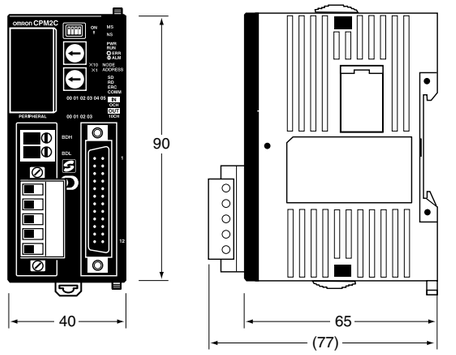
Available Models

Unit type		Inputs	Outputs	Clock	Model number
10 I/O points 6 inputs; 4 outputs	Connector	6, 24-VDC inputs	4 transistor (sinking) outputs	○	CPM2C-S100C-DRT
			4 transistor (sourcing) outputs	○	CPM2C-S110C-DRT

Dimensions (mm)

CPM2C-S100C-DRT
CPM2C-S110C-DRT



DeviceNet is a registered trademark of the ODVA (Open DeviceNet Vendor Association, Inc.).

CompoBus/D is a trademark used for OMRON products that conform to DeviceNet standards.

All CompoBus/D-series products conform to DeviceNet standards.

Note: Do not use this document to operate the Unit.

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Note: Specifications subject to change without notice.

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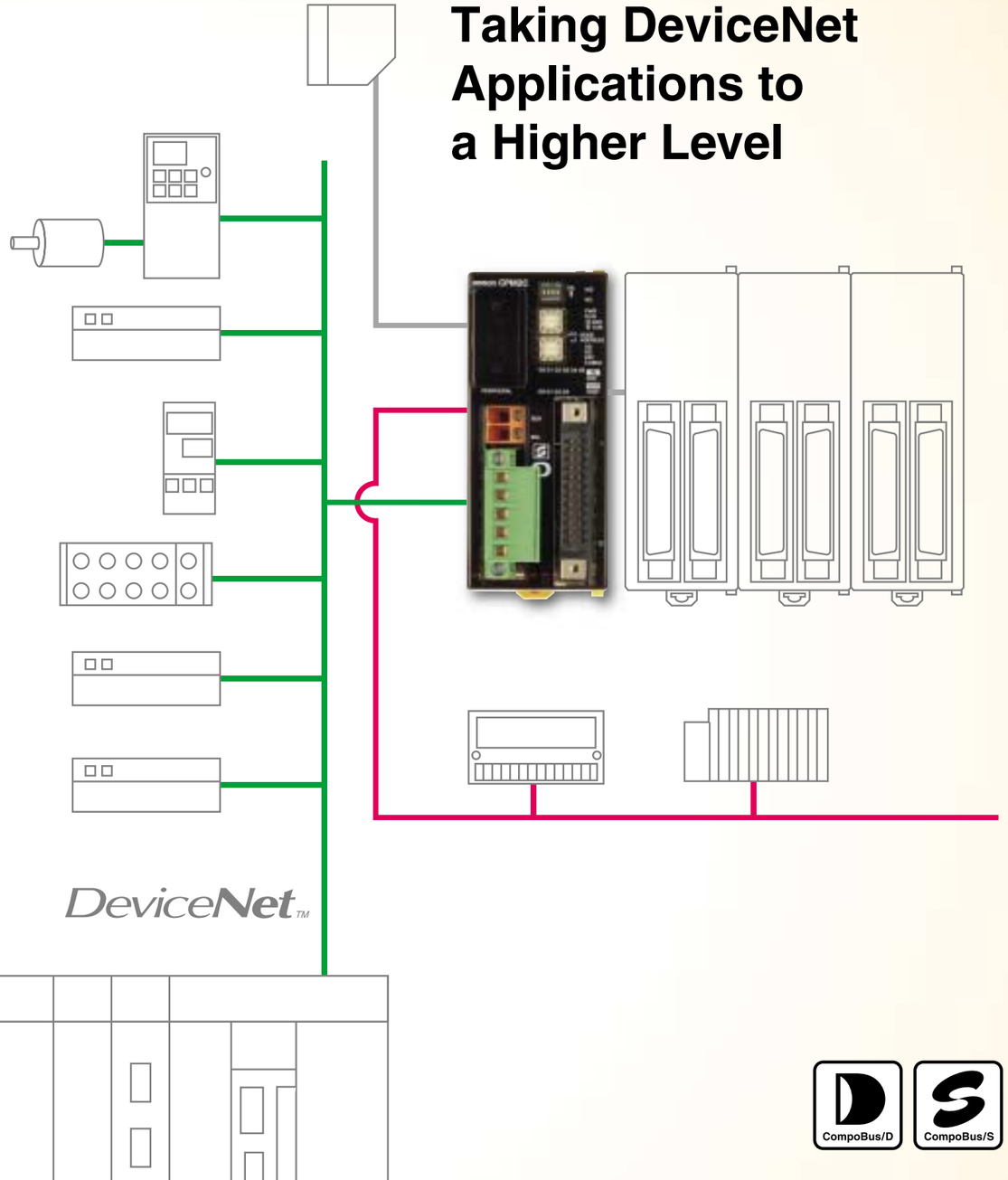
1100-5M

