

PROGRAMMABLE CONTROLLER
FP7 Digital Input/Output Unit
User's Manual

(MEMO)

Introduction

Thank you for purchasing a Panasonic product. Before you use the product, please carefully read through the user's manual, and understand it in detail to use the product properly.

Types of Manual

- There are different types of user's manual for the FP7 series, as listed below. Please refer to a relevant manual for the unit and purpose of your use.
- The manuals can be downloaded from the Panasonic website: <https://industry.panasonic.com/global/en/downloads/?tab=manual>.

Unit name or purpose of use	Manual name	Manual code
FP7 Power Supply Unit	FP7 CPU Unit User's Manual (Hardware)	WUME-FP7CPUH
FP7 CPU Unit	FP7 CPU Unit Command Reference Manual	WUME-FP7CUPGR
	FP7 CPU Unit User's Manual (Logging Trace Function)	WUME-FP7CPULOG
	FP7 CPU Unit User's Manual (Security Function)	WUME-FP7CPUSEC
	Instructions for Built-in LAN Port	FP7 CPU Unit User's Manual (LAN Port Communication)
FP7 CPU Unit User's Manual (Ethernet Expansion Function)		WUME-FP7CPUETEX
FP7 CPU Unit User's Manual (EtherNet/IP Communication)		WUME-FP7CPUEIP
Web Server Function Manual		WUME-FP7WEB
Instructions for Built-in COM Port	FP7 Series User's Manual (SCU Communication)	WUME-FP7COM
FP7 Extension Cassette (Communication) (RS-232C / RS485 type)		
FP7 Extension Cassette (Communication) (Ethernet Type)	FP7 Series User's Manual (Communication Cassette Ethernet Type)	WUME-FP7CCET
FP7 Extension (Function) Cassette Analog Cassette	FP7 Analog Cassette User's Manual	WUME-FP7FCA
FP7 Digital Input / Output Unit	FP7 Digital Input / Output Unit User's Manual	WUME-FP7DIO
FP7 Analog Input Unit	FP7 Analog Input Unit User's Manual	WUME-FP7AIH
FP7 Analog Output Unit	FP7 Analog Output Unit User's Manual	WUME-FP7AOH
FP7 Thermocouple Multi-analog Input Unit	FP7 Thermocouple Multi-analog Input Unit	WUME-FP7TCRTD
FP7 RTD Input Unit	FP7 RTD Input Unit User's Manual	
FP7 Multi Input / Output Unit	FP7 Multi Input / Output Unit User's Manual	WUME-FP7MXY
FP7 High-speed counter unit	FP7 High-speed Counter Unit User's Manual	WUME-FP7HSC
FP7 Pulse Output Unit	FP7 Pulse Output Unit User's Manual	WUME-FP7PG

Unit name or purpose of use	Manual name	Manual code
FP7 Positioning Unit	FP7 Positioning Unit User's Manual	WUME-FP7POSP
FP7 Serial Communication Unit	FP7 Series User's Manual (SCU Communication)	WUME-FP7COM
FP7 Multi-wire Link Unit	FP7 Multi-wire Link Unit User's Manual	WUME-FP7MW
FP7 Motion Control Unit	FP7 Motion Control Unit User's Manual	WUME-FP7MCEC
PHLS System	PHLS System User's Manual	WUME-PHLS
Programming Software FPWIN GR7	FPWIN GR7 Introduction Guidance	WUME-FPWINGR7

Safety Precautions

- Observe the following precautions to ensure personal safety or to prevent accidents.
- Before performing installation, operation, maintenance, or inspection, read this manual carefully to understand how to use the product correctly.
- Make sure that you fully understand the product, information on safety, and other precautions.
- This manual uses two safety symbols, different levels of safety precautions “Warning” and “Caution”, to indicate .



WARNING

Indicates a potentially hazardous situation which, if not handled correctly, could result in death or serious injury of the user.

- Take safety measures outside the product to ensure the safety of the entire system even if this product fails or an error occurs due to external factors.
- Do not use this product in atmospheres that contain flammable gases.
Doing so may result in explosion.
- Do not throw this product into the fire.
Doing so may cause the batteries or other electronic parts to explode.



CAUTION

Indicates a potentially hazardous situation which, if not handled correctly, could result in injury to the user or property damage.





- To prevent abnormal heat generation or smoke generation, use this product with some leeway from the guaranteed characteristics and performance values of the product.
- Do not disassemble or modify this product.
Doing so may result in abnormal heat generation or smoke generation.
- Do not touch any terminals while the power is on.
Doing so may result in electrical shock.
- Configure emergency stop and interlock circuits outside this product.
- Connect wires and connectors properly.
Failure to do so may result in abnormal heat generation or smoke generation.
- Do not perform work (such as connection or removal) with the power turned on.
Doing so may result in electrical shock.
- If this product is used in any way that is not specified by Panasonic, its protection function may be impaired.
- This product has been developed and manufactured for industrial use only.

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Handling Precautions

- **In this manual, the following symbols are used to indicate safety information that must be observed.**

	Indicates an action that is prohibited or a matter that requires caution.
	Indicates an action that must be taken.
	Indicates supplemental information.
	Indicates details about the subject in question or information useful to remember.

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Procedure

Indicates operation procedures.

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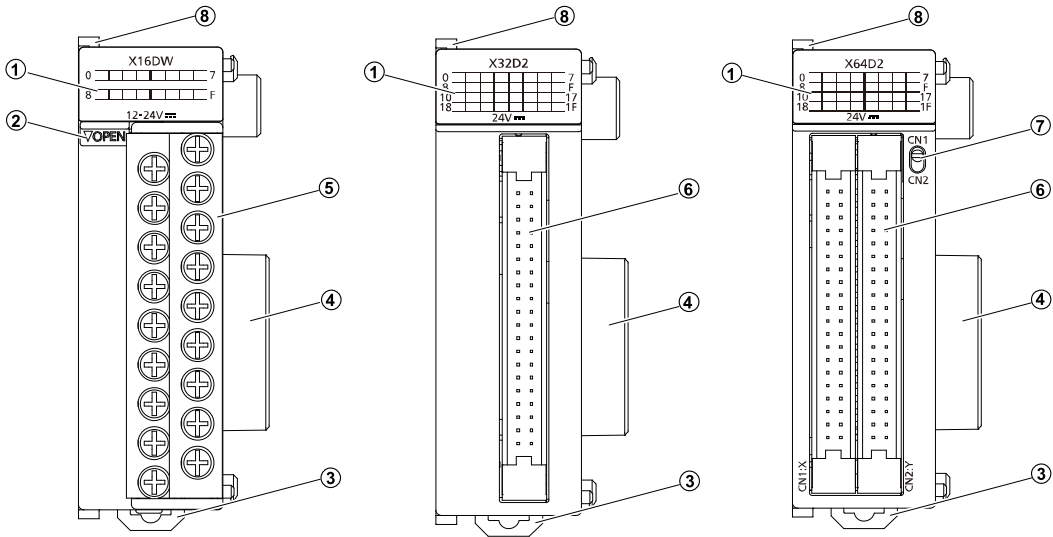
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1 Unit Common Specifications

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1.1 Names and Functions of Parts

1.1 Names and Functions of Parts



(1) I/O indicator LEDs

Indicates the ON/OFF status of the input and output.

(2) Terminal block release lever

Lowering this lever makes it possible to dismount the terminal block from the unit without disconnecting the wiring.

Push the lock button on the bottom of the unit to lock the release lever after the terminal block is installed.

(3) DIN hook

This hook is used to mount the unit onto the DIN rail.

(4) Unit connector

This connector is used to connect the internal circuits of two or more units.

(5) Terminal block

Connect power supplies for the purpose of operating and driving I/O circuits. Crimp terminals for M3 can be used.

(6) Connector (40P)

Connect power supplies for the purpose of operating and driving I/O circuits. Connectors for wire-pressed terminal cable or flat cable connectors can be used.

(7) Indicator selection switch

Use this switch to select the 32 points in the first half or the 32 points in the second half to be displayed by the I/O indicator LEDs.

(8) Fixing hook

This hook is used to fix two or more units.

1.2 Unit Type

■ Input unit

Type	Points	Connection method	Description
DC input	16 points	Terminal block	12 to 24 V DC (Common polarities + & - common) Response time switchable
	32 points	Connector	24 V DC (Common polarities + & - common) Response time switchable
	64 points	Connector	24 V DC (Common polarities + & - common) Response time switchable

■ Output unit

Type	Points	Connection method	Description
Relay output	16 points	Terminal block	Load current: 2 A/1 point and 5 A/1 common 16 points/common (with no relay sockets)
Transistor output sink type	16 points	Terminal block	Load current: 1 A/1 point and 5 A/1 common 16 points/common
	32 points	Connector	Load current: 0.3 A/1 point and 3.2 A/1 common 32 points/common
	64 points	Connector	Load current 0.3 A (8 points: Y0-Y7), 0.1 A (56 points: Y8-Y3F) 3.2 A/1 common, 32 points/1 common
Transistor output source type	16 points	Terminal block	Load current: 1 A/1 point and 5 A/1 common 16 points/common
	32 points	Connector	Load current: 0.3 A/1 point and 3.2 A/1 common 32 points/common
	64 points	Connector	Load current 0.3 A (8 points: Y0-Y7), 0.1 A (56 points: Y8-Y3F) 3.2 A/1 common, 32 points/1 common

■ I/O mixed unit

Type	Points	Connection method	Description
DC input / Transistor output sink type	Input: 32 points output: 32 points	Connector	<ul style="list-style-type: none"> Input specifications 24 V DC (Common polarities + & - common) Response time switchable Output specifications Load current 0.3 A (8 points: Y0-Y7), 0.1 A (24 points: Y8-Y1F) 3.2 A/1 common, 32 points/1 common
DC input / Transistor output	Input: 32 points	Connector	<ul style="list-style-type: none"> Input specifications 24 V DC (Common polarities + & - common)

1.2 Unit Type

Type	Points	Connection method	Description
source type	output: 32 points		Response time switchable <ul style="list-style-type: none">Output specifications Load current 0.3 A (8 points: Y0-Y7), 0.1 A (24 points: Y8-Y1F) 3.2 A/1 common, 32 points/1 common

2 Specifications

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2.1 General Specifications

2.1 General Specifications

2.1.1 Common Specifications

Items	Description
Ambient temperature	0°C to +55°C
Storage temperature	-40°C to +70°C
Ambient humidity	10% to 95% (RH) with no condensation (at +25°C)
Storage humidity	10% to 95% (RH) with no condensation (at +25°C)
Breakdown voltage	<p><DC input and transistor output> 500 V AC for 1 min. (Note 1)</p> <ul style="list-style-type: none"> • Between all input terminals and all output terminals • Between all input terminals and all output terminals (between different common terminals) • Between all input terminals and all CPU unit power supply terminals/ function earth terminals • Between all output terminals and all CPU power supply terminals/ function earth terminals <p><Relay output> 2,300 V AC for 1 min. (Note 1)</p> <ul style="list-style-type: none"> • Between all input terminals and all output terminals (between different common terminals) • Between all output terminals and all CPU power supply terminals/ function earth terminals
Insulation resistance (Test voltage: 500 V DC)	<p><DC input and transistor output> 100 M or larger 100MΩ or later</p> <ul style="list-style-type: none"> • Between all input terminals and all output terminals • Between all input terminals and all output terminals (between different common terminals) • Between all input terminals and all CPU unit power supply terminals/ function earth terminals • Between all output terminals and all CPU power supply terminals/ function earth terminals <p><Relay output> 100 M or larger 100MΩ or later</p> <ul style="list-style-type: none"> • Between all input terminals and all output terminals (between different common terminals) • Between all output terminals and all CPU power supply terminals/ function earth terminals
Vibration resistance	<p>Conforming to JIS B 3502 and IEC 61131-2 5 to 8.4 Hz, 3.5-mm single amplitude 8.4 to 150 Hz, acceleration of 9.8 m/s² 10-minute sweeping in X, Y, and Z directions (1 octave/min.)</p>
Shock resistance	<p>Conforming to JIS B 3502 and IEC 61131-2 147 m/s² or more, 3 times each in X, Y, and Z directions</p>
Noise resistance	<p><DC input and transistor output> 1,000 V p-p, pulse widths: 50 ns and 1 μs</p>

2.1 General Specifications

Items	Description
	<Relay output> 1,500 V p-p, pulse width: 50 ns and 1 μ s
Environment	Free from corrosive gases and excessive dust. EU Directive applicable standard
Overvoltage category	Category II
Pollution degree	Pollution degree 2

