General Specifications

A2FV70S, A2FV70D, A2CUKT3
Field Control Unit,
Cabinet Utility Kit (For RIO System Upgrade)

CENTUM VP

GS 33J64E10-01EN

[Release 6]

This document describes the hardware specifications of A2FV70S/A2FV70D field control unit (FCU) and A2CUKT3 cabinet utility kit, as well as the specifications of the field control station (for RIO System Upgrade).

Note: "RIO" stands for Remote I/O.

1. A2FV70S/A2FV70D Field Control Unit (for RIO System Upgrade)

■ GENERAL

A2FV70S and A2FV70D FCU are to replace the existing FCU for RIO System Upgrade.

A2FV70☐, ANB10☐, ANB11☐, and ANT10U can also be constructed by combining Base Plate, each module and so on. For detail, refer to "3. Field Control Station (RIO System Upgrade)".

■ HARDWARE SPECIFICATIONS

● Applicable products

The following models of FCU can be upgraded by the RIO System Upgrade.

Field Control Unit (19-inch rack mountable)					
Model	AFE10S	AFM10S	AFH10S	AFS10S	AFG10S
	AFE10D	AFM10D	AFH10D	AFS10D	AFG10D

Field Control Unit (with cabinet) (*1)					
Model	AFE20S	AFM20S	AFH20S	AFS20S	AFG20S
	AFE20D	AFM20D	AFH20D	AFS20D	AFG20D

Field Control Station (19-inch rack mountable) (*2)	
Model	PFCS
	PFCD

*1: Place an order of A2CUKT3-C☐☐☐ separately for upgrading the existing FCU (with cabinet).
*2: PFC☐ updates are performed by combining FCU (A2FV70☐/A2FVX1) and A2NN10D.

● Memory protection during power failure

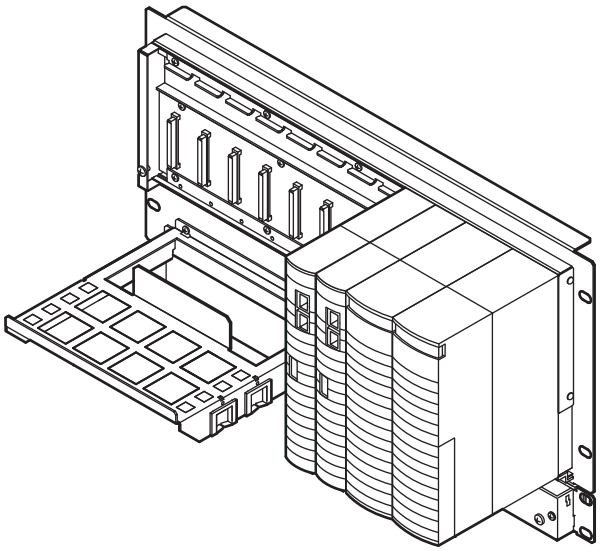
Battery

Battery Backup for Main Memory: Max. 72 hours
Battery Recharge Time: 48 hours or longer

● READY contact output

2 terminals (NC and C),
Contact points open during FCU failure
Contact rating: 30 V DC, 0.3 A or less

Note: When the option code of "/HKU" is specified, the house keeping unit (HKU) outputs failures of the FCU by opening the READY contact of the A2CUKT3.



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● Communication interface

Vnet/IP interface: Dual-redundant

● Connectable nodes

The following nodes can be connected to the FCU for RIO system upgrade.

Model	Description
A2NN10D	Node interface unit (for RIO system upgrade, 19-inch rack mountable)
A2NN20D	Node interface unit (for RIO system upgrade, cabinet installation type)
A2NN30D	Node interface unit (for N-IO) (*1)
ANB10D	ESB bus node units
ANB11D	Optical ESB bus node units

*1: A2NN30D can be used only with A2BN4D and A2BN5D. (A2BN3D can not be used for RIO System Upgrade.)

● HKU interface unit (option)

When the option code of "/HKU" is specified, the HKU outputs failures of FCU by opening the READY contact. The HKU also monitors the environmental status of the cabinet via the N-ESB bus or the optical ESB bus, which enables to display the HKU's operation status on the HIS as well as to generate system alarms.

YOKOGAWA

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● Module Configuration

Power Supply Module (PW481, PW482, or PW484): 2 modules for dual-redundant configuration
Processor Module (CP461 style S2 or later or CP471): 2 modules for dual redundant configuration
A dual-redundant configuration is enabled by using 2 identical modules with same model code (CP471 or CP461).
I/O Module (*1): 2 modules each for dual redundant configuration (*2) and max. 8 in total.

*1: The following modules can be installed in an FCU. For details, refer to the GS of each module.
[Communication modules (ALR111, ALR121, ALE111, ALF111, ALP121, A2LP131, and A2LP141), ESB bus coupler modules (EC401 and EC402), N-ESB bus coupler modules (A2EN402 and A2EN404), and Optical ESB bus repeater modules (ANT401 and ANT411)]
*2: ESB bus coupler modules (EC401/EC402), N-ESB bus coupler modules (A2EN402/A2EN404), and Optical ESB Bus Coupler Modules (ANT401/ANT411) are used always in a dual-redundant configuration. A single configuration or dual-redundant configuration can be selected for the communication modules (ALR111, ALR121, ALE111, ALF111, ALP121, and A2LP141). The PROFINET communication module(A2LP131) is always used in a single configuration with only 1 module.