OMRON

Programmable Slaves

CPM2C-S100C-DRT/CPM2C-S110C-DRT

Taking DeviceNet Applications to a Higher Level



CompoBus/D

CompoBus/S

A slave with the complex functionality needed for distributed blocks.

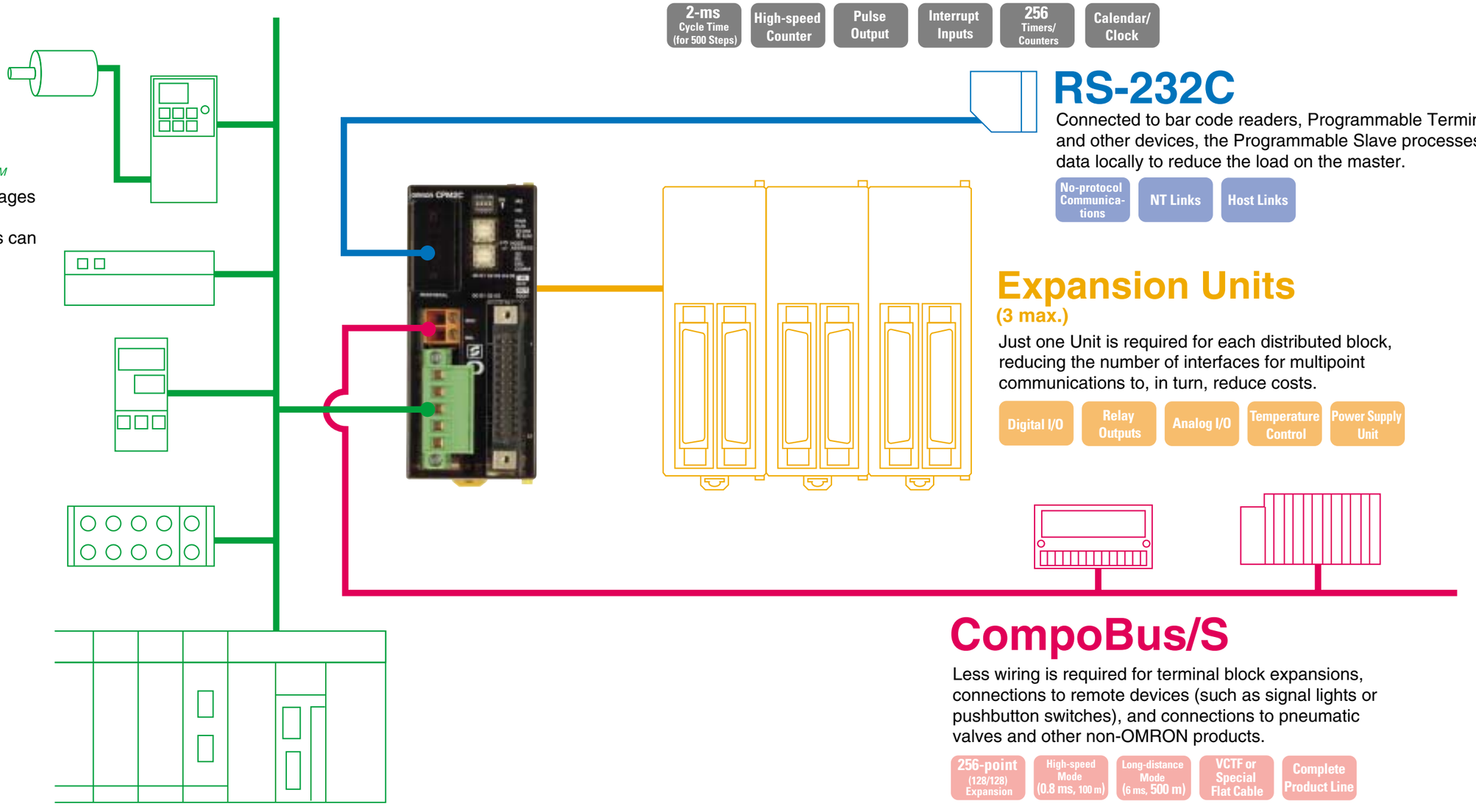
Programmable Slaves

**Programmable Slaves combine devices, such as sensors and actuators, into one functional unit that is treated as a DeviceNet slave.
Programmable Slaves greatly facilitate device distribution and functional organization.
They help standardize programming between units and reduce the amount of programming required at the master.
I/O and operational checks can be performed for each functional unit, rather than waiting for final system assembly, as with conventional distributed I/O systems.**

Functions

OMRON Programmable Slaves function as DeviceNet slaves, yet they provide PLC functionality to enable easy system expansion and create new potential.

- 2-ms Cycle Time (for 500 Steps)
- High-speed Counter
- Pulse Output
- Interrupt Inputs
- 256 Timers/ Counters
- Calendar/ Clock



DeviceNet™

Multiword I/O links and explicit messages are used to control slaves from the master. Log data for communications can be sent in one operation whenever necessary using explicit messages.

- 1,024-point I/O Links
- Explicit Messages
- DeviceNet-CompoBus/S Gateway

RS-232C

Connected to bar code readers, Programmable Terminals, and other devices, the Programmable Slave processes data locally to reduce the load on the master.

- No-protocol Communications
- NT Links
- Host Links

Expansion Units

(3 max.)

Just one Unit is required for each distributed block, reducing the number of interfaces for multipoint communications to, in turn, reduce costs.

- Digital I/O
- Relay Outputs
- Analog I/O
- Temperature Control
- Power Supply Unit

CompoBus/S

Less wiring is required for terminal block expansions, connections to remote devices (such as signal lights or pushbutton switches), and connections to pneumatic valves and other non-OMRON products.

- 256-point (128/128) Expansion
- High-speed Mode (0.8 ms, 100 m)
- Long-distance Mode (6 ms, 500 m)
- VCTF or Special Flat Cable
- Complete Product Line

