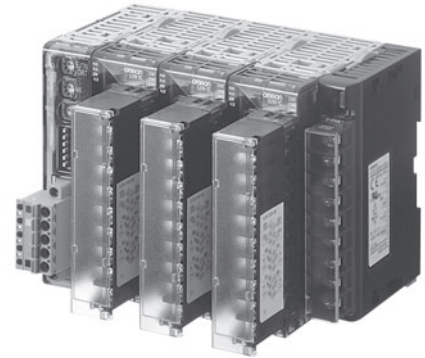


Modular Temperature Controller EJ1

CSM_EJ1_DS_E_8_1

In-panel Temperature Controller with Flexible Modular Design and Wide Integration with Host Devices

- The compact modular structure enables construction of temperature systems optimally suited to the application.
- Connection can be made to a Programmable Controller without any programming required, reducing the number of steps required in ladder programming design.
- One fully universal-input Unit includes a thermocouple, platinum-resistance thermometer, and analog input for easy selection and reduced inventory requirements.
- Connect directly to the G3ZA Multi-channel Power Controller using optimum cycle control for high-accuracy regulation with minimal noise.
- Autotuning (AT) can be used for independent heating/cooling PID control.
- Self-tuning (ST) can be used to calculate the PID constants with the step response method.
- Up to 16 Temperature Controllers can be connected to a single DeviceNet Communications Unit.



Supports DeviceNet Communications.



Refer to the "Safety Precautions" on page 20.

Ordering Information

Temperature Controller Standard Control Models

Name	Power supply voltage	No. of control points	Control outputs 1 and 2	Control outputs 3 and 4	Auxiliary output	Functions		Communications functions	Input type	Terminal	Model
						Heater burnout alarm	Event inputs				
Basic Unit (temperature control) *1 V1.2	24 VDC supplied from the End Unit	2	Voltage output: 2 points (for SSR drive) *2	Transistor output: 2 points (sinking)	None	2 *3	2	G3ZA connection port: RS-485 From End Unit: Port A or port B: RS-485	Thermocouple, platinum resistance thermometer, analog voltage, and analog current selectable for each channel.	M3 terminal	EJ1N-TC2A-QNHB
		4		Voltage output: 2 points (for SSR drive) *2		None	None			Screw-less clamp	EJ1N-TC2B-QNHB
		2	Current output: 2 points	Transistor output: 2 points (sinking)		2	Screw-less clamp			EJ1N-TC4A-QQ	
							Screw-less clamp			EJ1N-TC4B-QQ	
							Screw-less clamp			EJ1N-TC2A-CNB	
HFU with Programless Communications *1 V1.2		None	None	None	Transistor output: 4 points (sinking)	4	Port C: RS-485 or RS-232C selectable. From End Unit: Port A: RS-485 Port C: RS-422 From End Unit: Port A: RS-485	No input	M3 terminal	EJ1N-HFUA-NFLK	
									Screw-less clamp	EJ1N-HFUB-NFLK	
									M3 terminal	EJ1N-HFUA-NFL2	
									Screw-less clamp	EJ1N-HFUB-NFL2	
HFU with DeviceNet Communications *1					None	None	DeviceNet communications		Screw-less clamp	EJ1N-HFUB-DRT	
End Unit *1	24 VDC				Transistor output: 2 points (sinking)	None	Port A or B: RS-485 Connector: Port A		M3 terminal	EJ1C-EDUA-NFLK	
									Detachable connector	EJ1C-EDUC-NFLK	

*1. An End Unit is always required for connection to a Basic Unit or an HFU. An HFU cannot operate without a Basic Unit. External communications cannot be performed when using a Basic Unit only.

*2. For heating/cooling control applications, control outputs 3 and 4 on the 2-point models are used for the cooling or heating control outputs. On the 4-point models, heating/cooling control is performed for the two input points.

*3. When using the heater burnout alarm, purchase a Current Transformer (E54-CT1 or E54-CT3) separately.

Functional Upgrades

Refer to page 17 for details.

Upgrade functions are supported by the indicated version ("V1.1" or "V1.2") or a higher version of the software.

Refer to the following manual for precautionary information and other information necessary to use the EJ1:
EJ1 Modular Temperature Controller User's Manual (Cat. No. H142)

Accessories (Order Separately)

Current Transformer (CT)