(Note 1) Cutoff current: 5 mA (Factory default setting)

2.1.2 Current Consumption

Product name	Model number	Internal current consumption (24 V DC)
DC input unit	16 points AFP7X16DW	25mA or less
	32 points AFP7X32D2	30mA or less
	64 points AFP7X64D2	35mA or less
16-point-type relay output unit	AFP7Y16R	180mA or less
Transistor output unit (sink type)	16 points AFP7Y16T	35mA or less
	32 points AFP7Y32T	50mA or less
	64 points AFP7Y64T	75mA or less
Transistor output unit (source type)	16 points AFP7Y16P	35mA or less
	32 points AFP7Y32P	50mA or less
	64 points AFP7Y64P	75mA or less
I/O mixed unit 32-point DC input 32-point transistor output (sink type)	AFP7XY64D2T	55mA or less
I/O mixed unit 32-point DC input 32-point transistor output (source type)	AFP7XY64D2P	55mA or less

2.2 Input Unit Specifications

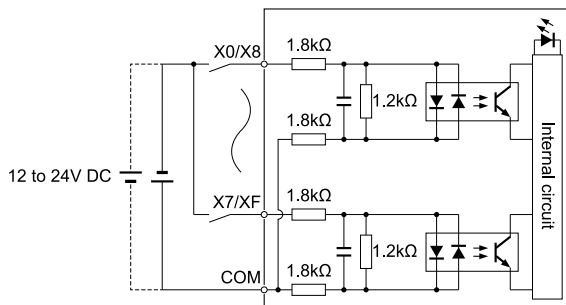
2.2 Input Unit Specifications

2.2.1 16-point-type DC Input Unit

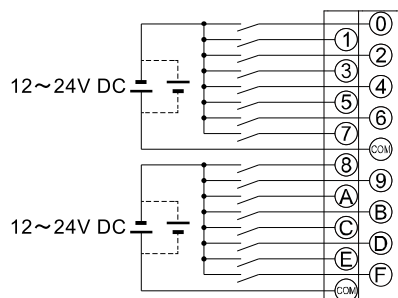
■ Description

Items		AFP7X16DW
Insulation system		Optical coupler
Rated input voltage		12 to 24 V DC
Rated input current		Approx. 6 mA (at 24 V DC)
Input impedance		Approx. 3.6kΩ
Operating voltage range		10.2 to 26.4 V DC
Min. ON voltage/Min. ON current		9.6 V/2 mA
Max. OFF voltage/Max. OFF current		2.5 V/1 mA
Response time	OFF→ON	0.1 ms max. (changeable with constant switching function at time of input)
	ON→OFF	0.2 ms max. (changeable with constant switching function at time of input)
Input points per common		8 points/common
Operating mode indicator		16-point LED indicator (Lit in ON state)
External connection method		Terminal block connections (M3 terminal screws)
Weight (unit)		Approx. 125g

■ Internal circuit Diagram



■ Terminal layout

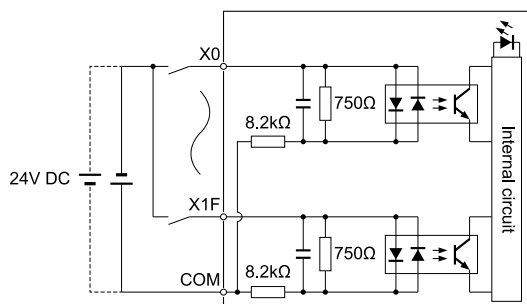


2.2.2 32-point-type DC Input Unit

■ Description

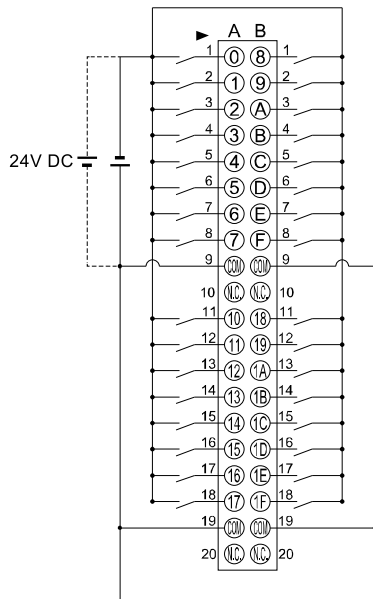
Items		AFP7X32D2
Insulation system		Optical coupler
Rated input voltage		24V DC
Rated input current		Approx. 2.7 mA (at 24 V DC)
Input impedance		Approx. 8.2k Ω
Operating voltage range		20.4 to 26.4 V DC
Min. ON voltage/Min. ON current		19.2 V/2.5 mA
Max. OFF voltage/Max. OFF current		5 V/1.5 mA
Response time	OFF→ON	0.2 ms max. (changeable with constant switching function at time of input)
	ON→OFF	0.2 ms max. (changeable with constant switching function at time of input)
Input points per common		32 points/common
Operating mode indicator		32-point LED indicator (Lit in ON state)
External connection method		Connector connections (40P conforming to MIL standards)
Weight (unit)		Approx. 95g

■ Internal circuit Diagram



2.2 Input Unit Specifications

Terminal layout



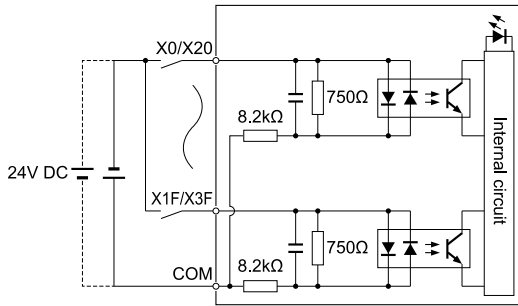
The COM terminals are connected internally.

2.2.3 64-point-type DC Input Unit

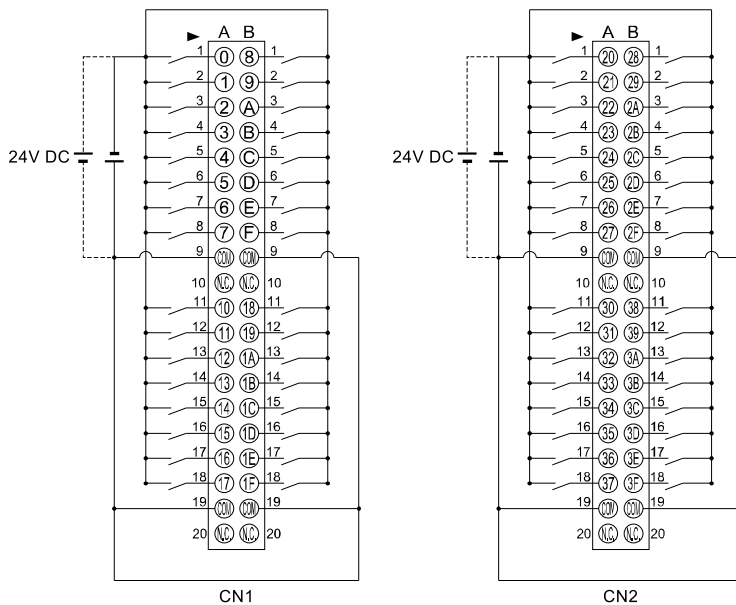
Description

Items		AFP7X64D2
Insulation system		Optical coupler
Rated input voltage		24V DC
Rated input current		Approx. 2.7 mA (at 24 V DC)
Input impedance		Approx. 8.2kΩ
Operating voltage range		20.4 to 26.4 V DC
Min. ON voltage/Min. ON current		19.2 V/2.5 mA
Max. OFF voltage/Max. OFF current		5 V/1.5 mA
Response time	OFF→ON	0.2 ms max. (changeable with constant switching function at time of input)
	ON→OFF	0.2 ms max. (changeable with constant switching function at time of input)
Input points per common		32 points/common
Operating mode indicator		32-point LED indicator (Lit in ON state)
External connection method		Connector connections (40P, conforming to MIL standards)
Weight (unit)		Approx. 110g

■ Internal circuit Diagram



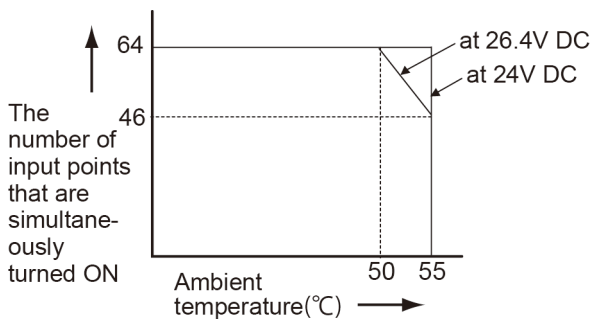
■ Terminal layout



The COM terminals in the same connector are connected internally.

■ Limits on number of simultaneously ON points

Refer to the following figure and reduce the number of input points that are simultaneously turned ON.



2.3 Output Unit Specifications

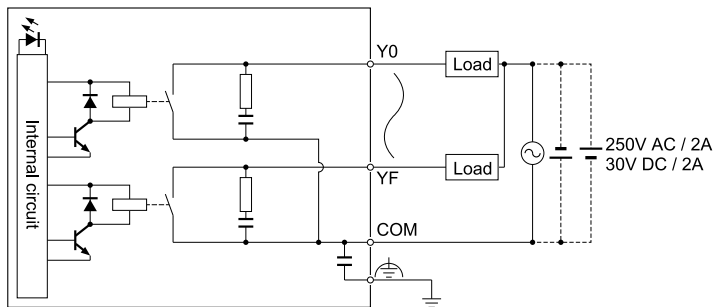
2.3 Output Unit Specifications

2.3.1 16-point-type Relay Output Unit

■ Description

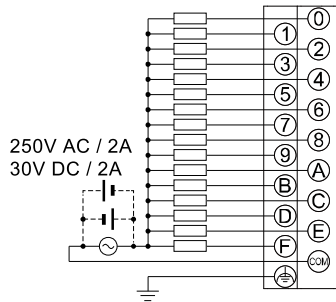
Items	AFP7Y16R	
Insulation system	Relay insulation	
Rated control capacity	2 A 250 V AC (5 A/common) and 2 A 30 V DC (5 A/common)	
Minimum load	1 mA 100 mV (resistive load)	
Response time	OFF→ON	Approx. 10 ms
	ON→OFF	Approx. 8 ms
Life	Mechanical lifetime	20 million times or more (Frequency of switching: 180 times/min.)
	Electrical lifetime	100,000 times or more (Frequency of switching: 20 times/min.)
Surge absorber	Snubber circuit (Leakage current: 0.2 mA or less)	
Relay sockets	None	
Input points per common	16 points/common	
Operating mode indicator	16-point LED indicator (Lit in ON state)	
External connection method	Terminal block connections (M3 terminal screws)	
Weight (unit)	Approx. 180g	

■ Internal circuit Diagram



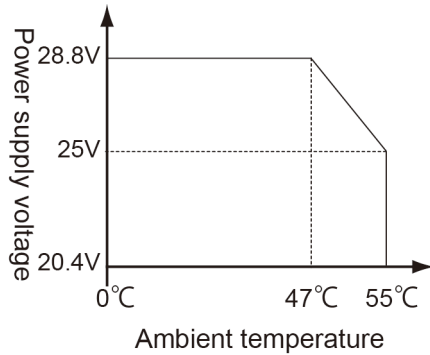
In order to avoid the effects of noise, be sure to ground the function earth terminal.

■ Terminal layout



■ Restriction on power supply voltage

Refer to the following figure and reduce the supply voltage according to the ambient temperature.



