

Programmable Controller CPU Modules

R00CPU

Program capacity 10K steps

R01CPU

Program capacity 15K steps

R02CPU

Program capacity 20K steps

R04CPU

Program capacity 40K steps

R08CPU

Program capacity 80K steps

R16CPU

Program capacity 160K steps

R32CPU

Program capacity 320K steps

R120CPU

Program capacity 1200K steps

R04ENCPU

Program capacity 40K steps, CC-Link IE embedded

R08ENCPU

Program capacity 80K steps, CC-Link IE embedded

R16ENCPU

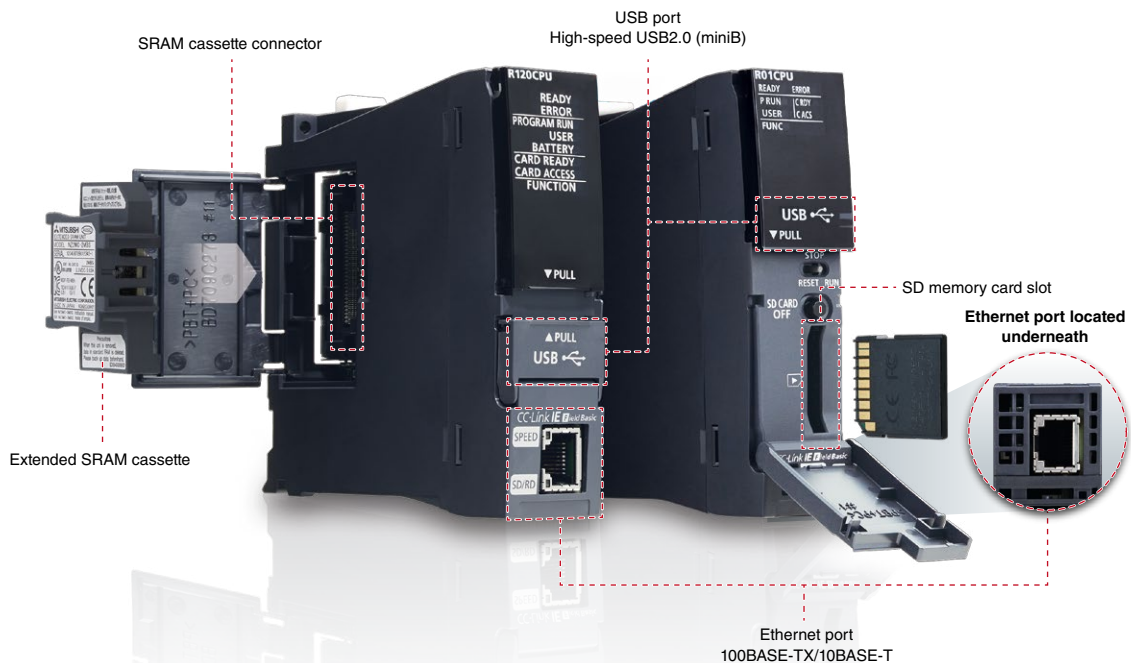
Program capacity 160K steps, CC-Link IE embedded

R32ENCPU

Program capacity 320K steps, CC-Link IE embedded

R120ENCPU

Program capacity 1200K steps, CC-Link IE embedded



At the core of the MELSEC iQ-R Series is a programmable controller CPU. This CPU is the heart of the control system and includes various features for different applications. The most common CPU is the programmable controller CPU, into which various features are embedded, enabling it to perform a wide range of control tasks. The different CPUs are highly scalable with five types available, based on program capacity needs (10K to 1200K steps). In addition, a CC-Link IE embedded CPU is available, further reducing hardware costs as a separate network module is not required.