Diameter	Model
5.8 dia.	E54-CT1
12.0 dia.	E54-CT3

G3ZA Connecting Cable

Cable length	Model
5 m	EJ1C-CBLA050

Rail Mounting Equipment

Name	Model
Mounting Rail	PFP-100N PFP-50N

CX-Thermo Support Software Ver. 4.1

Model
EST2-2C-MV4

USB-Serial Conversion Cable

Model
E58-CIFQ1

Specifications

Basic Unit/EJ1N-TC

Ratings

Item		Type	EJ1N-TC4	EJ1N-TC2
Power supply voltage			24 VDC	
Operating voltage range			85% to 110% of rated voltage	
Power consumption			5 W max. (at maximum load)	4 W max. (at maximum load)
Input *			Thermocouple: K, J, T, E, L, U, N, R, S, B, W, PLII ES1B Infrared Thermosensor: 10 to 70°C, 60 to 120°C, 115 to 165°C, 140 to 260°C Analog input: 4 to 20 mA, 0 to 20 mA, 1 to 5 V, 0 to 5 V, 0 to 10 V Platinum resistance thermometer: Pt100, JPt100	
Input impedance			Current input: 150 Ω max., voltage input: 1 MΩ min.	
Control outputs	Voltage output		Output voltage: 12 VDC ±15%, max. load current: 21 mA (PNP models with short-circuit protection circuit)	
	Transistor output		---	Max. operating voltage: 30 V, max. load current: 100 mA
	Current output		---	Current output range: 4 to 20 mA or 0 to 20 mA DC Load: 500 Ω max. (including transfer output) (Resolution: Approx. 2,800 for 4 to 20 mA DC, approx. 3,500 for 0 to 20 mA DC)
Event inputs	Input points		---	2
	Contact input		---	ON: 1 kΩ max., OFF: 100 kΩ min.
	Non-contact input		---	ON: Residual voltage: 1.5 V max., OFF: Leakage current: 0.1 mA max.
			---	Outflow current: Approx. 4 mA per point
Number of input and control points			Input points: 4, Control points: 4	Input points: 2, Control points: 2
Setting method			Via communications	
Control method			ON/OFF control or 2-PID (with autotuning, self-tuning) V1.2	
Other functions			Two-point input shift, digital input filter, remote SP, SP ramp, manual manipulated variable, manipulated variable limiter, interference overshoot adjustment, loop burnout alarm, RUN/STOP, banks, I/O allocations, etc.	
Ambient temperature range			Operating: -10°C to 55°C, Storage: -25°C to 65°C (with no icing or condensation)	
Ambient humidity range			Operating: 25% to 85% (with no condensation)	

* Inputs are fully universal. Therefore, platinum resistance thermometer, thermocouple, infrared thermosensor, and analog input can be selected.

Characteristics

Indication accuracy	Thermocouple input/platinum resistance thermometer input: ($\pm 0.5\%$ of indication value (PV) or $\pm 1^\circ\text{C}$, whichever is greater) ± 1 digit max. *1 Analog input: $\pm 0.5\%$ FS ± 1 digit max. CT input: $\pm 5\%$ FS ± 1 digit max.	
Hysteresis	0.1 to 999.9 EU (in units of 0.1 EU) *2	
Proportional band (P)	0.1 to 999.9 EU (in units of 0.1 EU) *2	
Integral time (I)	0 to 3,999 s (in units of 1 s)	
Derivative time (D)	0.0 to 999.9 s (in units of 0.1 s)	
Control period	0.5 s, 1 to 99 s (in units of 1 s)	
Manual reset value	0.0% to 100.0% (in units of 0.1%)	
Alarm setting range	-1,999 to 9,999 (decimal point position depends on input type)	
Sampling period	250 ms	
Influence of signal source resistance	Thermocouple: 0.1°C (0.2°F)/ Ω max. (100 Ω max per line) *3 Platinum resistance thermometer: 0.4°C (0.8°F)/ Ω max. (10 Ω max per line)	
Insulation resistance	20 M Ω min. (at 500 VDC)	
Dielectric strength	600 VAC, 50/60 Hz for 1 min between current-carrying terminals of different polarity	
Vibration resistance	10 to 55 Hz, 20 m/s ² for 2 hours each in X, Y, and Z directions	
Shock resistance	150 m/s ² , 3 times each in 6 directions	
Weight	180 g	
Degree of protection	Rear case: IP20, Terminal section: IP00	
Memory protection	EEPROM (non-volatile memory) (number of writes: 100,000)	
Standards	Approved standards	UL61010C-1, CSA C22.2 No.1010-1
	Conformed standards	EN61010-1 (IEC61010-1): Pollution level 2, overvoltage category II
EMC Directive	EMI:	EN61326
	EMI Radiated:	EN55011 Group1 class A
	EMI Conducted:	EN55011 Group1 class A
	EMS:	EN61326
	ESD Immunity:	EN61000-4-2
	Electromagnetic Field Immunity:	EN61000-4-3
	Burst immunity/Noise Immunity:	EN61000-4-4
	Conducted Disturbance Immunity:	EN61000-4-6
	Surge Immunity:	EN61000-4-5

*1. The indication of K thermocouples in the -200 to $1,300^\circ\text{C}$ range, T and N thermocouples at a temperature of -100°C or less, and U and L thermocouples at any temperature is $\pm 2^\circ\text{C} \pm 1$ digit maximum. The indication of B thermocouples at a temperature of 400°C or less is unrestricted. The indication of R and S thermocouples at a temperature of 200°C or less is $\pm 3^\circ\text{C} \pm 1$ digit max.
W = ($\pm 0.5\%$ of indication value (PV) or $\pm 3^\circ\text{C}$, whichever is greater) ± 1 digit max. PLII = ($\pm 0.5\%$ of indication value (PV) or $\pm 2^\circ\text{C}$, whichever is greater) ± 1 digit max.

The indication accuracy for K thermocouples in the -199.9 to 999.9°C range **V1.2** is ($\pm 0.5\%$ of indication value (PV) or $\pm 1^\circ\text{C}$, whichever is greater) ± 10 digit maximum. However, at a temperature of -100°C or less, it is $\pm 2^\circ\text{C} \pm 10$ digit maximum.

*2. "EU" stands for Engineering Unit. The location of the decimal point depends on the type of sensor that is selected.

If the decimal point locations is set to 0 (****), however, it will be treated as if it were set to 1 (***.).

*3. B, R, S, and W sensors: $0.2^\circ\text{C}/\Omega$ max. (100 Ω max.)

