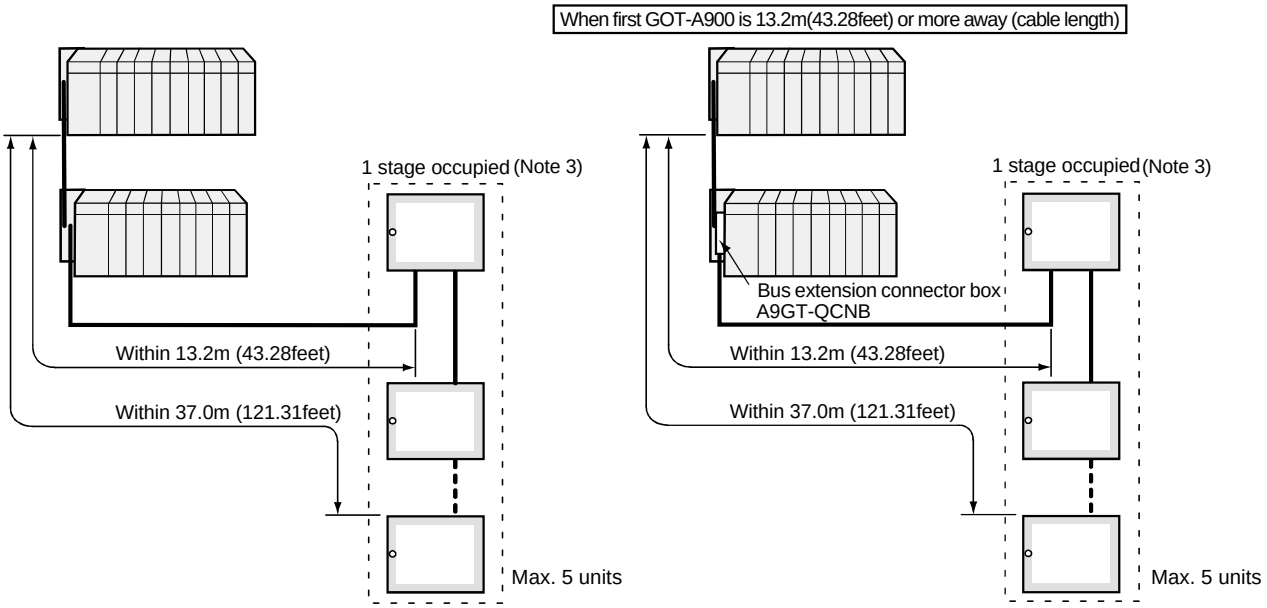
Connection Form		Q Mode	A Mode
Bus connection		○	×
CPU direct connection		○	○
Serial communication module connection (Computer link connection)	RS-422 communication	○	○
	RS-232C communication	○	○
MELSECNET/10 connection	Optical loop network	○	○
	Coaxial bus network	○	○
MELSECNET/II connection	Optical loop network	×	○
	Coaxial bus network	×	○
MELSECNET/B connection		×	○
CC-Link connection	Remote device	○	○
	Intelligent device	○	○

○: Usable, ×: Unusable

* Incompatible with MELSECNET/10H connection.

Connection to Q Mode CPU

■ Bus connection



Usable GOT-A900		A985GOT, A97□ GOT, A960GOT, A951GOT-Q, A956GOT	
Necessary interface module	A985GOT A97□ GOT-(B) A960GOT	When multiple GOTs are connected	A9GT-QBUS22S
		When one GOT is connected or the last GOT when multiple GOTs are connected	A9GT-QBUSS
	A956GOT	When multiple GOTs are connected	A9GT-QBUS2SU
	A951GOT-Q	When one GOT is connected or the last GOT when multiple GOTs are connected	Unnecessary (A951GOT-Q contains bus connection interface)
Connection cable		QC06B	0.6m cable (1.97 feet)
		QC12B	1.2m cable (3.94 feet)
		QC30B	3m cable (9.84 feet)
		QC50B	5m cable (16.39 feet)
		QC100B	10m cable (32.79 feet)
		A9GT-QC200BS	20m cable (65.57 feet)
		A9GT-QC300BS	30m cable (98.56 feet)
		A9GT-QC350BS	35m cable (114.75 feet)
Overall distance		37m (121.31 feet) (note that this overall distance is from main base and includes inter-base cable distances)	
Max. number of GOTs connected		5	
Number of I/O points occupied		16 points (handled as intelligent function module)	
Bus extension connector box		A9GT-QCNB	

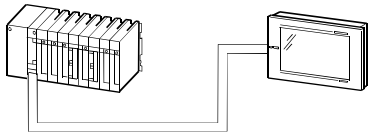
Note 1: When there are extension bases, connect the GOT-A900 after the extension bases. (Extension bases cannot be connected after the GOT-A900.)

Note 2: If the first GOT cannot be connected within 13.2m(43.28feet) of the last base, the bus extension connector box (A9GT-QCNB) must be connected between the extension cable connector of the base and the cable.

Note 3: Connection of the GOT-A900 occupies one extension stage.

System Configuration

■ CPU direct connection

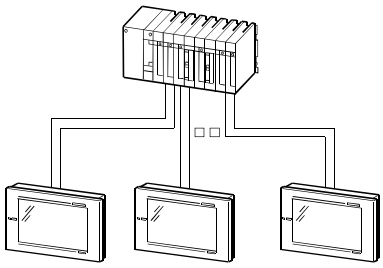


Usable GOT-A900		A985GOT, A97□GOT(-B), A960GOT, A953GOT ✻
Necessary interface module		A9GT-RS2
Connection cable	RS-232C cable	QC30R2 (cable length 3m [9.84 feet])
Max. cable length		15m (49.18 feet)

✻ The A953GOT contains the RS-232C communication interface and does not need the interface module.

✻ The communication speed that can be used by the A9GT-RS2 is up to 38.4kbps.

■ Serial communication module connection

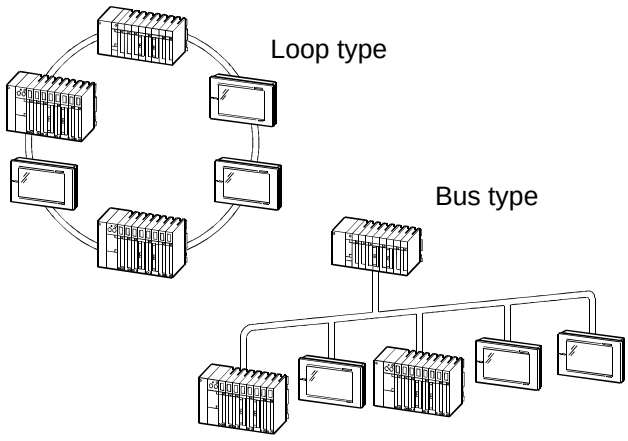


Usable GOT-A900		A985GOT, A97□GOT(-B), A960GOT, A950GOT, A953GOT
Necessary interface module		A9GT-RS4, A9GT-RS2
Connection cable	RS-232C cable	User made
	RS-422 cable	User made
Max. cable length	RS-232C connection	15m (49.18 feet)
	RS-422 connection	200m (655.74 feet)

✻ The A950GOT contains the RS-422 communication interface and the A953GOT contains the RS-232C communication interface, and they do not need the interface module.

✻ The communication speed that can be used by the A9GT-RS4 and A9GT-RS2 is up to 38.4kbps.

■ MELSECNET/10 connection



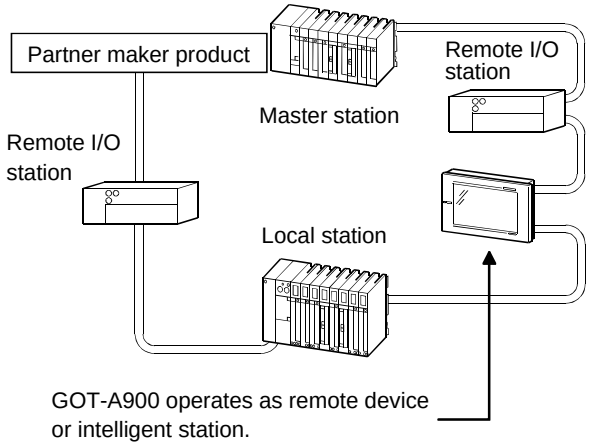
Usable GOT-A900	A985GOT, A97□GOT(-B), A960GOT, A956GOT
Necessary interface module	• Network module A7GT-J71LP23, A7GT-J71BR13
Connection cable	Optical fiber cable Coaxial cable
Overall distance	Conforms to network specifications

✻ Incompatible with MELSECNET/10H connection.

✻ CPU device ranges accessible via MELSECNET/10 are indicated below.

Device Name			Setting/Monitoring Range
Bit device	Input (X)		X0 to X7FF
	Output (Y)		Y0 to Y7FF
	Internal relay (W)		M0 to M8191
	Annunciator (F)		F0 to F2047
	Link relay (B)		B0 to BFFF
	Latch relay (L)		L0 to L8191
	Timer	Contact (TT)	TT0 to TT255
		Coil (TC)	TC0 to TC255
	Counter	Contact (TT)	CT0 to CT255
		Coil (TC)	CC0 to CC255
	Bit of word device		Specified bit of following word device (except index register and buffer memory)
	GOT bit register (GB)		GB64 to GB1023
Word device	Data register (D)		D0 to D6143
	Link register (W)		W0 to WFFF
	Timer (current value) (T)		T0 to T255
	Counter (current value) (C)		C0 to C255
	Index register	(Z) (V)	Z0 to Z6(Z0=Z) V0 to V6(V0=V)
	Accumulator (A)		A0 to A1
	Buffer memory (special function module) (BM)		BM0 to BMn
	Word of bit device		Conversion of above bit device into word (except timer and counter)
	Data register of GOT-A900 (GD)		GD64 to GD1023

■ CC-Link connection

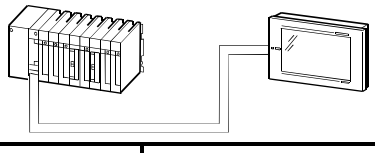


Usable GOT-A900	A985GOT, A97□GOT, A960GOT, A956GOT
Necessary interface module	• Intelligent device station A8GT-J61BT13 • Remote device station A8GT-J61BT15
Connection cable	Shielded twisted cable
Max. cable length	Conforms to network specifications

When the GOT is used as an intelligent station, device comment display and T/C set value monitor changing in system monitoring function are not available. When the GOT is used as a remote device station, the system monitoring function cannot be used.

Connection to A Mode CPU

■ CPU direct connection

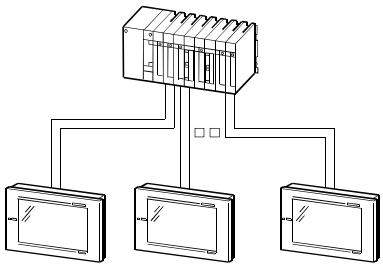


Usable GOT-A900		A985GOT, A97□GOT, A960GOT, A953GOT
Necessary interface module		A9GT-RS2
Connection cable	RS-232C cable	QC30R2 (cable length 3m [9.84feet])
Max. cable length		3m (9.84 feet)

∗ The A953GOT contains the RS-232C communication interface and does not need the interface module.

∗ The communication speed that can be used by the A9GT-RS2 is up to 9600kbps.

■ Serial communication module connection

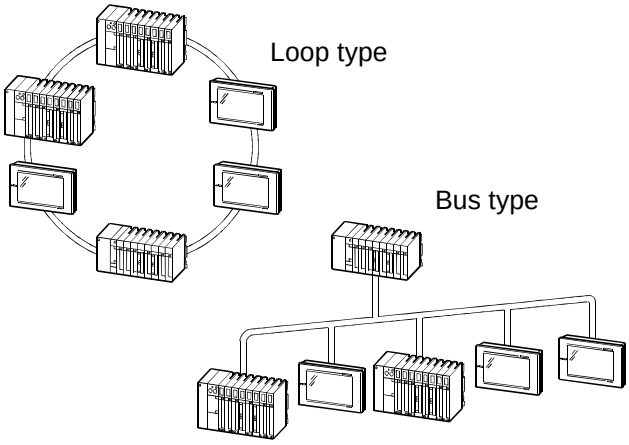


Usable GOT-A900		A985GOT, A97□GOT(-B), A960GOT, A950GOT, A953GOT
Necessary interface module		A9GT-RS4, A9GT-RS2
Connection cable	RS-232C cable	User made
	RS-422 cable	User made
Max. cable length	RS-232C connection	15m (49.18 feet)
	RS-422 connection	200m (655.74 feet)

∗ The A950GOT contains the RS-422 communication interface and the A953GOT contains the RS-232C communication interface, so they do not need an interface module.

∗ The communication speed that can be used by the A9GT-RS4 and A9GT-RS2 is up to 19.2kbps.

■ MELSECNET connection

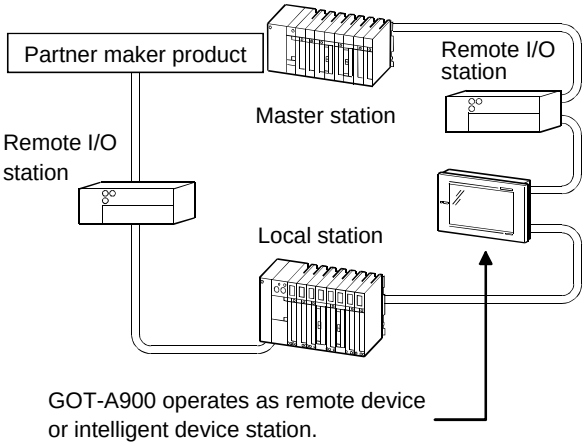


Usable GOT-A900	A985GOT, A97□GOT (-B), A960GOT, A956GOT
Necessary interface module	• MELSECNET(II), /B A7GT-J71AP23, A7GT-J71AR23, A7GT-J71AT23B • MELSECNET/10 A7GT-J71LP23, A7GT-J71BR23
Connection cable	Optical fiber cable Coaxial cable Twisted pair cable
Max. cable length	Conforms to network specifications

∗ Incompatible with MELSECNET/10H connection.

System Configuration

■ CC-Link connection

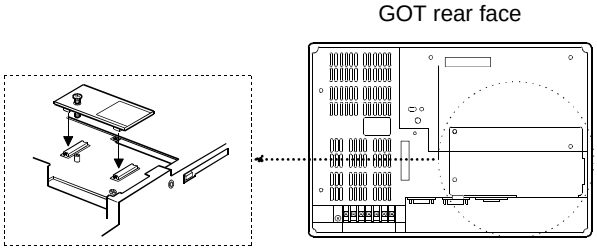


Usable GOT-A900	A985GOT, A97□GOT, A960GOT, A956GOT
Necessary interface module	• Intelligent device station A8GT-J61BT13 • Remote device station A8GT-J61BT15
Connection cable	Shielded twisted cable
Max. cable length	Conforms to network specifications

About Options

■ Extended memory (A985/A97□/A960GOT)

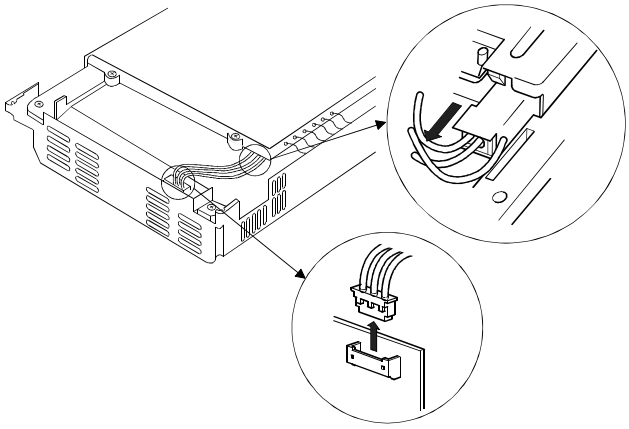
Using the memory board can expand the internal memory. It is also needed to perform the optional functions (e.g. recipe function, voice output function).



Type	Remarks
A9GT-FNB	For optional function only
A9GT-FNB1M	For optional function + built-in memory of 1M bytes
A9GT-FNB2M	For optional function + built-in memory of 2M bytes
A9GT-FNB4M	For optional function + built-in memory of 4M bytes
A9GT-FNB8M	For optional function + built-in memory of 8M bytes
A9GT-QFNB	For optional function only
A9GT-QFNB4M	For optional function + built-in memory of 4M bytes
A9GT-QFNB8M	For optional function + built-in memory of 8M bytes

■ Backlight

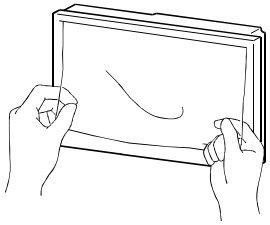
The GOT-A900 series allows the user to change the backlight easily. (On-the-spot replacement can be made easily.)
The EL does not have a backlight and needs no replacement.



