Product information
EBG 183-EN

MITSUBISHI ELECTRIC
FACTORY AUTOMATION

System Q

Redundant PLC System

Redundant System Control

for maximum availability

SPEED UP — 22 ms Hot Standby switchover time – ensuring continuous, available operation

IMPROVED COMMUNICATION — Full redundant concept for CPU, power supply and network architecture

INTELLIGENT DESIGN — On-line swap for function cards, standby CPU and base rack

MELSEC System Q – Redundant PLC System

The redundant MELSEC System Q stands for failure-free production process.

A redundant System Q configuration offers a flexible alternative to a traditional DCS solution.The System Q concept is to use standard PLC components with a proven high reliability, supported by an advanced network architecture and a dedicated tracking CPU.

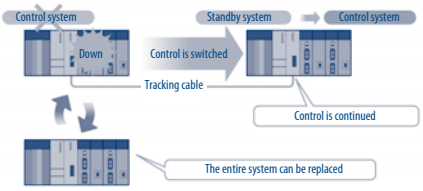
High availability

Redundant CPU configuration

At the center of the System Q redundant configuration are two dedicated process CPUs (QnPRH) linked together as a live system and a standby system. Each system is identical in configuration, offering a fully redundant construction to be installed in one of two ways.

Continuous operation even when errors occur

The redundant design of the entire system, including the power supply, the CPU, and the base enables the system to continue operation by switching control to the standby system even if the control system develops an error. This is called a Hot Standby Configuration.



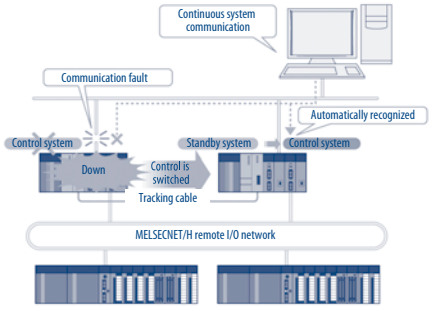
Within only 22ms the system switches over to the standby system in the event of failure.

The redundant system can be recovered from a malfunction by simply replacing the faulty module or the entire main base of that system.

Redundant network architecture

Network communication is maintained by switching over to the standby system when a network module fails or the cable is disconnected.

- In the event of failure, continuous operation of the remote I/O network is maintained through the use of the redundant standby master.
- MES and SCADA operation remains unaffected during the switch over. The standby master automatically continues operation between the remote control system and the management level processes.



In the event of failure the control is automatically switched to the standby system.

Easy to use

■ Build your system using standard Q series components

Designing a redundant system Q application is quick and easy. At the center of the system are two dedicated, redundant process CPUs that are then configured with standard Q series components. This reduces the Total Cost of Ownership of the system, keeps maintenance parts to a minimum and benefits from using standard, proven technology.

■ Online module change

Modules on the remote I/O system also have the same support for "Online Module Change" function as the Control and Standby CPU systems.

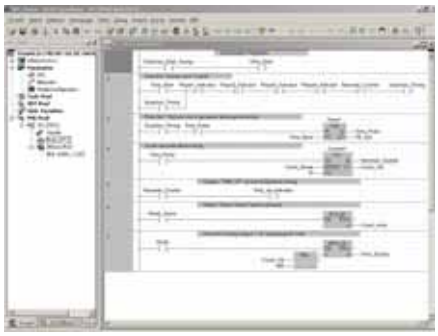
Simplified engineering

■ Choose the programming tool to suit

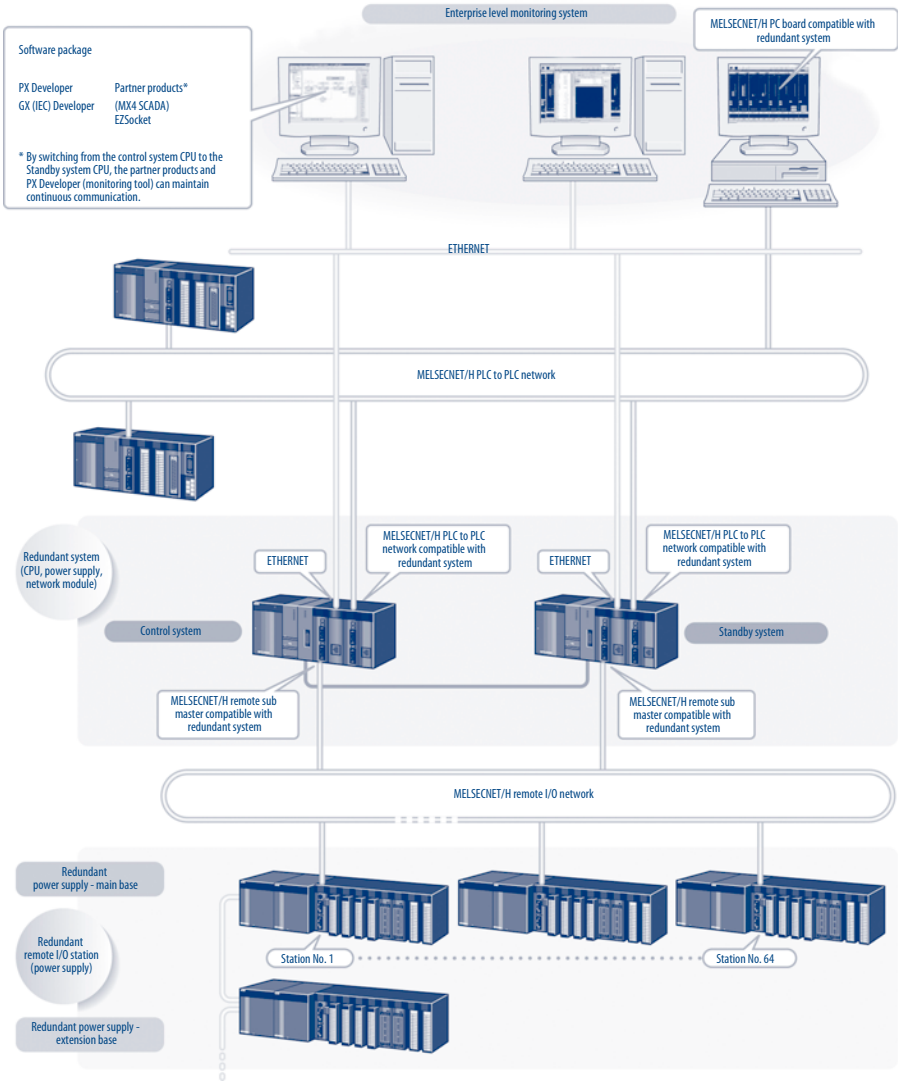
System Q redundant CPUs can be programmed with a number of programming tools; GX Developer for general sequence control; GX IEC Developer for IEC61131 systems and PX Developer for dedicated process industry applications.