NEW DeviceNet Programmable Slaves with PLC Functionality

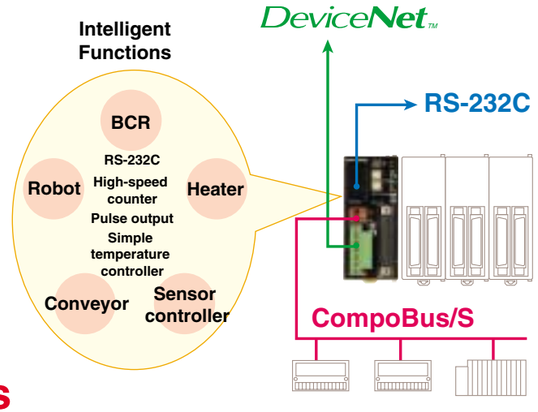
CPM2C-S100C-DRT
CPM2C-S110C-DRT

Programmable Slaves Increase Distributed Control Potential

Slaves with Composite Functionality

Implementing Mechanical Operations as Objects

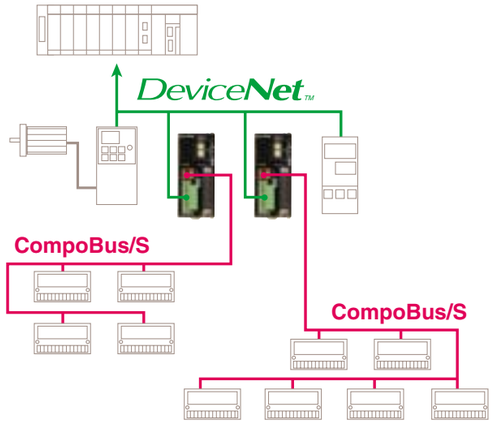
Combining the Programmable Slave's intelligent functions enables an entire mechanical unit to be designed with one slave. Using Programmable Slaves for distributed control allows mechanical operations to be treated as objects and enables programming using "programming components." These features make it far easier to modify and improve devices and systems. And because a Programmable Slave functions as a slave in a DeviceNet open network, a master made by another company can also be used.



Gateway

Gateway Functions

Using a Programmable Slave enables a wide variety of CompoBus/S inputs and outputs to be connected to a DeviceNet network.
One Programmable Slave provides remote I/O control for 256 I/O points (128 inputs/128 outputs) on 32 Units. (See note 1.)
When the maximum of 63 Programmable Slaves are connected to a DeviceNet network, control of more than 16,000 I/O points on 2,016 eight-point CompoBus/S slaves (1,008 input slaves/1,008 output slaves) can be controlled with one DeviceNet master. (See note 2.)



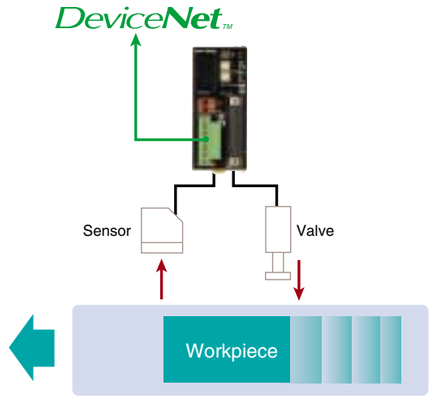
Note 1: When using 8-point slaves.
Note 2: Setting with a DeviceNet Configurator is required.
The number of Units and I/O points for which control is possible varies with the specifications of the DeviceNet master. The above specifications are possible with the CS1W-DRM21. The number of Units and I/O points for which control is possible will be less than that stated above when using the C200HW-DRM21-V1 or CVM1-DRM21-V1, which are currently available.

2 ms

Replacement of Logic Boards

High-speed processing compensates for the delay time in network communications.
A scan time of up to 2 ms is possible with a 500-step program. (See note 3.)
With 50-µs quick-response inputs and interrupt inputs, control requiring precise timing can be performed from a slave.
The Programmable Slave has a built-in high-speed counter, with a maximum input of 20 kHz. Use the counter with interrupt inputs to generate control interrupts when the count matches a set value.