2.3.2 16-point Sink-type Transistor Output Unit

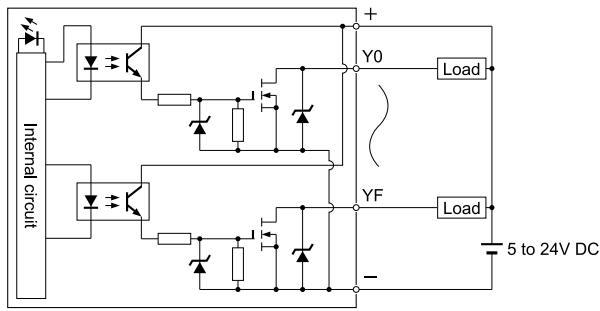
■ Description

Items	AFP7Y16T	
Insulation system	Optical coupler	
Output type	Open collector	
Rated load voltage	5 to 24 V DC	
Allowable load voltage range	4.75 to 26.4 V DC	
Max. load current	1A	
Common limits	5 A / common	
Max. inrush current	3A	
OFF state leakage current	1 μ A max.	
ON state max. voltage drop	0.5 V or less	
Response time	OFF→ON	0.05 ms or less (Load current: 0.5 mA or more)
	ON→OFF	0.3 ms or less (Load current: 0.5 mA or more)

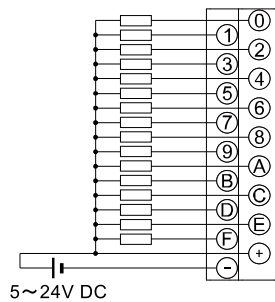
2.3 Output Unit Specifications

Items		AFP7Y16T
External power supply	Voltage	4.75 to 26.4 V DC
	Current	70 mA/common (at 24 V)
Surge absorber		Zener diode
Short-circuit protection		None
Input points per common		16 points/common
Operating mode indicator		16-point LED indicator (Lit in ON state)
External connection method		Terminal block connections (M3 terminal screws)
Weight (unit)		Approx. 125g

Internal circuit Diagram



Terminal layout



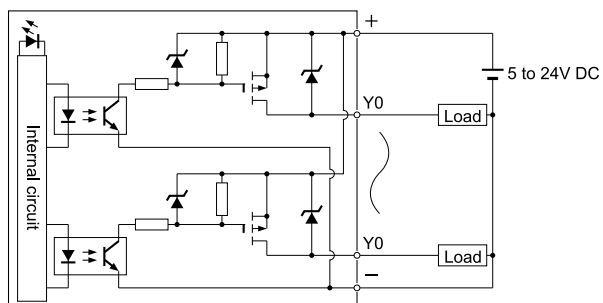
2.3.3 16-point Source-type Transistor Output Unit

Description

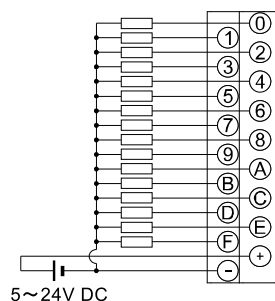
Items	AFP7Y16P
Insulation system	Optical coupler
Output type	Open collector
Rated load voltage	5 to 24 V DC
Allowable load voltage range	4.75 to 26.4 V DC
Max. load current	1A

Items		AFP7Y16P
Common limits		5 A / common
Max. inrush current		3A
OFF state leakage current		1 μ A or less
ON state max. voltage drop		0.5 V or less
Response time	OFF→ON	0.05 ms or less (Load current: 0.5 mA or more)
	ON→OFF	0.3 ms or less (Load current: 0.5 mA or more)
External power supply	Voltage	4.75 to 26.4 V DC
	Current	70 mA/common (at 24 V)
Surge absorber		Zener diode
Short-circuit protection		None
Input points per common		16 points/common
Operating mode indicator		16-point LED indicator (Lit in ON state)
External connection method		Terminal block connections (M3 terminal screws)
Weight (unit)		Approx. 125g

Internal circuit Diagram



Terminal layout



2.3 Output Unit Specifications

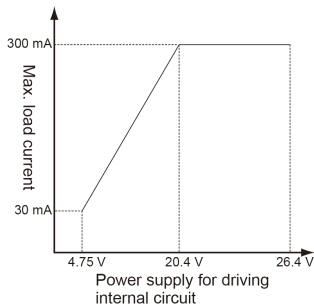
2.3.4 32-point Sink-type Transistor Output Unit

■ Description

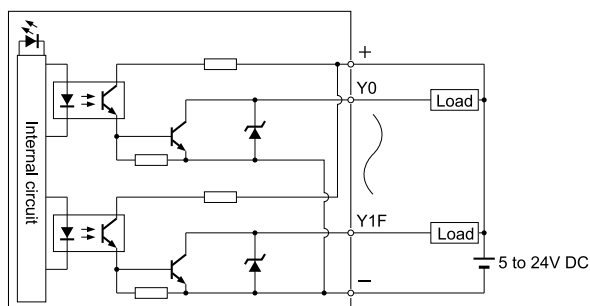
Items		AFP7Y32T
Insulation system		Optical coupler
Output type		Open collector
Rated load voltage		5 to 24 V DC
Allowable load voltage range		4.75 to 26.4 V DC
Max. load current		0.3 A (20.4 to 26.4 V DC) and 30 mA (4.75 V DC)
Common limits		3.2 A/common
Max. inrush current		0.6A
OFF state leakage current		1 μ A or less
ON state max. voltage drop		0.5 V or less
Response time	OFF→ON	0.1 ms or less (Load current: 1 mA or more)
	ON→OFF	0.3 ms or less (Load current: 1 mA or more)
External power supply	Voltage	4.75 to 26.4 V DC
	Current	110 mA/common (at 24 V)
Surge absorber		Zener diode
Short-circuit protection		None
Input points per common		32 points/common
Operating mode indicator		32-point LED indicator (Lit in ON state)
External connection method		Connector connections (40P, conforming to MIL standards)
Weight (unit)		Approx. 95g

■ Restriction on load current

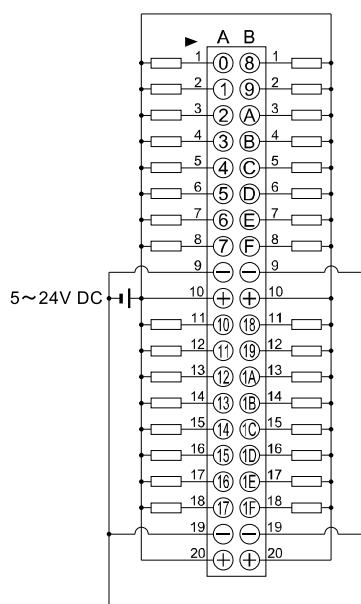
Refer to the following figure and reduce the load current according to the external power supply voltage.



Internal circuit Diagram



Terminal layout



Although the positive and negative terminals are connected internally, connect these terminals externally as well.

2.3.5 32-point Source-type Transistor Output Unit

Description

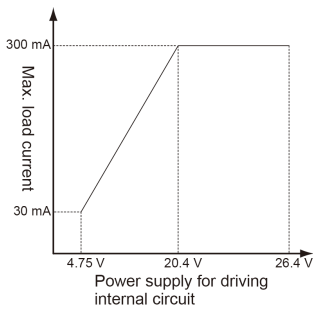
Items	AFP7Y32P
Insulation system	Optical coupler
Output type	Open collector
Rated load voltage	5 to 24 V DC
Allowable load voltage range	4.75 to 26.4 V DC
Max. load current	0.3 A (26.4 to 20.4 V DC) and 30 mA (4.75 V DC)

2.3 Output Unit Specifications

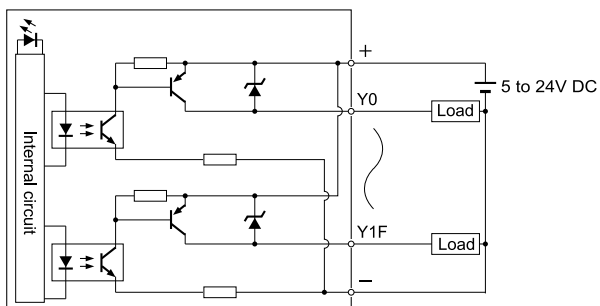
Items		AFP7Y32P
Common limits		3.2 A/common
Max. inrush current		0.6A
OFF state leakage current		1 μ A or less
ON state max. voltage drop		0.5 V or less
Response time	OFF→ON	0.1 ms or less (Load current: 2 mA or more)
	ON→OFF	0.5 ms or less (Load current: 2 mA or more)
External power supply	Voltage	4.75 to 26.4 V DC
	Current	130 mA/common (at 24 V)
Surge absorber		Zener diode
Short-circuit protection		None
Input points per common		32 points/common
Operating mode indicator		32-point LED indicator (Lit in ON state)
External connection method		Connector connections (40P, conforming to MIL standards)
Weight (unit)		Approx. 95g

■ Restriction on load current

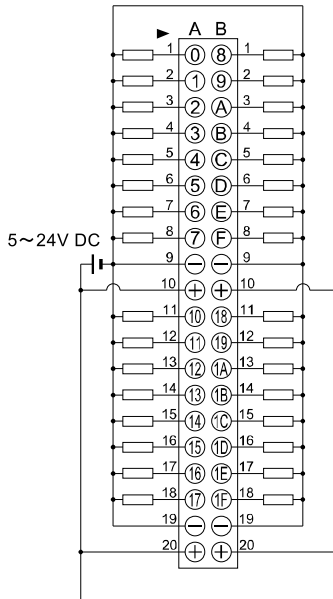
Refer to the following figure and reduce the load current according to the external power supply voltage.



■ Internal circuit Diagram



■ Terminal layout



Although the positive and negative terminals are connected internally, connect these terminals externally as well.

2.3.6 64-point Sink-type Transistor Output Unit

■ Description

Items		AFP7Y64T
Insulation system		Optical coupler
Output type		Open collector
Rated load voltage		5 to 24 V DC
Allowable load voltage range		4.75 to 26.4 V DC
Max. load current	0.3 A specifications (Y0 to 7)	0.3 A (20.4 to 26.4 V DC) and 30 mA (4.75 V DC)
	0.1 A specifications (other than the above)	0.1 A (20.4 to 26.4 V DC) and 15 mA (4.75 V DC)
Common limits		3.2 A / common
Max. inrush current		0.6A
OFF state leakage current		1 μA or less
ON state max. voltage drop		0.5 V or less
Response time	OFF→ON	0.1 ms or less (Load current: 2 mA or more)
	ON→OFF	0.3 ms or less (Load current: 2 mA or more)
External power supply	Voltage	4.75 to 26.4 V DC

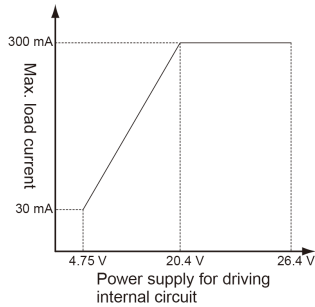
2.3 Output Unit Specifications

Items		AFP7Y64T
	Current	70 mA/common (at 24 V)
Surge absorber		Zener diode
Short-circuit protection		None
Input points per common		32 points/common
Operating mode indicator		32-point LED indicator (Lit in ON state, switchable)
External connection method		Connector connections (40P x 2, conforming to MIL standards)
Weight (unit)		Approx. 115g

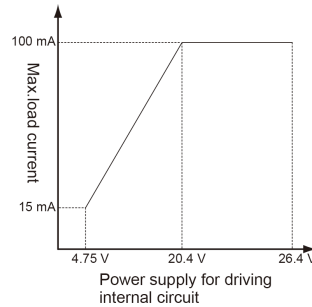
■ Restriction on load current

Refer to the following figure and reduce the load current according to the external power supply voltage.

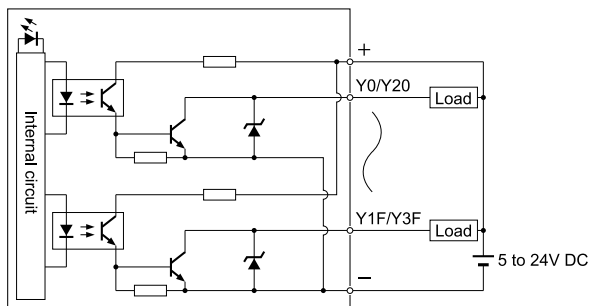
0.3 A specifications (Y0 to Y7)



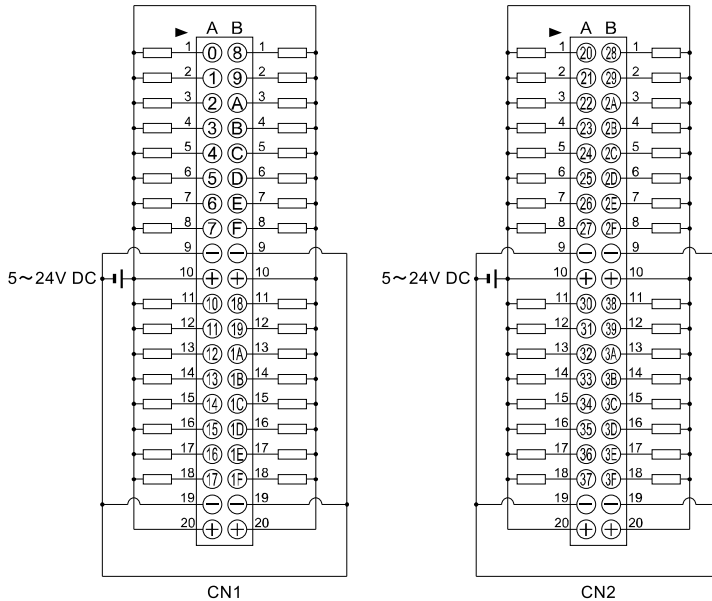
0.1 A specifications (other than Y0 to Y7)



■ Internal circuit Diagram



■ Terminal layout



Although the positive and negative terminals are connected internally, connect these terminals externally as well.