Type	Remarks
A9GT-80LTT	For 12-inch, high-intensity TFT color liquid crystal
A9GT-70LTT	For 10-inch, wide-angle vision TFT color liquid crystal
A9GT-70LTS	For 10-inch, D-STN color liquid crystal
A9GT-70LTTB	For 10-inch, high-intensity TFT color liquid crystal
A9GT-50LT	For 6-inch, STN color/monochrome liquid crystal

■ Protective sheet

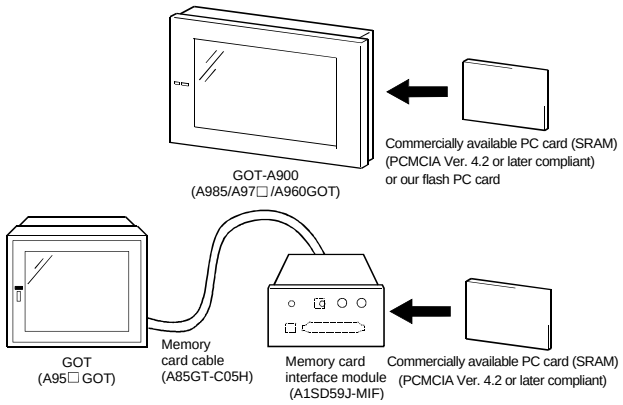
Sheet for protection of the GOT-A900 screen. The "MITSUBISHI" logo is removable. To protect the screen, always use the protective sheet.



Type	Remarks
A9GT-80PSC	Protective sheet for 12 inch, logo removable
A9GT-70PSC	Protective sheet for 10 inch, logo removable
A9GT-60PSC	Protective sheet for 9 inch, logo removable
A9GT-50PSC	Protective sheet for 6 inch, logo removable

■ PC card

The PC card is used to transfer the data of the monitor screen and to store the data of the alarm history and recipe functions.

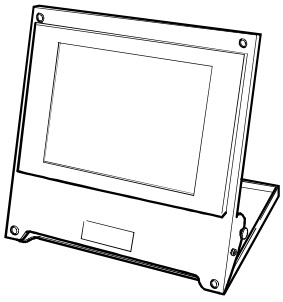


Type	Remarks
A9GTMEM-10MF	For GOT, memory capacity 10M bytes Flash PC card (formatted)
A9GTMEM-20MF	For GOT, memory capacity 20M bytes Flash PC card (formatted)
A9GTMEM-40MF	For GOT, memory capacity 40M bytes Flash PC card (formatted)

* To use the PC card in the A95□GOT, the memory card interface module (flash PC card is unusable) is needed.

■ Debugging stand

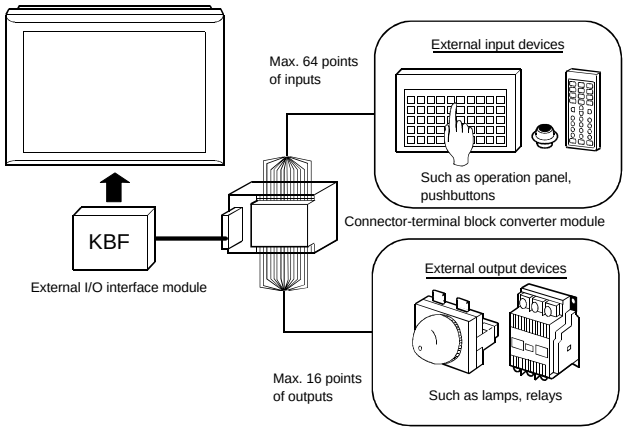
Stand used to place the GOT on a desk for debugging.



Type	Remarks
A9GT-80STAND	For 12-inch mounting
A9GT-70STAND	For 10/9-inch mounting
A9GT-50STAND	For 6-inch mounting

■ External I/O interface module

Using the external I/O interface module, you can provide external inputs (such as pushbuttons) and outputs (such as lamps, relays).



Type	Remarks
A9GT-70KBF	External I/O interface module (For A985GOT, A97□GOT (-B), A960GOT)
A8GT-50KBF	External I/O interface module (For A95□GOT (-M3))

■ Printer interface module (A95□GOT(-M3))

The printer interface module is needed to use the printer function on the A95□GOT. (The printer interface module is not needed for the A985GOT, A97□GOT (-B) and A960GOT since they contain the printer interface.)

Type	Remarks
A9GT-50PRF	Printer interface module for A95□GOT

General Specifications

■ General specifications of GOT-A900

Item	Specifications					
Operating ambient temperature	Display section	0 to 40℃ (0 to 55℃ for A975/A970GOT-TBA(-B)/TBD(-B))				
	Other than display section	0 to 55℃				
Storage ambient temperature	-20 to 60℃					
Operating ambient humidity	10 to 90%RH, non-condensing					
Storage ambient humidity	10 to 90%RH, non-condensing					
Vibration resistance	Conforming to JIS B 3502, IEC 1131-2		Frequency	Acceleration	Amplitude	Sweep count
		Under intermittent vibration	10 to 57Hz	—	0.075mm (0.003 inch)	10 times each in X, Y, Z directions (for 80 min.)
			57 to 150Hz	9.8m/S^2	—	
		Under continuous vibration	10 to 57Hz	—	0.035mm (0.001 inch)	
			57 to 150Hz	4.8m/S^2	—	
Shock resistance	Conforming to JIS B 3502, IEC 1131-2 (147 m/s^2, 3 times in each of 3 directions X, Y, Z)					
Environmentally resistant protective structure	IP65F or equivalent (front section)					
Operating atmosphere	No corrosive gases					
Operating altitude	2000m max. (6557.38 feet)					
Installation location	Inside control panel					
Overvoltage category＊1	Ⅱ or less					
Pollution level＊2	2 or less					

＊ 1: This indicates the section of the power supply to which the equipment is assumed to be connected between the public electrical power distribution network and the machinery within premises.
Category Ⅱ applies to equipment for which electrical power is supplied from fixed facilities.
The surge voltage withstand level for up to the rated voltage of 300 V is 2500 V.

＊ 2: This index indicates the degree to which conductive material is generated in the environment where the equipment is used.
In pollution level 2, only non-conductive pollution occurs but temporary conductivity may be produced due to condensation.

Performance Specifications

■ Performance specifications of A985/A975/970/960GOT

Item		Specifications					
		A985GOT-TBA※1 A985GOT-TBD※1 A980GOT-TBA-EU※1	A975GOT-TBA※1 A975GOT-TBD※1 A975GOT-TBA-B※2 A975GOT-TBD-B※2 A975GOT-TBA-EU※2	A970GOT-TBA※1 A970GOT-TBD※1 A970GOT-TBA-B※2 A970GOT-TBD-B※2 A970GOT-TBA-EU※2	A970GOT-SBA A970GOT-SBD A970GOT-SBA-EU	A970GOT-LBA A970GOT-LBD A970GOT-LBA-EU	A960GOT-EBA A960GOT-EBD A960GOT-EBA-EU
Display section	Type	※1 Wide-angle vision TFT color liquid crystal ※2 High-intensity TFT color liquid crystal			D-STN color liquid crystal	Monochrome liquid crystal	High-intensity EL
	Resolution (pixels)	800 × 600	640 × 480				640 × 400
	Display size (mm (inch))	246×184.5 (11.19×7.27)	211 × 158 (8.31×6.23)				192 × 120(7.56×4.73)
	Display color (colors)	256		16	8	2 (Monochro)	2 (yellow/orange, black)
Backlight		Cold-cathode backlight (backlight OFF/screen save time can be set)					—
Touch panel	Number of touch keys [points]	1900 (38 rows × 50 columns)	1200 (30 rows × 40 columns)				1000 (25 rows × 40 columns)
	Key size [pixels]	Minimum 16 × 16 (per key) 8 × 16 on bottom row only	Minimum 16 × 16 (per key)				
	Repeat function	No					
Memory	Type	Flash ROM					
	Application	For storing monitor screen data, for storing OS					
	Capacity	Built-in 1M bytes (user area), max. 9M bytes can be increased.					
Communication board slot		1 slot for communication board loading					
Communication module interface		1 channel for communication module loading					
Option module interface		1 channel for option module loading (e.g. A9GT-70KBF)					
PC card interface		1 channel for PC card loading					
Memory board slot		1 slot for memory board loading					
RS-232C interface		1 channel for personal computer connection, bar-code reader connection					
CRT interface		SVGA 1 channel for CRT connection	—				
Printer interface		1 channel for parallel printer connection					
Voice output terminal		For external speaker connection (stereo mini-jack), 1 channel each for right and left (2Vp-p, 0.4mW (under rated load 10 Ω), playable voice file: Windows WAV format, 8000kHz, 16-bit monaural (8 sec./voice file)					
Buzzer output		Single tone (sound length adjustable)					
Life	Display section [h]	41,000 (operating ambient temperature: 25°C)			50,000 (operating ambient temperature: 25°C)		30,000 (initial brightness 70%, operating ambient tempereture: 25°C)
	Backlight [h]	40,000			10,000		—
		(Period when display brightness becomes 50% at operating ambient temperature of 25°C)					
	Touch key	1 million times or more (operating force not more than 0.98N)					
	Built-in/extra memory	Number of write times: 100,000 times					
Weight (kg (lb))		TBA :2.35 (5.17) TBD :2.30 (5.06)	1.70 (3.74)		SBA/LBA :1.78 (3.92) SBD/LBD :1.80 (3.96) SBA-EU :1.78 (3.92)		EBA :1.51 (3.32) EBD :1.60 (3.52) EBA-EU :1.58 (3.48)
Compatible software package		Q mode: SW2D5C-GOTRE-PACK Version C or later (bus connection: SW3D5C-GOTRE-PACK or later) A mode: SW0D5C-GOTRE-PACK Version A or later (A985GOT-TB□: SW1D5C-GOTR-PACK C version or later, A970GOT-LB□: SW1D5C-GOTR-PACK J version or later)					

Performance Specifications

■ Performance specifications of A950/A951/A953/956GOT

Item		Specifications			
		A950GOT-SBD A950GOT-SBD-M3 A950GOT-LBD A950GOT-LBD-M3	A951GOT-QSBD A951GOT-QSBD-M3 A951GOT-QLBD A951GOT-QLBD-M3	A953GOT-SBD A953GOT-SBD-M3 A953GOT-LBD A953GOT-LBD-M3	A956GOT-SBD A956GOT-SBD-M3 A956GOT-LBD A956GOT-LBD-M3
Display section	Type	(Q)SBD(-M3): STN color liquid crystal (Q)LBD(-M3): Monochrome liquid crystal			
	Resolution (pixels)	320 × 240			
	Display size (mm (inch))	115 × 86 (4.53 × 3.3)			
	Display color (colors)	(Q)SBD(-M3): 8 (Q)LBD(-M3): 2 (monochrome)			
Backlight		Cold-cathode backlight (backlight OFF/screen save time can be set)			
Touch panel	Number of touch keys [points]	300 (15 rows × 20 columns)			
	Key size [pixels]	Minimum 16 × 16 (per key)			
	Repeat function	No			
Memory	Type	Flash ROM			
	Application	For storing monitor screen data, for storing OS			
	Capacity	Built-in 1M bytes (user area) (3M bytes (user area) for M3 type)			
RS-232C interface		—	—	1 channel built-in	—
RS-422 interface		1 channel built-in	—	—	—
Bus interface		—	1 channel built-in	—	—
Communication module interface		—	—	—	1 channel built-in
Optional module interface		1 channel for optional module loading • A1SD59J-MIF • A8GT-50KBF • A9GT-50PRF			
RS-232C interface		1 channel for personal computer connection, bar-code reader connection			
Buzzer output		Single tone (sound length adjustable)			
Life	Display section [h]	50,000 (initial brightness 70%, operating ambient temperature: 25°C)			
	Backlight [h]	40,000 (period when display brightness becomes 50% at operating ambient temperature of 25°C)			
	Touch key	1 million times or more (operating force not more than 0.98N)			
	Built-in/extra memory	Number of write times: 100,000 times			
Compatible software package		Q mode: SW2D5C-GOTRE-PACK Version C or later (bus connection: SW3D5C-GOTRE-PACK or later) A mode: SW1D5C-GOTRE-PACK Version H or later			

Power supply section specifications of GOT-A900

Item			Specifications			
			A9□□GOT-□BA(-B,-EU)	A985GOT-TBD A97□GOT-□BD(-B) A960GOT-EBD	A950GOT-□BD (-M3) A951GOT-Q□BD (-M3) A953GOT-□BD (-M3)	A956GOT-□BD – (M3)
Input power supply			100 to 240VAC (+10%, -15%)	24VDC (+25%, -20%)	24VDC (+10%, -15%)	
Input frequency [Hz]			50/60Hz±3Hz	—		
Input max. apparent power			50VA max. (at 100VAC input). 60VA for other than RS-422, RS-232C, bus connection 63VA max. (at 200VAC input) 75VA for other than RS-422, RS-232C, bus connection	—		
Input max. power			40W		12W	16W
Inrush current			40Ap max. (264VAC, max. load)	61Ap max. (30VDC, max. load)	40Ap max. (26.4VDC, max. load)	
Permissible instantaneous power failure time			20ms (100VAC or more)	1ms (19.2VDC or more)	1ms (20.4VDC or more)	
Noise immunity			By noise simulator of 1,500Vp-p noise voltage, 1μs noise with and 25 to 60Hz noise frequency	By noise simulator of 500Vp-p noise voltage, 1μs noise with and 25 to 60Hz noise frequency		
Dielectric withstand voltage			1500VAC for 1 minute across AC external terminals-earth (EU: 3600VAC for 1 second)	500VAC for 1 minute across DC external terminals-earth		
Insulation resistance			10MΩ or more by insulation resistance tester			
External output			Transistor output, 2 points (RUN, OUTPUT)	—		
	Insulation system		Photocoupler insulation			
	Rated load voltage		12V/24VDC			
	Operating load voltage range		10.2 to 30VDC (peak voltage 30V)			
	Max. load current		0.1A/point, 0.2A/common			
	Max. inrush current		0.4A, within 10ms			
	OFF time leakage current		0.1mA max.			
	ON-time max. voltage drop		1.0VDC(TYP.)0.1A, 2.5VDC(MAX.)0.1A			
	Response time	OFF to ON	10ms max. (resistive load)			
		ON to OFF	10ms max. (resistive load)			
	Surge suppressor		Zener diode			
Applicable wire size			0.75 to 2mm^2			
Applicable crimping terminal			RAV1.25-3, V2-S3.3, V2-N3A, FV2-N3A			
Applicable tightening torque			58.8N / cm to 88.2N / cm			

Performance Specifications

■ Performance specifications of communication boards and communication modules

● Performance specifications of bus boards

Item	A9GT-QBUSS	A9GT-QBUS2S	A9GT-QBUS2SU
Application	For connection of 1 GOT	For connection of multiple GOTs	For connection of multiple GOTs for A950
Number of bus ports	1	2	2
Applicable PLC	Q mode PLC only	Q mode PLC only	Q mode PLC only
Weight (g(lb))	90 (0.20)	100 (0.22)	170 (0.37)

● Performance specifications of serial communication boards

Item	A9GT-RS2	A9GT-RS4
Interface connector	9-pin D-sub (male) inch screwing type	9-pin D-sub (male) inch screwing type
Communication speed	38400bps	38400bps
Weight (g(lb))	90 (0.20)	98 (0.22)

● Performance specifications of network and data link modules

Item	Network Module			Data Link Module		
	A7GT-J71LP23	A7GT-J71BR13		A7GT-J71AP23	A7GT-J71AR23	A7GT-J71AT23B
Communication speed	10Mbps (20Mbps: multiple transmission)	10Mbps		1.25Mbps		125k/250k/500k/1 Mbps
Communication system	Token ring system	Token bus system		Polling system		
Synchronization system	Frame synchronization system					
Transmission path format	Duplex loop	Simplex bus		Duplex loop		Bus
Overall distance	30km(98360.66feet) When using SI cable: 500m (639.34feet) between stations When using QSI cable: 1km(3278.69feet) between stations	3C-2V: 300m (983.61feet) (300m between stations)	5C-2V: 500m (1639.34 feet) (500m between stations)	10km (32786.89feet) (1km (3278.69feet) between stations)	10km (32786.89feet) (500m (1639.34feet) between stations)	125kbps: 1200m(3934.43feet) 250kbps: 600m(1967.21feet) 500kbps: 400m(131.48feet) 1Mbps: 200m(655.74feet)
Weight (g(lb))	350 (0.77)			290 (0.64)	300 (0.66)	300 (0.66)

● Performance specifications of CC-Link communication modules

Item	A8GT-J61BT13	A8GT-J61BT15
CC-Link station type	Intelligent device station	Remote device station
Communication speed	156k/625k/2.5M/5M/10Mbps	
Overall distance	Depends on transmission speed. Independently of transmission speed setting, at least 2m (6.56feet) is required as inter-station cable length between master/local station and preceding or subsequent station At transmission speed of 5Mbps or 10Mbps, note that max. transmission distance differs according to inter-station cable length between remote I/O/remote device stations. 156kbps:1200m(3934.43feet) /625kbps:600m(1967.21feet) /2.5Mbps:200m(655.74feet) /5Mbps:110m to 150m(360.66 to 491.80feet) /10Mbps:50m to 100m(163.93 to 327.87feet)	
Max. number of modules connected	26 (when 1 station is occupied)	32 (when 2 stations are occupied)
Weight (g(lb))	210 (0.46)	200 (0.44)