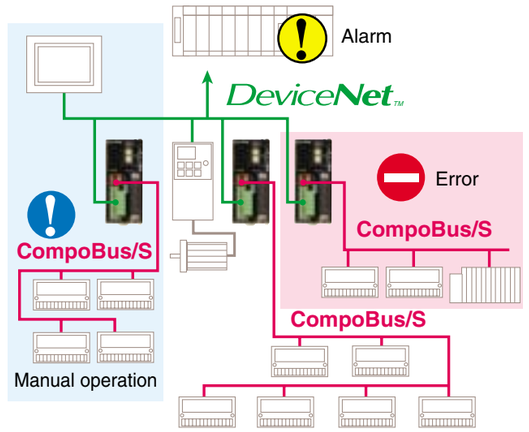
Note 3: The above figure applies for programming with basic instructions only. In CompoBus/S Long-distance Communications Mode, the scan time is 7 ms min.



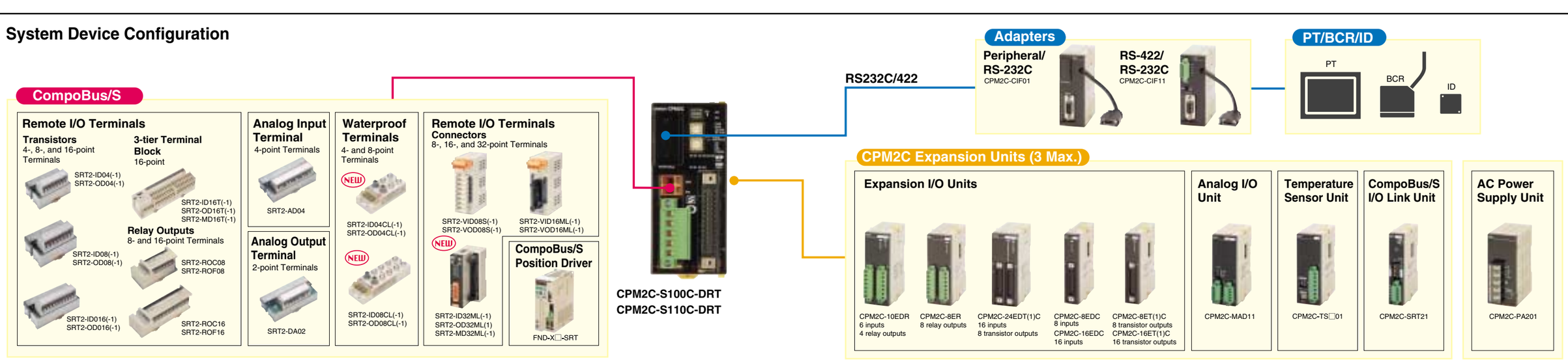
Maintenance

Shunting Operation for Communications Errors and Preventive Maintenance

Shunting processing can be used when communications errors occur during Programmable Slave operation. When using devices that require time to restart, such as heaters or pumps, energy can be saved by using standby mode when restarting.
For emergency processing when errors occur, work that is separate from the network can be continued locally using manual operations. There are also functions that can be used for preventive maintenance, such as counting the number of relay operations using a counter, or monitoring the operating time using the clock. These functions can be used to, for example, monitor the life of products or determine when lubrication is necessary.



System Device Configuration



Functions

2-ms Cycle Time (for 500 Steps)
The Programmable Slave boasts 50-µs quick-response inputs and a scan time of 2 ms max. for 500-step operation. Interrupt inputs provide the high mechanical speed required for improved productivity.

High-speed Counter
A single-axis high-speed counter provides a response frequency of 20 kHz (single-phase) or 5 kHz (2-phase), and a 2-axis high-speed counter provides a response frequency of 2 kHz (single-phase only).

Pulse Output
Choose from two, single-phase pulse outputs with no acceleration/deceleration, two pulse outputs with variable duty-ratio, or trapezoid acceleration/deceleration outputs (one pulse and direction output and one incrementing/decrementing pulse output). Either absolute or relative coordinates can be used for the coordinate system for pulse outputs (set in the PC Setup).

Interrupt Inputs
Interrupt inputs provide what's necessary to program high-speed response. The Programmable Slave has two separate interrupt inputs (both inputs can be used for either quick-response inputs or interrupt inputs in counter mode) with a minimum input signal width of 50 µs and a response time of 0.3 ms. When an interrupt input turns ON, the program is interrupted to execute the interrupt program.