Communications Specifications

Item	Port B *1	Port A Terminal/ Port A Connector *1	G3ZA Connection Port *2
Transmission path connection	RS-485 (multipoint)		
Communications method	RS-485 (two-wire, half duplex)		
Synchronization method	Start-stop synchronization		
Communications protocol	CompoWay/F, Modbus *4 V1.1	CompoWay/F	
Baud rate	9.6, 19.2, 38.4, 57.6, or 115.2 kbps	38.4 kbps fixed	57.6 kbps fixed
Transmission code	CompoWay/F: ASCII, Modbus: RTU	CompoWay/F: ASCII	
Data bit length	7 or 8 bits	7 bits	
Stop bit length	1 or 2 bits	2 bits	
Error detection	Vertical parity (none, even, or odd)	Vertical parity (even)	
	Block check character (BCC): with CompoWay/F, CRC-16: (with Modbus)		
Flow control	None		
Interface	RS-485		
Retry function	None		
Communications response wait time	0 to 99 ms (default: 5 ms) V1.1	1 to 99 ms (default: 1 ms)	---
Number of Units that can be connected in parallel *3	64 Units (model numbers with TC4: 256 channels, model numbers with TC2: 128 channels) Communications connection via port B on the End Unit	64 Units (model numbers with TC4: 256 channels, model numbers with TC2: 128 channels) Communications connection via port A on the End Unit	8 Units (Communications connection via G3ZA port on the Basic Unit)

*1. Connection from the EJ1C-EDU. When using an HFU, port B on the End Unit can be used for distributed placement only.

*2. A special cable (EJ1C-CBLA050) must be purchased separately for the G3ZA connection.

*3. For the number of Units that can be connected, refer to "Connection Precautions" on page 11.

*4. The Modbus protocol can be used with Basic Unit with version 1.1 or higher.

Current Transformer (CT) Rating

Dielectric strength	1,000 VAC for 1 min
Vibration resistance	50 Hz, 98 m/s ²
Weight	E54-CT1: Approx. 11.5 g, E54-CT3: Approx. 50 g
Accessories (E54-CT3 only)	Armatures (2), plugs (2)

Characteristics of the Heater Burnout Alarm, SSR Failure Alarm, and Heater Overcurrent Alarm (TC2□-QNHB Model Only)

Maximum heater current	100 VAC
Input current indication accuracy	±5%FS ±1 digit max.
Heater burnout alarm setting range	0.1 to 99.9 A (in units of 0.1 A) 0.0 A: Heater burnout alarm output turns OFF. 100.0 A: Heater burnout alarm output turns ON. Min. detection ON time: 100 ms *1
SSR failure alarm setting range	0.1 to 99.9 A (in units of 0.1 A) 0.0 A: SSR failure alarm output turns ON. 100.0 A: SSR alarm output turns OFF. Min. detection OFF time: 100 ms *2
Heater overcurrent alarm setting range	0.1 to 99.9 A (in units of 0.1 A) 0.0 A: Heater overcurrent alarm output turns ON. 100.0 A: Heater overcurrent alarm output turns OFF. Min. detection ON time: 100 ms *1

*1. When the control output ON time is less than 100 ms, heater burnout detection, heater overcurrent detection, and heater current measurement are not performed.

*2. When the control output OFF time is less than 100 ms, SSR failure alarm and leakage current measurement are not performed.

HFU Unit/EJ1N-HFU□-NFL□

Ratings

Power supply voltage		24 VDC
Operating voltage range		85% to 110% of rated voltage
Power consumption		2 W max. (at maximum load)
Auxiliary outputs *	Outputs	4
	Transistor outputs	Max. operating voltage: 30 VDC, Max. load current: 50 mA
Event inputs	Inputs	4
	Contact inputs	ON: 1 kΩ max., OFF: 100 kΩ min.
	Transistor inputs	ON: residual voltage of 1.5 max., OFF: leakage current of 0.1 mA max.
		Outflow current: Approx. 4 mA (per contact)
Programless connection	Downloading (EJ1 reads data from a PLC)	Number of parameters that can be set: 1200 V1.2
	Uploading (EJ1 writes data to a PLC)	Number of parameters that can be set: 1200 V1.2
	Applicable PLCs	OMRON: CS/CJ/NJ Series Mitsubishi Electric: MELSEC-An/AnS/FX _{3UC} Series V1.1 Mitsubishi Electric: MELSEC-Q/QnA/QnAS Series
Ambient temperature range		Operating: -10°C to 55°C Storage: -25°C to 65°C (with no icing or condensation)
Ambient humidity range		Operating: 25% to 85% (with no condensation)

* Auxiliary outputs can be allocated using digital output allocations.

Characteristics

Insulation resistance		20 MΩ min. (at 500 VDC)
Dielectric strength		600 VAC, 50/60 Hz for 1 min between current-carrying terminals of different polarity
Vibration resistance		10 to 55 Hz, 20 m/s ² for 2 hours each in X, Y, and Z directions
Shock resistance		150 m/s ² , 3 times each in 6 directions
Weight		160 g
Degree of protection		Rear case: IP20, Terminal section: IP00
Memory protection		EEPROM (non-volatile memory) (number of writes: 100,000)
Standards	Approved standards	UL61010C-1, CSA C22.2 No.1010-1
	Conformed standards	EN61010-1 (IEC61010-1): Pollution level 2, overvoltage category II
EMC Directive		Refer to page 3.

Communications Characteristics: Port C

Transmission path connection		RS-485/RS-422: Multi-point, RS-232C: Point-to-point *1
Communications method		RS-485/RS-422 (two-wire, half duplex), RS-232C
Synchronization method		Start-stop synchronization
Communications protocol		• OMRON PLC protocol (Connectable PLCs: SYSMAC CS/CJ/CP Series) • AnA/AnU CPU common commands (Connectable PLCs: MELSEC-An/AnS/FX_{3UC} Series) V1.1 • MC protocol (form 5) (Connectable PLCs: MELSEC-Q/QnA/QnAS Series)
Baud rate		9.6, 19.2, 38.4, 57.6, or 115.2 kbps
Transmission code		Binary
Data bit length		8 bits
Stop bit length		1 bit
Error detection		Depends on protocol selected for the programless communications protocol.
Flow control		None
Interface		RS-485, RS-422, RS-232C *1
Retry function		Available
Communications response wait time		0 to 99 ms (default: 5 ms) V1.1
Number of Basic Units that can be connected in parallel *2		32 Units (model numbers with TC4:128 channels max., model numbers with TC2:64 channels max.)
Number of HFUs that can be connected V1.1		• CS/CJ/NJ-series PLCs: 8 (EJ1-HFU□-NFLK) • MELSEC Q/QnA/QnAS-series PLCs: 8 (EJ1-HFU□-NFL2)

*1. The communications method can be switched between RS-485 and RS-232C. A separate model must be used for RS-422 communications.