● Module installation restrictions

When using EC401 or EC402 ESB bus coupler module, install them in slots 7 and 8 of the FCU.
A pair of ANT401 or ANT411 optical ESB bus repeater master modules is to be installed in an odd-number slot and the one on the right of the slots 1 to 6 according to the number of branches.
A pair of A2EN402 or A2EN404 N-ESB bus coupler modules is to be installed in an odd-number slot and the one on the right of the slots 1 to 8 according to the number of branches. Note that the pair of A2EN402/A2EN404 cannot be installed in slots 7 and 8 of the FCU when EC401/EC402 are installed (as these modules occupy slots 7 and 8).

For remarks on installation of the communication modules and the bus interface modules, refer to the GS “N-IO System Overview” (GS 33J62A10-01EN).

● Node unit installation restriction

An N-IO node can be connected to EC4☐1, A2EN40☐, and ANT4☐1 installed in the A2FV70☐ via an N-ESB bus or an optical ESB bus.
An FIO node can be connected only to EC4☐1 and ANT4☐1 installed in the A2FV70☐ via an ESB bus or an optical ESB bus.

● Mounting restrictions by application capacity limitations

The number of nodes that can be connected to an FCU is as shown below. The node expansion license does not limit the number of nodes, but limited by the VP6F1900 software license.

Basic Control Functions (VP6F1900)

Number of N-IO nodes (*1)	Max. 8 nodes per FCU
Number of N-IO I/O Units (*2)	Max. 40 units per FCU
Sum of ANB11D/ANB10D units	Max. 8 units per FCU
Sum of ALR111/ALR121/ALE111/ALP121/A2LP131/A2LP141 modules	Max. 32 modules (16 pairs in dual-redundant configuration) per FCU
Sum of ALF111 modules	Max. 64 modules (32 pairs in dual-redundant configuration) per FCU
Sum of Communication Modules to be mounted (*3)	Max. 64 modules (*1) per FCU

*1: An N-IO node consists of a node interface unit and N-IO I/O units. For details refer to the GS “N-IO Node (for RIO System Upgrade)” (GS 33J64F10-01EN)
*2: An N-IO I/O unit consists of I/O modules and I/O adaptors. For details refer to the GS “N-IO Node (for RIO System Upgrade)” (GS 33J64F10-01EN)
*3: This is the sum of ALR111, ALR121, ALE111, ALF111, ALP121, A2LP131, and A2LP141 modules.
For details, refer to the GS “VP6F1900 Control Function for Field Control Station (for A2FV70☐)” GS 33J15C20-01EN) and the GS “VP6F3100 Project I/O License” (GS 33J15A10-01EN).

● Power Supply

To be specified by the Suffix Code.

Voltage: 100-120 V AC, Frequency: 50/60 Hz
Voltage: 220-240 V AC, Frequency: 50/60 Hz
Voltage: 24 V DC

● Power Consumption

For 100-120 V AC: 200 VA
For 220-240 V AC: 230 VA
For 24 V DC: 5.5 A

● Weight

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Approx. 6.9 kg (Model A2FV70S)
Approx. 7.7 kg (Model A2FV70D)

● Mounting

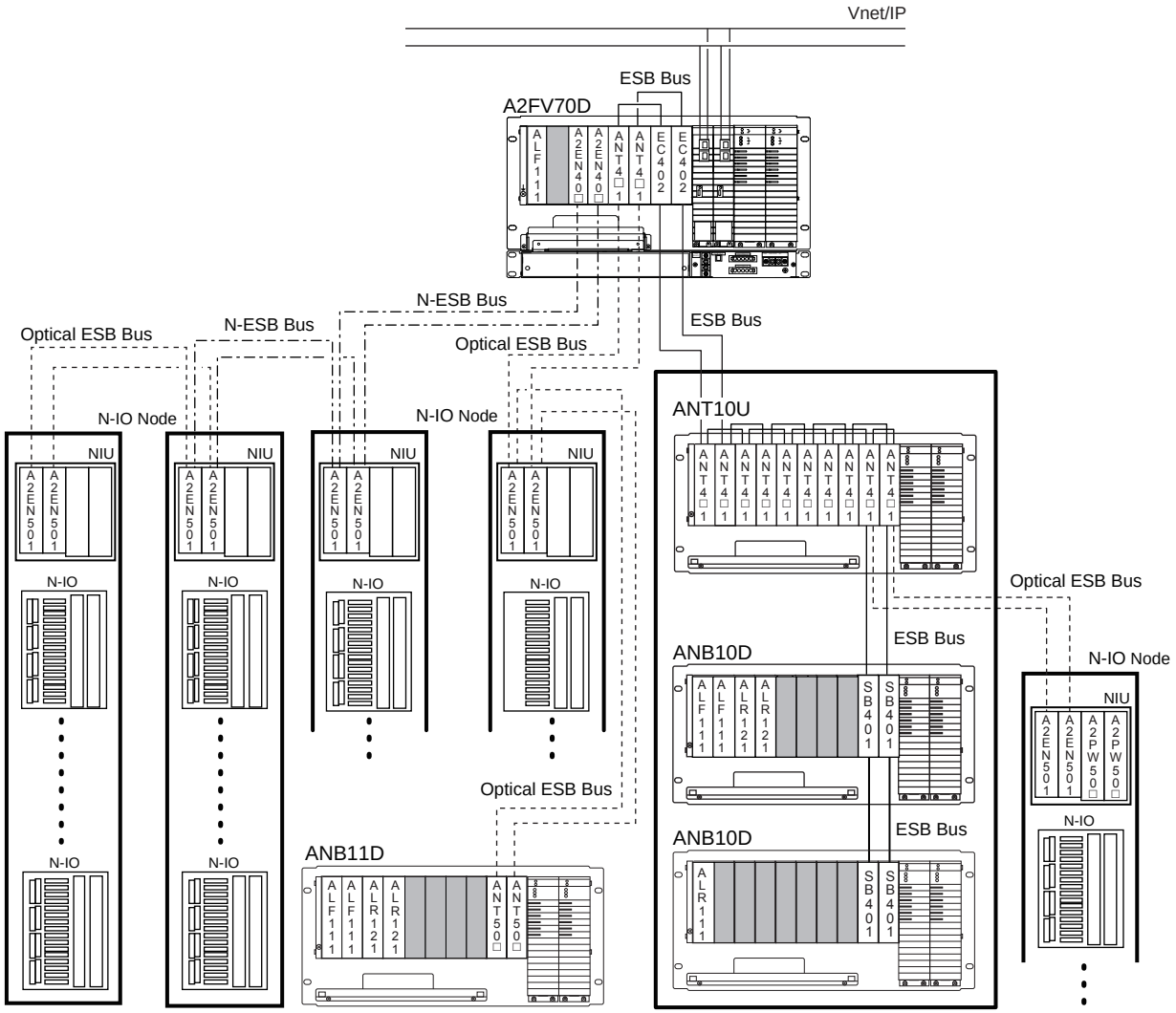
19-inch Rack Mounting (M5x8 screws)
With insulation bush (accessory)