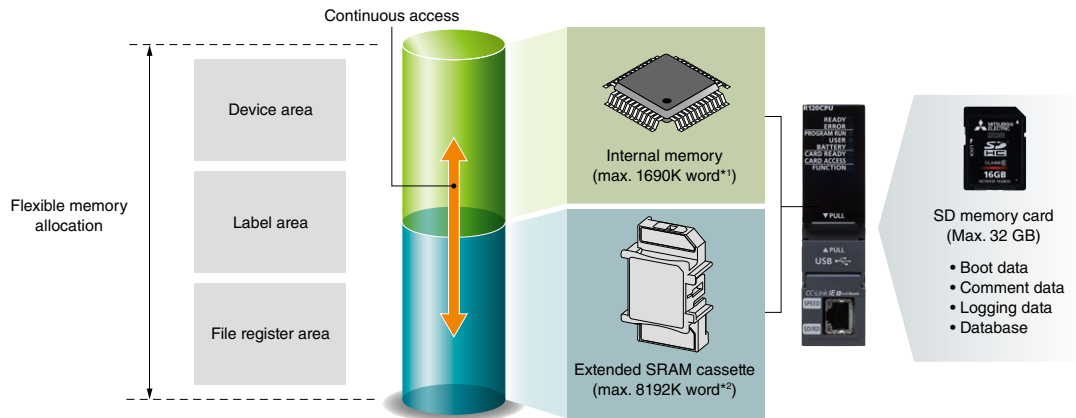
Built-in hardware features

Programmable controller CPUs are equipped with a built-in USB port (high-speed Ver. 2.0 Mini-B) and an Ethernet port (up to 100 Mbps) as standard, enabling connection to a general LAN network*1 or MELSOFT software. Two memory options are included as well, an external SRAM cassette that enables device/label memory to be increased and doubling up as a hardware security key, and an SD memory card which can be used for logging data, troubleshooting device values or as a memory database for recipe storage.

*1. General LAN connection supported by the Ethernet port only.

Flexible, large-capacity data storage