256 Timers/ Counters
A total of 256 timers and counters are available, including 1-ms, 10-ms, 100-ms, and 1-s/10-s timers, and decrementing and reversible counters.

Calendar/ Clock
The clock can be read from the program to access the current year, month, day, day of the week, and time (hours, minutes, and seconds). The clock is set from a Programming Device, such as a Programming Console. The Programmable Slave can also compensate for time inaccuracies of up to 30 seconds.

DeviceNet

1,024-point I/O Links
I/O links of up to 1,024 points (512 inputs and 512 outputs) can be created with the master. The input and output areas used in the I/O links can be allocated independently and the data areas, starting addresses, and sizes of these read/write areas can be specified as required.

Explicit Messages
Explicit messages can be sent from the master to read or write data in any data area in the Programmable Slave.

DeviceNet-CompoBus/S Gateway
At its default settings, the Programmable Slave can be used as a CompoBus/S (128 inputs and 128 outputs) Gateway. (Two words of memory are required for status.)

RS-232C

No-protocol Communications
The communications I/O instructions TXD(48) and RXD(47) can be used in no-protocol mode to exchange data with standard serial devices. For example, data can be received from a bar code reader or transmitted to a serial printer. (See note 1.)

Host Links
A personal computer or OMRON Programmable Terminal (PT) connected in Host Link Mode can be used to read/write data in the Programmable Slave's I/O memory or read/change its operating mode.

NT Links
An OMRON PT can be connected directly to the Programmable Slave via a 1:1 NT Link for high-speed communications. (See notes 1 and 2.)

Note 1: Either a Peripheral/RS-232C Adapter or an RS-422/RS-232C Adapter is required for connection.
Note 2: Connection via a 1:N NT Link is not possible.

CompoBus/S

256-point (128/128) Expansion
The Programmable Slave can function as a CompoBus/S master to control a wiring-reduction bus. It is possible to connect up to 32 input and output devices with up to 256 I/O points. Device configurations can be changed or expanded easily.

High-speed Mode (0.8 ms, 100 m)
In High-speed Communications Mode, communications are possible over a distance of up to 100 m at a fixed cycle time of 0.8 ms (256 points).

Long-distance Mode (6 ms, 500 m)
When using Long-distance Communications Mode, the main line length can be extended to 500 m (communications cycle time: 6 ms). Also, versatile branching up to 200 m is possible using Special Flat Cable or 4-wire VCTF cable.

VCTF or Special Flat Cable
The widely available VCTF (0.75) can be used for the communications cable. Alternatively, a Special Flat Cable can be used to enable simple one-touch expansion.

Complete Product Line
A wide range of models, including Remote I/O Terminals (transistor terminals with terminal-blocks or connectors), Analog Input Terminals, Analog Output Terminals, Relay Output Terminals, Waterproof Terminals, and Position Drivers are available as slaves.

CPM2C Expansion Units

Digital I/O
The following mixed-I/O Units are available in addition to 8- and 16-point Input Units, and 8- and 16-point Output Units:
10-point Units: 6 inputs, 4 relay outputs
20-point Units: 12 inputs, 8 relay outputs
24-point Units: 16 inputs, 8 transistor outputs
32-point Units: 16 inputs, 16 transistor outputs

Relay Outputs
An Expansion I/O Unit with a terminal block providing 8 relay outputs is also available.

Analog I/O
The Analog I/O Unit has two analog inputs and one analog output. (By combining the PID control instruction and PWM instruction, time-proportional control is possible.) Resolution: 1/6,000; Conversion period: 2 ms/point.

Temperature Control
Temperature Sensor Units come in two types: Models with thermocouple inputs and models with platinum resistance thermometer inputs. Both types have two input points. Conversion period: 250 ms/2 points.