● Connection

Power supply: M4 screw terminal connection
Grounding: M4 screw terminal connection
READY contact output: M4 screw terminal connection
Vnet/IP interface: UTP cable (CAT5e or superior) to connect Layer 2 switch.

■ SYSTEM CONFIGURATION

The figure below shows an example of the RIO System Upgrade configured by A2FV70☐, N-IO and FIO nodes.



NIU: Node interface unit (A2NN10D, A2NN20D or A2NN30D)
N-IO: N-IO I/O unit
ANT4☐1: ANT4☐1-☐E, -☐F
ANT5☐2: AMT5☐2-☐E, -☐F

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Figure Configuration of the RIO System Upgrade

■ EXTERNAL DIMENSIONS

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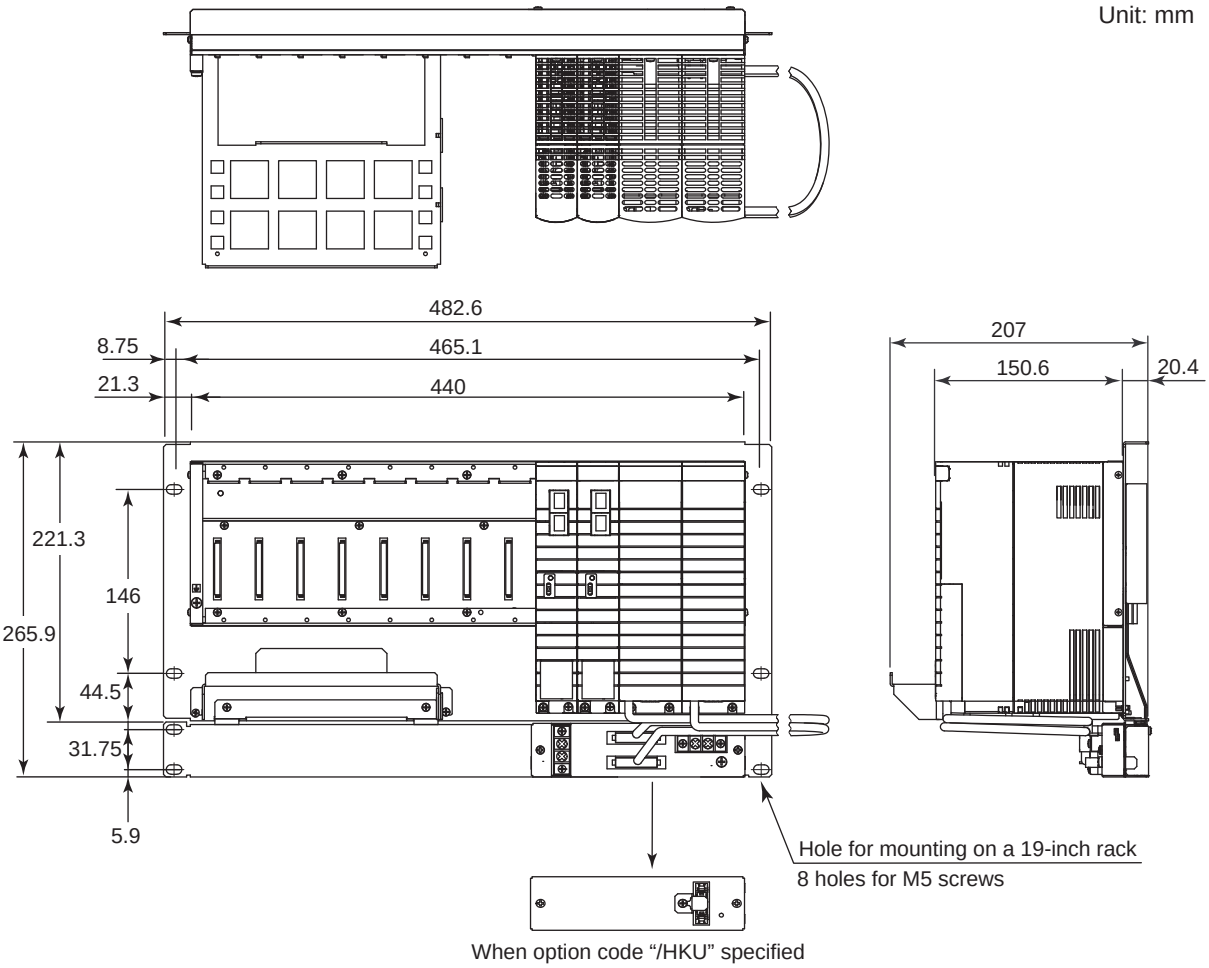
Unit: mm