2.3.7 64-point Source-type Transistor Output Unit

■ Description

Items	AFP7Y64P	
Insulation system	Optical coupler	
Output type	Open collector	
Rated load voltage	5 to 24 V DC	
Allowable load voltage range	4.75 to 26.4 V DC	
Max. load current	0.3 A specifications (Y0 to 7)	0.3 A (20.4 to 26.4 V DC) and 30 mA (4.75 V DC)
	0.1 A specifications (other than the above)	0.1 A (20.4 to 26.4 V DC) and 15 mA (4.75 V DC)
Common limits	3.2 A/common	
Max. inrush current	0.6A	
OFF state leakage current	1 μ A or less	
ON state max. voltage drop	0.5 V or less	
Response time	OFF→ON	0.1 ms or less (Load current: 2 mA or more)
	ON→OFF	0.5 ms or less (Load current: 2 mA or more)
External power supply	Voltage	4.75 to 26.4 V DC

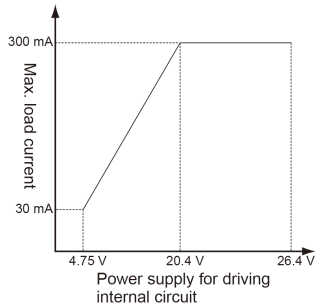
2.3 Output Unit Specifications

Items		AFP7Y64P
	Current	90 mA/common (at 24 V)
Surge absorber		Zener diode
Short-circuit protection		None
Input points per common		32 points/common
Operating mode indicator		32-point LED indicator (Lit in ON state, switchable)
External connection method		Connector connections (40P x 2, conforming to MIL standards)
Weight (unit)		Approx. 115g

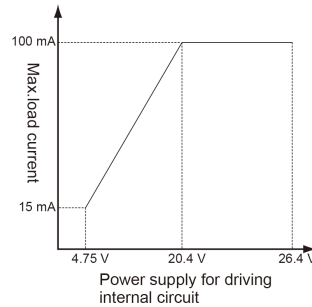
■ Restriction on load current

Refer to the following figure and reduce the load current according to the external power supply voltage.

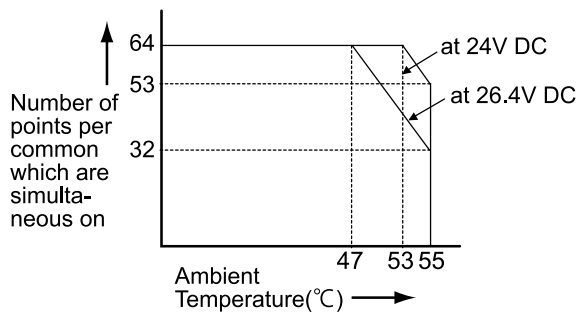
0.3 A specifications (Y0 to Y7)



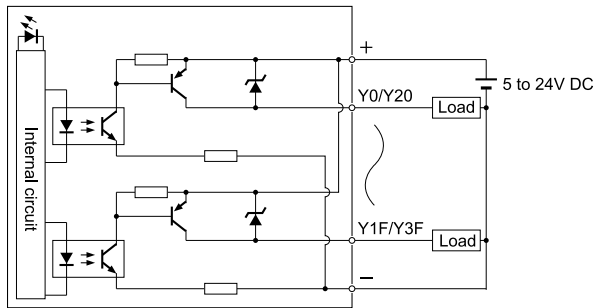
0.1 A specifications (other than Y0 to Y7)



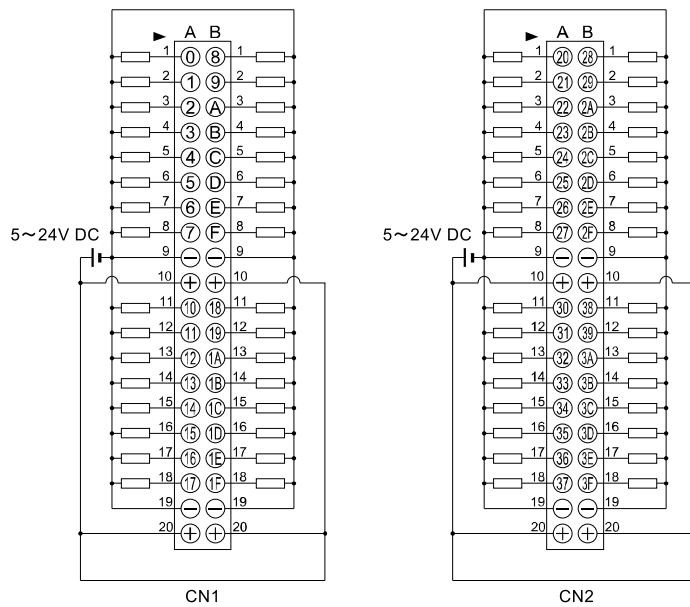
■ Limits on number of simultaneously ON points (common to input/output)



■ Internal circuit Diagram



■ Terminal layout



Although the positive and negative terminals are connected internally, connect these terminals externally as well.

2.4 I/O Mixed Unit Specifications

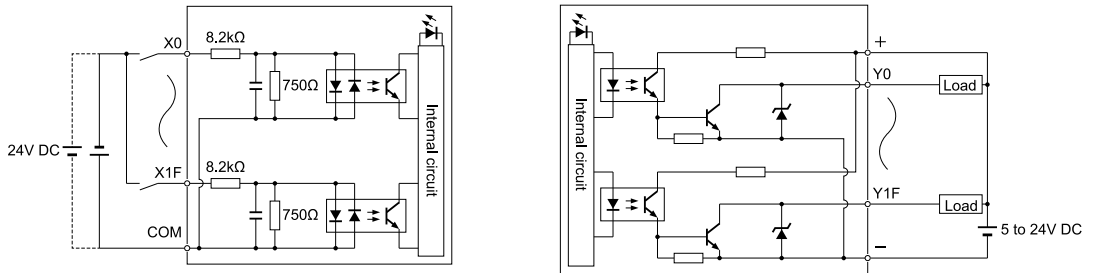
2.4 I/O Mixed Unit Specifications

2.4.1 32-point DC Input/32-point Sink Type Transistor Output

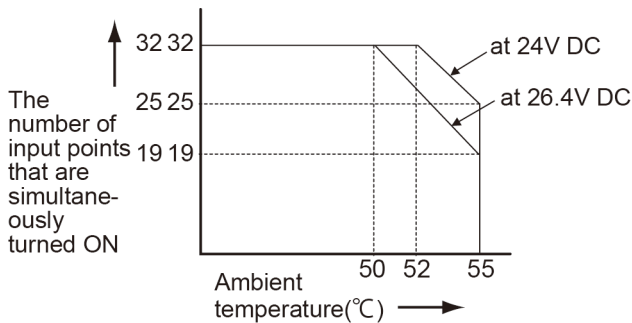
■ Description

Items		AFP7XY64D2T	
Input specifications	Insulation system	Optical coupler	
	Rated input voltage	24V DC	
	Rated input current	Approx. 2.7 mA (at 24 V DC)	
	Input impedance	Approx. 8.2kΩ	
	Operating voltage range	20.4 to 26.4 V DC	
	Min. ON voltage/Min. ON current	19.2 V/2.5 mA	
	Max. OFF voltage/Max. OFF current	5 V/1.5 mA	
	Response time	OFF→ON	0.2 ms max. (changeable with constant switching function at time of input)
		ON→OFF	0.2 ms max. (changeable with constant switching function at time of input)
Input points per common	32 points/common		
Output specifications	Insulation system	Optical coupler	
	Output type	Open collector	
	Rated load voltage	5 to 24 V DC	
	Allowable load voltage range	4.75 to 26.4 V DC	
	Max. load current	0.3 A specifications (Y0 to 7)	0.3 A (20.4 to 26.4 V DC) and 30 mA (4.75 V DC)
		0.1 A specifications (other than the above)	0.1 A (20.4 to 26.4 V DC) and 15 mA (4.75 V DC)
	Common limits	3.2 A/common	
	Max. inrush current	0.6A	
	OFF state leakage current	1 μA or less	
	ON state max. voltage drop	0.5 V or less	
	Response time	OFF→ON	0.1 ms or less (Load current: 2 mA or more)
		ON→OFF	0.3 ms or less (Load current: 2 mA or more)
	External power supply	Voltage	4.75 to 26.4 V DC
		Current	70 mA/common (at 24 V)
	Surge absorber	Zener diode	
Short-circuit protection	None		
Input points per common	32 points/common		
Operating mode indicator	32-point LED indicator (Lit in ON state)		
External connection method	Connector connections (40P, conforming to MIL standards)		
Weight (unit)	Approx. 115g		

■ Internal circuit Diagram



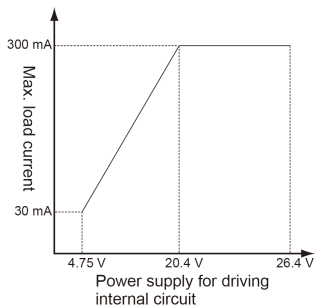
■ Limits on number of simultaneously ON points (common to input/output)



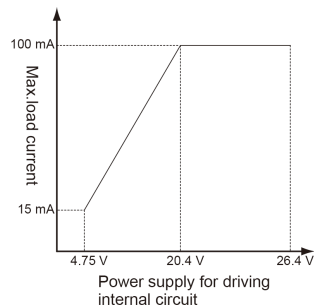
■ Restriction on load current

Refer to the following figure and reduce the load current according to the external power supply voltage.

0.3 A specifications (Y0 to Y7)

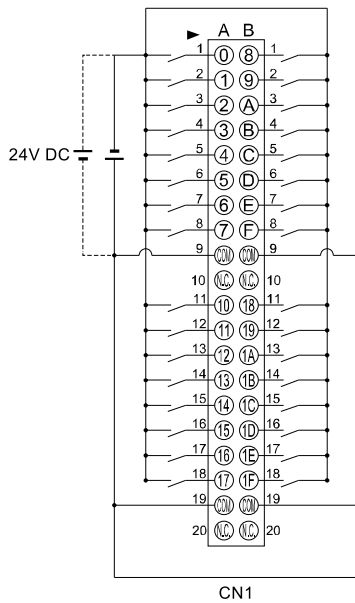


0.1 A specifications (other than Y0 to Y7)

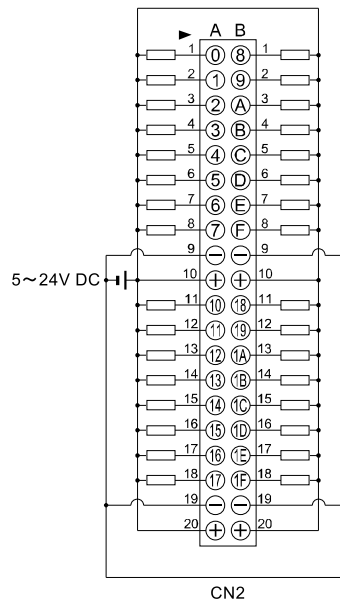


2.4 I/O Mixed Unit Specifications

Terminal layout



The COM terminals are connected internally.



Although the positive and negative terminals are connected internally, connect these terminals externally as well.