Power Supply Unit
A Power Supply Unit with the same slim, compact design as the Programmable Slave is available. One-touch wiring is possible with the enclosed connector cable (23 cm). It can also be used as the power supply for indicators. (In this case, wiring must be performed by the user.)

General Specifications and Performance Specifications

Item	Specification	
Control method	Stored program method	
I/O control method	Cyclic scan method (Immediate refreshing can be performed with IORF(97).)	
Programming language	Ladder diagram	
Instruction length	1 step per instruction, 1 to 5 words per instruction	
Instructions	Basic instructions	14
	Special instructions	105 instructions, 185 variations
Execution time	Basic instructions	0.64 µs (LD instruction)
	Special instructions	7.8 µs (MOV instruction)
Program capacity	4,096 words	
Max. I/O capacity	CPU Unit only: 10 points Expansion I/O: 72 points (24-point Expansion I/O Unit X 3) (Up to 3 Expansion I/O Units can be connected.) CompoBus/S: 256 points (338 in total)	
Input bits	IR 00000 to IR 00915 (Bits not used for input bits can be used for work bits.)	
Output bits	IR 01000 to IR 01915 (Bits not used for output bits can be used for work bits.)	
CompoBus/S input bits	128 bits: IR 02000 to IR 02715	
CompoBus/S output bits	128 bits: IR 03000 to IR 03715	
Work bits	672 bits: IR 02800 to IR 02915 IR 03800 to IR 04915 IR 04000 to IR 04915 IR 20000 to IR 22715	
Special bits (SR area)	440 bits: SR 22800 to SR 25507	
Temporary bits (TR area)	8 bits (TR0 to TR7)	
Holding bits (HR area)	320 bits: HR 0000 to HR 1915	
Auxiliary bits (AR area)	384 bits: AR 0000 to AR 2315 These include the CompoBus/S slave status flags (AR 04 to 07).	
Link bits (LR area)	256 points: LR 0000 to LR 1515	
Timers/Counters	256 timers/counters: TIM/CNT 000 to TIM/CNT 255 1-ms timers: TMHH(--) 10-ms timers: TIMH(15) 100-ms timers: TIM 1-s/10-s timers: TIML(--) Decrementing counters: CNT Reversible counters: CNTR(12)	
Data memory	Read/Write	2,048 words (DM 0000 to DM 2047) The Error Log is contained in DM 2000 to DM 2021.
	Read-only	456 words (DM 6144 to DM 6599)
	PC Setup	56 words (DM 6600 to DM 6655)
DeviceNet slave functions	DeviceNet Remote I/O Link • Use up to 1,024 I/O points in the I/O Link. Explicit Message Communications • Any PC data area can be accessed from the master.	

Connecting Cable (CPM2C-CN111, CS1W-CN114, or CS1W-CN118) is required to connect to the communications (peripheral/RS-232C) port.

Item		Specification
Basic interrupt functions	Interrupt inputs	2 interrupts (Used for both counter mode interrupt inputs and quick-response inputs.)
	Scheduled interrupts	1 interrupt
High-speed counter functions	High-speed counters	1 counter (20 kHz single-phase or 5 kHz 2-phase)
	Counter interrupts	1 interrupt (set value comparison or set-value range comparison)
	Interrupt Inputs (Counter mode)	2 interrupts (Used for both external interrupt inputs and quick-response inputs.)
	Count-up interrupts	2 interrupts (Used for both external interrupt inputs and quick-response inputs.)
Quick-response inputs		2 inputs (Used for both external interrupt inputs and counter mode interrupt inputs.) Min. input pulse width: 50 µs max.
Pulse output		2 points with acceleration/deceleration, 10 Hz to 10 kHz each, and no direction control;1 point with trapezoid acceleration/deceleration, 10 Hz to 10 kHz, and direction control;2 points with variable duty-ratio outputs
Synchronized pulse control		1 point
Input time constant (ON response time = OFF response time)		Can be set for CPU inputs and Expansion Unit inputs only. (1 ms, 2 ms, 3 ms, 5 ms, 10 ms, 20 ms, 40 ms, or 80 ms)
Clock		Equipped with clock (built-in RTC)
Communications functions		Peripheral port: Supports Host Link, peripheral bus, no-protocol, or Programming Console connections. RS-232C port: Supports Host Link, no-protocol, 1:1 Link, or 1:1 NT Link connections.
Memory protection		HR area, AR area, program contents, DM area contents, and counter values maintained during power interruptions.
Memory backup		Non-volatile (flash) memory: Program, read-only DM area, and PC Setup
		Memory backup (lithium battery; 2-year lifetime): DM area, HR area, AR area, and counter values
Self-diagnostic functions		CPU errors (watchdog timer), memory errors, communications errors, setting errors, battery errors, and expansion I/O bus errors
Program checks		No END instruction, programming errors (checked when operation is started)
Programming Devices	Programming Console	C200H-PRO27, CQM1-PRO01, or CQM1H-PRO01
	Ladder Support Software (V3/V6)	IBM PC/AT or compatible
	SYSMAC Support Software (V1.1)	IBM PC/AT or compatible