Nominal tolerance:

Nominal tolerance is ± 0.8 mm for the dimensions of 0.5 mm or more and 120 mm or less, and the combined nominal tolerance is ± 1.5 mm.
The nominal tolerance is in accordance with JEM 1459 for the dimensions over 120 mm.

■ SOFTWARE REQUIREMENT

The A2FV70☐ is supported by CENTUM VP R6.03 or later.
A software license is required to use the A2FV70☐. For details, refer to the GS "VP6F1900 Control Function for Field Control Station (for A2FV70☐)" (GS 33J15C20-01EN) and "VP6F3100 Project I/O License" (GS 33J15A10-01EN).

■ STANDARD ACCESSORIES

The A2FV70☐ FCU is delivered with the following standard accessories.

Part Name	Part No.	Quantity	Remarks
Insulating bush	S9049PM	8	Accessory

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■ MODEL AND SUFFIX CODES

Field control unit

		Description
Model	A2FV70S	Field Control Unit (for RIO System Upgrade, 19-inch Rack Mountable)
Suffix Codes	-A	Standard type (for CP471) (*1)
	-S	Standard type (for CP461) (*2)
	3	Dual-redundant Vnet/IP, single power supply
	4	Dual-redundant Vnet/IP, dual-redundant power supply
	1	Always 1
	1	100 - 120 V AC power supply (*3)
	2	220 - 240 V AC power supply (*3)
	4	24 V DC power supply (*3)
	0	With no explosion protection
	0	Basic type
	1	With ISA Standard G3 option
	0	Always 0
Option Code	/HKU	With HKU Interface (*4)

*1: CP471 operates with CENTUM VP R6.01 or later version of Control Function for Field Control Station. Be sure to apply the software patch for supporting CP471 for CENTUM VP R6.01, R6.02, R6.03, and R6.04. CP471 can be combined with the style code S3 or later of ESB bus coupler module EC401. See GS 33J60E30-01EN.
*2: Unavailable for ordering A2FV70S with CP461 due to the supply ends on October 19, 2019. Existing CP461 can be replaced with CP471. Replacement from CP461 to CP471 is prohibited to perform by a user. This replacement must be done by the service engineer authorized by Yokogawa Electric Corporation. CP471 can be combined with the style code S3 or later of ESB bus coupler module EC401. See GS 33J60E30-01EN.
*3: To meet the safety standards and EMC standards, the unit must be installed in a keyed metallic cabinet.
*4: When used in combination with A2CUKT3 for upgrading the current field control unit (AFE20☐, AFM20☐, AFH20☐, AFS20☐, or AFG20☐), specify the option code oh “/HKU.”

Duplexed field control unit

		Description
Model	A2FV70D	Duplexed Field Control Unit (for RIO System Upgrade, 19-inch Rack Mountable)
Suffix Codes	-A	Standard type (for CP471) (*1)
	-S	Standard type (for CP461) (*2)
	4	Dual-redundant Vnet/IP, dual-redundant power supply
	1	Always 1
	1	100 - 120 V AC power supply (*3)
	2	220 - 240 V AC power supply (*3)
	4	24 V DC power supply (*3)
	0	With no explosion protection
	0	Basic type
	1	With ISA Standard G3 option
	0	Always 0
Option Code	/HKU	With HKU interface (*4)

*1: CP471 operates with CENTUM VP R6.01 or later version of Control Function for Field Control Station. Be sure to apply the software patch for supporting CP471 for CENTUM VP R6.01, R6.02, R6.03, and R6.04. CP471 can be combined with the style code S3 or later of ESB bus coupler module EC401. See GS 33J60E30-01EN.
*2: Unavailable for ordering A2FV70D with CP461 due to the supply ends on October 19, 2019. Existing CP461 can be replaced with CP471. Replacement from CP461 to CP471 is prohibited to perform by a user. This replacement must be done by the service engineer authorized by Yokogawa Electric Corporation. CP471 can be combined with the style code S3 or later of ESB bus coupler module EC401. See GS 33J60E30-01EN.
*3: To meet the safety standards and EMC standards, the unit must be installed in a keyed metallic cabinet.
*4: When used in combination with A2CUKT3 for upgrading the current field control unit (AFE20☐, AFM20☐, AFH20☐, AFS20☐, or AFG20☐), specify the option code of “/HKU.”

■ ORDERING INFORMATION

Specify models, suffix codes, and option codes when ordering.