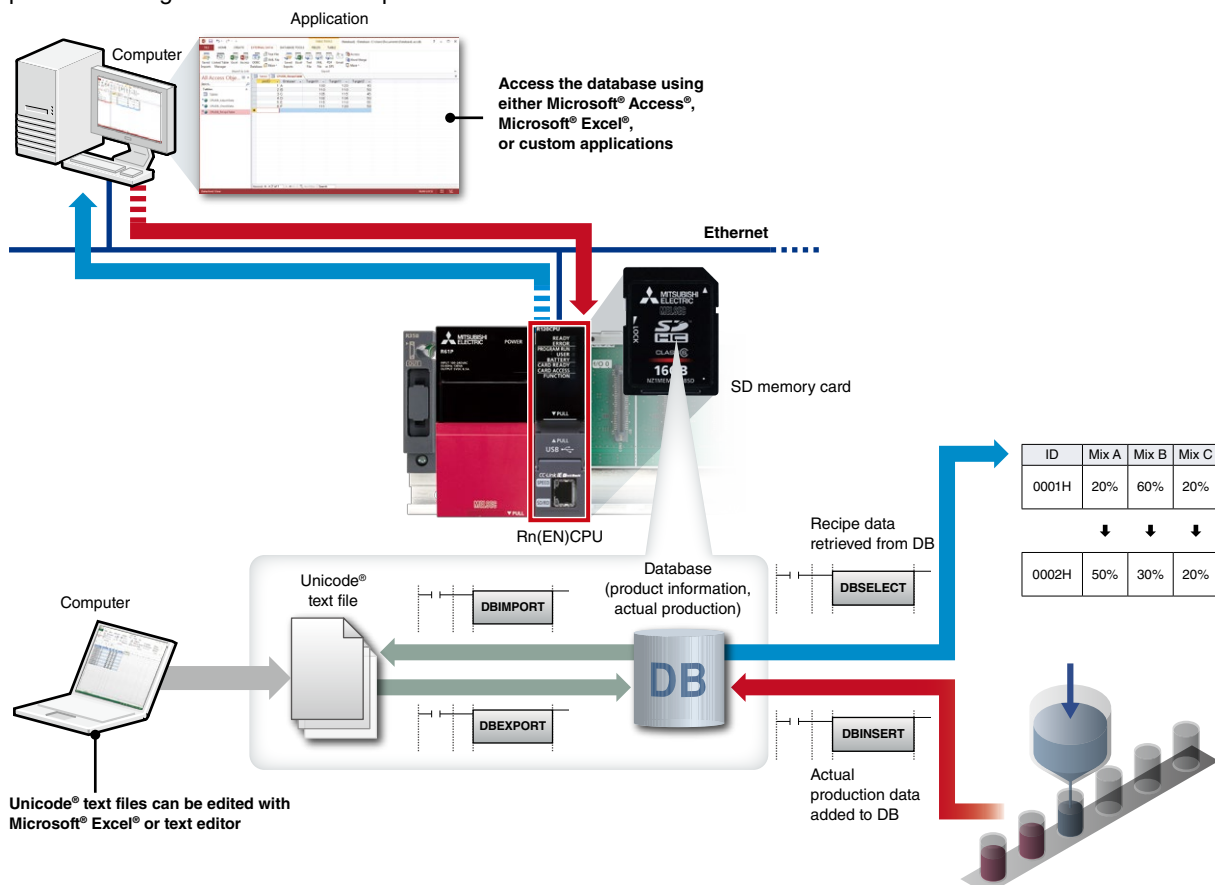
The MELSEC iQ-R Series programmable controller CPU is designed to allow an external SRAM cassette to be installed directly into the CPU module. This option makes it possible to increase internal device memory to an impressive 9882K words, expanding device/label memory even further. An SD memory card can be used at the same time, expanding data logging memory and the capacity of the internal database, which is ideal for large-scale systems. In general, management of programmable controller internal data is quite flexible, making programming even easier by allowing various data area allocations to be changed within the CPU memory and SRAM cassette.