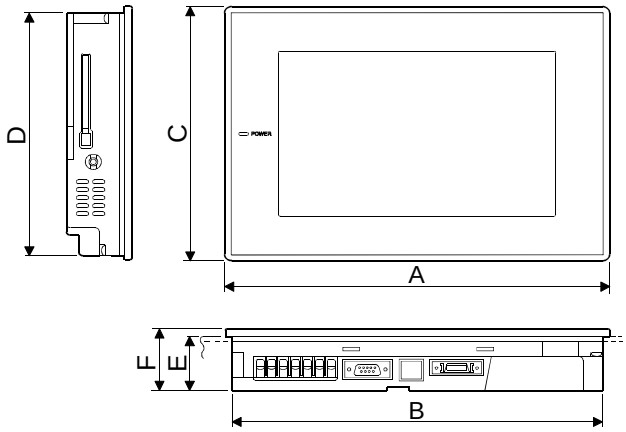
■ Function list

Function			Outline
Drawing function	Data display function	Numeric display function	Shows values stored in PLC devices.
		Data list display function	Collects states of multiple word devices at given intervals and shows values in tabulated form.
		ASCII display function	Regards data stored consecutively in word devices as a character code (ASCII code, shift JIS code) and shows a character string.
		Clock display function	Shows clock data of PLC CPU.
	Message display function	Comment display function	• Comment display (bit) function Shows comment associated with ON/OFF of bit device. • Comment display (word) function Shows comment associated with value of word device.
		Alarm history display function	Shows as history data the ON states of specified bit devices and the occurrence times, comments and others when word device value condition holds.
		Alarm list display function	• System alarm function Checks for GOT/PLC CPU/MELSECNET communication error at intervals of 3 seconds and shows error code and error message at occurrence of error. • User alarm function Associates multiple bit devices with comments and shows ON bit devices in order of specified priority.
	Moving image display function	Part display function	• Part display (bit) function Shows part associated with ON/OFF of bit device. • Part display (word) function Shows part associated with value of word device.
		Part motion display function	Shows in motion or in path the part figure associated with bit device ON/OFF or word device value in the specified moving method.
		Lamp display function	• Lamp display (bit) function Lights/extinguishes lamp according to ON/OFF of bit device. • Lamp display (word) function Changes lamp lit-up color according to value of word device.
		Panel meter display function	Shows on meter the ratio of word device value to high/low value.
	Graph display function	Trend graph display function	Gathers data stored in word device at specified timing, shows trend graph, and after showing it to the end of display range, scrolls.
		Line graph display function	Batch-gathers data of multiple word devices and shows line graph.
		Bar graph display function	Shows data stored in multiple word devices in bar graph.
		Statistic graph display function	Collects data of multiple word devices and graphs the ratio of each word device data to the whole.
		Level display function	Shows in level the ratio of word device value to high/low value in any closed figure.
	Touch key function		Touching the screen allows device change, screen switching, etc.
	Data input function	Numeric input function	Writes any value to specified word device.
		ASCII input function	Writes any ASCII and shift JIS code to specified word device.

Function List

Function			Outline
Drawing function	Other object functions	Report function	Numerical data stored in word devices or special function module buffer memory are gathered and printed per data collection trigger, or comments associated with numerical data or bit device ON/OFF are printed. • Logging report Data are gathered and printed per data collection trigger and data to be printed next are printed subsequently without page break of printer paper. • Real-time report Data are gathered per data collection trigger, collected data are stored into PC card, and data stored in PC card are printed at printing trigger.
		Hardcopy function	ON/OFF of bit device or touching of touch key (extended function) causes currently displayed monitor screen of GOT to be printed or saved into PC card in BMP file format.
		System information function	PLC CPU checks GOT operating status or transmits information on GOT900 series operating status to GOT.
		Status monitoring function	Performs write/operation to PLC CPU when specified condition holds (specified bit device turns ON/OFF).
		Alarm flow function	Used to associate comments with multiple bit devices and show comments of ON bit devices in order of occurrence in right-to-left flow of base screen.
		Recipe function	Writes/reads device value to specified device of PLC CPU under specified condition (device ON/OFF).
		Voice function	Used to set WAV-format voice file for playing voice as error warning sound message or as touch sound at touch of touch key.
		Test function	Used to show test window during monitor screen display to change device values. (This function is also valid during ladder monitor function.)
		Bar code function	Data read by bar-code reader connected to GOT is written to PLC CPU.
		Operation panel function	Operation panel is used to perform write to devices, e.g. touch input, numerical input and screen switching, from outside GOT.
Maintenance function		System monitor function	Monitors/tests PLC CPU devices and special function module buffer memory.
Security function			• Screen level security Can protect screen switching, hide display partially, and protect input operation. Can also protect switching to optional functions such as system monitor function. • System level security Protects switching to system screen (utility function) such as setup screen. • Project level security Protects uploading of screen data.
Other functions		Printer function	Performs print-out of alarm history, output of daily/monthly report (report function), color hard copy of display screen, etc.

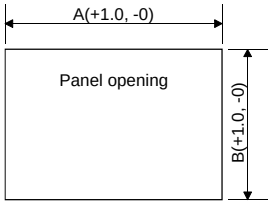
■ A985/A97□/A960/A95□GOT



Type	A	B	C	D	E	F
A985GOT	312 (12.29)	301 (11.86)	238 (9.38)	227 (10.91)	43 (1.58)	49 (1.93)
A97□GOT (-B)	297 (11.70)	288 (11.35)	208 (8.20)	199 (7.84)	40 (1.58)	46 (1.81)
A960GOT	268 (10.56)	257 (10.13)	192 (7.56)	182 (7.17)	43 (1.69)	49 (1.93)
A95□GOT (-M3)	164.5 (6.48)	155.5 (6.13)	136 (5.36)	123 (4.85)	51 (2.01)	57 (2.25)

Unit : mm(inch)

● Panel cutting dimension

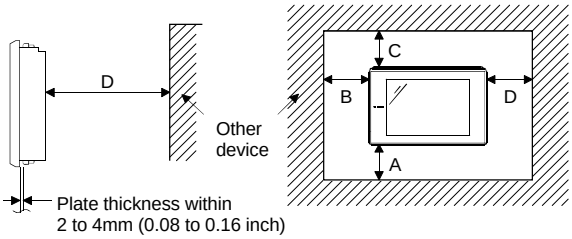


Values in ( ) are tolerances in mm unit.

Type	A	B
A985GOT	302 (11.90)	228 (8.98)
A97□GOT (-B)	289 (11.39)	200 (7.88)
A960GOT	258 (10.17)	183 (7.21)
A95□GOT (-M3)	156 (6.15)	123.5 (4.87)

Unit : mm(inch)

● Product mounting clearances



A-area dimensions

Since the connection cable of the GOT-A900 is pulled out in a downward direction, the following space is required in consideration of its flexing radius.

Type	A
A985GOT	130 (5.12) or more
A97□GOT	
A960GOT	140 (5.52) or more
A950/951/953GOT	130 (5.12) or more
A956GOT	130 (5.12)or more (165mm (6.50inch) or more for use of optical fiber cable in MELSECNET connection)

Unit : mm(inch)

B-area dimension

To use the memory card or voice output device, 100mm (3.94inch) or more space is needed in consideration of cable pulling-out or memory card loading/unloading. (50mm (1.97inch) or more when they are not used.)

C-area dimension

To ensure good ventilation, provide 80mm(3.15inch) or more distance from structure or other devices at top of the unit.

D-area dimension

When a device which generates radiated noise, etc. (such as a contactor) and/or a device which generates heat is placed around the GOT, leave a 100mm(3.94inch) or more clearance at the back and 50mm(1.97inch) or more clearances on the right- and left-hand sides to avoid the influence of noise and heat.

＊The ambient temperature of the unit should not be higher than 55°C.

6. APPENDICES

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Safety Precautions

Safety Precautions (Always read these precautions)

When using the Q series products, thoroughly read the manuals packed with the individual products and the associated manuals introduced in the manuals packed with the products, and also pay careful attention to safety and handle the equipment properly.
The precautions given in this section are concerned with all Q series products and describe only the items to be noted in the design stage. For the precautions for individual products and the precautions for installation, wiring, starting, maintenance, usage and disposal of the products, always refer to the QCPU (Q Mode) User's Manual (Hardware Design/Maintenance and Inspection) and the user's manuals of the individual products.
These [Safety Precautions] classify the safety precautions into two categories: "DANGER" and "CAUTION".

⚠DANGER	Procedures which may lead to a dangerous condition and cause death or serious injury if not carried out properly.
⚠CAUTION	Procedures which may lead to a dangerous condition and cause superficial to medium injury, or physical damage only, if not carried out properly.

Depending on circumstances, procedures indicated by ⚠CAUTION may also be linked to serious consequences.
In any case, it is important to follow the instructions.

■ DESIGN PRECAUTIONS

⚠DANGER

- Install a safety circuit external to the PLC that keeps the entire system safe if an external power supply fault or PLC failure occurs. Otherwise, accidents could result from false output or malfunction.
  (1) Outside the PLC, construct mechanical damage preventing interlock circuits such as emergency stop, protective circuits, forward/reverse or other opposed-motion interlocking circuits, and positioning upper and lower limits switches.
  (2) When the PLC detects either of the following faulty conditions, it may stop operation and turn off all outputs.
  • The overcurrent protection or overvoltage protection of the power supply module is activated.
  • The PLC CPU detected a fault, such as the watchdog timer error, with its self-diagnostic function.
  In addition, all outputs may be turned on when there is a fault that the PLC CPU cannot detect, such as in the I/O controller. Build a fail-safe circuit or provide a proper mechanism outside the PLC that will make sure the machine will operate safely at such times.
  For fail-safe circuit examples, refer to "Loading and Installation" on the next page.
  IMPORTANT: Whether outputs are turned off or not depends on the Hold/Clear selection preset per output module. When Hold is selected, outputs are not turned off if a faulty condition is detected. Therefore, always make up a necessary external safety circuit.
  (3) Outputs could be left on or off when there is a problem in the output module relay or transistor. Build an external monitoring circuit that will monitor any output signal that could cause serious accidents.
- When overcurrent which exceeds the rating or caused by short-circuited load flows in the output module for a long time, it may cause smoke or fire. To prevent this, configure an external safety circuit, such as a fuse.
- Build a circuit that turns on the external power supply when the PLC power supply is turned on. If the external power supply is turned on first, it could result in false output or malfunction.
- When a communications fault occurs in the data link, the faulty station is placed in the following states. Using communications status information, configure an interlock circuit in the sequence program so that the system operates safely. Not doing so could result in false output or malfunction.
  (1) The data link data prior to the communications fault is held intact.
  (2) All outputs turn off in the remote I/O stations of MELSECNET(II, /B, /10) and CC-Link.
  (3) In the remote I/O stations of MELSECNET/MINI-S3, outputs are held or all outputs turn off in accordance with E.C. mode setting.
  For checking a faulty communications station or the operating status at a communications fault, refer to the corresponding data link manual.

⚠CAUTION

- Do not bundle the control and communication cables with the main circuit and power cables, or install them close to each other. They should be installed 100 mm (3.94inch) or more away from each other. Not doing so could result in noise that would cause malfunction.

■ MOUNTING PRECAUTIONS

⚠CAUTION

- Use the PLC in the environment that meets the general specifications given in this manual. Using this PLC in any environment outside the range of the general specifications could result in electric shock, fire, malfunction, or damage to or deterioration of the product.

■ WIRING PRECAUTIONS

⚠CAUTION

- Be sure to ground the FG terminals and LG terminals to the protective earth conductor. Not doing so could result in electric shock or malfunction.
- Use the PLC at the rated voltage of each module. Using it at any different voltage can cause a fire or failure.
- Do not connect the outputs of multiple power supply modules in parallel. Doing so can heat the power supply modules, causing a fire or failure.

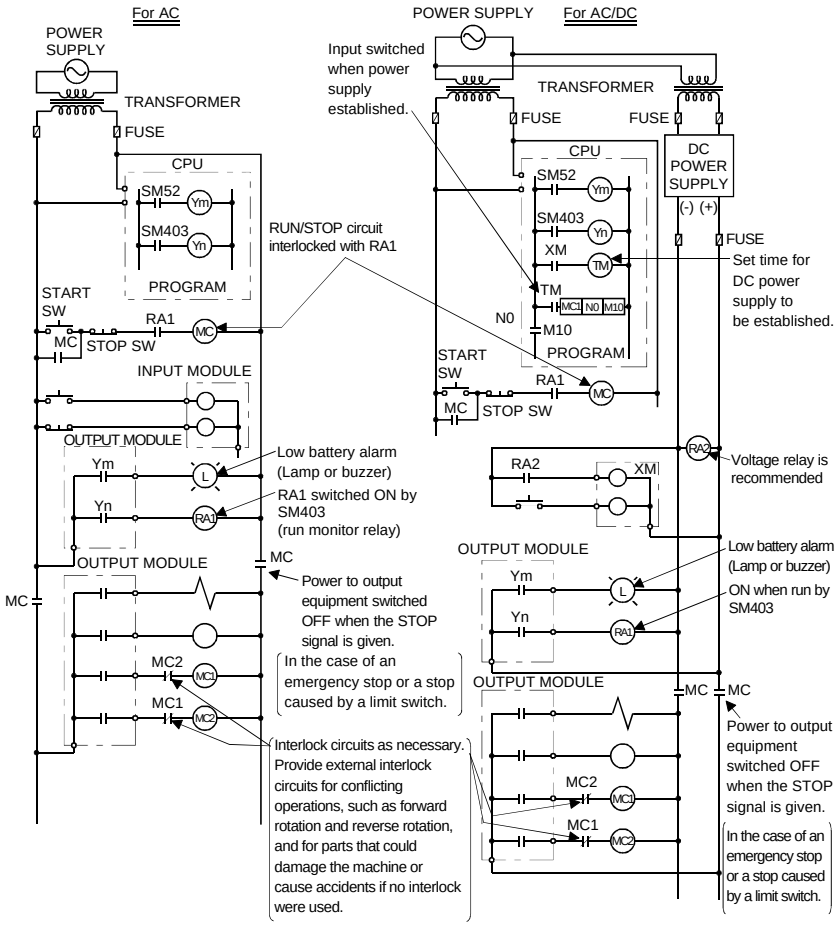
Safety Considerations

When the PLC power supply is switched ON→OFF, proper process output may not be provided temporarily due to differences in delay time and starting time between the PLC power supply and PLC output load power supply (especially DC).
For example, if the output load power supply is switched on in a DC output module and the PLC power supply is then switched on, the DC output module may provide false output instantaneously at power-on of the PLC.

Therefore, it is necessary to make a circuit which can switch on the PLC power supply first.
Also, an abnormal operation may be performed if an external power supply fault or PLC failure takes place.
To prevent any of these abnormal operations from leading to the abnormal operation of the whole system, areas which can result in machine breakdown and accidents due to abnormal operations (e.g. emergency stop, protective and interlock circuits) should be constructed outside the PLC.
Examples of system design circuits in the above viewpoint are given below.

■ System design circuit example 1 (when not using $\overline{\text{ERR}}$ contact of power supply module)

● When using Q mode



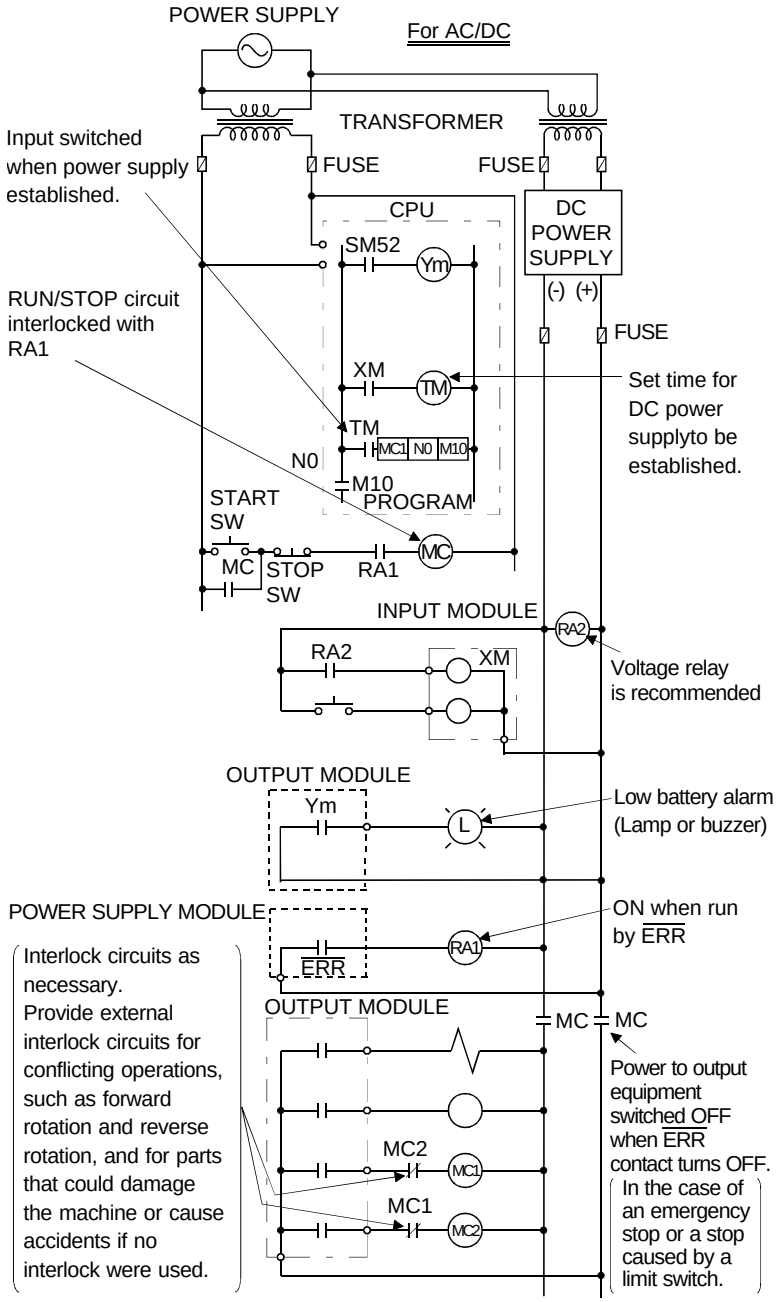
● When PLC power supply and output power supply are both AC

(1) Switch power ON.
(2) Set CPU to RUN.
(3) Turn ON the start switch.
(4) When the magnetic contactor (MC) comes on, the output equipment is powered and driven by the program.