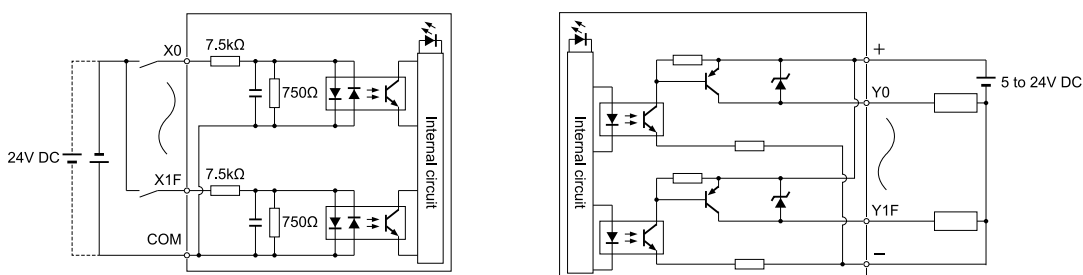
2.4.2 32-point DC Input/32-point Source Type Transistor Output

Description

Items		AFP7XY64D2P	
Input specifications	Insulation system	Optical coupler	
	Rated input voltage	24V DC	
	Rated input current	Approx. 3.4 mA (at 24 V DC)	
	Input impedance	Approx. 7.5kΩ	
	Operating voltage range	20.4 to 26.4 V DC	
	Min. ON voltage/Min. ON current	19.2 V/2.5 mA	
	Max. OFF voltage/Max. OFF current	5 V/1.5 mA	
	Response time	OFF→ON	0.2 ms max. (changeable with constant switching function at time of input)
		ON→OFF	0.2 ms max. (changeable with constant switching function at time of input)
Input points per common		32 points/common	

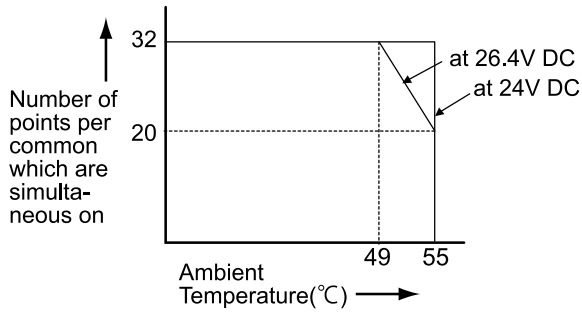
Items		AFP7XY64D2P	
Output specifications	Insulation system	Optical coupler	
	Output type	Open collector	
	Rated load voltage	5 to 24 V DC	
	Allowable load voltage range	4.75 to 26.4 V DC	
	Max. load current	0.3 A specifications (Y0 to 7)	0.3 A (20.4 to 26.4 V DC) and 30 mA (4.75 V DC)
		0.1 A specifications (other than the above)	0.1 A (20.4 to 26.4 V DC) and 15 mA (4.75 V DC)
	Common limits	3.2 A / common	
	Max. inrush current	0.6A	
	OFF state leakage current	1 μ A or less	
	ON state max. voltage drop	0.5 V or less	
	Response time	OFF→ON	0.1 ms or less (Load current: 2 mA or more)
		ON→OFF	0.5 ms or less (Load current: 2 mA or more)
	External power supply	Voltage	4.75 to 26.4 V DC
		Current	90 mA/common (at 24 V)
	Surge absorber	Zener diode	
Short-circuit protection	None		
Input points per common	32 points/common		
Operating mode indicator	32-point LED indicator (Lit in ON state, switchable)		
External connection method	Connector connections (40P x 2, conforming to MIL standards)		
Weight (unit)	Approx. 115g		

■ Internal circuit Diagram



2.4 I/O Mixed Unit Specifications

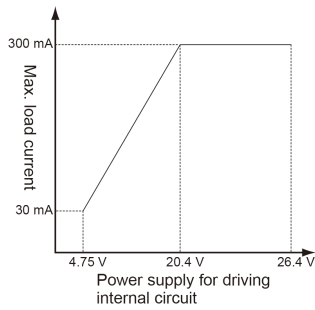
■ Limits on number of simultaneously ON points (common to input/output)



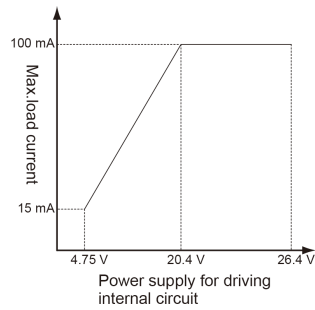
■ Restriction on load current

Refer to the following figure and reduce the load current according to the external power supply voltage.

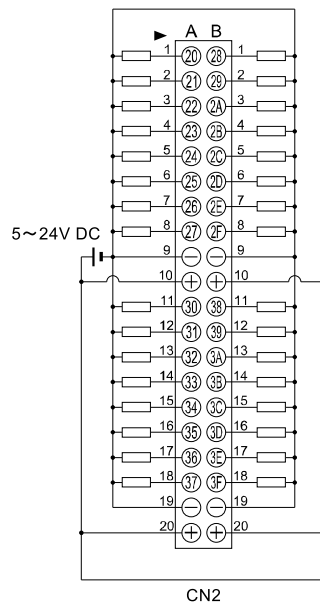
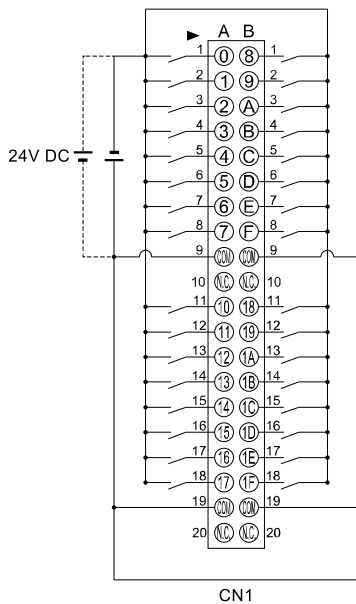
0.3 A specifications (Y0 to Y7)



0.1 A specifications (other than Y0 to Y7)



■ Terminal layout



2.4 I/O Mixed Unit Specifications

The COM terminals are connected internally.

Although the positive and negative terminals are connected internally, connect these terminals externally as well.

2.5 Input Time Constant Switching Function

2.5 Input Time Constant Switching Function

2.5.1 Overview of Function

- Software tools can change the input time constant.
- Select the set time from the below, and set the selected set time on a unit-by-unit basis:
None/0.1/0.5/1.0/5.0/10.0/20.0/70.0/[ms]
- The set constant is added to the response time specific to the hardware of each unit.
Example) 16-point Input Unit
Specific response time: OFF→ON: 0.1 ms, ON→OFF: 0.2 ms
If "1.0 ms" is set for this unit, the following overall response periods will result. Response time after setting OFF→ON: 1.1 ms, ON→OFF: 1.2 ms

■ Accuracy of Time Constants

The time constant to be set has a margin of error, which should be kept in mind when selecting the set value. The accuracy of each time constant is shown in the table below.

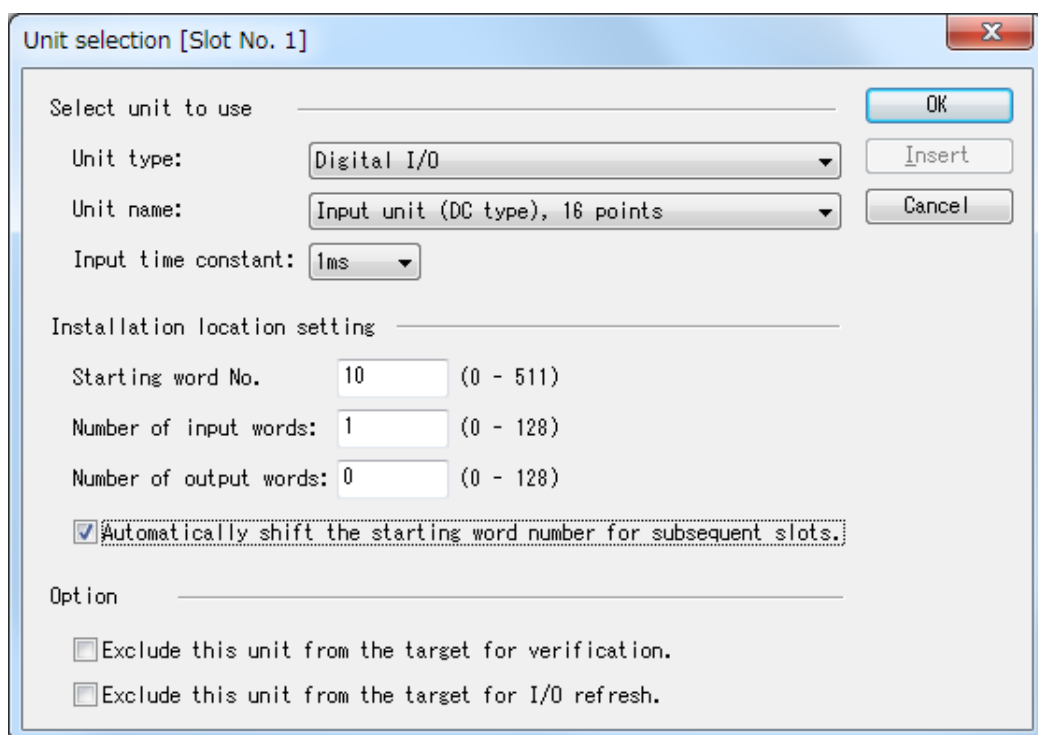
Setting	Accuracy	
	Min.	Max.
No time constant settings	—	—
0.1 ms	0.1 ms	0.2 ms
0.5 ms	0.3 ms	0.7 ms
1 ms	0.7 ms	1.3 ms
5 ms	3.0 ms	5.2 ms
10 ms	6.0 ms	10.4 ms
20 ms	12.1 ms	20.7 ms
70 ms	48.6 ms	82.8 ms

2.5.2 Setting by FPWIN GR7 Software Tool

The input time constant can be set in the "I/O map" of the FPWIN GR7 configuration menu.

1 2 Procedure

1. From the menu bar, select:"Options">"FP7 Configuration"
The "FP7 Configuration" dialog box is displayed.
2. Select "'I/O Map'."
3. Double-click the "'Operating Unit'" in the target slot.
The "Select Unit" dialog box is displayed.
4. Select the target Digital I/O Unit and input time constant, and press the [[OK]] button.
The information set is registered with the I/O map.



The image shows a software dialog box titled "Unit selection [Slot No. 1]". It contains several configuration fields and options:

- Select unit to use:** A text input field.
- Unit type:** A dropdown menu set to "Digital I/O".
- Unit name:** A dropdown menu set to "Input unit (DC type), 16 points".
- Input time constant:** A dropdown menu set to "1ms".
- Installation location setting:** A text input field.
- Starting word No.:** A text input field with "10" and a range "(0 - 511)".
- Number of input words:** A text input field with "1" and a range "(0 - 128)".
- Number of output words:** A text input field with "0" and a range "(0 - 128)".
- Automatically shift the starting word number for subsequent slots:** A checked checkbox.
- Option:** A text input field.
- Exclude this unit from the target for verification:** An unchecked checkbox.
- Exclude this unit from the target for I/O refresh:** An unchecked checkbox.

Buttons on the right side include "OK", "Insert", and "Cancel".

(MEMO)

3 Wiring

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3.1 Wiring Precautions

3.1 Wiring Precautions

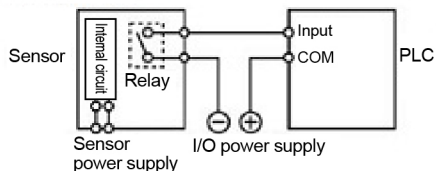
3.1.1 Before Wiring

- Before wiring, please read the specifications of the unit carefully.
- Each unit varies in ambient temperature, the number of simultaneously ON points, and supply voltage limitations.

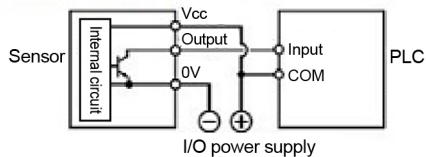
3.1.2 Precautions on Input Wiring

■ Connection of photoelectric sensor and proximity sensor

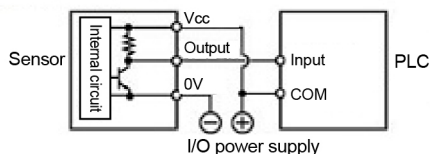
Relay output type



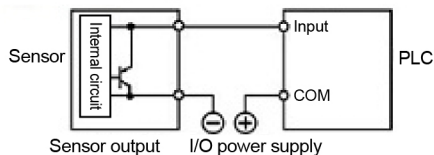
NPN open collector output type



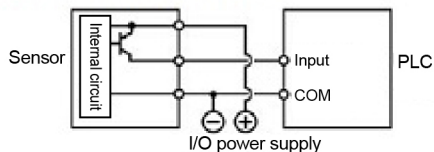
Voltage output type



Two-wire output type



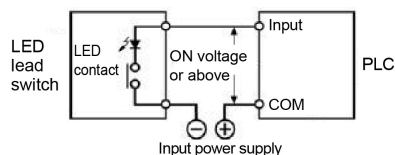
PNP open collector output type



■ Connection of LED-equipped reed switch

With a LED is connected to an input contact such as LED-equipped reed switch, make sure that the voltage value applied to the input terminal of PLC is greater than on voltage value.

In particular, take care when connecting a number of switches in series.