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2. A2CUKT3 Cabinet utility kit (for RIO System Upgrade)

■ GENERAL

A2CUKT3 is a kit for upgrading existing FCU cabinets, distribution boards of I/O expansion cabinets, and temperature monitoring functions of cabinets when upgrading the RIO system. The A2CUKT3 kit as well as FCU for the RIO System Upgrade and N-IO node units enables to utilize the existing assets when upgrading the control system. The hardware specifications of the A2CUKT3 are described in this section. Installation of the A2CUKT3 shall be performed by Yokogawa or its affiliate.

A2FV70□, ANB10□, ANB11□, and ANT10U can also be constructed by combining Base Plate, each module and so on. For detail, refer to “3. Field Control Station (RIO System Upgrade)”.

■ STANDARD SPECIFICATIONS

● Applicable Cabinet

For A2CUKT3-C□□□ (For FCU with Cabinet)

Category	Field Control Unit (for V net and RIO, with Cabinet)				
Model	AFE20S	AFM20S	AFH20S	AFS20S	AFG20S
	AFE20D	AFM20D	AFH20D	AFS20D	AFG20D

Note: Ordering of the A2FV70□/HKU is required for upgrading the field control unit.

For A2CUKT3-N□□□ (For I/O expansion cabinet)

Category	I/O Expansion Cabinet
Model	ACB21 (*1)

*1: Except for ACB21-S3000

● Components of the cabinet utility kit

Table Main parts of A2CUKT3 (1/2)

Parts Classfication / Parts Names / supplementation	Quantity L;Left :Qty R;Right :Qty	Power supply voltage	Parts No. A2CUKT3-C□□□ (FCU with cabinet)	Parts No. A2CUKT3-N□□□ (For I/O expansion cabinet)	Remarks
Power distribution					
Main power distribution board	L:1 R:1(When a dual power supply suffix seledted)	100 VAC	S9100FE		
		220 V AC	S9121FE		
		24 V DC	S9101FE		
FCU power distribution board					
For front side	L:1 R:1	100 V AC	S9106FE	—	
		220 V AC	S9107FE	—	
		24 V DC	S9108FE	—	
Node power distribution board					
For front side	L:1 R:1	100 V AC	—	S9104FE	
		220 V AC	—		
		24 V DC	—	S9105FE	
For rear side	L:1 R:1	100 V AC	S9122FE		
		220 V AC			
		24 V DC	S9123FE		

Note: “HKU” stands for a House Keeping Unit.

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Table Main parts of A2CUKT3 (2/2)

Parts Classfication	Parts Names	Quantity L;Left :Qty R;Right :Qty	Power supply voltage	Parts No. A2CUKT3-C□□□ (FCU with cabinet)	Parts No. A2CUKT3-N□□□ (For I/O expansion cabinet)	Remarks
Grounding cable						
	Between grounding bars	1 / 1	—	S9997UV / S9998UV		
	Between main power distribution board and grounding bar	1 / 1	—	S9995UV / S9996UV (When Dual power supply suffix seledted)		
House Keeping						
HKU interface unit		1	—	S9102FE	S9124FE or S9103FE (*1)	
HKU (for I/O expansion cabinet)		1	—	—	S9113FE	Not provided when "/NHKU" is selected.
FCU fan unit (with a built-in HKU)		1	100 V AC	S9109FE	—	4 units of fan unit for FCU fan unit is included.
			220 V AC			
			24 V DC	S9110FE	—	
Door fan frame						
	For Front side	1	—	S9320UK		
	For Rear side	1	—	S9327UK		
Door fan cable						
	For Front side	1	—	S9898UV		
	For Rear side	1	—	S9899UV		
Fan power supply unit		1	100 V AC	—	S9111FE	
			220 V AC			
			24 V DC		S9112FE	
Junction adaptor		1	100 V AC	—	S9114FE	Relays the power line between the main power distribution board and fan power supply unit.
			220 V AC			
			24 V DC		S9115FE	
Thermistor		1	—	S9090UG		
Thermistor cable		1	—	S9999UV		

Note: "HKU" stands for a House Keeping Unit.
*1: Use 9124FE when option code of "/NHKU" is selected and S9103FE for other cases.

● READY Contact Output

A2CUKT3-C□□□ (FCU with Cabinet): 3 terminals (NC, NO, and C)
Contact Rating:
Rated voltage: 250 V AC/30 V DC or less
Rated current: 2 A
Rated power: 125 VA or less

● Power supply voltage

100-120 V AC, Frequency: 50/60 Hz
220-240 V AC, Frequency: 50/60 Hz
24 V DC
Specify with the Suffix Code.

● Power Consumption

A2CUKT3-C□□□ (With FCU and the maximum number of front and rear nodes are installed)
For 100-120 V AC: 1700 VA
For 220-240 V AC: 2000 VA
For 24 V DC: 50 A
A2CUKT3-N□□□ (When the maximum number of front and rear nodes is installed)
For 100-120 V AC: 1600 VA
For 220-240 V AC: 1700 VA
For 24 V DC: 42 A

● Connection terminal

Power Supply: M6 screw terminal connection
Contact Output: M4 screw terminal connection

● Weight

A2CUKT3-C□□□, Approx. 24 kg
A2CUKT3-N□□□, Approx. 16 kg

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■ EXAMPLE OF UPGRADING CABINET