*1. Based on R120CPU.
*2. Based on N22MC-16MBS (16 MB).

Data management utilizing internal database (DB)

The CPU includes an internal database that can be installed into the SD memory card. This feature allows, for example, a selection of database commands that can add/delete/change records to be utilized for simple recipe functions. It is also much easier to import/export Unicode® files for use in spreadsheets. Accessing the CPU internal database data from a computer equipped with Microsoft® Access® or Excel® is also supported. The CPU internal database is especially useful for the food and beverage industry where multiple product variations are produced using the same machine process.



System configuration

CPU

I/O

Analog

Motion, Positioning, High-speed Counter, Channel isolated pulse input

Network

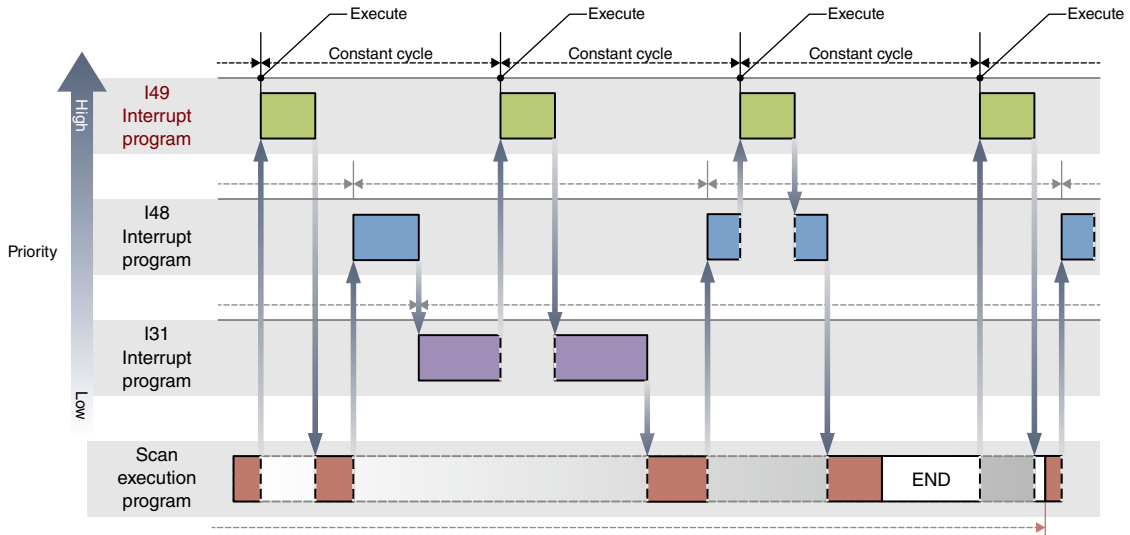
Advanced information

Technology

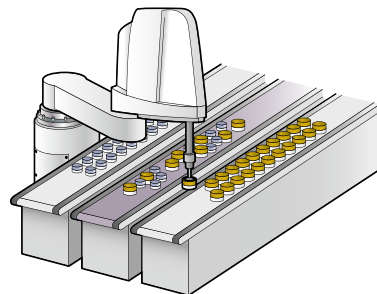
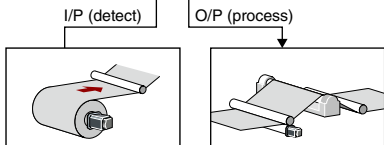
Software

High-speed, event driven programs

Further improvements to CPU performance have resulted in the interval time between event driven programs (interrupt programs) reduced to 50 us. This has been realized by having multiple event driven programs able to be nested within other event driven programs and being triggered from already executing programs. This kind of performance is available with a standard input module and programmable controller CPU, without requiring a dedicated interrupt type input module, which helps to further reduce hardware costs while realizing a high-precision control system.

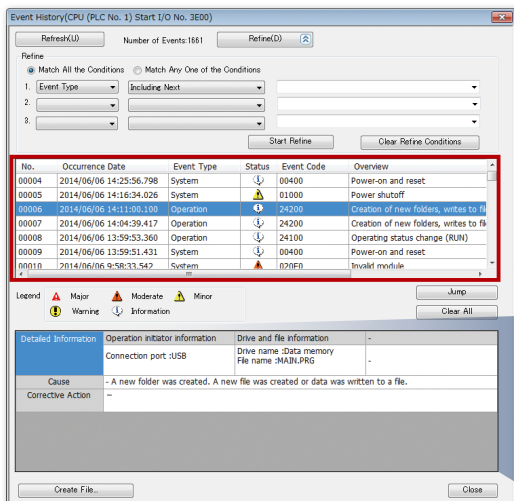


I/P module + ABS encoder accurately detect variable high-speed I/P signals.



CPU program management data

Operation and system historical events are automatically recorded in the CPU module, allowing quick root cause analysis of system errors or management of program changes. Actual changes to the program, parameters and system errors are viewable using GX Works3 or can be exported as a CSV file for use by other third-party software.



Detailed Information		
Operation initiator information	Drive and file information	Drive and file information
Connection port :USB	Drive name :Data memory	File name :MAIN.PRG
Cause	- A new folder was created. A new file was created or data was written to a file.	
Corrective Action	-	

View operations and system events with corresponding event/error codes, data can be sorted according to various attributes.

Corresponding explanatory text

Intuitive root cause analysis

When the SD memory card is installed, device data is saved automatically to the SD memory at the time of system failure. This data is useful for investigating the cause of the failure, enabling various data collected before and during the event to be analyzed. The data can be used in a situation such as when the origin of a machine is different than where the machine was actually being used, and the data can simply be sent by e-mail (for example) as a data file for analysis.

Overseas production site

Easy setup just by setting trigger conditions

Data logged automatically when an error occurs

Domestic development dept.