*2. For the number of Units that can be connected, refer to "Connection Precautions" on page 11.

HFU Unit/EJ1N-HFUB-DRT

Ratings

Power supply voltage	DeviceNet power supply	24 VDC (for internal circuits)
	EDU power supply	24 VDC (for RS-485 communications circuits and Temperature Controllers)
Operating voltage range	DeviceNet power supply	11 to 25 VDC
	EDU power supply	20.4 to 26.4 VDC
Power consumption (at maximum load)		1 W max. (at maximum load)
Main functions		Remote I/O communications, explicit message communications, CompoWay/F command feed-through function, parameter backup function, and configuration registration
Ambient temperature range		Operating: -10°C to 55°C Storage: -25°C to 65°C (with no icing or condensation)
Ambient humidity range		Operating: 25% to 85% (with no condensation)

Characteristics

Insulation resistance		20 MΩ min. (at 500 VDC)
Dielectric strength		600 VAC, 50/60 Hz for 1 min
Vibration resistance		10 to 55 Hz, 10 m/s ² for 2 hours each in X, Y, and Z directions
Shock resistance		150m/s ² max. 3 times each in 3 axes, 6 directions
Weight		70 g max.
Degree of protection		IP20
Memory protection		EEPROM, 100,000 write operations (backup data)
Standards	Approved standards	UL61010-1, CSA C22.2 No.1010-1
	Conformed standards	EN61010-1 (IEC61010-1): Pollution level 2, overvoltage category II
EMC Directive		Refer to page 3.

Communications Characteristics

Communications protocol		Conforms to DeviceNet.		
Communications functions	Remote I/O communications	Master-slave connections (polling, COS, or cyclic) Conforms to DeviceNet specifications.		
	I/O allocation	Input and output data can be allocated freely by user with the Configurator. Allocations can be made to DeviceNet parameters or Temperature Controller parameters. Two blocks for IN Area, up to 100 words One block for OUT Area, up to 100 words (The first word is always allocated to the OUT Enable Bit.)		
	Message communications	Explicit message communications CompoWay/F communications commands can be sent (commands are sent in explicit message format).		
Connection format		Combination of multidrop and T-branch connections (for trunk and drop lines)		
Baud rate		DeviceNet: 500, 250, or 125 kbps, or automatic detection of master baud rate		
Communications media		Special 5-wire cable (2 signal lines, 2 power lines, and 1 shield line)		
Communications distance		Baud rate	Network length	Drop line length
		500 kbps	100 m max. (100 m max.)	6 m max.
		250 kbps	250 m max. (100 m max.)	6 m max.
		125 kbps	500 m max. (100 m max.)	6 m max.
		The values in parentheses apply when Thin Cables are used.		
Communications power supply		11 to 25 VDC		
Maximum number of nodes that can be connected		64 (includes Configurator when used.)		
Maximum number of slaves that can be connected		63		
Error control		CRC error detection		
DeviceNet power supply		Power supplied from DeviceNet communications connector		
Applicable Temperature Controllers		EJ1 Series (excluding the EJ1G) TC4: EJ1N-TC4A-QQ and EJ1N-TC4B-QQ TC2: EJ1N-TC2A-QNHB, EJ1N-TC2B-QNHB, EJ1N-TC2A-CNB, and EJ1N-TC2B-CNB		
Maximum number of Temperature Controllers that can be connected *		16 Units (model numbers with TC4: 64 channels max., model numbers with TC2: 32 channels max.)		

* For the number of Units that can be connected, refer to "Connection Precautions" on page 11.

End Unit/EJ1C-EDU

Ratings

Power supply voltage		24 VDC
Operating voltage range		85% to 110% of rated voltage
Auxiliary output *	Outputs	2
	Transistor outputs	Max. operating voltage: 30 VDC, Max. load current: 50 mA
Ambient temperature range		Operating: -10°C to 55°C Storage: -25°C to 65°C (with no icing or condensation)
Ambient humidity range		Operating: 25% to 85% (with no condensation)

* Auxiliary output can be allocated using the bus output allocation for each Basic Unit.

Characteristics

Insulation resistance		20 MΩ min. (at 500 VDC)
Dielectric strength		600 VAC, 50/60 Hz for 1 min between current-carrying terminals of different polarity
Vibration resistance		10 to 55 Hz, 20 m/s ² for 2 hours each in X, Y, and Z directions
Shock resistance		150 m/s ² , 3 times each in 6 directions
Weight		70 g
Degree of protection		End Unit case: IP20, Terminal section: IP00
Standards	Approved standards	UL61010C-1, CSA C22.2 No.1010-1
	Conformed standards	EN61010-1 (IEC61010-1): Pollution level 2, overvoltage category II
EMC Directive		Same as for the Basic Unit. Refer to page 3.

Communications

Port B *1	Basic Unit Communications (Refer to "Communications Specifications" on page 4.)
Port A	Basic Unit Communications (Refer to "Communications Specifications" on page 4.)
Port A connector *2	E58-CIFQ1

*1. Port B communications for the End Unit cannot be used when port C communications for the HFU is used.

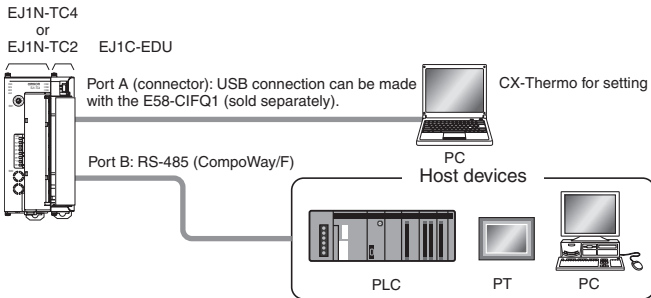
*2. Port A connector communications and port A terminal communications cannot be used at the same time.