Communications Specifications

DeviceNet

Item	Specification
Communications protocol	DeviceNet
Connection form	Combination of multi-drop and T-branch connections (See note 1.)
Baud rate	500 kbps, 250 kbps, or 125 kbps (switchable)
Communications media	Special 5-wire cables (2 signal lines, 2 power lines, and 1 shield line)
Communications distance	Baud rate / Network length (See note 2.) / Main line length / Total branch line length 500 kbps / 100 m max. (See note 3.) / 6 m max. / 39 m max. 250 kbps / 250 m max. (See note 3.) / 6 m max. / 78 m max. 125 kbps / 500 m max. (See note 3.) / 6 m max. / 156 m max.
Maximum number of nodes	64 (This figure includes the master. Maximum number of connectable slaves: 63.)
Error controls	CRC error check, node address duplication check, scan list verification

Note 1: Connect external terminating resistance.
Note 2: Distance between the farthest nodes.
Note 3: If thin, special cables are used for the main lines, this figure will be 100 m max.

CompoBus/S

Item		Specification
Communications protocol		Special CompoBus/S protocol
Coding method		Manchester coding
Connection form		Combination of multi-drop method and T-branch connections (See note 1.)
Baud rate		High-speed Communications Mode: 750 kbps Long-distance Communications Mode: 93.75 kbps (See note 2.)
Communications cycle time	High-speed Communications Mode	0.5 ms (with 8 input and 8 output slaves connected) 0.8 ms (with 16 input and 16 output slaves connected)
	Long-distance Communications Mode	4.0 ms (with 8 input and 8 output slaves connected) 6.0 ms (with 16 input and 16 output slaves connected)
Communications media		2-wire cable (VCTF 0.75 X 2), 4-wire cable (VCTF 0.75 X 4), or Special Flat Cable
Communications distance		2-wire VCTF cable

Communications mode	Main line length	Branch line length	Total branch line length
High-speed Communications Mode	100 m max.	3 m max.	50 m max.
Long-distance Communications Mode	500 m max.	6 m max.	120 m max.

4-wire VCTF cable or Special Flat Cable

Communications mode	Main line length	Branch line length	Total branch line length
High-speed Communications Mode (See note 3.)	30 m max.	3 m max.	30 m max.
Long-distance Communications Mode (See note 4.)	Free branching (up to a total cable length of 200 m)		

Maximum number of nodes		32
Error control checks		Manchester code check, frame length check, and parity check

Note 1: Connect external terminating resistance.
Note 2: Switched using DM area setting. (Default setting: 750 kbps.)
Note 3: If the number of slaves connected is 16 or less, the maximum main line length will be 100 m max., and the maximum total branch line length will be 50 m max.
Note 4: There are no restrictions on the branching configuration, main line length, branch line length, or total branch line length. Connect external terminating resistance to the node farthest from the master.