● **A2CUKT3-C□□□ (For FCU with Cabinet)**

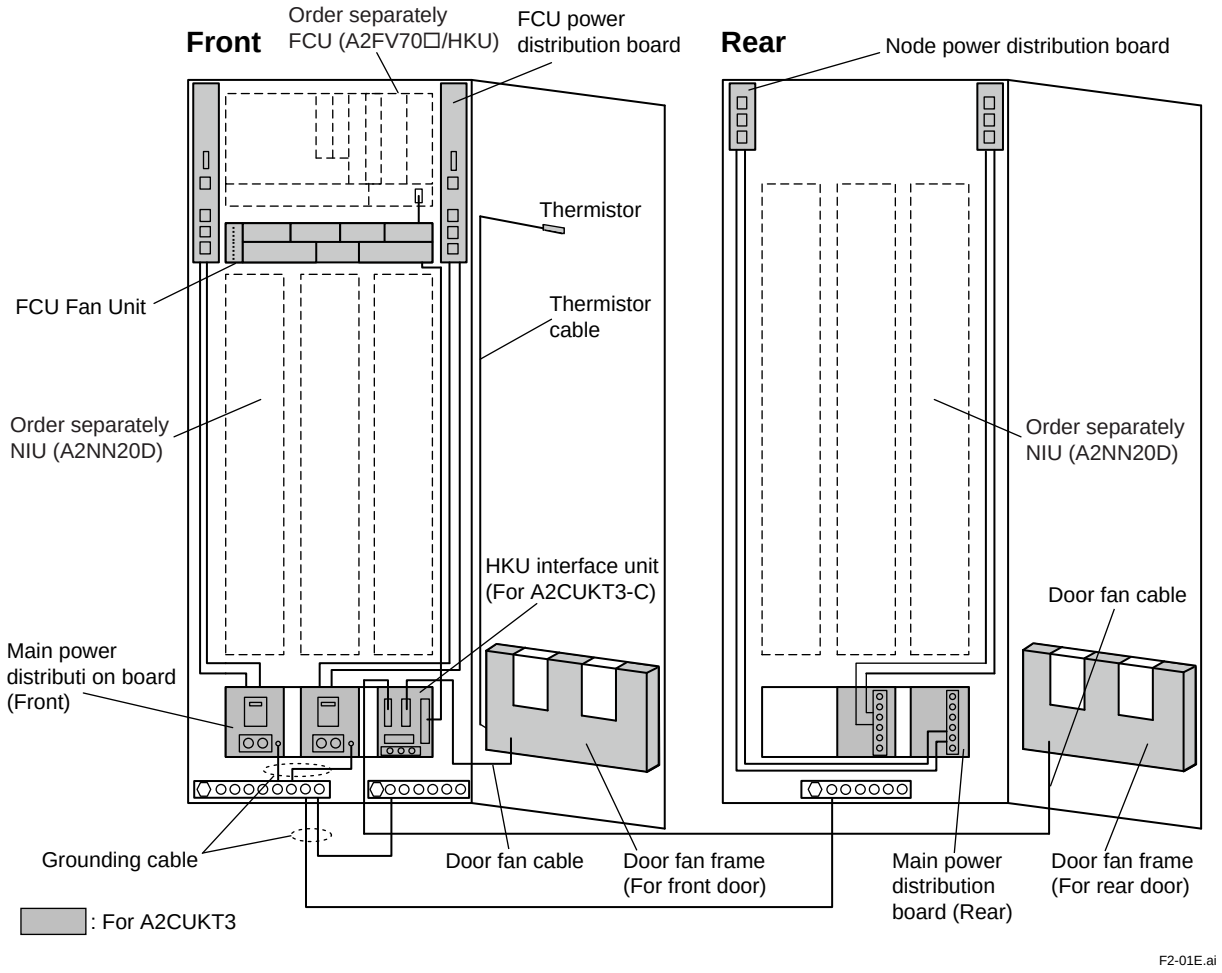

Figure Upgrading FCU with cabinet using A2CUKT3-C□□□

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● A2CUKT3-N□□□ (For I/O Expansion Cabinet)