Unit Configuration Example

Minimal Configuration

Small Systems with 2 Channels or 4 Channels Communicating with the Host Device via RS-485 (CompoWay/F Protocol)

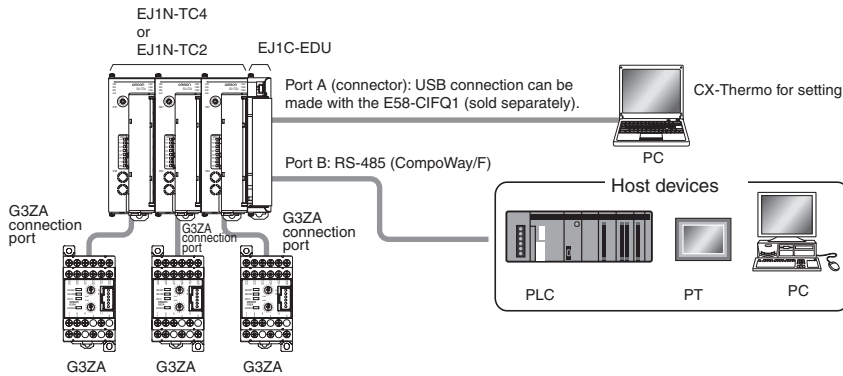
- Alarms can be allocated to the auxiliary output for the End Unit.
- G3ZA/G3PW outputs can be used.



Multiple Units without an EJ1N-HFU

Building Systems Communicating with the Host Device, such as a PLC, PT, or Computer, via RS-485 (CompoWay/F Protocol)

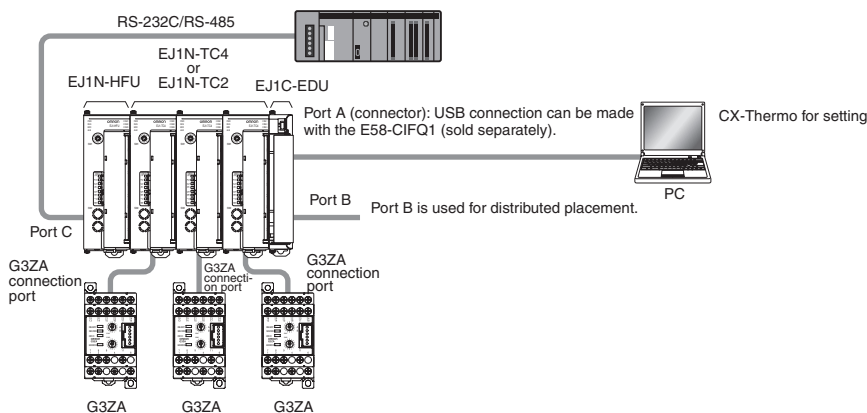
- The 2 auxiliary alarm outputs provided on the End Unit can be used for integrated alarm systems.
- G3ZA/G3PW outputs can be used.
- Distributed placement is possible by using multiple EJ1C-EDU End Units.



Multiple Units with an EJ1N-HFU

Using the EJ1N-HFU□-NFL□ to Build a System Communicating 1:1 with a PLC Using Programless Communications

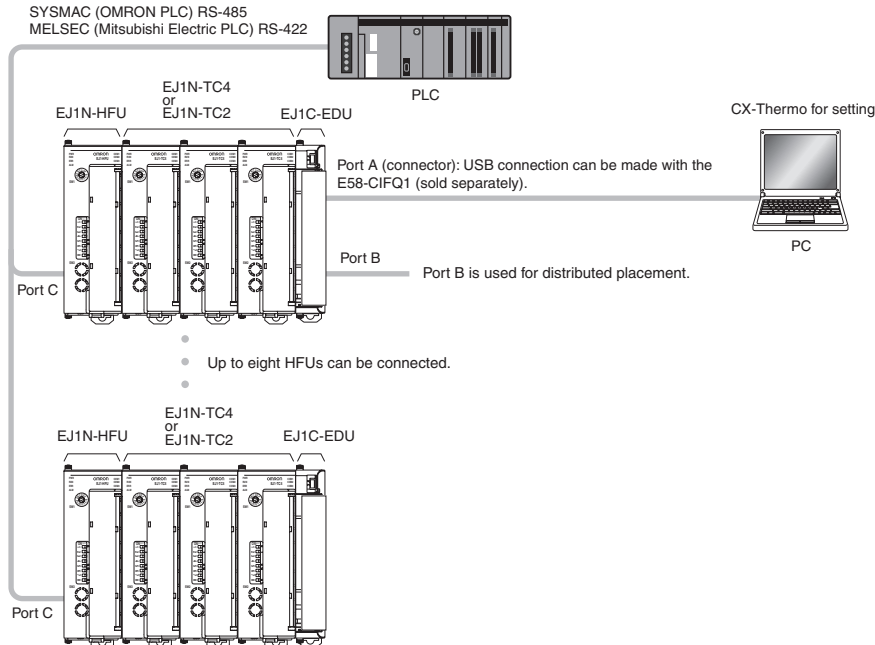
- The 2 auxiliary outputs provided on the End Unit can be used.
- The 4 event inputs and 4 auxiliary outputs of the HFU can also be used.
- G3ZA/G3PW outputs can be used.
- Distributed placement is possible by using multiple EJ1C-EDU End Units



Multiple Units with an EJ1N-HFU

Using the EJ1N-HFU□-NFL□ to Build Systems Communicating 1:1 with a PLC Using Programless Communications V1.1

- Up to eight HFUs can be connected to one port on a PLC.
- G3ZA/G3PW outputs can be used.
- Distributed placement is possible by using multiple EJ1C-EDU End Units.
- To connect more than one HFU, specific PLC and EJ1 models must be used.
Refer to “Connecting EJ1 Controllers 1:N to a PLC” on page 13.