Visual representation of data when error occurs

Quicker root cause analysis

Data sent via email

Easily collect manufacturing data

Utilizing the installed SD memory card, CPU internal memory or a direct live connection to the CPU module, logging data (device/label) can be easily realized just by simply registering the parameters. In addition, logging can be automatically sent to an FTP server. Logged data can be utilized in a number of ways, such as using third-party spreadsheet software or as a real-time feed of data for analyzing various manufacturing processes. The real-time feature enables live feeds showing data as they happen in addition to historical trending. Logged historical trend files support the Unicode® text file format, which is especially useful for Asian based applications as most languages in the region require Unicode® compatibility for information to be legible.

Real-time monitoring

Monitoring data

Direct connection to the programmable controller via Ethernet or USB

File transfer

Logging files

Logging files are sent to an FTP server

Logging

Logging files

Displays logging file data saved in the SD memory card

System configuration

CPU

I/O

Analog

Motion, Positioning, High-speed Counter, Channel isolated pulse input

Network

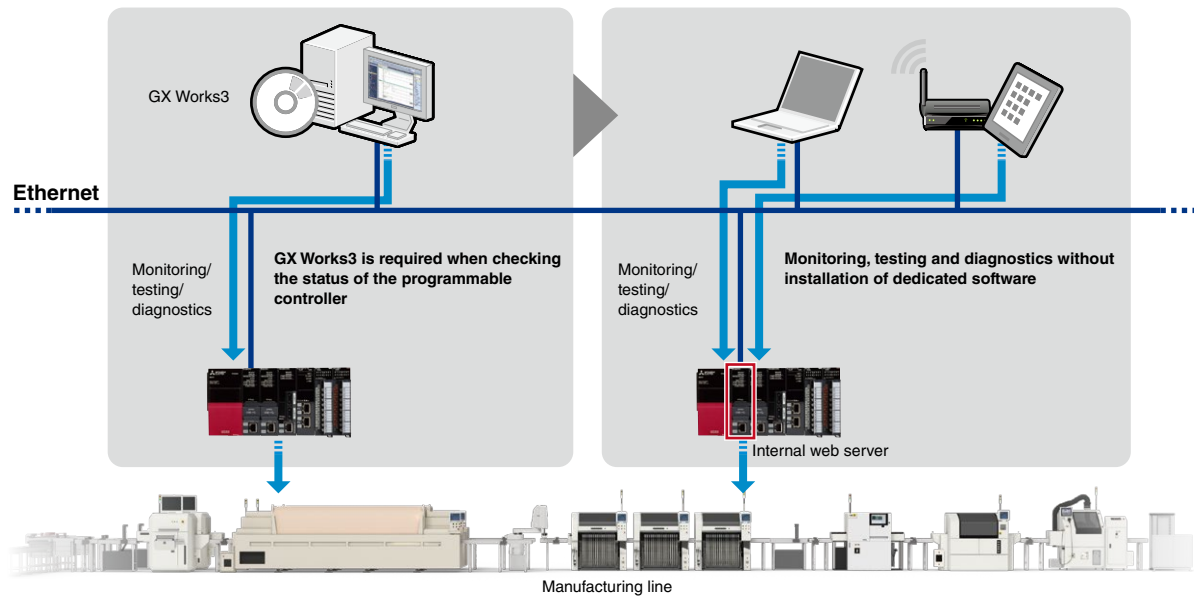
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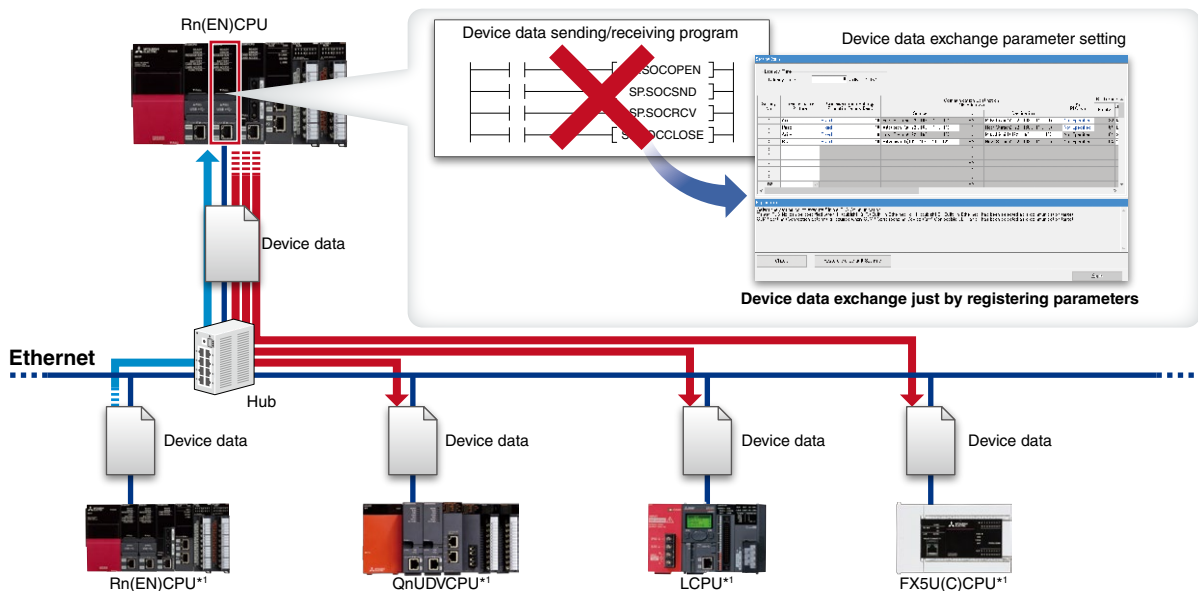
Basic diagnostics utilizing CPU internal web server