● When PLC power supply is AC and output power supply is DC

(1) Switch power ON.
(2) Set CPU to RUN.
(3) When DC power is established, RA2 goes ON.
(4) Timer (TM) times out after the DC power reaches 100%. (The TM set value should be the period of time from when RA2 goes ON to the establishment of 100% DC voltage. Set this value to approximately 0.5 seconds.)
(5) Turn ON the start switch.
(6) When the magnetic contactor (MC) comes on, the output equipment is powered and driven by the program. (If a voltage relay is used at RA2, no timer (TM) is required in the program.)

■ System design circuit example 2 (when using $\overline{\text{ERR}}$ contact of Q61P-A1/Q61P-A2 power supply module)



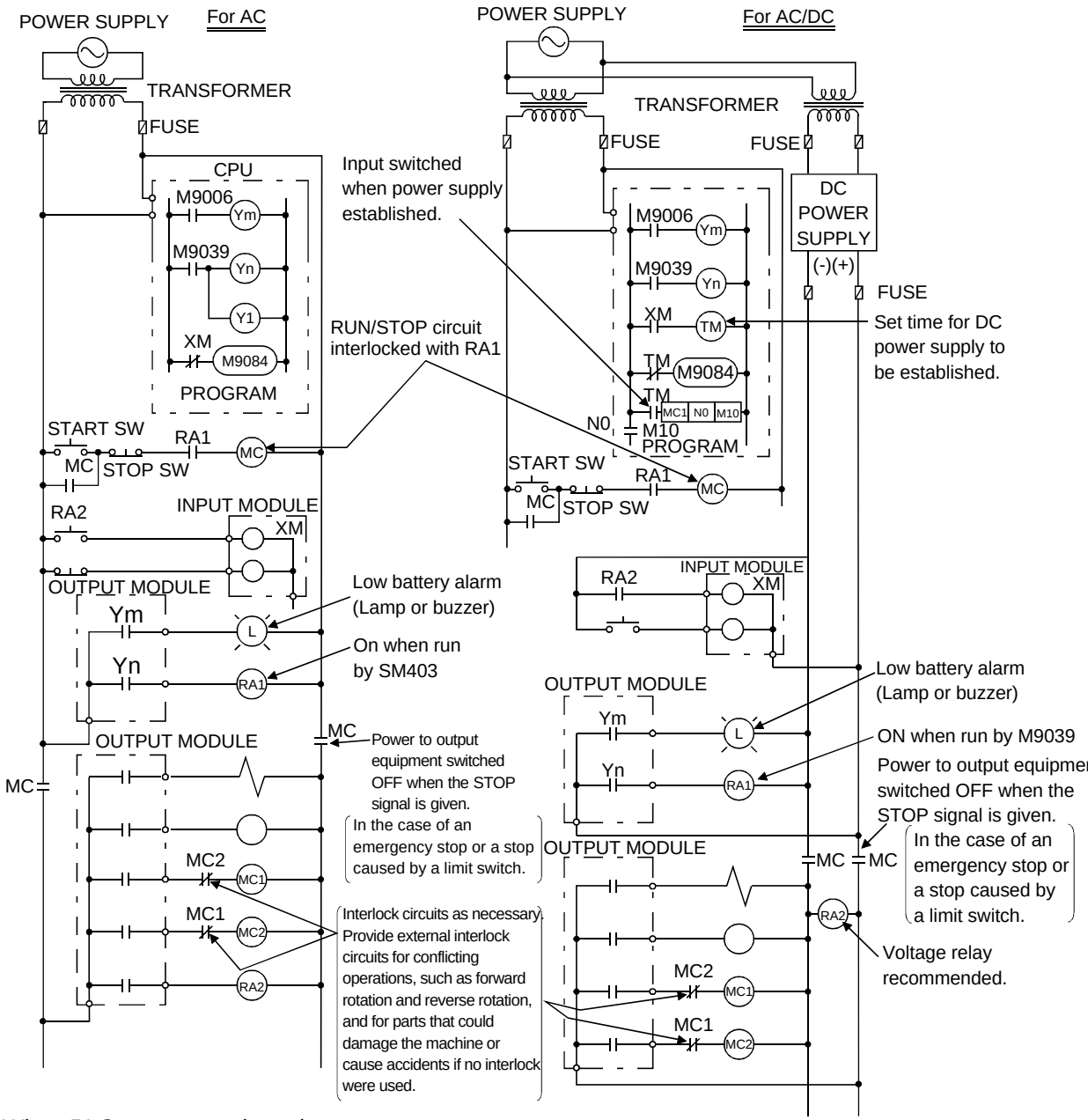
● When PLC power supply is AC and output power supply is DC

(1) Switch power ON.
(2) Set CPU to RUN. $\overline{\text{ERR}}$ contact turns ON.
(3) When DC power is established, RA2 goes ON.
(4) Timer (TM) times out after the DC power reaches 100%. (The TM set value should be the period of time from when RA2 goes ON to the establishment of 100% DC voltage. Set this value to approximately 0.5 seconds.)
(5) Turn ON the start switch.
(6) When the magnetic contactor (MC) comes on, the output equipment is powered and may be driven by the program. (If a voltage relay is used at RA2, no timer (TM) is required in the program.)

The power-ON procedure is as follows:

Note: Only the $\overline{\text{ERR}}$ contact of the power supply module loaded in the main base is valid. The $\overline{\text{ERR}}$ contact of the power supply module loaded in the extension base cannot be used.

● When using A mode



● When PLC power supply and output power supply are both AC

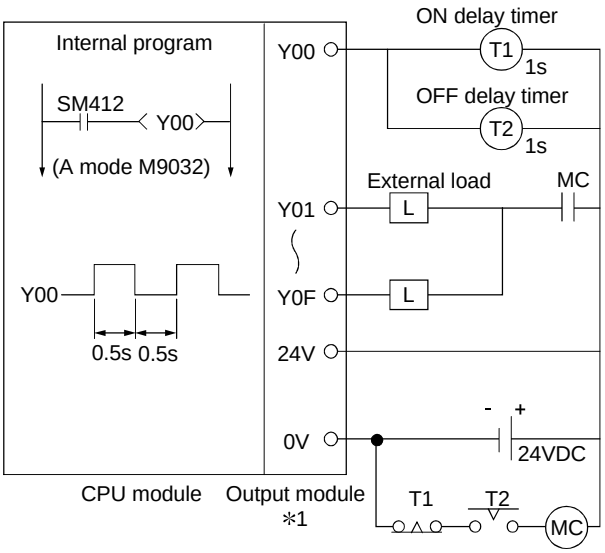
(1) Switch power ON.
(2) Set CPU to RUN.
(3) Turn ON the start switch.
(4) When the magnetic contactor (MC) comes on, the output equipment is powered and may be driven by the program.

● When PLC power supply is AC and output power supply is DC

(1) Switch power ON.
(2) Set CPU to RUN.
(3) When DC power is established, RA2 goes ON.
(4) Timer (TM) times out after the DC power reaches 100%. (The TM set value should be the period of time from when RA2 goes ON to the establishment of 100% DC voltage. Set this value to approximately 0.5 seconds.)
(5) Turn ON the start switch.
(6) When the magnetic contactor (MC) comes on, the output equipment is powered and may be driven by the program. (If a voltage relay is used at RA2, no timer (TM) is required in the program.)

■ Fail-safe measures against failure of the PLC

Failure of a PLC CPU or memory can be detected by the self diagnosis function. However, failure of I/O control area may not be detected by the CPU.
In such a case, all I/O points turn ON or OFF depending on a condition of a failure, and normal operation and safety may not be maintained.
Though Mitsubishi PLCs are manufactured under strict quality control, configure an external fail-safe circuit so that a PLC failure occurring for some reason would not lead to machine damage or accidents.



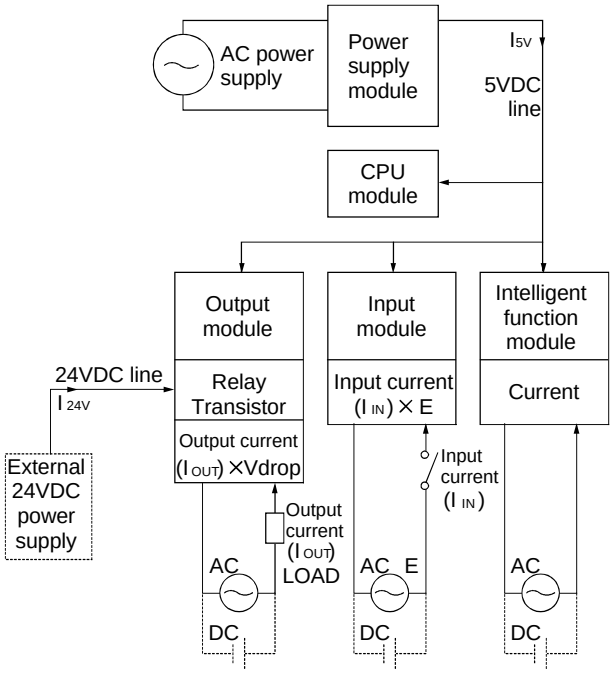
*1: Y00 alternates between ON and OFF at 0.5 second intervals.
Use a no-contact output module (transistor in the example shown above).

PLC Generated Heat Calculation

The temperature inside an enclosure containing the PLC must be kept below the operating ambient temperature given in the general specifications. Hence, heat in the panel must be calculated from the average power consumption of the equipment contained therein. This section explains how to find the average power consumption of the Q series system. Calculate an in-panel temperature rise from the power consumption.

■ Calculation of average power consumption

Power is consumed by the following PLC areas.



● Power consumption of power supply module
Approximately 70% of the power supply module current is converted into power, with the remaining 30% dissipated as heat, i.e. 3/7 of the output current is used by the power supply module. Therefore, the calculation expression is as follows.

$$Wpw = \frac{3}{7} \times (I_{5V} \times 5) \ (W)$$

I_{5V}: 5VDC current consumption of each module

● Total 5VDC circuit power consumption of modules
The 5VDC output circuit power of the power supply module is the total power consumption of the modules.

$$W_{5V} = I_{5V} \times 5$$

● Total 24VDC average power consumption of output module (power consumption of points switched on simultaneously)
The average power of the external 24VDC power supply is the total current consumption of the modules.

$$W_{24V} = I_{24V} \times 24(W)$$

● Average current consumption due to output section drop voltage of output module (power consumption of points switched on simultaneously)

$W_{OUT} = I_{OUT} \times Vdrop \times$ number of output points $\times$ simultaneous ON ratio (W)

I_{OUT} : Output current (actual operating current) (A)

Vdrop : Drop voltage of each output module (V)

● Input section average power consumption of input module (power consumption of points switched on simultaneously)

$W_{IN} = I_{IN} \times E \times$ number of input points $\times$ simultaneous ON ratio (W)

I_{IN} : Input current (effective value for AC) (A)

E : Input voltage (actual operating voltage) (V)

● Power consumption of intelligent function module power supply section when Q mode is used

$W_S = I_{5V} \times 5 \times I_{24V} \times 24 \times I_{100V} \times 100$ (W)

● Power consumption of whole PLC system

The sum of the above values is the power consumption of the entire PLC system.

$W = W_{pw} + W_{5V} + W_{24V} + W_{OUT} + W_{IN} + W_S$ (W)

Further calculations are necessary to work out the heat generated and a temperature rise in the panel.
Generally a temperature rise in the panel is expressed as follows.

$$T = \frac{W}{UA} [^{\circ}C]$$

W : Power consumption of the entire PLC system (obtained as above)

A : Panel inside surface area [m^2]

U : if the panel temperature is uniform….6
if the panel air is not circulated…….4

POINT
If the temperature rise in the enclosure exceeds the specified range, it is recommended to install a heat exchanger to lower the temperature in the panel. If an ordinary fan is used, it will suck not only external air but also dust, etc. Note that conductive dust, etc. may affect the PLC.

Base Module Mounting

■ Mounting instructions

Note the following when mounting the PLC in an enclosure, etc.

(1) Leave a minimum of 30mm(1.18inch) clearance above the PLC to ensure proper ventilation and ease of module replacement.

(2) The PLC must not be installed on its side, horizontally or to a ceiling to ensure proper ventilation.

(3) Ensure that the surface on which the base is to be mounted is flat to prevent possible flexing of the printed circuit boards.

(4) Do not mount the PLC close to sources of vibration like large magnetic contactors or no-fuse breakers.

(5) Use wiring conduits where appropriate.
For installations with conduit running closer to the PLC than the clearances shown on the next page, note the following.

1) When used above the PLC, the conduit should be less than 50mm(1.97inch) deep to allow proper ventilation.
Leave an adequate clearance above the PLC to tighten or remove the mounting screws in the module top. Module replacement cannot be made if the mounting screws cannot be accessed.

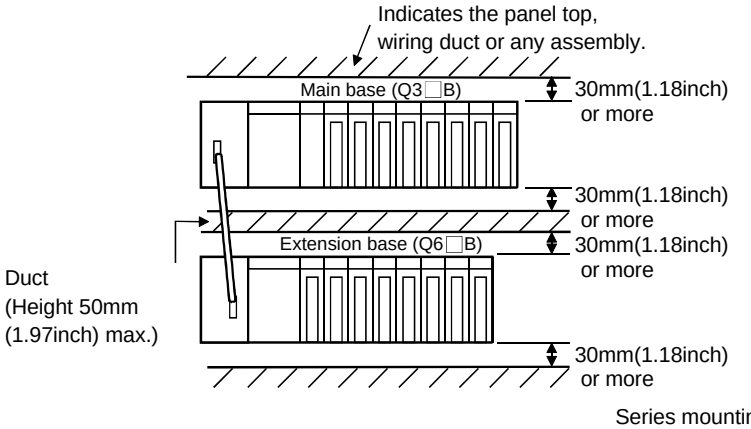
2) When used below the PLC, ensure that there is an adequate clearance for the 100/200VAC input cable of the power supply module and the I/O and 12/24VDC cables of the I/O modules.

(6) Equipment fitted before the PLC (fitted at the back of the panel door) should be installed at least 100mm (3.94 inch) away from the PLC to protect it from radiated noise and heat.
Also, any equipment on either side of the base module should be at least 50mm (1.97 inch) away from the base module.