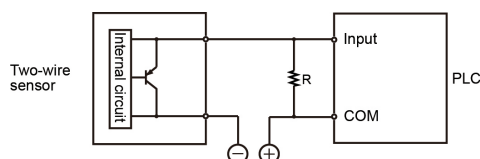
■ Connection of two-wire type sensor

If the input of the PLC is not turned off because of leakage current from the two-wire type sensor,

the connection of a bleeder resistor is recommended, as shown below.

Using 16-point type input unit (AFP7X16DW):

(Off voltage: 2.5 V; input impedance: 3.6kΩ)



I: Sensor's leakage current (mA)

R: Bleeder resistor (kΩ)

The off voltage of the input is 2.5 V. Therefore, select an R so that the voltage between the COM terminal and the input terminal will be less than 2.5 V.

The input impedance is 3.6kΩ.

$$I \times \frac{3.6R}{3.6+R} \leq 2.5. \text{ Therefore, } R \leq \frac{9}{3.6I-2.5} \text{ (k}\Omega\text{)}$$

The wattage W of the resistor is:

$$W = \frac{(\text{Power supply voltage})^2}{R}$$

In the actual selection, use a value that is 3 to 5 times the value of W.

■ Connection of LED-equipped limit switch

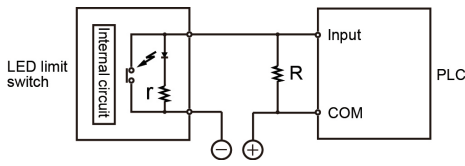
With the LED-equipped limit switch, if the input of the PLC is not turned off or if the LED of the limit switch is kept on because of the leakage current,

the connection of a bleeder resistor is recommended, as shown below.

Using 16-point type input unit (AFP7X16DW):

(Off voltage: 2.5 V; input impedance: 3.6kΩ)

3.1 Wiring Precautions



r: Internal resistor of limit switch (kΩ)

R: Bleeder resistor (kΩ)

The input off voltage is 2.5 V. Therefore, when the power supply voltage is 2.4 V, the input impedance is 3.6kΩ.

$$I \times \frac{2.4-2.5}{r} \text{ or more}$$

Obtain R so that the above current will flow. Obtain I in the same way as when using the above 2-wire sensor.

$$R \leq \frac{9}{3.6I-2.5} \text{ (k}\Omega\text{) } W = \frac{(\text{Power supply voltage})^2}{R} \times (3 \text{ to } 5)$$

3.1.3 Precautions on Output Wiring

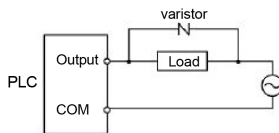
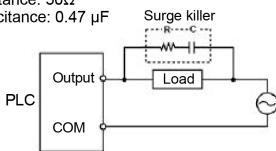
■ Connection of inductive loads

When connecting an inductive load, a protective circuit should be installed in parallel with the load.

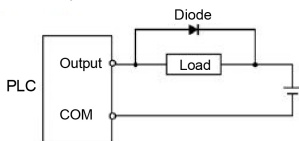
When connecting the DC type inductive loads and relay type output unit, be sure to connect a diode for protective circuit across the ends of the load. This will affect the life of the relay.

When using an AC inductive load (Relay output type)

Surge killer example
Resistance: 50Ω
Capacitance: 0.47 μF

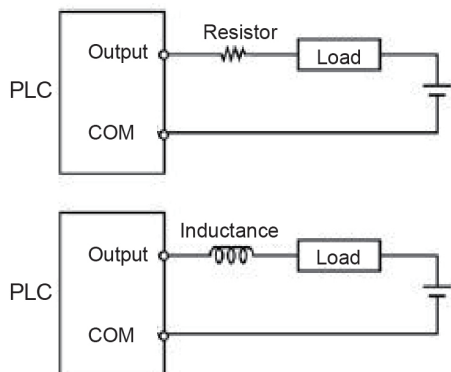


DC load example



■ Connection of capacitive loads

When connecting the loads with large in-rush currents, be sure to connect a protection circuit in series with the load.



■ Precautions for overload

To protect the units from overloading, it is recommended to attach an external fuse for each point.

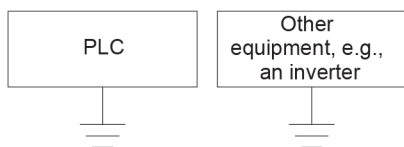
There are times that the elements for the output units cannot be protected even if external fuses are connected.

■ Earth

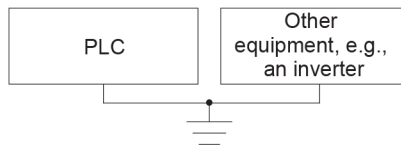
- In order to avoid the effects of noise, be sure to ground the AFP7Y16R terminal.
- The grounding connection should have a resistance not in excess of 100Ω .
- The point of grounding should be as close to the PLC as possible. The ground wire should be as short as possible.
- Sharing the ground with another device may have an adverse effect. Therefore, be sure that grounding is dedicated.



OK



Not OK



📄 Note

- Sharing the ground with another device may have an adverse effect. Therefore, be sure that grounding is dedicated.

3.2 Wiring I/O Unit of Terminal Block Type

3.2 Wiring I/O Unit of Terminal Block Type

3.2.1 Suitable Wires and Solderless Terminals

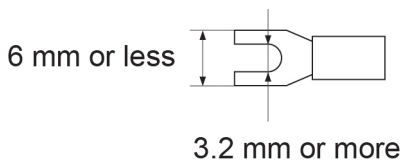
■ Suitable wires

Suitable wires	Tightening torque
AWG22 to 14 (0.3 mm ² to 2.0 mm ²)	0.5 to 0.6 N·m

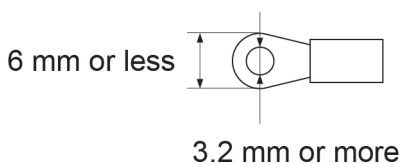
Solderless terminal

M3 terminal screws are used for the terminal. The following suitable solderless terminals are recommended for the wiring to the terminals.

● Fork type terminal



● Round type terminal



■ Suitable solderless terminal

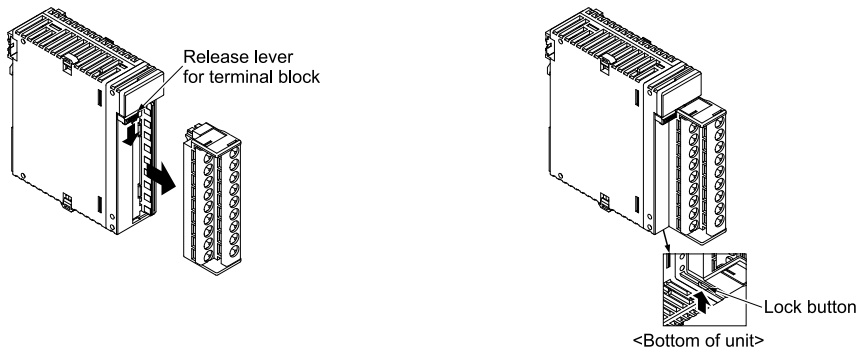
Manufacturer	Shape	Part No.	Suitable wires
J.S.T. Mfg Co., Ltd.	Fork type	1.25-B3A	0.25 to 1.65 mm ²
	Round type	1.25-MS3	
	Fork type	2-N3A	1.04 to 2.63 mm ²
	Round type	2-MS3	

3.2.2 Wiring to Terminal Block

Remove the terminal block before beginning the wiring operations.

To remove the terminal block, push downward the release lever located at the top of the terminal block.

3.2 Wiring I/O Unit of Terminal Block Type



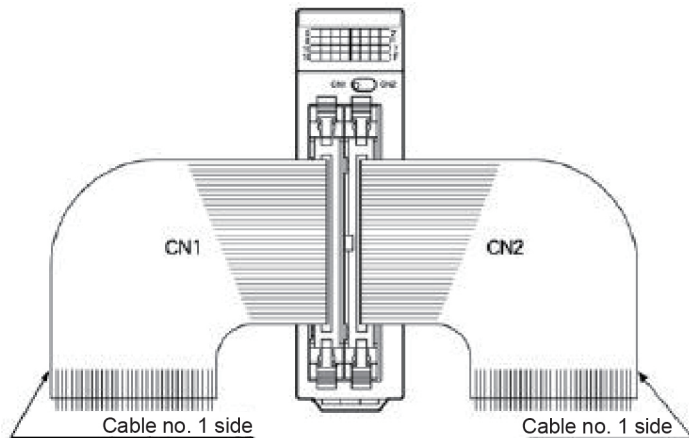
- Install the terminal block by inserting it all the way to its original position and pressing the lock button on the bottom of the unit. Then confirm that the terminal block is securely attached and cannot be removed.

3.3 Wiring Connector-type I/O Unit(Flat Cable Connectors)

3.3 Wiring Connector-type I/O Unit(Flat Cable Connectors)

Applicable units: 64-point type input unit, 64-point type output unit, I/O mixed unit

■ Flat Cable Connection Diagram



■ Correspondence table of flat cable No. and I/O No.

The relationship between the cable number and I/O number is shown below.

Cable No.	CN1 Group		CN2 Group	
	Input No.	Output No.	Input No.	Output No.
1	X0	Y0	X20	Y20
2	X8	Y8	X28	Y28
3	X1	Y1	X21	Y21
4	X9	Y9	X29	Y29
5	X2	Y2	X22	Y22
6	XA	YA	X2A	Y2A
7	X3	Y3	X23	Y23
8	XB	YB	X2B	Y2B
9	X4	Y4	X24	Y24
10	XC	YC	X2C	Y2C
11	X5	Y5	X25	Y25
12	XD	YD	X2D	Y2D
13	X6	Y6	X26	Y26
14	XE	YE	X2E	Y2E
15	X7	Y7	X27	Y27
16	XF	YF	X2F	Y2F
17	COM	-	COM	-
18	COM	-	COM	-

3.3 Wiring Connector-type I/O Unit(Flat Cable Connectors)

Cable No.	CN1 Group		CN2 Group	
	Input No.	Output No.	Input No.	Output No.
19	NC	+	NC	+
20	NC	+	NC	+
21	X10	Y10	X30	Y30
22	X18	Y18	X38	Y38
23	X11	Y11	X31	Y31
24	X19	Y19	X39	Y39
25	X12	Y12	X32	Y32
26	X1A	Y1A	X3A	Y3A
27	X13	Y13	X33	Y33
28	X1B	Y1B	X3B	Y3B
29	X14	Y14	X34	Y34
30	X1C	Y1C	X3C	Y3C
31	X15	Y15	X35	Y35
32	X1D	Y1D	X3D	Y3D
33	X16	Y16	X36	Y36
34	X1E	Y1E	X3E	Y3E
35	X17	Y17	X37	Y37
36	X1F	Y1F	X3F	Y3F
37	COM	-	COM	-
38	COM	-	COM	-
39	NC	+	NC	+
40	NC	+	NC	+

■ Suitable wires (strand wire)

Size	Pitch	Rated current
AWG28 (7 wires/0.127 dia.)	1.27 mm	1A

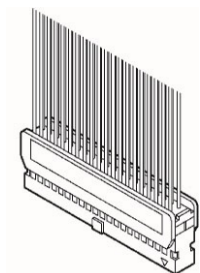
3.4 Wiring Connector-type I/O Unit(Wire-pressed Terminal Cable)

3.4 Wiring Connector-type I/O Unit(Wire-pressed Terminal Cable)

■ Specifications of connectors for wire-pressed terminal cable

This is a connector allowing loose wires to be connected without removing the wire's insulation. A dedicated pressure connection tool is required to connect the loose wires.

Wire-pressed connector (40P)



■ Suitable wires (strand wire)

Size	Nominal cross-sectional area	Insulation thickness	Rated current
AWG22	0.3 mm ²	1.5 to 1.1 dia.	3A
AWG24	0.2 mm ²		

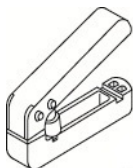
■ Wiring with connectors for wire-pressed terminal cable (provided with unit)

Manufacturer	Composition of components	Unit type and required quantity	
		32-point-type Input Unit 32-point-type Output Unit	64-point-type Input Unit 64-point-type Output Unit I/O mixed unit
Panasonic-made (AFP2801)	Housing (40P)	1 x 1 set	1 x 2 set
	Semi-cover (40P)	2 x 1 set	2 x 2 set
	Contact (for AW22 or 24) 5 pins	8 x 1 set	8 x 2 set

(Note 1) The 32-point-type unit is provided with one set and the 64-point-type and I/O mixed units are provided with two sets each. If you need more connectors, purchase AFP2801 (2 sets/pack).