CPU diagnostics and device monitoring can be easily done via a web browser on a computer or tablet computer, without requiring to install GX Works3 realizing easier diagnostics when an error occurs.



Device data transferring without programming

The CPU supports simple settings with GX Works3 enabling the transfer of device data, such as production data without requiring a program. Communications can be done between MELSEC iQ-R Series and iQ-F Series, Q Series, and L Series control systems.



*1. Supported by the embedded Ethernet port only.

Programmable controller CPU module specifications

LD : Ladder diagram ST : Structured text FBD : Function block diagram SFC : Sequential function chart

Item	R00CPU	R01CPU	R02CPU	R04(EN)CPU	R08(EN)CPU	R16(EN)CPU	R32(EN)CPU	R120(EN)CPU
Control method	Stored program cyclic operation							
I/O control mode	Refresh mode (Direct access I/O is available by specifying direct access I/O (DX, DY))							
Programming language	LD ST FBD SFC							
Extended programming language	Function block (FB), label programming (system/local/global)							
Program execution type	Initial, scan, fixed scan, interrupt, standby							
Number of I/O points [X/Y] (point)	4096	4096	4096	4096	4096	4096	4096	4096
Constant scan (ms) (Function for keeping regular scan time)	0.5...2000 (Setting available in 0.1 ms increments)			0.2...2000 (Setting available in 0.1 ms increments)				
Memory capacity								
Program capacity (step)	10K	15K	20K	40K	80K	160K	320K	1200K
Program memory (byte)	40K	60K	80K	160K	320K	640K	1280K	4800K
Device/label memory*1 (byte)	252K	252K	252K	400K	1188K	1720K	2316K	3380K
Data memory (byte)	1.5M	1.5M	1.5M	2M	5M	10M	20M	40M
Instruction processing time								
LD instruction (ns)	31.36	31.36	3.92	0.98	0.98	0.98	0.98	0.98
MOV instruction (ns)	62.72	62.72	7.84	1.96	1.96	1.96	1.96	1.96
E + instruction (floating-point addition) (ns)	100.0	100.0	17.6	9.8	9.8	9.8	9.8	9.8
Structured text IF instruction*2 (ns)	31.36	31.36	3.92	1.96	1.96	1.96	1.96	1.96
Structured text FOR instruction*2 (ns)	31.36	31.36	3.92	1.96	1.96	1.96	1.96	1.96
PC MIX value*3 (instructions/μs)	19	19	146	419	419	419	419	419
Interface connection port								
High-speed USB2.0 (miniB)	●	●	●	●	●	●	●	●
Ethernet (100 BASE-TX/10 BASE-T)	●	●	●	●	●	●	●	●
CC-Link IE connection port								
Ethernet (1000BASE-T/100BASE-TX/10BASE-T)	-	-	-	●*4*5	●*4*5	●*4*5	●*4*5	●*4*5