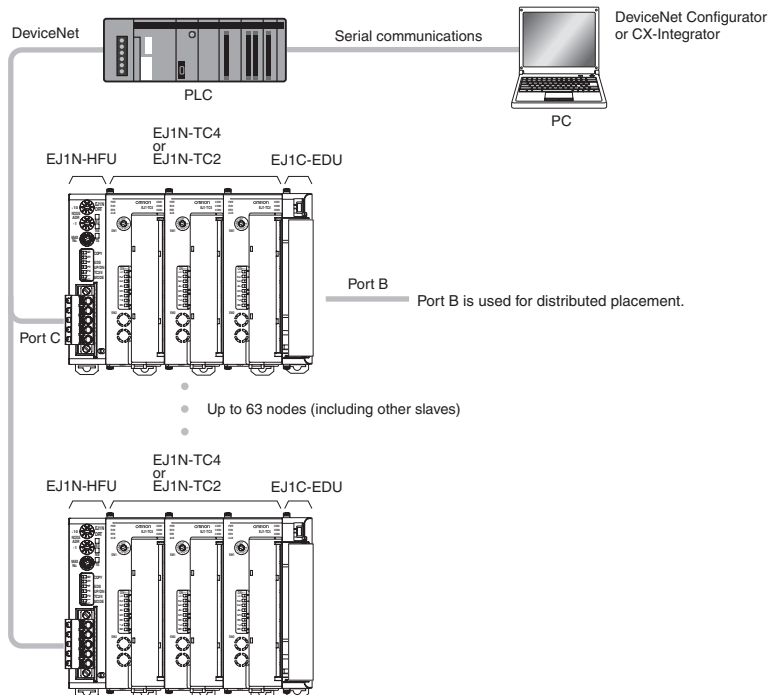


Note: Set the EJ1N-TC to a communications unit number that is not being used by the EJ1N-HFU.

Multiple Units with an EJ1N-HFU

Using the EJ1N-HFUB-DRT to Build a System Communicating with a PLC

- Up to 63 DeviceNet slaves can be connected to the DeviceNet Masters in one PLC.
- G3ZA/G3PW outputs can be used.
- Distributed placement is possible by using multiple EJ1C-EDU End Units.



Connection Precautions

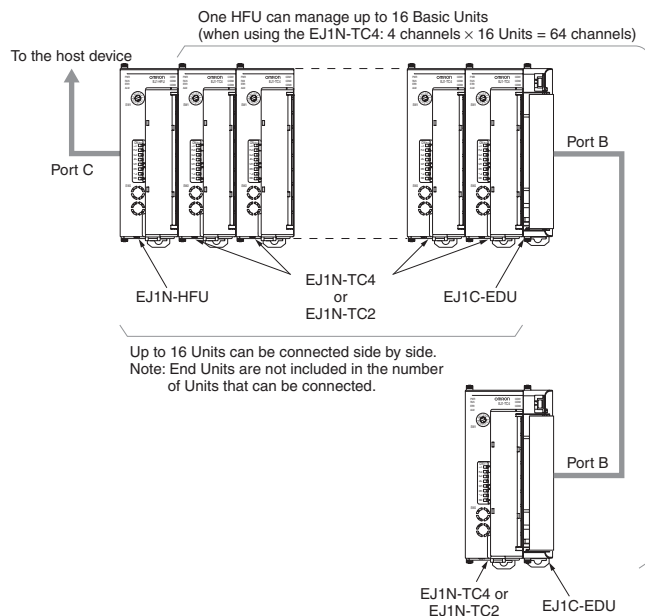
Communications Unit Number Setting

- Communications unit numbers 0 to 63 can be assigned to Basic Units and HFUs.

Restrictions on the Number of Units That Can Be Connected

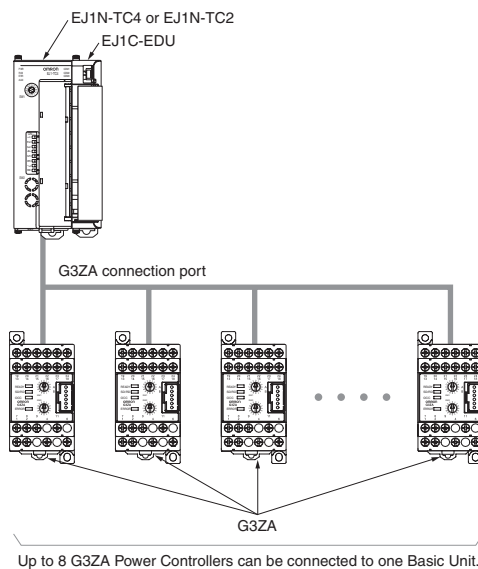
Restrictions for HFUs

- One EJ1N-HFU can manage up to 32 Basic Units (EJ1N-TC4/TC2).
- Up to 16 Units can be connected side by side including the EJ1N-HFU. The End Unit is not included in the 16 Units.
- To use the CX-Thermo Support Software from a computer to set EJ1N-TC4/EJ1N-TC2 Basic Units that are connected with distributed placement, use a communications cable to connect port A (on the terminal block) on both Units.