■ Pressure connection tool

Manufacturer	Product No.
Panasonic-made	AXY52000FP



3.4 Wiring Connector-type I/O Unit(Wire-pressed Terminal Cable)

3.4.1 Wiring the Discrete-wire Connector

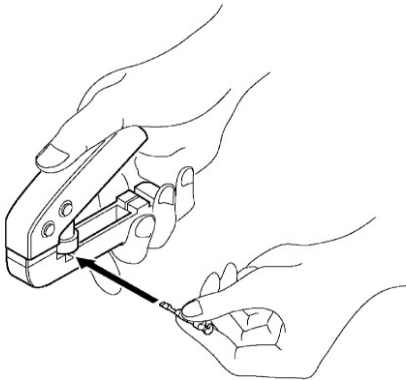


- When performing wiring work, refer to the instruction manual of the crimping tool in order to prevent faulty wiring.

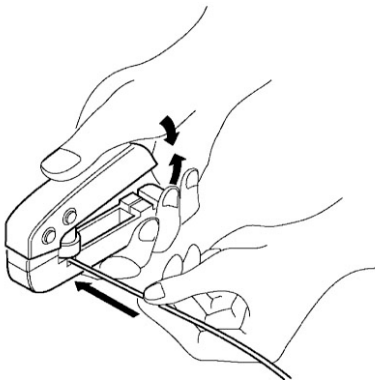
1 2

Procedure

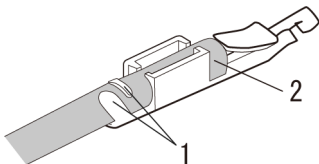
1. Bend and break the contact, and set it in the crimping tool.



2. Insert the wire without removing its insulation until it stops, and lightly grip the crimping tool.

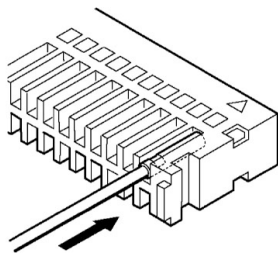


3. The contact appears as shown below after it is crimped. Confirm the following two points.
 1. The wire must be embraced inside the clamped part.
 2. The wire must be inserted to the end.

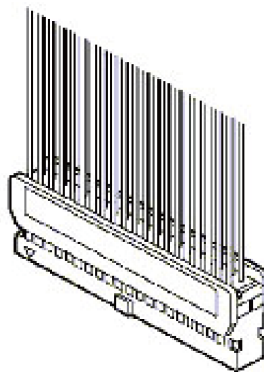
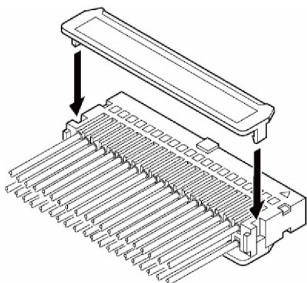


4. Insert the wire with the contact into the housing.

3.4 Wiring Connector-type I/O Unit(Wire-pressed Terminal Cable)



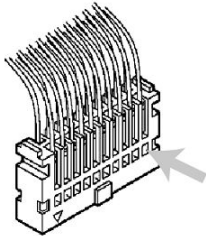
5. When all the wires have been inserted, fit the semi-cover into place.



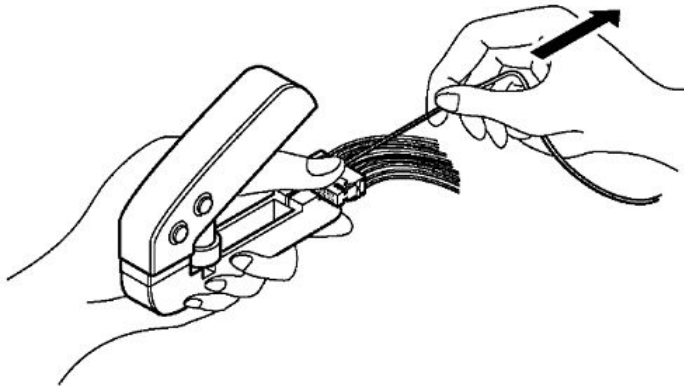
3.4 Wiring Connector-type I/O Unit(Wire-pressed Terminal Cable)

i Info.

- If there is a wiring mistake or the wire is incorrectly press-fit, use the crimping tool to remove the contact.
 1. Set the pin of the crimping tool at the position indicated by an arrow.



2. Hold the housing with fingers and pull the wire.



3.5 Wiring Connector-type I/O Unit(Push-In Connector)

3.5 Wiring Connector-type I/O Unit(Push-In Connector)

3.5.1 About Push-In Connector

40-pole push-in type connector manufactured by Ningbo Degson Electronic Co. Ltd. that can be used with the FP7 Series.

Product name	Model number	Remarks
Push-in connector set (40-pole)	AFP2808	2 pcs.

3.5.2 Compatible Parts and Dedicated Tools

Pole terminal with insulating sleeve

Use the following pole terminals.

Manufacturer	Model number	Size	Cross-sectional area
Phoenix Contact Co. Ltd	A10, 34-8TQ	AWG#22	0.34 mm ²

Dedicated pressure-welding tool for pole terminals

Manufacturer	Model number
Phoenix Contact Co. Ltd	CRIMPFOX 10S

3.5.3 Wiring to Connector

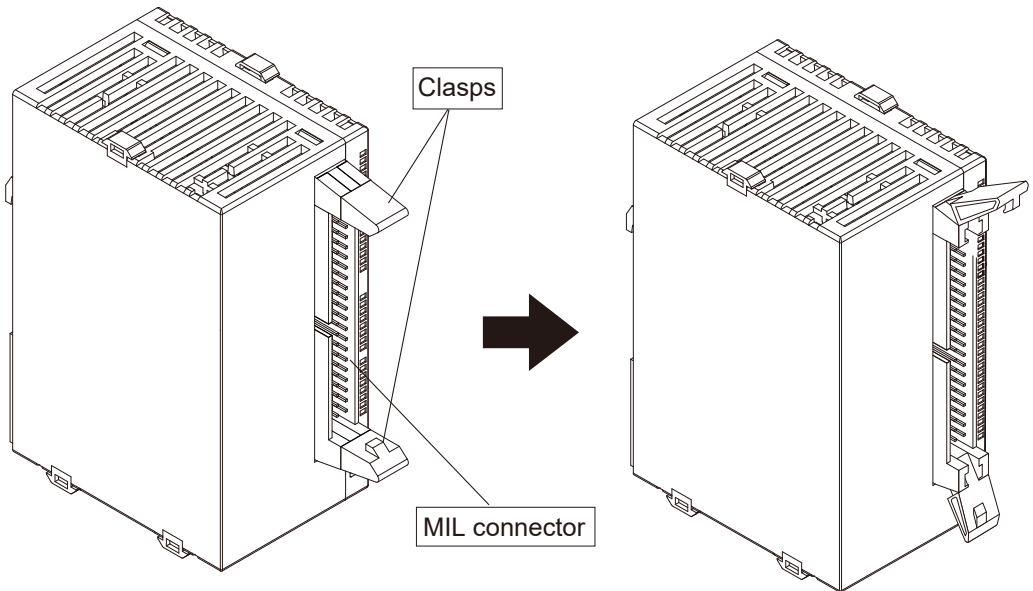
Installing onto the Unit

Follow the procedure below to install the product onto the unit.

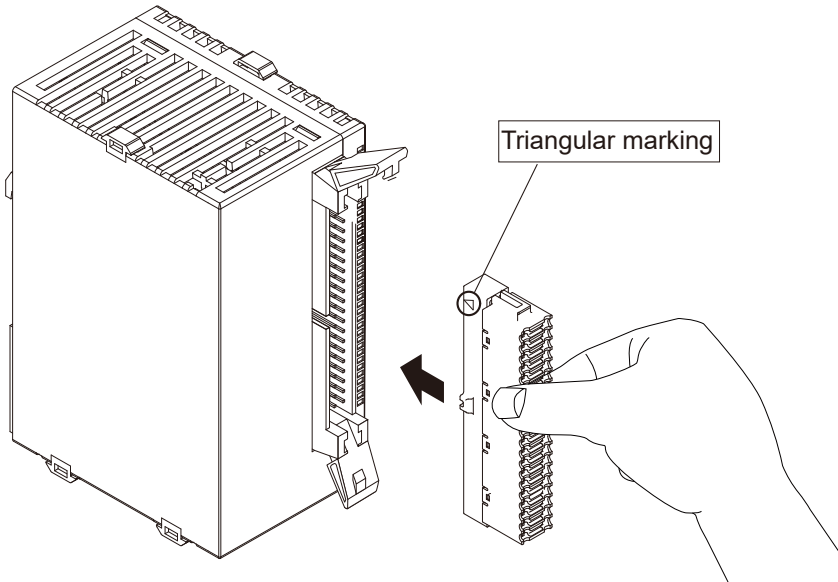
1 Procedure

1. Open out the clasps of the MIL connector.

3.5 Wiring Connector-type I/O Unit(Push-In Connector)

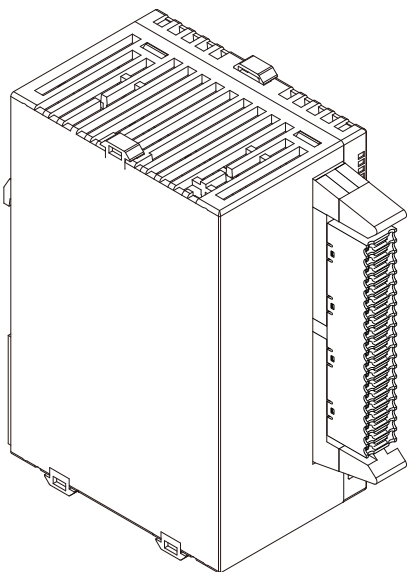


2. Insert the product into the MIL connector. When inserting the product, make sure that the triangular marking is at the top.



3. Insert the product until the clasps of the MIL connector close.

3.5 Wiring Connector-type I/O Unit(Push-In Connector)



Wiring

Follow the procedure below when wiring.

Note

Wiring precautions

- Do not damage the core when stripping off the covering material.
- Do not apply stress to the wires after wiring.
- Do not solder the core. Soldering the core may cause it to disconnect due to vibration.

1 2 Procedure

1. Strip off the covering material from the wire

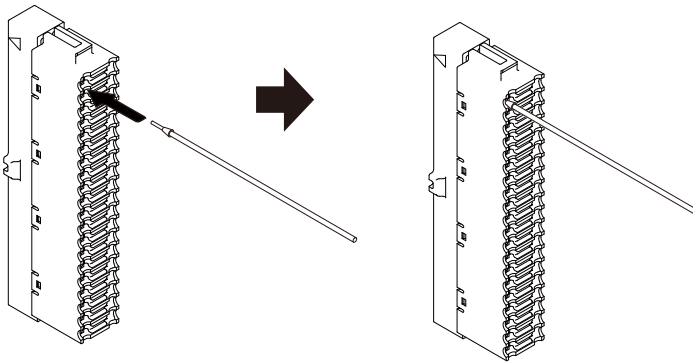


2. Attach the pole terminal to the core part. Do not twist the core when attaching.



3. After attaching the pole terminal, pressure-weld using the dedicated pole terminal pressure-welding tool.
4. After pressure-welding, insert the wire into the product.

3.5 Wiring Connector-type I/O Unit(Push-In Connector)



i Info.

After inserting the wire, ensure that the wire does not protrude.

Replacing Wires

Follow the procedure below when replacing wires.