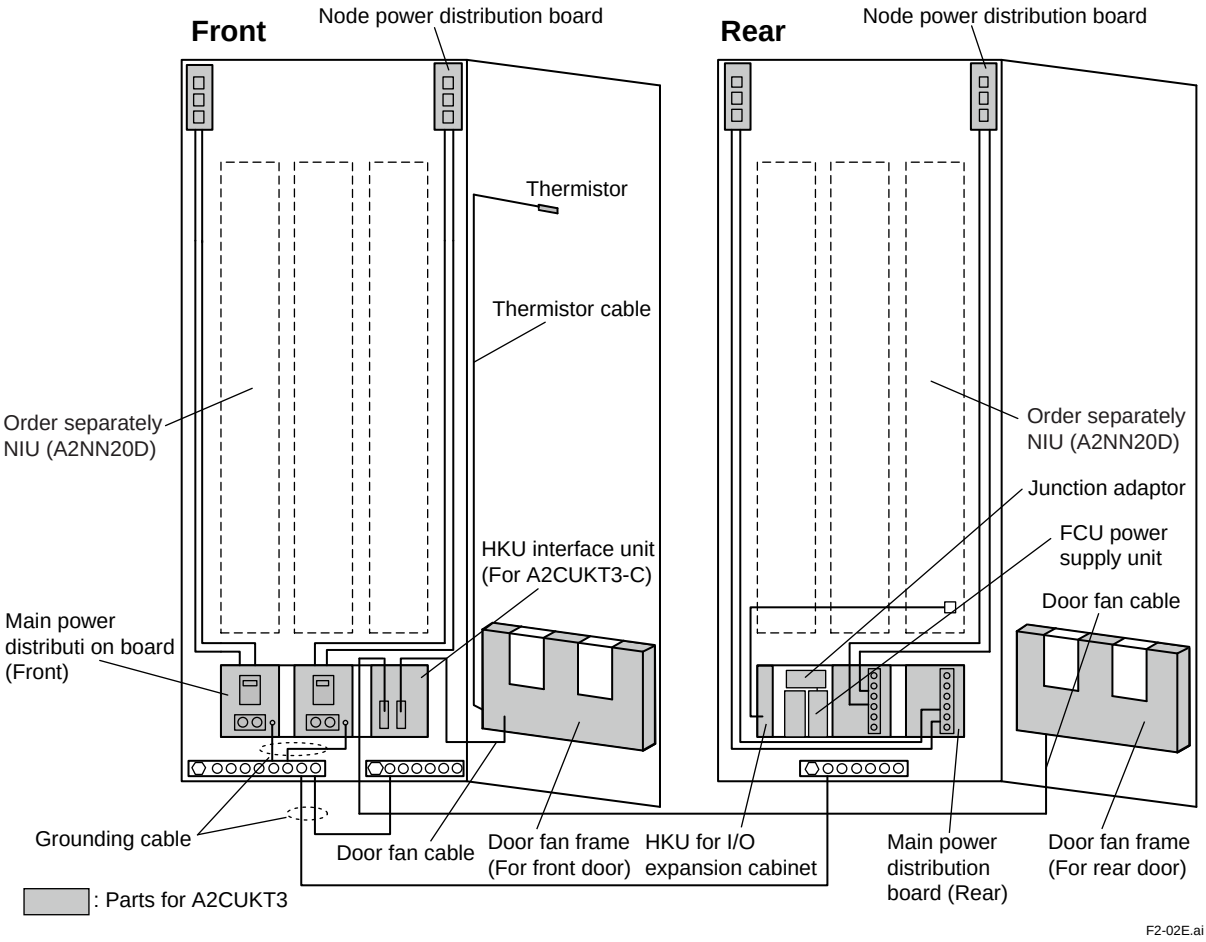

Figure Upgrading I/O expansion cabinet with A2CUKT3-N□□□

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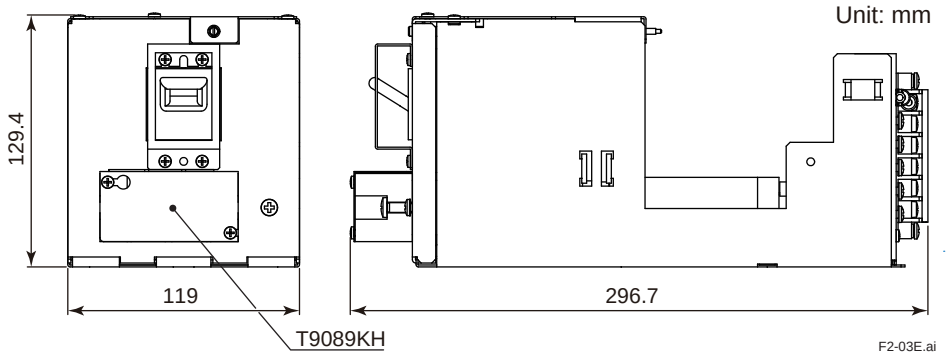
■ EXTERNAL DIMENSIONS