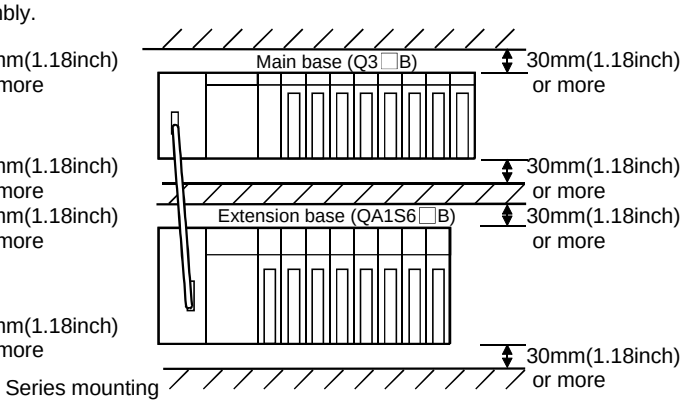
Loading and Installation

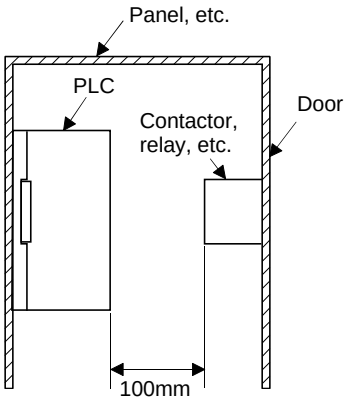
■ Mounting

(1) When using Q6□B extension base

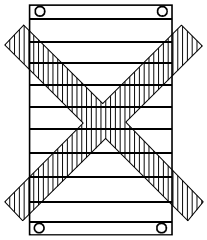


(2) When using QA1S6□B extension base

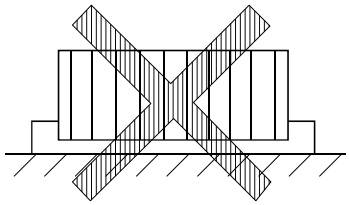




PLC front clearance from equipment



Vertical mounting (Not allowed)



Horizontal mounting (Not allowed)

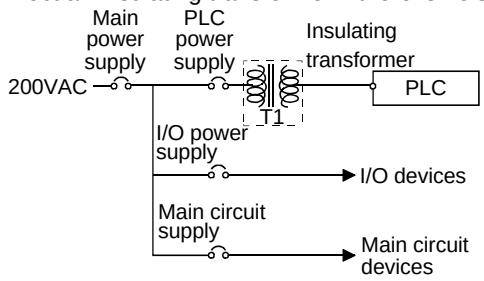
Wiring

■ Wiring instructions

This section gives the instructions for wiring the power supply and I/O cables.

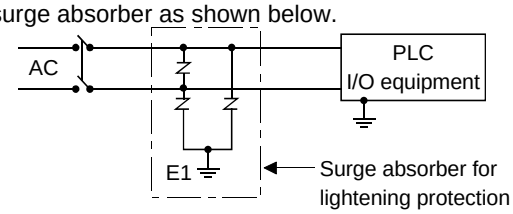
● Power supply wiring

(1) Wire the PLC power supply, I/O equipment and other equipment in separate lines as shown below.
Connect an insulating transformer if there is noise.



(2) The 100VAC, 200VAC and 24VDC cables should be twisted as tightly as possible in the shortest possible length.
Use the largest possible gauge (max. 2mm^2) to minimize any voltage drop.

(3) As a measure against surges due to lightning, use a surge absorber as shown below.

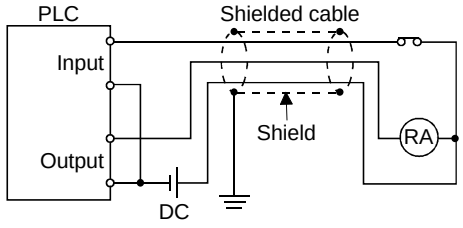


POINTS

(1) Ground the surge absorber (E_1) and PLC (E_2) separately.
(2) When selecting a surge absorber, make due allowance for increases in the power supply voltage.

● I/O equipment wiring

(1) Run the input and output lines separately.
(2) When the I/O signal cables cannot be separated from the main circuit and power lines, use a batch-shielded cable grounded at the PLC end, or in some cases, at the opposite end.

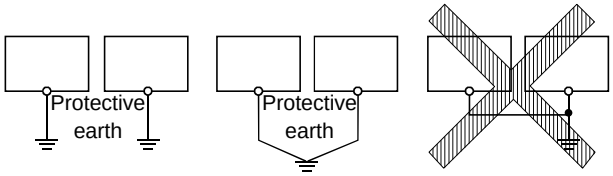


(3) Where wiring runs through piping, securely ground the piping.
(4) Run the 24VDC I/O cables separately from 100VAC and 200VAC cables.
(5) Wiring over 200m (656.17ft.) or further may give rise to leakage currents due to the line capacity, causing false inputs. This must be corrected by taking proper measures.

● Grounding

The way of grounding indicates below ((1), (2) and (3)).

(1) Where possible, independently ground the PLC to the protective earth conductor. (Grounding resistance 100Ω max.)
(2) When independent grounding is impossible, use the shared grounding method shown in 2).



1) Independent grounding ... Best
2) Shared grounding ... Good
3) Shared grounding ... Not allowed

(3) Use 2mm^2 or larger grounding wire. The grounding points should be as near as possible to the PLC to minimize the grounding cable length.

6 COMPATIBILITY WITH THE Y2K PROBLEM

Compatibility of MELSEC Q Series CPU Modules with the Y2K Problem

Both the Q and A mode CPUs of the Q series will operate properly in and after the year 2000. Compatibility with the year 2000 (Y2K) problem will be described below. It should be noted that there are differences in compatibility between the Q and A mode CPUs.

Q mode CPU	Q02CPU, Q02HCPU, Q06HCPU, Q12HCPU, Q25HCPU
A mode CPU	Q02CPU-A, Q02HCPU-A, Q06HCPU-A

Q Mode CPU

■ Clock timing range

The timing range of the Q mode CPU clock function is from January 1, 1980 to December 31, 2079.

■ Leap year date compensation

The Q mode CPU automatically compensates for a leap day within the above timing range.

■ Recognition of years in and after 2000

The Q mode CPU has four-digit year data. It will not mistake the year 2000 for 1900 if you create a sequence program which will handle the year data in four digits.

A Mode CPU

■ Clock timing range

The A mode CPU clock function has only two-digit year data. Namely, it times from January 1, 00 to December 31, 99 in every century and cannot recognize differences between 1900, 2000 and 2100.

■ Leap year date compensation

The A mode CPU makes automatic leap year compensation correctly until February 28, 2100. Though there is no leap day of February 29, 2100, the CPU times as if there is a leap day, so the clock data must be re-set on March 1, 2100.

■ Recognition of years in and after 2000

As described above, the A mode CPU has only two-lower-digit year data. When the year data is handled in a sequence program, proper processing may not be performed depending on the way of handling.
For example, when years are compared to know whether one is greater or less than the other, comparison in the two lower digits will lead to the judgment that 2000 is older than 1999.

In a system where a personal computer or similar external device reads the A mode CPU devices via the computer link module, MELSECNET(II)/10 module or the like to perform result management, the data in and after 2000 will be handled as older than the data prior to 2000 if the clock data of the A mode CPU has also been rearranged into the reading time series.
In such a case, the application program of the external device must be modified to handle the year data in four digits. A general way often used to change the year data from two digits to four digits is to add "19" in front of the two-lower-digit year data of "50 to 99" and convert it into four digits of "19□□" or to add "20" in front of the two-digit data of "00 to 49" and convert it into four digits of "20□□".

MELFANSweb: Information retrieval and communication on the Internet

● Product lineup

Introduces the outlines of our products per series. This is useful to get the entire picture, e.g. product types.

● New products

Introduces products released recently or to be released soon.

● Standard-compliant products

Introduces products which comply with various standards, such as explosion-proof and shipborne products, and with foreign standards, such as UL and EN.

● Product details

Provides detailed information on individual products such as specifications, functions, features, wiring examples and outline dimensional drawings. These can be exported as images.

● Manual guidance

Offers information on the manuals packed with the products and optional manuals, e.g. updated version and new product-compatible manual lists.

● What's New

Notice of items recently added or changed. Use this when you want to know only the newest information.

● Announcement

Notice of expansion plans, etc. from the MELFANSweb. View this from time to time.

● Contact

Introduces the locations and handling models of the Japanese domestic and overseas sales sites (branches, etc.) and service sites.

URL http://www.nagoya.melco.co.jp/english/

Q Mode Model List

CPU Modules (Q Mode)

Product		Type	Outline
CPU module		Q02CPU	I/O points: 4096 Program capacity: 28K steps Basic instruction 79ns
		Q02HCPU	I/O points: 4096 Program capacity: 28K steps Basic instruction 34ns
		Q06HCPU	I/O points: 4096 Program capacity: 60K steps Basic instruction 34ns
		Q12HCPU	I/O points: 4096 Program capacity: 124K steps Basic instruction 34ns
		Q25HCPU	I/O points: 4096 Program capacity: 252K steps Basic instruction 34ns
		13JL97	QCPU (Q mode) Hardware Design/Maintenance and Inspection Manual (optional)
		13JL98	QCPU (Q mode) User's Manual (Function Explanation Program Fundamentals) (optional)
		13JF58	QCPU (Q mode)/QnACPU Programming Manual (Common Instructions) (optional)
		13JF60	QCPU (Q mode)/QnACPU Programming Manual (SFC) (optional)
		13JF61	QCPU (Q mode) Programming Manual (MELSAP-L) (optional)
		13JF59	QCPU (Q mode)/QnACPU Programming Manual (PID Control Instructions) (optional)
		13JL96	QCPU (Q mode) User's Manual: Hardware (packed with Q3□B)
Battery		Q6BAT	Replacement battery
IC memory card		Q2MEM-1MBS	Small SRAM card Capacity: 1M bytes
		Q2MEM-2MBF	Small linear flash memory card Capacity: 2M bytes
		Q2MEM-4MBF	Small linear flash memory card Capacity: 4M bytes
		Q2MEM-8MBA	Small ATA card Capacity: 8M bytes
		Q2MEM-16MBA	Small ATA card Capacity: 16M bytes
		Q2MEM-32MBA	Small ATA card Capacity: 32M bytes
SRAM card battery		Q2MEM-BAT	Replacement battery, for Q2MEM-1MBS
Base module	Main	Q35B	Power supply + CPU + 5 slots for Q series I/O
		Q38B	Power supply + CPU + 8 slots for Q series I/O
		Q312B	Power supply + CPU + 12 slots for Q series I/O
	Extension	Q65B	Power supply + 5 - I/O slots, for Q series module loading
		Q68B	Power supply + 8 - I/O slots, for Q series module loading
		Q612B	Power supply + 12 - I/O slots, for Q series module loading
	Adapter	Q6DIN1	DIN rail mounting adapter, for Q38B/Q312B/Q68B/Q612B
		Q6DIN2	DIN rail mounting adapter, for Q35B/Q65B
Extension cable		QC06B	0.6m (19.69ft.) cable for Q65B/Q68B/Q612B connection
		QC12B	1.2m (3.98ft.) cable for Q65B/Q68B/Q612B connection
		QC30B	3m (9.84ft.) cable for Q65B/Q68B/Q612B connection
		QC50B	5m (16.4ft.) cable for Q65B/Q68B/Q612B connection
		QC100B	10m (32.81ft.) cable for Q65B/Q68B/Q612B connection
Power supply module		Q61P-A1	100-120VAC input/5VDC 6A output
		Q61P-A2	200-240VAC input/5VDC 6A output
AC input module		QX10	100-120VAC, input 16 points, input time constant: 20ms, terminal block
DC input module		QX40	24VDC positive common input, 16 points, input time constant 1/5/10/20/70ms, terminal block
		QX41	24VDC positive common input, 32 points, input time constant 1/5/10/20/70ms, connector
		QX42	24VDC positive common input, 64 points, input time constant 1/5/10/20/70ms, connector
		QX80	24VDC negative common input, 16 points, input time constant 1/5/10/20/70ms, terminal block
		QX81	24VDC negative common input, 32 points, input time constant 1/5/10/20/70ms, connector
Contact output module		QY10	240VAC/24VDC 2A, 16 points, without fuse, terminal block
Transistor output module		QY40P	12/24VDC 0.1A sink, 16 points, with short-circuit protection function, terminal block
		QY41P	12/24VDC 0.1A sink, 32 points, with short-circuit protection function, connector
		QY42P	12/24VDC 0.1A sink, 64 points, with short-circuit protection function, connector
		QY50	12/24VDC 0.5A sink, 16 points, with fuse, terminal block
		QY80	12/24VDC 0.5A source, 16 points, with fuse, terminal block
		QY81P	12/24VDC 0.1A source, 32 points, with short-circuit protection function, connector
Blank module		QG60	—
I/O module		13JL99	Q Series I/O Module User's Manual (optional)

Note 1: The purchase order number is indicated in the manual's Type field.

Q Mode Model List

Product	Type	Outline
Analog module	Q64AD	4 channels, analog-to-digital conversion: voltage/current input
	Q68ADV	8 channels, analog-to-digital conversion: voltage input
	Q68ADI	8 channels, analog-to-digital conversion: current input
	SW0D5C-QADU-E	Analog-to-digital converter module utility software
	13JR03	Q64AD, Q68ADV, A68ADI User's Manual (Details) (optional) (Note 1)
	13JQ51	Q64AD, Q68ADV, A68ADI User's Manual: Hardware (packed with product)
	Q62DA	2 channels, digital-to-analog conversion: voltage/current output
	Q64DA	4 channels, digital-to-analog conversion: voltage/current output
	SW0D5C-QDAU-E	Digital-to-analog converter module utility software
	13JR02	Q62DA, Q64DA User's Manual (Details) (optional) (Note 1)
	13JQ49	Q62DA, Q64DA User's Manual: Hardware (packed with product)
High-speed counter module	QD62	2 channels, 200kpps, 5/12/24VDC input, sink transistor output
	QD62D	2 channels, 500kpps, differential input, sink transistor output
	QD62E	2 channels, 200kpps, 5/12/24VDC input, source transistor output
	SW0D5C-QCTU-E	High-speed counter utility software
	13JL95	QD62, QD62D, QD62E User's Manual (Details) (optional) (Note 1)
	13JQ69	QD62, QD62D, QD62E User's Manual: Hardware (packed with product)
Positioning module	QD75P1	1 axis, open collector output
	QD75P2	2 axes, open collector output
	QD75P4	4 axes, open collector output
	QD75D1	1 axis, differential output
	QD75D2	2 axes, differential output
	QD75D4	4 axes, differential output
	SW0D5C-QD75P-E	QD75 positioning module software
	13JR09	QD75P/QD75D User's Manual (Details) (optional)
	13J973	QD75P/QD75D User's Manual: Hardware (packed with product)
	13JN62	SW0D5C-QD75P-E Operating Manual (optional) (Note 3)
MELSECNET/10H module	QJ71LP21	SI/QSI optical cable, dual loop
	QJ71BR11	Coaxial 75Ω cable, single bus
	13JF92	MELSECNET/10H Reference Manual (optional)
	13JQ48	QJ71LP21, QJ71BR11 User's Manual (packed with product)
CC-Link module	QJ61BT11	For master/local
	13JL91	QJ61BT11 User's Manual: Details (optional)
	13JQ41	QJ61BT11 User's Manual: Hardware (packed with product)
Ethernet module	QJ71E71	For 10BASE-5/10BASE-T
	QJ71E71-B2	For 10BASE-2
	13JL88	Ethernet Module User's Manual: Basic (optional)
	13JL89	Ethernet Module User's Manual: Applications (optional)
	13JF89	MC Protocol Reference Manual (optional)
	13JQ35	QJ71E71, QJ71E71-B2 User's Manual: Hardware (packed with product)
Serial communication module	QJ71C24	RS-232 1ch, RS-422/485 1ch
	QJ71C24-R2	RS-232 2ch
	SW0D5C-QSCU-E	Serial communication module utility software
	13JL86	Serial Communication Module User's Manual: Basic (optional) (Note 1)
	13JL87	Serial Communication Module User's Manual: Applications (optional)
	13JF89	MC Protocol Reference Manual (optional)
	13JQ31	QJ71C24, QJ71C241-R2 User's Manual: Hardware (packed with product)
Extension base module	QA1S65B	Power supply + 5 - I/O slots, for AnS series module loading
	QA1S68B	Power supply + 8 - I/O slots, for AnS series module loading
Extension cable	QC06B	0.6m(1.97ft.) cable for QA1S65B/QA1S68B connection
	QC12B	1.2m(3.93ft.) cable for QA1S65B/QA1S68B connection
	QC30B	3m(9.84ft.) cable for QA1S65B/QA1S68B connection
	QC50B	5m(16.39ft.) cable for QA1S65B/QA1S68B connection
	QC100B	10m(32.79ft.) cable for QA1S65B/QA1S68B connection
AnS series module	In addition to the above modules, the AnS series modules can be loaded and used in the QA1S65B/QA1S68B. Refer to the AnS series module model list.	

Note 1: User's manual includes explanations of the corresponding utility software. Also, the user's manual (details) is included the corresponding utility software in the PDF format.
Note 2: The purchase order number is indicated in the manual's Type field.
Note 3: The PDF format manual is included in the software product.