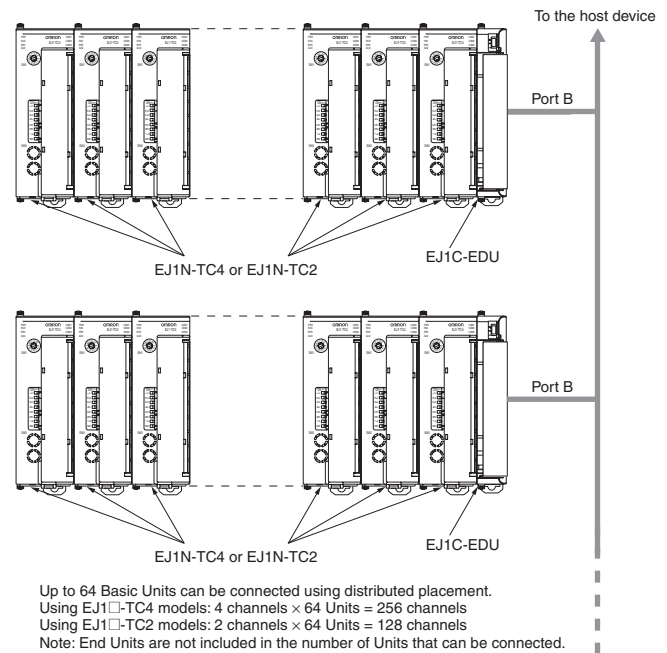
Restrictions When Connecting with the G3ZA

- Up to 8 G3ZA Multi-channel Power Controllers can be connected to one Basic Unit (EJ1N-TC4/TC2).

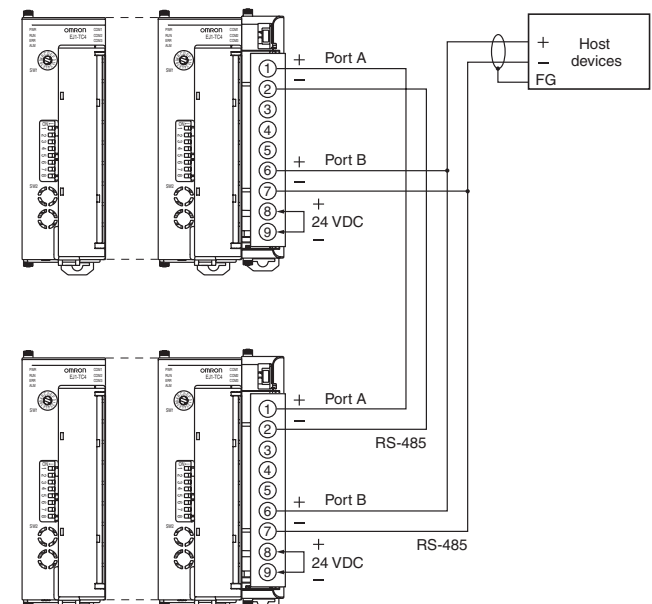


Restrictions for Basic Units

- When the system is configured of only Basic Units (EJ1N-TC4/TC2), up to 64 Units can be connected.
- Distributed placement is possible by using End Units (EJ1C-EDU).
- Up to 16 Units can be connected side by side. The End Unit is not included in the 16 Units.
- To use the CX-Thermo Support Software from a computer to set EJ1N-TC4/EJ1N-TC2 Basic Units that are connected with distributed placement, use a communications cable to connect port A (on the terminal block) on both Units.



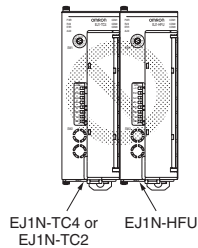
Wiring for Distributed Placement



Note: To use the CX-Thermo Support Software from a computer to set EJ1N-TC4/EJ1N-TC2 Basic Units that are connected with distributed placement, use a communications cable to connect port A (terminals 1 and 2 on the terminal block) on both Units.

Restrictions on Unit Placement

Always connect the HFU on the left side of the Basic Unit.



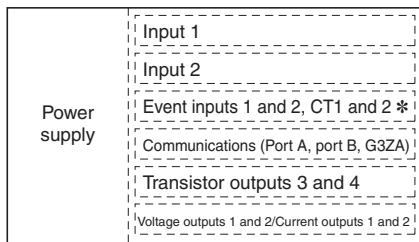
Insulation Blocks

Each EJ1 Unit is electrically insulated for each function block as shown in the following figures.

Functional insulation is applied between the power supply, input, output, and communications terminal sections.

If reinforced double insulation is required, use power supplies that comply with IEC60664 for reinforced double insulation for the EJ1's external power supply and for power supplies connected to the EJ1.

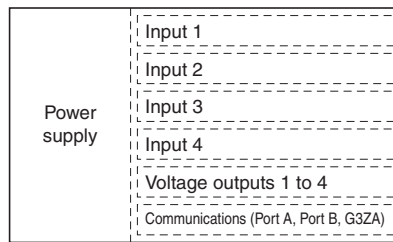
EJ1N-TC2



Functional isolation

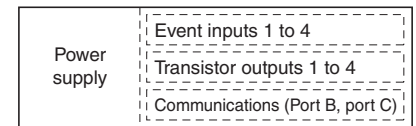
* Not provided on models with current outputs.