CC-Link IE Field Network Basic connection port								
Ethernet (100BASE-TX/10BASE-T)	●	●	●	●	●	●	●	●
Memory interface								
SD memory card	-	●	●	●	●	●	●	●
Extended SRAM cassette	-	-	-	●	●	●	●	●
Function								
Multiple interrupt	●	●	●	●	●	●	●	●
Standard PID control	●	●	●	●	●	●	●	●
Internal database	-	-	-	●	●	●	●	●
Memory dump	-	●	●	●	●	●	●	●
Data logging	-	●*6	●*6	●	●	●	●	●
Real-time monitor	●	●	●	●	●	●	●	●
Security	●	●	●	●	●	●	●	●
Inter-modular synchronization	●	●	●	●	●	●	●	●
SLMP communication	●	●	●	●	●	●	●	●
Firmware update*7	●	●	●	●	●	●	●	●

*1. Extended SRAM cassette expands the device/label memory area.
 *2. The IF or FOR sentence of the structured text consists of several instructions, which may increase the processing time period.
 *3. Average number of instructions such as for basic instructions and data processing executed in 1 μs. The larger the value, the faster the processing speed.
 *4. Available with R□ENCPU. For details about network specifications, refer to the RJ71EN71 performance specifications on page 76.
 *5. The following networks are supported, Ethernet, CC-Link IE Control (twisted pair cable), and CC-Link IE Field (two simultaneous Ethernet networks and combined CC-Link IE Field and CC-Link IE Control networks are not supported).
 *6. Logging data can be saved in the SD memory card only.
 *7. Depends on supported CPU firmware version, for more information please refer to the relevant product manual.

SD memory card*8 specifications

Item	NZ1MEM-2GBSD	NZ1MEM-4GBSD	NZ1MEM-8GBSD	NZ1MEM-16GBSD
Type	SD memory card	SDHC memory card	SDHC memory card	SDHC memory card
Capacity (byte)	2G	4G	8G	16G

*8. SD memory card is not supported for the R00CPU.

Extended SRAM cassette specifications

Item	NZ2MC-1MBS	NZ2MC-2MBS	NZ2MC-2MBSE	NZ2MC-4MBS	NZ2MC-8MBS	NZ2MC-8MBSE	NZ2MC-16MBS
Capacity (byte)	1M	2M	2M	4M	8M	8M	16M
ECC type	-	-	●	-	-	●	-
Supported CPU modules							
Programmable controller CPU*9	●	●	-	●	●	-	●
Process CPU	-	-	●	-	-	●	-
SIL2 process CPU	-	-	●	-	-	●	-
Safety CPU	●	●	●	●	●	●	-

*9. Not supported for R00CPU, R01CPU, R02CPU.

Battery-less option cassette*10

Item	NZ1BLC
Type	Option cassette

*10. Supported for R04(EN)CPU, R08(EN)CPU, R16(EN)CPU, R32(EN)CPU, R120(EN)CPU.

System configuration

CPU

I/O

Analog

Motion, Positioning, High-speed Counter, Channel isolated pulse input

Network

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Software