A Mode Model List

Product		Type	Outline
CPU module for A mode		Q02CPU-A	I/O points: 4096 Program capacity: 28K steps Basic instruction 79ns
		Q02HCPU-A	I/O points: 4096 Program capacity: 28K steps Basic instruction 34ns
		Q06HCPU-A	I/O points: 4096 Program capacity: 30K steps × 2 Basic instruction 34ns
		13JR10	QCPU (A mode) User's Manual: Details
		13J740	ACPU Programming Manual (Fundamentals)
		13J741	ACPU Programming Manual (Common Instructions)
		13J742	AnSHCPU/AnACPU/AnUCPU Programming Manual (Dedicated Instructions)
		13J743	AnA/AnUCPU Programming Manual (AD57 Instructions)
		13J744	AnA/AnUCPU Programming Manual (PID Control Instructions)
		13JF40	MELSAP-2 Programming Manual
		13JL96	QCPU (A mode) User's Manual: Hardware (packed with QA1S3□B)
Battery		Q6BAT	Replacement battery
IC memory card		Q2MEM-1MBS	Small SRAM card Capacity: 1M bytes
SRAM card battery		Q2MEM-BAT	Replacement battery, for Q2MEM-1MBS
Base module	Main	QA1S35B	Power supply + CPU + 5-I/O slots for AnS series module loading
		QA1S38B	Power supply + CPU + 8-I/O slots for AnS series module loading
	Extension	QA1S65B	Power supply + 5 I/O slots for AnS series module loading
		QA1S68B	Power supply + 8 I/O slots for AnS series module loading
Extension cable		QC06B	0.6m(1.97ft.) cable for QA1S65B/QA1S68B connection
		QC12B	1.2m(3.93ft.) cable for QA1S65B/QA1S68B connection
		QC30B	3m(9.84ft.) cable for QA1S65B/QA1S68B connection
		QC50B	5m(16.39ft.) cable for QA1S65B/QA1S68B connection
		QC100B	10m(32.79ft.) cable for QA1S65B/QA1S68B connection
AnS series module		In addition to the above modules, the AnS series modules can be loaded and used in the QA1S65B/QA1S68B. Refer to the AnS series module model list.	

Note 1: The purchase order number is indicated in the manual's Type field.

Q/A Mode Common Model List

Product	Type	Outline	Compatible Mode	
			A	Q
For main/extension base	A1S61PN	100-240VAC input, 5VDC 5A output	○	○
	A1S62PN	100-240VAC input, 5VDC 3A/24VDC 0.6A output	○	○
	A1S63P	24VDC input, 5VDC 5A output	○	○
AC input module	A1SX10	100-120VAC, 16 points, terminal block	○	○
	A1SX10EU	100-120VAC, 16 points, terminal block	○	○
	A1SX20	200-240VAC, 16 points, terminal block	○	○
	A1SX20EU	200-240VAC, 16 points, terminal block	○	○
AC/DC input module	A1SX30	12/24VAC, 12/24VDC, 16 points, terminal block	○	○
DC input module	A1SX40	12/24VDC, 16 points, terminal block (sink)	○	○
	A1SX40-S1	24VDC, 16 points, terminal block, for high-speed input (sink)	○	○
	A1SX40-S2	24VDC, 16 points, terminal block, for high leakage current sensor (sink)	○	○
	A1SX41	12/24VDC, 32 points, connector (sink)	○	○
	A1SX41-S1	24VDC, 32 points, connector, for high-speed input (sink)	○	○
	A1SX41-S2	24VDC, 32 points, connector, for high leakage current sensor (sink)	○	○
	A1SX42	12/24VDC, 64 points, connector (sink)	○	○
	A1SX42-S1	24VDC, 64 points, connector, for high-speed input (sink)	○	○
	A1SX42-S2	24VDC, 64 points, connector, for high leakage current sensor (sink)	○	○
	A1S42X	24VDC dynamic, 64 points, connector (sink)	○	○
TTL-CMOS input module	A1SX71	5/12VDC, 32 points, connector (sink/source)	○	○
DC input module	A1SX80	12/24VDC, 16 points, terminal block for high-speed input (sink/source)	○	○
	A1SX80-S1	24VDC, 16 points, terminal block, for high-speed input (sink/source)	○	○
	A1SX80-S2	24VDC, 16 points, terminal block, for high leakage current sensor (sink/source)	○	○
	A1SX81	12/24VDC, 32 points, connector (sink/source)	○	○
	A1SX81-S2	24VDC, 32 points, connector, for high leakage current sensor (sink/source)	○	○
	A1SX82-S1	24VDC, 64 points, connector (sink/source)	○	○
Contact output module	A1SY10	240VAC/24VDC 2A, 16 points, terminal block	○	○
	A1SY10EU	240VAC/24VDC 2A, 16 points, terminal block	○	○
	A1SY14EU	240VAC/24VDC 2A, 12 points, terminal block	○	○
	A1SY18A	240VAC/24VDC 2A, 8 independent contact output points, terminal block	○	○
	A1SY18AEU	240VAC/24VDC 2A, 8 points, terminal block	○	○
Triac output module	A1SY22	100-240VAC 0.6A, 16 points, terminal block, with fuse	○	○
	A1SY28A	100-240VAC 1A, 8 points, all points independent	○	○
	A1SY28EU	100-240VAC 0.6A, 8 points, 4 points/common	○	○
Transistor output module	A1SY40	12/24VDC 0.1A, 16 points, terminal block, with fuse (sink)	○	○
	A1SY41	12/24VDC 0.1A, 32 points, connector, with fuse (sink)	○	○
	A1SY42	12/24VDC 0.1A, 64 points, connector, with fuse (sink)	○	○
	A1S42Y	12/24VDC 0.1A dynamic, 64 points, connector, with fuse (sink)	○	○
	A1SY50	12/24VDC 0.5A, 16 points, terminal block, with fuse (sink)	○	○
	A1SY60	24VDC 2A, 16 points, terminal block, with fuse (sink)	○	○
	A1SY68A	5/12/24/48VDC 2A, 8 points, terminal block, all points independent	○	○
TTL-CMOS output module	A1SY71	5/12VDC, 32 points, transistor 16mA, connector, with fuse (sink)	○	○
Transistor output module	A1SY80	12/24VDC 0.8A, 16 points, terminal block, with fuse (source)	○	○
	A1SY81	12/24VDC 0.1A, 32 points, connector, with fuse (source)	○	○
	A1SY81EP	12/24VDC 0.1A, 32 points, short-circuit protection (source)	○	○
	A1SY82	12/24VDC 0.1A, 64 points, connector, with fuse	○	○
	A1S60E	5/12/24VDC 2A, 16 points, terminal block, with fuse (source)	○	○
DC input transistor output module	A1SH42	12/24VDC, 32 input points, 32 output points 0.1A, connector, with fuse (source)	○	○
	A1SH42-S1	24VDC, 32 high-speed input points, 32 output points 0.1A, connector, with fuse	○	○
	A1SX48Y58	24VDC, 8 input points, transistor 0.5A, 8 output points, terminal block	○	○
DC input, contact output module	A1SX48Y18	24VDC, 8 input points, 2A contact, 8 output points, terminal block	○	○

Note 1: Compatible mode ○: Usable, △: Usable with restriction, ×: Unusable, —: External accessory

Q/A Mode Common Model List

Product	Type	Outline			Compatible Mode	
					A	Q
High-speed counter	A1SD61	DC input, 50kpps, 1 channel			○	○
	A1SD62	DC input, 100kpps, 2 channels			○	○
	A1SD62D	Differential input (preset DC input), 200kpps, 2 channels			○	○
	A1SD62D-S1	Differential input (preset differential input), 200kpps, 2 channels			○	○
	A1SD62E	DC input, source output type, 100kpps, 2 channels			○	○
Analog-to-digital converter module	A1S64AD	Analog input, 4 channels			○	○
	A1S68AD	Analog input, 8 channels			○	○
Digital-to-analog converter module	A1S62DA	Analog output, 2 channels			○	○
	A1S68DAV	0 to ±10V, analog output, 8 channels			○	○
	A1S68DAI	4-20mA, analog output, 8 channels			○	○
Temperature-digital converter module	A1S62RD3	Pt100 (3 wire type), 2 channels			○	○
	A1S62RD4	Pt100 (4 wire type), 2 channels			○	○
	A1S68TD	Thermocouple input, 8 channels			○	○
Analog I/O module	A1S63ADA	Analog input 2 channels, analog output 1 channel			○	○
	A1S66ADA	Analog input 4 channels, analog output 2 channels			○	○
Temperature control module	A1S64TCTT-S1	Thermocouple input/transistor output, 4 channels			○	○
	A1S64TCTTBW-S1	Thermocouple input/transistor output, 4 channels, with heater wire breakage detection function			○	○
	A1S64TCRT-S1	Pt100 input/transistor output, 4 channels			○	○
	A1S64TCRTBW-S1	Pt100 input/transistor output, 4 channels, with heater wire breakage detection function			○	○
Temperature control module	A1S62TCTT-S2	Thermocouple input/transistor output (heating/cooling), 2 channels			○	○
	A1S62TCTTBW-S2	Thermocouple input/transistor output (heating/cooling), 2 channels, with heater wire breakage detection function			○	○
	A1S62TCRT-S2	Pt100 input/transistor output (heating/cooling), 2 channels			○	○
	A1S62TCRTBW-S2	Pt100 input/transistor output (heating/cooling), 2 channels, with heater wire breakage detection function			○	○
Pulse catch module	A1SP60	Pulse catch function, 16 point input			○	○
Analog timer module	A1ST60	8 timer points			○	○
Interrupt module	A1SI61	Interrupt input, 16 points			○	○
Computer link module	A1SJ71UC24-R2	RS-232, 1 channel			○	×
	A1SJ71UC24-R4	RS-422/RS-485, 1 channel			○	×
	A1SJ71UC24-PRF	Computer link/printer function, RS-232C, 1 channel			○	×
Positioning module	A1SD70	Analog output, 1 axis			○	○
	A1SD71-S2	Pulse train output, 2 axes			○	○
	A1SD71-S7	Pulse train output, 2 axes, manual pulse generator usable				
	A1SD75M1	SSC network compatible	1 axis	2 axes (linear/circular interpolation) Absolute system/incremental system/speed-position switching control		
	A1SD75M2		2 axes			
	A1SD75M3		3 axes			
	A1SD75P1-S3	Pulse train output	1 axis	2 axes (linear/circular interpolation) -2147483648 to 2147483647 pulses		
	A1SD75P2-S3		2 axes			
	A1SD75P3-S3		3 axes			
	A1SD774M	4 axes, motion control module			○	○
A1SD75 cable	A1SD75-C01HA	D-Sub 25-pin/half-pitch D-Sub conversion adapter cable			—	—
Teaching module	AD75TU	For AD75/A1SD75			—	—
Positioning module-servo amplifier connection cable	AD75C20SH	A1SD75P□-Mitsubishi MR-H□A connection cable (2m (6.56ft.))			—	—
	AD75C20SJ	A1SD75P□-Mitsubishi MR-J□A connection cable (2m (6.56 ft.))			—	—
	AD75C20SJ2	A1SD75P□-Mitsubishi MR-J2□A connection cable (2m (6.56 ft.))			—	—
	AD75C20SC	A1SD75P□-Mitsubishi MR-C□A connection cable (2m (6.56 ft.))			—	—
MELSECNET/MINI-S3	A1SJ71PT32-S3	Master module for optical/twisted pair cables			○	△
	A1SJ71T32-S3	Master module for twisted pair cables only			○	△
MELSECNET(II)	A1SJ71AP21	For master/local, SI/QSI optical cable, duplex loop			○	×
	A1SJ71AR21	For master/local, coaxial 75Ω cable, duplex loop			○	×
MELSECNET/B	A1SJ71AT21B	For master/local module, twisted pair			○	×
	A1SJ71T25B	Remote I/O module, twisted pair			○	×

Note 1: Compatible mode ○: Usable, △: Usable with restriction, ×: Unusable, —: External accessory

Q/A Mode Common Model List

Product	Type	Outline	Compatible Mode	
			A	Q
MELSECNET/10	A1SJ71LP21	SI/QSI optical cable, duplex loop, for control/ordinary/master station	○	×
	A1SJ71BR11	Coaxial 75Ω cable, simplex bus, for control/ordinary/master station	○	×
	A1SJ72QLP25	SI/QSI optical cable, duplex loop, for remote I/O station	○	×
	A1SJ72QBR15	Coaxial 75Ω cable, simplex bus, for remote I/O station	○	×
	A6BR10	Repeater for coaxial bus, 100-240VAC power supply	—	—
	A6BR10-DC	Repeater for coaxial bus, 240VDC power supply	—	—
	A6RCON-R75	75Ω termination resistor for coaxial bus	—	—
Ethernet module	A1SJ71E71-B2-S3	Ethernet interface module (10BASE2)	○	×
	A1SJ71E71-B5-S3	Ethernet interface module (10BASE5)	○	×
CC-Link module	A1SJ61BT11	Master/local module, for twisted pair	○	×
I/O Link master module	A1SJ51T64	Master module, twisted pair/ cabtire cable	○	○
JEMANET	A1SJ71J92-S3	JPCN-1 master module, twisted pair	○	△
	A1SJ72J95	JPCN-1 slave module, twisted pair	○	○
B/NET module	A1SJ71B62-S3	Power distribution control equipment transmission signal unit interface module for B/NET	○	△
S-LINK master module	A1SJ71SL92	Max. 128 control I/O points, S-LINK master module	○	○
Intelligent communication module	A1SD51S	Intelligent communication module	○	△
Modbus	A1SJ71UC24-R2-S2	Modbus ASCII/RTU slave, RS-232 × 1ch	○	△
	A1SJ71UC24-R4-S2	Modbus ASCII/RTU slave, RS-422/485 × 1ch	○	△
Profibus	A1SJ71PB96F	Profibus-FMS, Client or Server	○	△
	A1SJ71PB92D	Profibus-DP, Master	○	○
DeviceNet	A1SJ71DN91	DeviceNet, Master	○	○
Position detection module	A1S62LS	Absolute position detection by dedicated sensor	○	○
PLC simple monitoring module	A1SS91	PLC simple monitoring module	○	○
Memory card interface module	A1SD59J-S2	Memory card interface module	○	○
	A1SD59J-MIF	Memory card module	—	—
	AC20MIF-L	Connection cable 2m (6.56ft.)	—	—
ID interface module (Note 2)	A1SJ71ID1-R4	ID reader/writer interface module, 1 channel	○	△
	A1SJ71ID2-R4	ID reader/writer interface module, 2 channels	○	△
	A1SD32ID1	ID reader/writer interface module, 1 channel	○	○
	A1SD32ID2	ID reader/writer interface module, 2 channels	○	○
Blank cover	A1SG60	Blank cover for I/O slot	○	○
	A1SG62	16/32/64 point dummy module	○	○
AnS conversion adapter	A1S-TA32	32-point crimp-contact terminal block adapter 0.5mm^2 (AWG20)	—	—
	A1S-TA32-3	32-point crimp-contact terminal block adapter 0.3mm^2 (AWG22)	—	—
	A1S-TA32-7	32-point crimp-contact terminal block adapter 0.75mm^2 (AWG18)	—	—
	A1S-TB32	32-point screw terminal block adapter 0.14mm^2 to 0.75mm^2 (AWG26 to 18)	—	—

Note 1: Compatible mode ○: Usable, △: Usable with restriction, ×: Unusable, —: External accessory
Note 2: Please confirm compliance of the ID products to local laws and regurations for radio transmitting devices.