1 2 Procedure

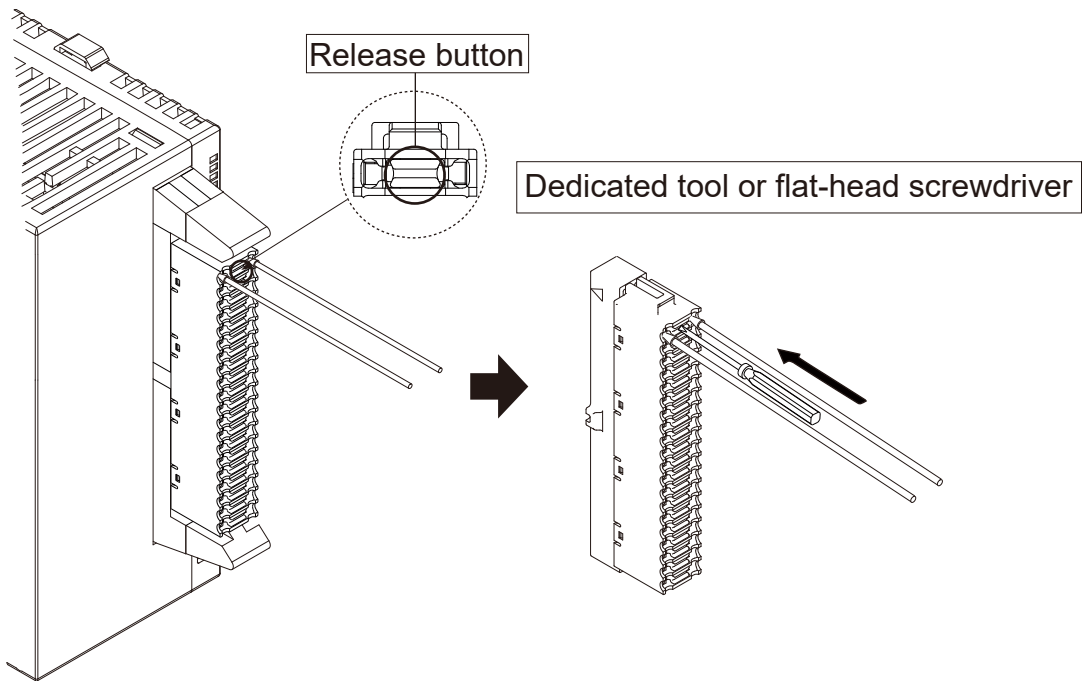
Use the following dedicated tool or an equivalent flat-head screwdriver to remove the wire.

Dedicated tool

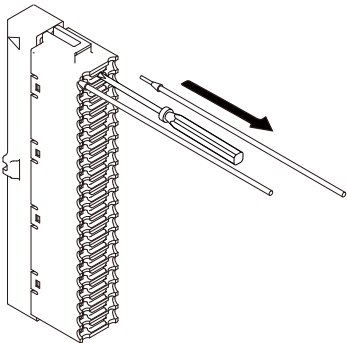
Manufacturer	Model number	Remarks
Phoenix Contact Co. Ltd	SZS 0, 4x2, 5	Blade width 0.4 × Blade thickness 2.5

1. Push the dedicated tool or flat-head screwdriver into the release button on the product.

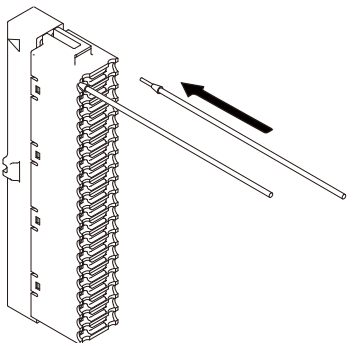
3.5 Wiring Connector-type I/O Unit(Push-In Connector)



- 2.** Remove the wire while pressing down the button.



- 3.** Insert the new wire. For details on how to insert the wire, refer to "[Wiring](#)".



3.5 Wiring Connector-type I/O Unit(Push-In Connector)

Info.

- Pressing the release button unlocks the wires on both sides of the button. After replacing the wires, ensure that the wires do not protrude.

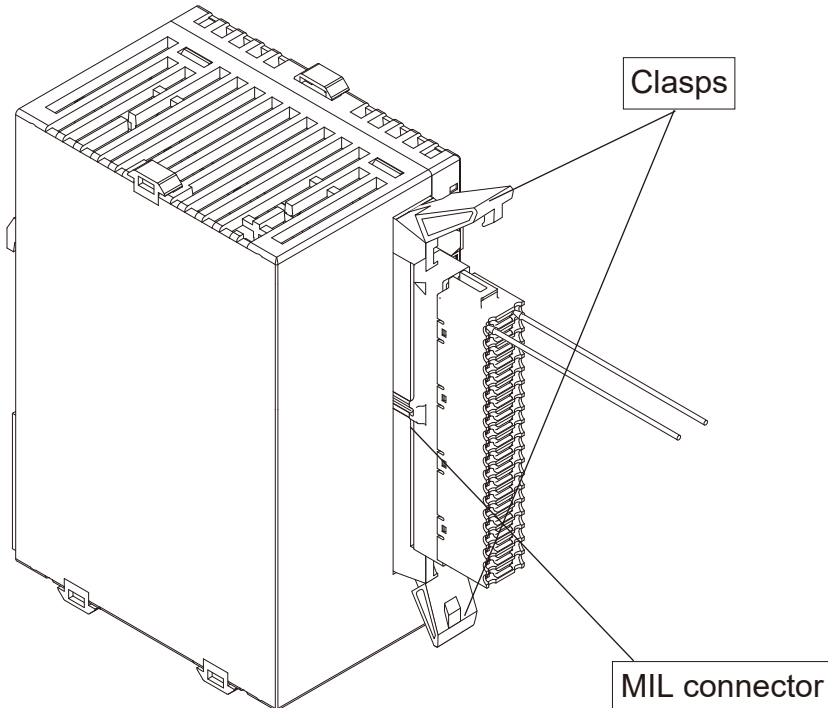
3.5 Wiring Connector-type I/O Unit(Push-In Connector)

Removing from the Unit

Follow the procedure below to remove the product from the unit.

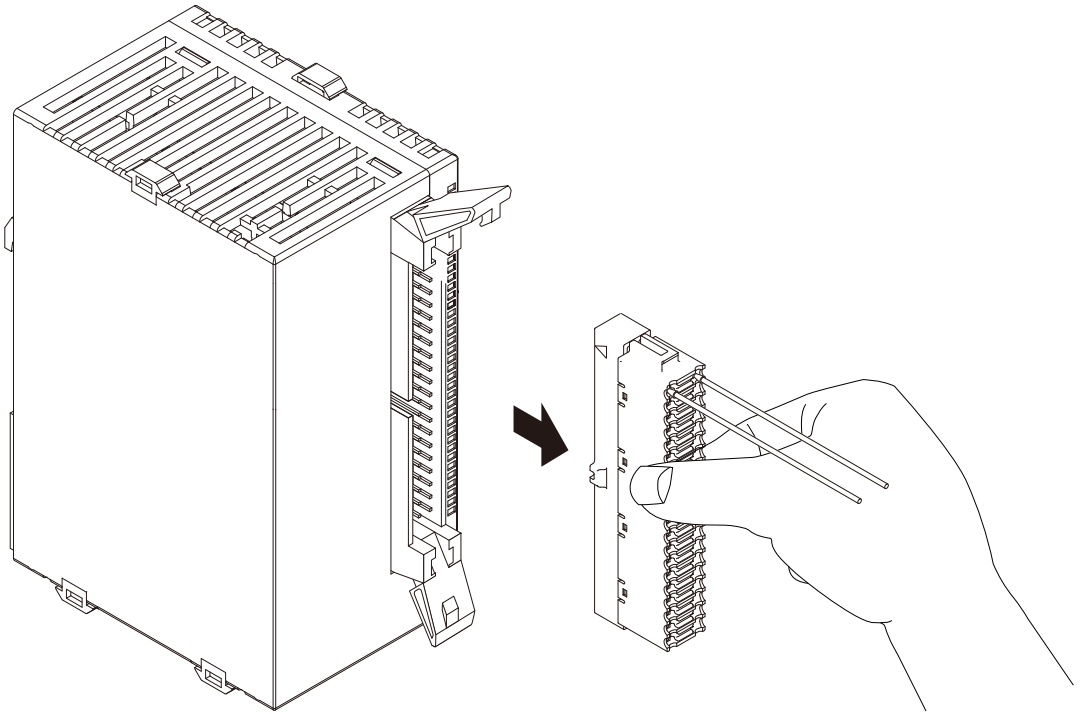
1 2 Procedure

1. Open out the clasps of the MIL connector.



2. Remove the product from the unit.

3.5 Wiring Connector-type I/O Unit(Push-In Connector)



(MEMO)

Record of Changes

The manual number can be found at the bottom of the cover page.

Date	Manual No.	Record of Changes
Mar. 2013	WUME-FP7DIO-01	1st Edition
Oct. 2013	WUME-FP7DIO-02	2nd Edition <ul style="list-style-type: none">• Corrected errors• Added models AFP7Y32P, AFP7Y64P, AFP7XY64D2P
Oct. 2020	WUME-FP7DIO-03	3rd Edition <ul style="list-style-type: none">• Corrected errors
Jun. 2022	WUME-FP7DIO-04	4th Edition Changed manual formatting
May 2023	WUME-FP7DIO-05	5th Edition Add Push-In Connector "3.5.1 About Push-In Connector"
Apr. 2024	WUME-FP7DIO-06	6th Edition <ul style="list-style-type: none">• Change in Corporate name

Order Placement Recommendations and Considerations

The Products and Specifications listed in this document are subject to change (including specifications, manufacturing facility and discontinuing the Products) as occasioned by the improvements of Products. Consequently, when you place orders for these Products, Panasonic Industry Co., Ltd. asks you to contact one of our customer service representatives and check that the details listed in the document are commensurate with the most up-to-date information.

[Safety precautions]

Panasonic Industry Co., Ltd. is consistently striving to improve quality and reliability. However, the fact remains that electrical components and devices generally cause failures at a given statistical probability. Furthermore, their durability varies with use environments or use conditions. In this respect, check for actual electrical components and devices under actual conditions before use. Continued usage in a state of degraded condition may cause the deteriorated insulation. Thus, it may result in abnormal heat, smoke or fire. Carry out safety design and periodic maintenance including redundancy design, design for fire spread prevention, and design for malfunction prevention so that no accidents resulting in injury or death, fire accidents, or social damage will be caused as a result of failure of the Products or ending life of the Products.

The Products are designed and manufactured for the industrial indoor environment use. Make sure standards, laws and regulations in case the Products are incorporated to machinery, system, apparatus, and so forth. With regard to the mentioned above, confirm the conformity of the Products by yourself.

Do not use the Products for the application which breakdown or malfunction of Products may cause damage to the body or property.

- i) usage intended to protect the body and ensure security of life
- ii) application which the performance degradation or quality problems, such as breakdown, of the Products may directly result in damage to the body or property

It is not allowed the use of Products by incorporating into machinery and systems indicated below because the conformity, performance, and quality of Products are not guaranteed under such usage.

- i) transport machinery (cars, trains, boats and ships, etc.)
- ii) control equipment for transportation
- iii) disaster-prevention equipment / security equipment
- iv) control equipment for electric power generation
- v) nuclear control system
- vi) aircraft equipment, aerospace equipment, and submarine repeater
- vii) burning appliances
- viii) military devices
- ix) medical devices (except for general controls)
- x) machinery and systems which especially require the high level of reliability and safety

[Acceptance inspection]

In connection with the Products you have purchased from us or with the Products delivered to your premises, please perform an acceptance inspection with all due speed and, in connection with the handling of our Products both before and during the acceptance inspection, please give full consideration to the control and preservation of our Products.

[Warranty period]

Unless otherwise stipulated by both parties, the warranty period of our Products is three years after the purchase by you or after their delivery to the location specified by you. The consumable items such as battery, relay, filter and other supplemental materials are excluded from the warranty.

[Scope of warranty]

In the event that Panasonic Industry Co., Ltd. confirms any failures or defects of the Products by reasons solely attributable to Panasonic Industry Co., Ltd. during the warranty period, Panasonic Industry Co., Ltd. shall supply the replacements of the Products, parts or replace and/or repair the defective portion by free of charge at the location where the Products were purchased or delivered to your premises as soon as possible.

However, the following failures and defects are not covered by warranty and we are not responsible for such failures and defects.

- (1) When the failure or defect was caused by a specification, standard, handling method, etc. which was specified by you.
- (2) When the failure or defect was caused after purchase or delivery to your premises by an alteration in construction, performance, specification, etc. which did not involve us.
- (3) When the failure or defect was caused by a phenomenon that could not be predicted by the technology at purchasing or contracted time.
- (4) When the use of our Products deviated from the scope of the conditions and environment set forth in the instruction manual and specifications.
- (5) When, after our Products were incorporated into your products or equipment for use, damage resulted which could have been avoided if your products or equipment had been equipped with the functions, construction, etc. the provision of which is accepted practice in the industry.
- (6) When the failure or defect was caused by a natural disaster or other force majeure.
- (7) When the equipment is damaged due to corrosion caused by corrosive gases etc. in the surroundings.

The above terms and conditions shall not cover any induced damages by the failure or defects of the Products, and not cover your production items which are produced or fabricated by using the Products. In any case, our responsibility for compensation is limited to the amount paid for the Products.

[Scope of service]

The cost of delivered Products does not include the cost of dispatching an engineer, etc. In case any such service is needed, contact our sales representative.

Panasonic Industry Co., Ltd.

(MEMO)

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