■ Automatic program transfer

Both program and parameters created using GX Developer and PX Developer can be automatically transferred to the standby system. This ensures that the program does not have to be downloaded twice, therefore reducing total setup and design time.



GX (IEC) Developer

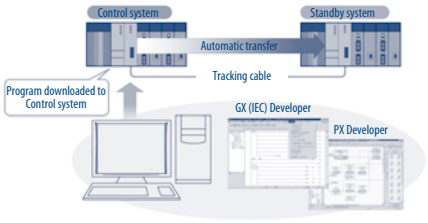


An example system with redundant CPUs and MELSECNET/H network.

System configuration

■ Redundancy to suit your needs

Each System Q solution can be designed with the level of redundancy to suit the application including; redundant CPU, power supply, network interface and remote I/O.



The redundant System Q synchronises the programs of the two systems automatically.

■ An example system

The operating system can be switched over in order to maintain control in case of CPU, network, or power supply malfunction.

Since the remote I/O is connected via a network, it can be installed in a location far from the main base.

Using a dual optical loop for the MELSCNET/H remote I/O ensures continuous control even if there is a problem with the network cable.

The remote I/O can be used in distributed control, the effect of any problem with a remote station (I/O, etc.) on the system can be easily limited.

Specifications ///

Item		CPU	
		Q12PRHCPU	Q25PRHCPU
Control system		Cyclic program scan	
I/O control		Refresh mode	
Programming language	Sequence control dedicated language	Ladder, list, ST, SFC	
	Process control language	FBD for process control ①	
Number of I/O device points ②		8192 points	
Number of I/O points ③		4096 points	
Number of CPUs mounted		1 (multiple-CPU configurationis not available)	
Number of mountable modules		11 on the main base unit (7 when the power supply is redundant type)	
Number of extension base		0 – (All non-redundant modules are mounted on the remote I/O station (the maximum number of modules that can be mounted on a remote station is 64).)	
Number of remote I/O points		8192 points (up to 2048 points per station)	
Program capacity	Number of steps	124 ksteps	252 ksteps
	Number of programs	124	252 ④
Device memory capacity ⑤		Device memory: 29 kwords File register (internal): 128 kwords (It can be extended up to 1017 kwords by adding a memory card (2 MB).)	
Instruction types		Sequence basic/applied instructions, instrumentation instructions Instrumentation instruction types: Control/Operation instructions, I/O control instructions, compensation operation instructions, arithmetic operation instructions, comparison operation instructions, automatic tuning instructions	
Functions compatible with redundant system		- Redundant configuration of the entire system, including the CPU, the power supply, and the base unit Hot standby system for the control and standby systems online module change both backup and separate mode available	
		- Large-capacity data tracking	Large-capacity device data transfer (100 kwords) from the control system to the standby system
		- Redundant network system	Switchover in case of MELSECNET/H or Ethernet module malfunction or network wire disconnection
		- Engineering environment (GX Developer) Communication with programming tools	The control system or standby system can be designated by direct connection to the CPU or connection via a network.
		Online program change function	PLC write, online program change, online multi-block change
		Program memory copy function	Copying control system programs to the standby system
		Redundant system setting	The tracking device and network paring can be set with parameters.
Loop control specifications	Control cycle	10 ms -/control loop (can be set for each loop)	
	Number of control loops	No limit ⑥	
	Main functions	2-degree-of-freedom PID control, cascade control, automatic tuning function, feed forward control	
RAS	Online module replacement	The I/O, analog, temperature input, temperature control, and pulse input modules can be replaced (on a remote I/O station)	
	Output in case of error stop	Clear or output retention can be designated for each module	
Communication port		USB, RS232	
Modules that can be mounted on the main base unit		Network modules for the Q series can be mounted (Ethernet, MELSECNET/H, and CC-Link only)	
Programming software		GX Developer, GX IEC Developer	
		PX Developer	

① PX Developer is required for programming by FBD.
② Total number of the I/O points on the main base unit, which are directly controlled from the CPU module, and the I/O points controlled as remote I/O by the remote I/O network.
③ The number of I/O points on the main base unit, which are directly controlled from the CPU module.
④ The maximum number of files that can be executed is 124. It is impossible to execute 125 or more files. Two SFC/MELSAP-Ls are available, one of which is a program execution control SFC.
⑤ Each number of device points in the data memory can be changed within 29 kwords, depending on the parameters.
⑥ The number of control loops is restricted by the combination of the device memory capacity (128 kwords/loop used) and the control cycle.

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