Accessories Shared Among Q/AnS Series I/O

Product			Type	Outline		
Connector/terminal block converter module			A6TBXY36	Sink type input module, sink type output module (standard type)		
			A6TBXY54	Sink type input module, sink type output module (2-wire type)		
			A6TBX70	For sink type input module (3-wire type)		
			A6TBX36-E	For source type input module (standard type)		
			A6TBY36-E	For source type output module (standard type)		
			A6TBY54-E	Source module input module (2-wire type)		
Connector/terminal block converter module			A6TBX54-E	Source module output module (2-wire type)		
			A6TBX70-E	Source module input module (3-wire type)		
Cable			AC05TB	For 0.5m (1.64ft.) sink module		
			AC10TB	For 1m (3.28ft.) sink module		
			AC20TB	For 2m (6.56ft.) sink module		
			AC30TB	For 3m (9.84ft.) sink module		
			AC50TB	For 5m (16.40ft.) sink module		
			AC80TB	For 8m (26.25ft.) sink module (common current 0.5A max.)		
			AC100TB	For 10m (32.80ft.) sink module (common current 0.5A max.)		
			AC05TB-E	For 0.5m (1.64ft.) sink module		
			AC10TB-E	For 1m (3.28ft.) sink module		
			AC20TB-E	For 2m (6.56ft.) sink module		
			AC30TB-E	For 3m (9.84ft.) sink module		
			AC50TB-E	For 5m (16.40ft.) sink module		
Relay terminal module			A6TE2-16SRN	Relay terminal module		
	Cable		AC06TE	Cable for relay terminal module connection	Cable length 0.6m (1.97ft.)	Application to AY42, AY42-S1, AY42-S4, AH42, A1SY41, A1SY42, A1SH42
			AC10TE		Cable length 1m (3.28ft.)	
			AC30TE		Cable length 3m (9.84ft.)	
			AC50TE		Cable length 5m (16.40ft.)	
			AC100TE		Cable length 10m (32.80ft.)	
I/O connector	For sink	Soldering	A6CON1	Soldering 32-point connector (standard equipped)		40-pin connector
		For crimp contact	A6CON2	Crimp-contact connection 32-point connector		
		For pressure displacement	A6CON3	Flat cable pressure-displacement 32-point connector		
	For source	Soldering	A6CON1E	Soldering 32-point connector		31-pin D-sub connector
		For crimp contact	A6CON2E	Crimp-contact connection 32-point connector		
		For pressure displacement	A6CON3E	Flat cable pressure-displacement 32-point connector		

Product	Type	Outline
Input module	AJ65BTB1-16D	16 points, 24VDC (7mA), 1-wire type, terminal block type
	AJ65BTB2-16D	16 points, 24VDC (7mA), 2-wire type, terminal block type
	AJ65BTC1-32D	32 points, 24VDC (7mA), 1-wire type, connector type
Output module	AJ65BTB1-16T	16 points, 24VDC (0.5A), transistor output, 1-wire type, terminal block type
	AJ65BTB2-16T	16 points, 24VDC (0.5A), transistor output, 2-wire type, terminal block type
	AJ65BTC1-32T	32 points, 24VDC (0.5A), transistor output, 1-wire type, connector type
	AJ65BTB2-16DR	16 points, 24VDC/240VAC (2A), relay contact output, 2-wire type, terminal block type
I/O composite module	AJ65BTB1-16DT	8 input points, 24VDC (7mA), 8 output points, 24VDC (0.5A), transistor output, 1-wire type, terminal block
	AJ65BTB2-16DT	8 input points, 24VDC (7mA), 8 output points, 24VDC (0.5A), transistor output, 2-wire type, terminal block
	AJ65BTB2-16DR	8 input points, 24VDC (7mA), 8 output points, 24VDC/240VAC (2A), relay contact output, 2-wire type, terminal block
Small input module	AJ65SBTB1-8D	8 points, 24VDC (7mA), 1-wire type, response time 1.5ms, terminal block type
	AJ65SBT1-16D	16 points, 24VDC (7mA), 1-wire type, response time 1.5ms, terminal block type
	AJ65SBTB1-16D1	16 points, 24VDC (5mA), 1-wire type, response time 0.2ms, terminal block type
	AJ65SBTB1-32D	32 points, 24VDC (7mA), 1-wire type, response time 1.5ms, terminal block type
	AJ65SBTB1-32D1	32 points, 24VDC (5mA), 1-wire type, response time 0.2ms, terminal block type
	AJ65SBTC1-32D	32 points, 24VDC (5mA), 1-wire type, response time 1.5ms, one-touch connector type (plug optional)
	AJ65SBTC1-32D1	32 points, 24VDC (5mA), 1-wire type, response time 0.2ms, one-touch connector type (plug optional)
	AJ65SBTC4-16D	16 points, 24VDC (5mA), 2-, 3-, 4-wire type, response time 1.5ms, one-touch connector type (for 8 sensors) (shared between sink and source: selected by switch) (plug: optional)
	AJ65SBTCF1-32D	32 points, 24VDC (5mA), 1-wire type, response time 1.5ms, FCN connector type
	AJ65SBTW4-16D	16 points, 24VDC (5mA), response time 1.5ms, waterproof 4-wire type (for 8 sensors) (shared between sink and source: selected by switch) (cap: optional) (waterproof type)
Small output module	AJ65SBTB1-8T	8 points, 12/24VDC (0.5A), transistor output, 1-wire type, terminal block type
	AJ65SBTB1-16T	16 points, 12/24VDC (0.5A), transistor output, 1-wire type, terminal block type
	AJ65SBTB1-32T	32 points, 12/24VDC (0.5A), transistor output, 1-wire type, terminal block type
	AJ65SBTCF1-32T	32 points, 12/24VDC (0.1A), 1-wire type, transistor output, FCN connector type
	AJ65SBTC1-32T	32 points, 12/24VDC (0.1A), transistor output, 1-wire type, one-touch connector type (plug: optional)
	AJ65SBTB1-16T1	16 points, 12/24VDC (0.5A), 1-wire type, transistor output (OFF-time leakage current 0.1mA), terminal block type
	AJ65SBTB1-32T1	32 points, 12/24VDC (0.5A), 1-wire type, transistor output (OFF-time leakage current 0.1mA), terminal block type
	AJ65SBTB1-8TE	8 points, 12/24VDC (0.1A), 1-wire type, transistor output (source), terminal block type
	AJ65SBTB1-16TE	16 points, 12/24VDC (0.1A), 1-wire type, transistor output (source), terminal block type
	AJ65SBTB2-8A	8 points, 2-wire type 100VAC input, terminal block type
	AJ65SBTB2-16A	16 points, 2-wire type 100VAC input, terminal block type
	AJ65SBTB2-8R	8 points, 24VDC, 100 to 240VAC, 2-wire type relay output, terminal block type
	AJ65SBTB2-16R	16 points, 24VDC, 100 to 240VAC, 2-wire type relay output, terminal block type
Small I/O composite module	AJ65SBTB1-32DT	16 points, 24VDC (7mA), 1-wire type, response time 1.5ms 16 points, 24VDC (0.5A), 1-wire type, transistor output, terminal block type
	AJ65SBTC1-32DT	16 input points, 24VDC (5mA), 1-wire type, response time 1.5ms (plug: optional) 16 output points, 24VDC (0.1A), transistor output, 1-wire type, one-touch connector type
	AJ65SBTC1-32DT1	16 input points, 24VDC (5mA), 1-wire type, response time 0.2ms (plug: optional) 16 output points, 24VDC (0.1A), transistor output, 1-wire type, one-touch connector type
	AJ65SBTC4-16DT	8 input points, 24VDC (5mA), 2-, 3-, 4-wire type, response time 1.5ms (for 8 sensors) (plug: optional) 8 output points, 24VDC (0.1A), transistor output, 1-, 2-, 3-wire type, one-touch connector type
	AJ65SBTCF1-32DT	16 points, 12/24VDC (5mA), 1-wire type, response time 1.5ms 16 points, 12/24VDC (0.1A), 1-wire type, transistor output, FCN connector type
	AJ65SBTW4-16DT	8 input points, 24VDC (5mA), response time 1.5ms (for 8 sensors) 8 output points, 12/24VDC (0.5A), transistor output (cap: optional), (waterproof type)
Analog-to-digital conversion module	AJ65BT-64AD	4 channel input, analog input: -10V to +10V, -20mA to +20mA Digital output: -2000 to +2000, 0 to +4000

CC-Link Remote Devices

Product	Type	Outline		
Digital-to-analog conversion module	AJ65BT-64DAV	4 channel voltage output, digital input: -2000 to +2000 Analog output: -10V to +10V		
	AJ65BT-64DAI	4 channel current output, digital input: -2000 to +2000 Analog output: 4mA to 20mA		
High-speed counter module	AJ65BT-D62	DC input, preset DC input, counting range: 0 to 16777215 (24-bit binary)		
	AJ65BT-D62D	Differential input, preset DC input, counting range: 0 to 16777215 (24-bit binary)		
	AJ65BT-D62D-S1	Differential input, preset differential input, counting range: 0 to 16777215 (24-bit binary)		
Positioning	AJ65BT-D75P2-S3	2 axes (independent, with linear/circular interpolation simultaneous)		
Temperature input	AJ65BT-68TD	8-channel thermocouple input		
Temperature input	AJ65BT-64RD3	4-channel Pt100 (3-wire type) input		
	AJ65BT-64RD4	4-channel Pt100 (4-wire type) input		
RS-232C	AJ65BT-R2	RS-232C, 1 channel, with 2 DC input points/2 transistor output points		
GPP connection	AJ65BT-G4	PLC read/write/monitor/test for master station, local station and other stations on MELSECNET	Accessible to A mode CPU only	
ID module	AJ65BT-D32ID2	Reader/writer 2-channel connection		
Plug for one-touch connector (20-piece set)		Plug color	Applicable cable core size (mm^2)	Applicable cable outline size (mm^2)
	A6CON-P214	Transparent	0.14 to 0.2 (AWG#26 to 24)	ϕ1.0 to 1.4
	A6CON-P220	Yellow		ϕ1.4 to 2.0
	A6CON-P514	Red	0.3 to 0.5 (AWG#22 to 20)	ϕ1.0 to 1.4
	A6CON-P520	Blue		ϕ1.4 to 2.0
Protective cover	A6CVR-8	Applies to AJ65SBTB1-8D, AJ65SBTB1-8T (10-piece set)		
	A6CVR-16	Applies to AJ65SBTB1-16D, AJ65SBTB1-16D1, AJ65SBTB1-16T, AJ65SBTC1-32D, AJ65SBTC1-32D1, AJ65SBTC1-32T, AJ65SBTC1-32DT, AJ65SBTC1-32DT1, AJ65SBTC4-16D, AJ65SBTC4-16DT (10-piece set)		
	A6CVR-32	Applies to AJ65SBTB1-32D, AJ65SBTB1-32D1, AJ65SBTB1-32T (10-piece set)		
Dustproof cap	A6CAP-DC1	Unused connector protection cap, dustproof only (not compliant with IP67) (20-piece set)		
Waterproof cap	A6CAP-WP1	Unused connector protection cap, waterproof structure: IP67-compliant (20-piece set)		

Software, Peripheral Devices

Product	Type	Outline	Compatible Mode A	Compatible Mode Q	Compatible OS
System software	SW1D5C-QSET-E	Ladder/list/SFC programming, simulation tool, SW0D5C-QADU/QDAU/QSCU/QCTU (CD-ROM)	○	○	5/8/N
	SW5D5C-GPPLLT-E	Ladder/list/SFC programming, simulation tool (CD-ROM)	○	○	5/8/N
	SW5D5C-GPPW-E	Ladder/list/SFC programming (CD-ROM)	○	○	5/8/N
	SW5D5C-GPPW-E5	Ladder/list/SFC programming (CD-ROM), license product (for 5 licenses)	○	○	5/8/N
	SW5D5C-GPPW-E10	Ladder/list/SFC programming (CD-ROM), license product (for 10 licenses)	○	○	5/8/N
	13J966	Starting GPPW (optional)	—	—	—
	13J974	GPPW Operating Manual: Startup (packed with product)	—	—	—
	13J975	GPPW Operating Manual (optional) (Note 1)	—	—	—
	13J976	GPPW Operating Manual: SFC (optional) (Note 1)	—	—	—
	13J980	GPPW Operating Manual (MELSAP-L) (optional) (Note 1)	—	—	—
Simulation software	SW5D5C-LLT-E	Simulation tool (CD-ROM)	○	○	5/8/N
	SW5D5C-LLT-E5	Simulation tool (CD-ROM), license product (for 5 licenses)	○	○	5/8/N
	SW5D5C-LLT-E10	Simulation tool (CD-ROM), license product (for 10 licenses)	○	○	5/8/N
	13J977	LLT Operating Manual (optional) (Note 1)	—	—	—
Data conversion software	SW0D5C-CNVW-E	CSV file, TXT file data conversion (CD-ROM)	○	○	5/8/N
	SW0D5C-CNVW-E5	CSV file, TXT file data conversion (CD-ROM), license product (for 5 licenses)	○	○	5/8/N
	SW0D5C-CNVW-E10	CSV file, TXT file data conversion (CD-ROM), license product (for 10 licenses)	○	○	5/8/N
	13J949	CNVW Operating Manual (packed with product)	—	—	—
Intelligent function module software	SW0D5C-QADU-E	Analog-to-digital converter module utility (CD-ROM) (Note 2)	×	○	5/8/N
	SW0D5C-QDAU-E	Digital-to-analog converter module utility (CD-ROM) (Note 2)	×	○	5/8/N
	SW0D5C-QSCU-E	Serial communication module utility (CD-ROM) (Note 2)	×	○	5/8/N
	SW0D5C-QCTU-E	High-speed counter module utility (CD-ROM) (Note 2)	×	○	5/8/N
Monitoring control system software tool	SW3D5F-CSKP-E	Basic communication support software tool (FD)	○	○	5/8/N
	SW3D5F-CSKP-E5	Basic communication support software tool (FD), license product (for 5 licenses)	○	○	5/8/N
	SW3D5F-CSKP-E10	Basic communication support software tool (FD), license product (for 10 licenses)	○	○	5/8/N
	SW3D5F-CSKP-E20	Basic communication support software tool (FD), license product (for 20 licenses)	○	○	5/8/N
	13J954	CSKP Operating Manual (packed with product)	—	—	—
	13JF57	CSKP Programming Manual (packed with product)	—	—	—
	SW3D5F-OLEX-E	EXCEL communication support software tool (FD)	○	○	5/8/N
	SW3D5F-CSOLEX-E	CSKP, EXCEL communication support software tool set product (FD)	○	○	5/8/N
	SW3D5F-OLEX-E5	EXCEL communication support software tool (FD), license product (for 5 licenses)	○	○	5/8/N
	SW3D5F-OLEX-E10	EXCEL communication support software tool (FD), license product (for 10 licenses)	○	○	5/8/N
	13J955	OLEX Operating Manual (packed with product)	—	—	—
	SW3D5F-XMOP-E	Monitoring OCX software tool (FD)	○	○	5/8/N
	SW3D5F-CSXMOP-E	CSKP, monitoring OCX software tool set product (FD)	○	○	5/8/N
	SW3D5F-XMOP-E5	Monitoring OCX software tool (FD), license product (for 5 licenses)	○	○	5/8/N
	SW3D5F-XMOP-E10	Monitoring OCX software tool (FD), license product (for 10 licenses)	○	○	5/8/N
	13J956	XMOP Operating Manual (packed with product)	—	—	—
	SW0D5C-PIC-B	Graphic data package	○	○	5/8/N

Note 1: Manual in PDF format is included in corresponding software.
Note 2: Operation manual of the software and user's manual of corresponding modules in PDF format are included.
Note 3: Compatible mode : ○: Usable, ×: Not usable
Note 4: Compatible OS : 5: Windows 95, 8: Windows 98, N: Windows NT 4.0
Note 5: Please contact local Mitsubishi office for availability of Japanese, Chinese and German version software.

Software, Peripheral Devices

Product	Type	Outline	Compatible Mode		Compatible OS
			A	Q	
Special module data setting software	SW0IVD-MINIP-E	MELSECNET/MINI-S3 data setting software	○	○	V
	13JF37	MINIP Operating Manual (packed with product)	—	—	—
	SW0IVD-ROMA-E	Intel HEX format ROM write-compatible data transfer software	○	○	V
	13JF34	ROMA Operating Manual (packed with product)	—	—	—
	SW1IX-AD51HPE	A1SD51S BASIC programming software	○	○	V
	13J733	AD51HP Operating Manual (packed with product)	—	—	—
	SW1IVD-AD71P	AD71, AD72 positioning data setting software	○	○	V
	13J916	AD71P Operating Manual (packed with product)	—	—	—
	SW0D5C-AD75P-E	AD75 positioning data setting software (CD-ROM)	○	○	5/8/N
	13J948	AD75P-E Operating Manual (packed with product)	—	—	—
	SW0D5C-QD75P-E	QD75 positioning data setting software (CD-ROM)	○	○	5/8/N
	13J973	QD75P-E Operating Manual (packed with product)	—	—	—
Connection cable	QC30R2	RS-232 cable for personal computer-CPU connection, 3m(9.84ft.) (mini-DIN6P)-(Dsub9P)	○	○	—
PC card adapter	Q2MEM-ADP	Adapter for standard PCMCIA slot of Q2MEM memory card	○	○	—

Note 1: Compatible mode : ○: Usable
Note 2: Compatible OS : 5: Windows 95, 8: Windows 98, N: Windows NT 4.0, V: MS-DOS (DOS/V)

Personal Computer Network Boards

Product	Type	Outline	Compatible Mode		Com-patible OS
			A	Q	
MELSECNET/10 interface board	A70BDE-J71QLP23	MELSECNET/10 interface for ISA bus, optical SI/QSI-200/250 (driver type: SW3DNF-MNET10)	○	△	5/8/N/V
	A70BDE-J71QLP23GE	MELSECNET/10 interface for ISA bus, optical GI-500/125 (driver type: SW3DNF-MNET10)	○	△	5/8/N/V
	A70BDE-J71QBR13	MELSECNET/10 interface for ISA bus, coaxial bus (driver type: SW3DNF-MNET10)	○	△	5/8/N/V
	13JL81	MELSECNET/10 Interface Board User's Manual (packed with product)	—	—	—
CC-Link interface board	A80BDE-J61BT13	CC-Link interface for PCI bus, local station, twisted pair (driver type: SW3DNF-CCLINK)	○	○	5/8/N
	13JL82	A80BD-J61BT13 User's Manual (packed with product)	—	—	—

Note 1: Compatible OS: 5: Windows 95, 8: Windows 98, N: Windows NT 4.0, V: MS-DOS (DOS/V)
Note 2: MELSECNET/10 board is compatible with MELSECNET/10 mode and is not compatible with MELSECNET/10H mode.
Note 3: Compatible mode: ○: Usable, △: Usable with restriction, ×: Unusable