EJ1N-TC4



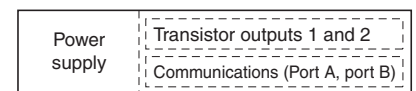
Functional isolation

EJ1N-HFU□-NFL□



Functional isolation

EJ1C-EDU



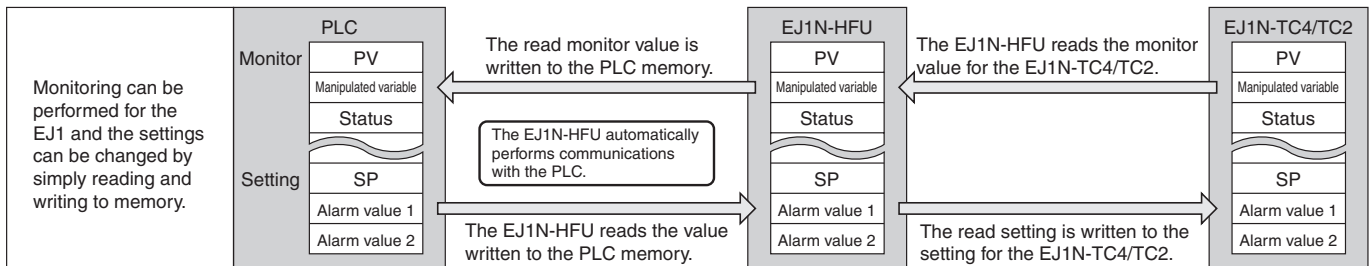
Functional isolation

Programless Communications

Communications with PLCs from OMRON (CS/CJ/CP/NJ Series) and Mitsubishi Electric (MELSEC-Q/QnA/QnAS/An/Ans/FX_{3UC} Series) can be performed without creating ladder programming.

Using programless communications enables monitoring and changing settings for the EJ1 by simply reading and writing to PLC memory.

The EJ1 automatically performs communications with the PLC, which reduces work hours spent programming for communications from the PLC to the EJ1.



Connectable Devices

Connecting an EJ1 Controller 1:1 to a PLC CS/CJ/CP/NJ Series

Name	Model No.	Communications ports	
		Port 1	Port 2
Serial Communications Units *1	CJ1W-SCU21-V1	RS-232C	RS-232C
	CJ1W-SCU22		
	CJ1W-SCU31-V1	RS-422A/485	RS-422A/485
	CJ1W-SCU32		
	CJ1W-SCU41-V1	RS-422A/485	RS-232C
	CJ1W-SCU42		
	CS1W-SCU21-V1 *2	RS-232C	RS-232C
	CS1W-SCU31-V1	RS-422A/485	RS-422A/485
Serial Communications Boards	CS1W-SCB21-V1 *2	RS-232C	RS-232C
	CS1W-SCB41-V1 *2	RS-232C	RS-422A/485
CPU Units	CJ Series	---	RS-232C
	CS Series	---	RS-232C
	CP Series	RS-232C or RS-422A/485 can be used by adding an Option Board.	

*1. Only the CJ1W-SCU□2 Serial Communications Unit can be used to connect to an NJ-series Controller.

*2. Use only products manufactured on or after December 20, 1999.

For details, refer to the *CS/CJ Series, Serial Communications Boards/Units Operation Manual* (Cat. No. W336).

MELSEC-Q/QnA/QnAS Series

Name	Model No.	Communications ports	
		Channel 1	Channel 2
Q-compatible Serial Communications Unit	QJ71C24N QJ71C24	RS-232C	RS-422/485
	QJ71C24N-R2 QJ71C24-R2	RS-232C	RS-232C
	QJ71C24N-R4	RS-422/485	RS-422/485
QnA-compatible Serial Communications Unit	AJ71QC24N	RS-232C	RS-422/485
	AJ71QC24N-R2	RS-232C	RS-232C
	AJ71QC24N-R4	RS-422	RS-422/485
QnAS-compatible Serial Communications Unit	A1SJ71QC24N	RS-232C	RS-422/485
	A1SJ71QC24N-R2	RS-232C	RS-232C

Note: 1. Refer to the Mitsubishi Electric PLC documentation for information on MELSEC PLCs.

2. More than one EJ1 Controller to one PLC is not possible even with RS-422 communications. Refer to *Connecting EJ1 Controllers 1:N to a PLC*, below, for product combinations that support 1:N connections.
3. Connection ability has been verified for the above MELSEC models. Design changes and other factors, however, may prevent normal connection. Always confirm operation in advance.

MELSEC-An/AnS Series V1.1

Name	Model No.	Communications ports
An-compatible Computer Link Unit	AJ71UC24	RS-232C or RS-422/485
AnS-compatible Computer Link Unit	A1SJ71UC24-R2	RS-232C
	A1SJ71UC24-R4	RS-422/485
	A1SJ71UC24-PRF	RS-232C

Note: Use a MELSEC-AnA/AnU CPU.

MELSEC-FX_{3UC} Series V1.1

Name	Model No.	Communications ports
Communications Adapter	FX _{3U} -232ADP	RS-232C
	FX _{3U} -485ADP	RS-485
Function Board	FX _{3U} -232-BD	RS-232C
	FX _{3U} -485-BD	RS-485

Connecting EJ1 Controllers 1:N to a PLC V1.1

The combinations of PLCs and HFUs that can be connected 1:N are listed below.

CS/CJ/CP/NJ Series

Name	Model No.	Communications ports
Serial Communications Units *1	CJ1W-SCU31-V1	Port 1 or 2
	CJ1W-SCU41-V1	Port 1
	CS1W-SCU31-V1	Port 1 or 2
Serial Communications Board	CS1W-SCB41-V1 *2	Port 2
CPU Units	CP Series	RS-422A/485 can be used by adding an Option Board.
EJ1N-HFU	EJ1N-HFUA-NFLK EJ1N-HFUB-NFLK	Port C

*1. Only the CJ1W-SCU□2 Serial Communications Unit can be used to connect to an NJ-series Controller.

*2. Use only products manufactured on or after December 20, 1999.

For details, refer to the *CS/CJ Series, Serial Communications Boards/Units Operation Manual* (Cat. No. W336).

MELSEC-Q/QnA/QnAS Series

Name	Model No.
Serial Communications Units	Channel 2 of QJ71C24N QJ71C24N-R4 Channel 2 of A1SJ71QC24N Channel 2 of AJ71QC24N AJ71QC24N-R4
EJ1N-HFU	EJ1N-HFUA-NFL2 EJ1N-HFUB-NFL2

Note: Refer to the Mitsubishi Electric PLC documentation for information on MELSEC PLCs.