GOT-A900 Graphic Operation Terminal

Product	Type	Outline
A985GOT	A985GOT-TBA	800×600 pixels, 256-color TFT color LCD, screen size: 12 (100-240VAC power supply built in), high intensity
	A985GOT-TBD	800×600 pixels, 256-color TFT color LCD, screen size: 12 (24VDC power supply built in), high intensity
	A985GOT-TBA-EU	800×600 pixels, 256-color TFT color LCD, screen size: 12 (100-240VAC power supply built in), high intensity, CE/UL/cUL compliance
A975GOT	A975GOT-TBA	640×480 pixels, 256-color TFT color LCD, screen size: 10 (100-240VAC power supply built in), wide-angle vision
	A975GOT-TBA-B	640×480 pixels, 256-color TFT color LCD, screen size: 10 (100-240VAC power supply built in), high intensity
	A975GOT-TBD-B	640×480 pixels, 256-color TFT color LCD, screen size: 10 (24VDC power supply built in), high intensity
	A975GOT-TBD	640×480 pixels, 256-color TFT color LCD, screen size: 10 (24VDC power supply built in), wide-angle vision
	A975GOT-TBA-EU	640×480 pixels, 256-color TFT color LCD, screen size: 10 (100-240VAC power supply built in), high intensity, CE/UL/cUL compliance
A970GOT	A970GOT-TBA	640×480 pixels, 16-color TFT color LCD, screen size: 10 (100-240VAC power supply built in), wide-angle vision
	A970GOT-TBD	640×480 pixels, 16-color TFT color LCD, screen size: 10 (24VDC power supply built in), wide-angle vision
	A970GOT-TBA-B	640×480 pixels, 16-color TFT color LCD, screen size: 10 (100-240VAC power supply built in), high intensity
	A970GOT-TBD-B	640×480 pixels, 16-color TFT color LCD, screen size: 10 (24VDC power supply built in), high intensity
	A970GOT-TBA-EU	640×480 pixels, 16-color TFT color LCD, screen size: 10 (100-240VAC power supply built in), high intensity, CE/UL/cUL compliance
	A970GOT-SBA	640×480 pixels, 8-color STN color LCD, screen size: 10 (100-240VAC power supply built in)
	A970GOT-SBD	640×480 pixels, 8-color STN color LCD, screen size: 10 (24VDC power supply built in)
	A970GOT-SBA-EU	640×480 pixels, 8-color STN color LCD, screen size: 10 (100-240VAC power supply built in), CE/UL/cUL compliance
	A970GOT-LBA	640×480 pixels, STN monochrome LCD, screen size: 10 (100-240VAC power supply built in)
	A970GOT-LBD	640×480 pixels, STN monochrome LCD, screen size: 10 (24VDC power supply built in)
	A970GOT-LBA-EU	640×480 pixels, STN monochrome LCD, screen size: 10 (100-240VAC power supply built in), CE/UL/cUL compliance
A960GOT	A960GOT-EBA	600×400 pixels, monochrome EL, screen size: 9 (100-240VAC power supply built in)
	A960GOT-EBD	600×400 pixels, monochrome EL, screen size: 9 (24VDC power supply built in)
	A960GOT-EBA-EU	640×400 pixels, monochrome EL, screen size: 9 (100-240VAC power supply built in), CE/UL/cUL compliance
A950GOT	A950GOT-SBD	320×240 pixels, 8-color STN color LCD, RS422 interface, 1MB built-in memory, 24VDC power supply
	A950GOT-LBD	320×240 pixels, monochrome LCD, RS422 interface, 1MB built-in memory, 24VDC power supply
	A951GOT-QSBD	320×240 pixels, 8-color STN color LCD, Q series bus interface, 1MB built-in memory, 24VDC power supply
	A951GOT-QLBD	320×240 pixels, monochrome LCD, Q series bus interface, 1MB built-in memory, 24VDC power supply
	A953GOT-SBD	320×240 pixels, 8-color STN color LCD, RS232C interface, 1MB built-in memory, 24VDC power supply
	A953GOT-LBD	320×240 pixels, monochrome LCD, RS232C interface, 1MB built-in memory, 24VDC power supply
	A956GOT-SBD	320×240 pixels, 8-color STN color LCD, external communication interface required, 1MB built-in memory, 24VDC power supply
	A956GOT-LBD	320×240 pixels, monochrome LCD, external communication interface required, 1MB built-in memory, 24VDC power supply
	A950GOT-SBD-M3	320×240 pixels, 8-color STN color LCD, RS422 interface, 3MB built-in memory, 24VDC power supply
	A950GOT-LBD-M3	320×240 pixels, monochrome LCD, RS422 interface, 3MB built-in memory, 24VDC power supply

GOT-A900 Graphic Operation Terminal

Product	Type	Outline	
A950GOT	A951GOT-QSBD-M3	320×240 pixels, 8-color STN color LCD, Q series bus interface, 3MB built-in memory, 24VDC power supply	
	A951GOT-QLBD-M3	320×240 pixels, monochrome LCD, Q series bus interface, 3MB built-in memory, 24VDC power supply	
	A953GOT-SBD-M3	320×240 pixels, 8-color STN color LCD, RS232C interface, 3MB built-in memory, 24VDC power supply	
	A953GOT-LBD-M3	320×240 pixels, monochrome LCD, RS232C interface, 3MB built-in memory, 24VDC power supply	
	A956GOT-SBD-M3	320×240 pixels, 8-color STN color LCD, external communication interface required, 3MB built-in memory, 24VDC power supply	
	A956GOT-LBD-M3	320×240 pixels, monochrome LCD, external communication interface required, 3MB built-in memory, 24VDC power supply	
Bus connection board	A9GT-QBUSS	For bus connection to Q mode PLC, for connection of one A960/970/975/985GOT or for last GOT when multiple GOTs are connected	
	A9GT-QBUS2S	For bus connection to Q mode PLC, for connection of multiple A960/970/975/985GOTs	
	A9GT-QBUS2SU	For bus connection to Q mode PLC, for connection of multiple A956GOTs	
	A9GT-QCNB	For bus connection to Q mode PLC, needed when distance to first GOT exceeds 13.2m (43.28ft.)	
Serial communication board	A9GT-RS4	For CPU direct connection/computer link connection/microcomputer connection and RS-422 connection	
	A9GT-RS2	For CPU direct connection/computer link connection/microcomputer connection and RS-232 connection	
	A9GT-RS2T	Clock function built-in serial communication board	
Network connection module	A7GT-J71LP23	MELSECNET/10 inter-PLC optical loop	
	A7GT-J71BR13	MELSECNET/10 inter-PLC coaxial bus	
Data link connection module	A7GT-J71AP23	MELSECNET/II optical loop	
	A7GT-J71AR23	MELSECNET/II coaxial loop	
	A7GT-J71AT23B	MELSECNET/B twisted pair bus	
CC-Link connection module	A8GT-J61BT13	CC-Link (intelligent device station) twisted pair	
	A8GT-J61BT15	CC-Link (remote device station) twisted pair	
Backlight	A9GT-80LTT	A985GOT TFT color LCD display section replacement backlight (1 pc.)	
	A9GT-70LTT	A975/975GOT TFT color LCD display replacement backlight (1 pc.)	
	A9GT-70LTT-B	A975/975GOT-B TFT color LCD display replacement backlight (1 pc.)	
	A9GT-70LTS	A975/975GOT STN color LCD display replacement backlight (2-piece set)	
	A9GT-50LT	A95□GOT STN color/monochrome LCD display replacement backlight	
Extension memory board	A9GT-FNB	For optional OS	
	A9GT-FNB1M	For optional OS + extension memory 1MB	
	A9GT-FNB2M	For optional OS + extension memory 2MB	
	A9GT-FNB4M	For optional OS + extension memory 4MB	
	A9GT-QFNB	For optional OS (for MELSEC-QnA/A/FX ladder monitoring)	
	A9GT-QFNB4M	For optional OS + extension memory 4MB (for MELSEC-QnA/A/FX ladder monitoring)	
Protective sheet	A9GT-80PSC	Protective sheet (for A985GOT, without logo) 5-piece set	Any of these needed
	A9GT-80PSCL	Protective sheet (for A985GOT, logo removable) 5-piece set	
	A9GT-70PSC	Protective sheet (for A975/970GOT, without logo) 5-piece set	
	A9GT-70PSCL	Protective sheet (for A975/970GOT, logo removable) 5-piece set	
	A9GT-60PSC	Protective sheet (for A960GOT, without logo) 5-piece set	
	A9GT-60PSCL	Protective sheet (for A960GOT, logo removable) 5-piece set	
	A9GT-50PSC	Protective sheet (for A95□GOT, logo removable) 5-piece set	
Attachment		Conventionally used model	Replaceable model
	A77GT-96ATT	A77GOT-L/L-S3/L-S5/CL/CL-S3/CL-S5	A960GOT
	A85GT-95ATT	A85□GOT	A95□GOT
	A87GT-96ATT	A77GOT-EL/EL-S3/EL-S5, A870GOT-EWS, A8GT-70GOT-EW/EB	A960GOT
	A87GT-97ATT	A870GOT-SWS/TWS, A8GT-70GOT-SW/SB/TW/LB	A97□GOT
Stand	A9GT-80STAND	Debugging stand for A985GOT	
	A9GT-70STAND	Debugging stand for A975/970/960GOT	
	A9GT-50STAND	Debugging stand for A95□GOT	
Memory card	Q1MEM-64S	Memory capacity 64k bytes, for QnACPU, SRAM, (PCMCIA 2.1 compliant)	
	Q1MEM-128S	Memory capacity 128k bytes, for QnACPU, SRAM, (PCMCIA 2.1 compliant)	
	Q1MEM-256S	Memory capacity 256k bytes, for QnACPU, SRAM, (PCMCIA 2.1 compliant)	
	Q1MEM-512S	Memory capacity 512k bytes, for QnACPU, SRAM, (PCMCIA 2.1 compliant)	
	Q1MEM-1MS	Memory capacity 1M bytes, for QnACPU, SRAM, (PCMCIA 2.1 compliant)	
	Q1MEM-2MS	Memory capacity 2M bytes, for QnACPU, SRAM, (PCMCIA 2.1 compliant)	

GOT-A900 Graphic Operation Terminal

Product	Type	Outline		
Flash PC card	A9GTMEM-10MF	GOT memory capacity 10M bytes, flash PC card formatted		
	A9GTMEM-20MF	GOT memory capacity 20M bytes, flash PC card formatted		
	A9GTMEM-40MF	GOT memory capacity 40M bytes, flash PC card formatted		
Printer module	A9GT-50PRF	For connection of parallel printer for A95□GOT, 1 channel		
Printer/memory module	A9GT-50MIF.PRF	Memory card interface with parallel printer for A95□GOT, 1 channel each		
External I/O interface	A9GT-70KBF	External I/O interface for A960/A97□/A985GOT (12/24VDC, 8 input points/64 keyboard input points, 16 transistor output points)		
	A8GT-50KBF	External I/O interface for A95□GOT (12/24VDC, 8 input points/64 keyboard points, 16 transistor output points)		
Drawing software	SW3D5C-GOTRE-PACK	CD-ROM for Windows 98/95/NT 4.0		
Q series bus cable	QC06B	0.6m(1.97ft.) cable	Q mode PLC bus connection cable	
	QC12B	1.2m(3.93ft.) cable	Q mode PLC bus connection cable	
	QC30B	3m(9.84ft.) cable	Q mode PLC bus connection cable	
	QC50B	5m(16.40ft.) cable	Q mode PLC bus connection cable	
	QC100B	10m(32.79ft.) cable	Q mode PLC bus connection cable	
	A9GT-QC200BS	20m(65.57ft.) cable	Q mode PLC bus connection cable	For purchasing, contact Mitsubishi Electric System Service Co., Ltd.
	A9GT-QC300BS	30m(98.36ft.) cable	Q mode PLC bus connection cable	
	A9GT-QC350BS	35m(114.75ft.) cable	Q mode PLC bus connection cable	
RS-422 cable	AC30R4-25P	3m(9.84ft.) cable	CPU connection RS-422 cable	
	AC100R4-25P	10m(32.79ft.) cable	CPU connection RS-422 cable	
	AC300R4-25P	30m(98.36ft.) cable	CPU connection RS-422 cable	
Personal computer connection RS-232C cable	AC30N2A	3m(9.84ft.) cable	For personal computer connection (both sides: D-sub 25-pin), 25-9 pin converter is needed for GOT side.	
	AC30R2	3m(9.84ft.) cable	For personal computer connection (both sides: D-sub 25-pin), 25-9 pin converter is needed for GOT side.	
	AC30R2-9P	3m(9.84ft.) cable	For personal computer connection (one side: D-sub 9-pin, D-sub 25-pin)	
	AC30R2-9SS	3m(9.84ft.) cable	For personal computer connection (both sides: D-sub 9-pin)	
	FX-232CAB-1	3m(9.84ft.) cable	For personal computer connection (both sides: D-sub 9-pin)	
	FX-232CAB-2	3m(9.84ft.) cable	For personal computer connection (one side: D-sub 9-pin, half-pitch)	
CPU connection RS-232 cable	QC30R2	3m(9.84ft.) cable	CPU connection RS-232 cable	
Parallel cable (Centronics compliant)	AC30PIO-20P	3m(9.84ft.) cable	For parallel printer connection	

Product		Type	Outline
D-NS series	Battery-less data carrier	D-NS03PS	Plate type, memory capacity 320k bytes, compact
		D-NS03PM	Plate type, memory capacity 320k bytes, metal mounting
		D-NS03P	Plate type, memory capacity 320k bytes, oil-resistant/metal mounting
	Reader/writer	D-NS422RW	Standard, max. communications distance 25mm(0.99inch)
		D-NS422RWS	Compact, max. communications distance 15mm(0.59inch)
	ID controller	D-NS232IF2	For personal computer RS-232C, reader/writer 2 channels
	Cable	D-NS422CAB10	10m(32.79ft.) for reader/writer D-NS422RW, D-422RWS extension
		D-NS422CAB20	20m(65.57ft.) for reader/writer D-NS422RW, D-422RWS extension
		D-NS422CAB40	40m(131.15ft.) for reader/writer D-NS422RW, D-422RWS extension
		D-NS422CAB100	100m(327.87ft.) for reader/writer D-NS422RW, D-422RWS extension
D series	Battery-built-in data carrier	D-8PS	Plate type, memory capacity 8k bytes, compact
		D-8PX	Plate type, memory capacity 8k bytes, battery replacement
		D-8P	Plate type, memory capacity 8k bytes, long distance
		D-03P	Plate type, memory capacity 320k bytes, compact
		D-03CS	Card type, memory capacity 320k bytes, compact card
	Holder	D-03CS-HLD	For D-03CS screwing
	Reader/writer	D-422RWL	Long distance, max. communications distance 260mm(10.24inch)
		D-422RW	Standard, max. communications distance 90mm(3.55inch)
	Handy controller	D-20HC	Handy controller, Japanese display
		D-20HC-E	Handy controller, English display
		D-20HC-RW	Reader/writer for D-20HC
	For general-purpose personal computer	D-232RW	Reader/writer for RS-232, combination with SW1IVW-AIDP and D-20HC
		D-232IF	RS-232 signal conversion module, combination with SW1IVW-AIDP and D-422RWL or D422RW
		D-20HC-PS	Power supply adapter for D232 interface
	Cable	D-422CAB10	10m(32.79ft.) for reader/writer D-422RW, D-422RWL extension
		D-422CAB30	30m(65.57ft.) for reader/writer D-422RW, D-422RWL extension
		D-422CAB50	50m(131.15ft.) for reader/writer D-422RW, D-422RWL extension
		D-422CAB100	100m(327.87ft.) for reader/writer D-422RW, D-422RWL extension
		D-422CAB200	200m(655.74ft.) for reader/writer D-422RW, D-422RWL extension
		D-232CAB10	10m(32.79ft.) for reader/writer D-232RW extension
		FX2N-CNV-IF	Cable for FX-1DIF, conversion cable for connection with FX2N/A1FX

Note 1: Please confirm complience of the ID products to local laws and regulations for radio transmitting devices.

Service Network

Sales Office

North America			
USA	Mitsubishi Electric Automation, Inc.	500 Corporate Woods Parkway, Vernon Hills, IL 60061	Tel: 1-847-478-2100 Fax: 1-847-478-0328
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	Ohio-South Office	7566 Paragon Road, Centerville, OH 45459	Tel: 1-937-291-4600 Fax: 1-937-291-4606
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Belgium	Getronics NV/SA	Pontbeeklaan 43 1730 Zellik	Tel: 32-2-4671711 Fax: 32-2-4671745
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Finland	UTU Urho Tuominen OY	P.O.Box 59 Fin-28101, Pori	Tel: 358-2-550800 Fax: 358-2-5508841
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Spain	Mecco Medicion Control S.A	Gran via Deles Corts Catalanes 133, 4 E-08014 Barcelona	Tel: 34-3-4227700 Fax: 34-3-4322847
Portugal	Foneca Limitada	Estrada de Taboeira 87/89 Esgueira P-3800 Aveiro	Tel: 351-34-315800 Fax: 351-34-315804
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China	Ryoden International Shanghai Ltd.	3F Block5 Building Automation Instrumentation Plaza 103 Cao Bao Rd.Shanghai 200233, China	Tel: 86-21-6475-3228 Fax: 86-21-6484-6996
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India	Messung Systems	15 Electric Sadan-III, M.I.D.C Bhosari, Pune 411026	Tel: 91-20-7128927 Fax: 91-20-7128108

Service Network

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