● Main power distribution board

AC



DC

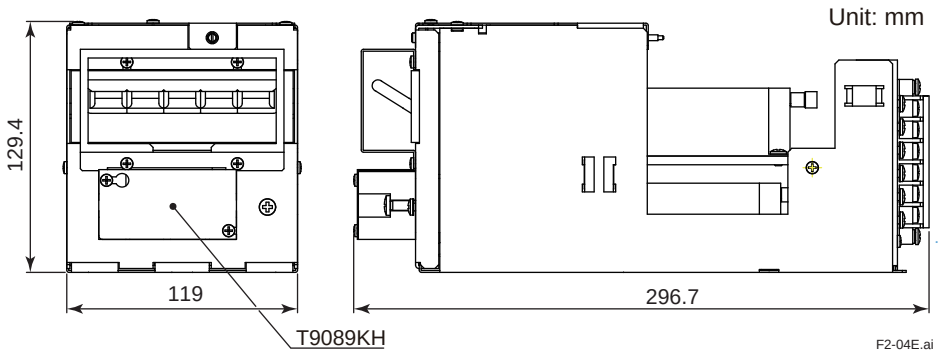


Figure Main power distribution board

● HKU interface unit

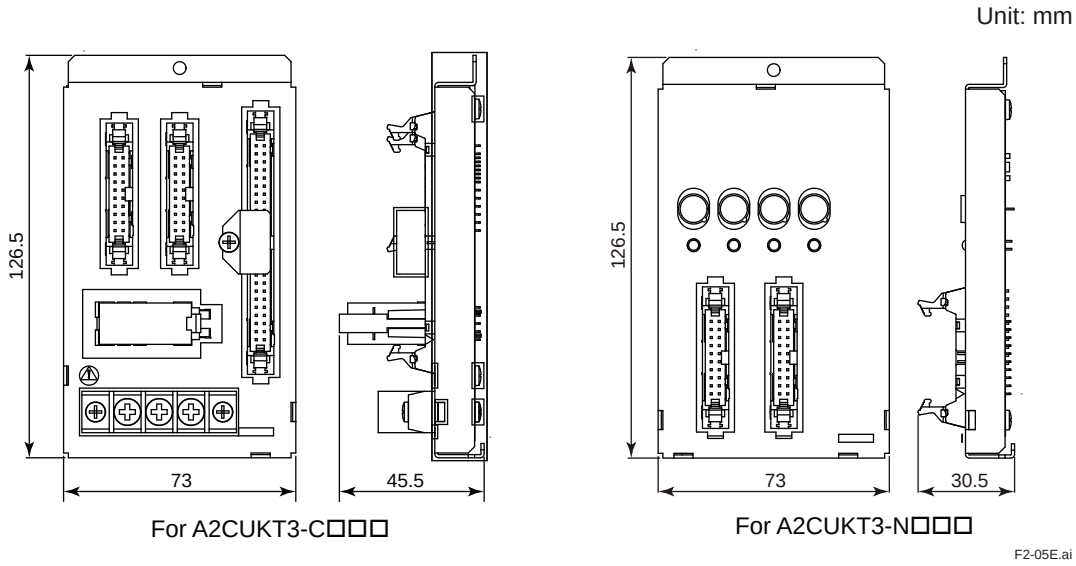


Figure HKU interface unit

Nominal tolerance:

Nominal tolerance is ± 0.8 mm for the dimensions of 0.5 mm or more and 120 mm or less, and the combined nominal tolerance is ± 1.5 mm.

The nominal tolerance is in accordance with JEM 1459 for the dimensions over 120 mm.

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● Node power distribution board

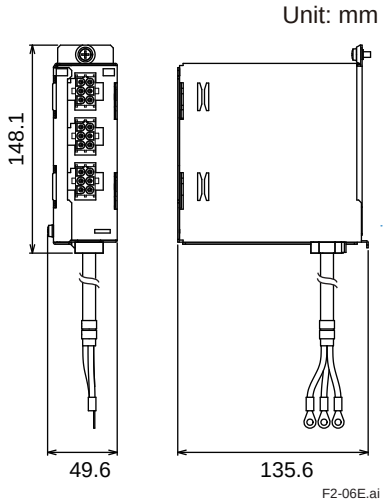

Figure Node power distribution board

● FCU power distribution board

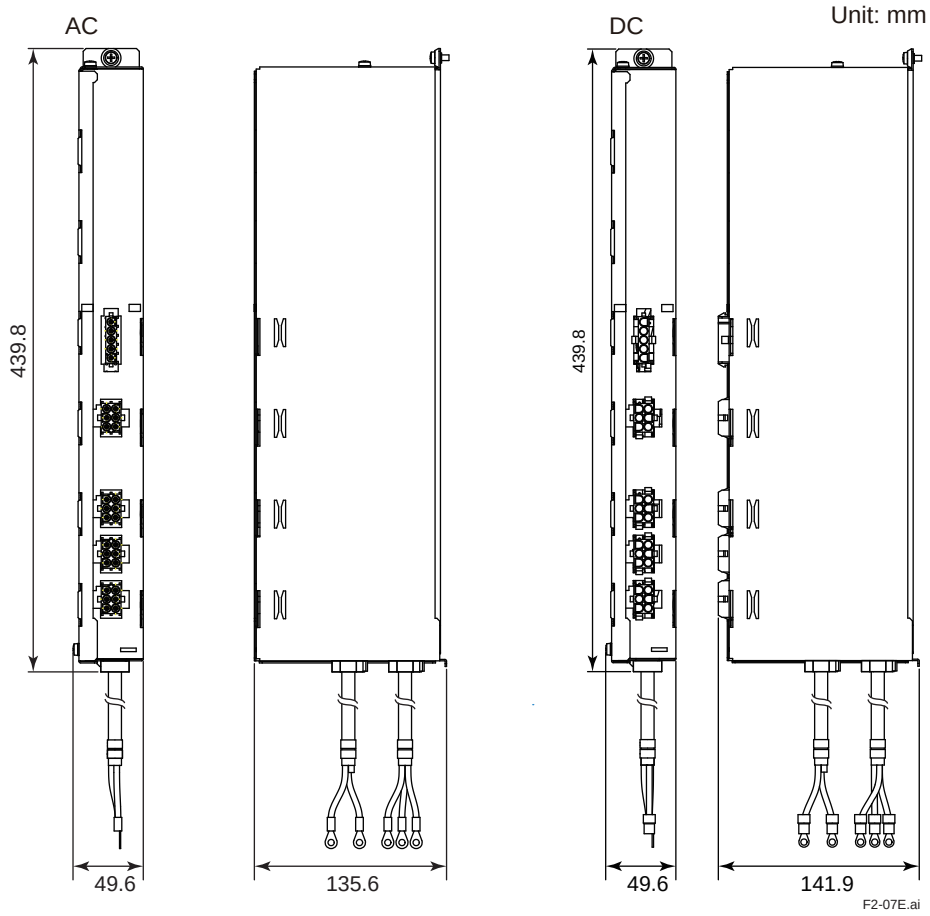

Figure FCU power distribution board (for A2CUKT3-C□□□ only)

Nominal tolerance:

Nominal tolerance is ± 0.8 mm for the dimensions of 0.5 mm or more and 120 mm or less, and the combined nominal tolerance is ± 1.5 mm.

The nominal tolerance is in accordance with JEM 1459 for the dimensions over 120 mm.

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● FCU fan unit (with a built-in HKU)

Unit: mm

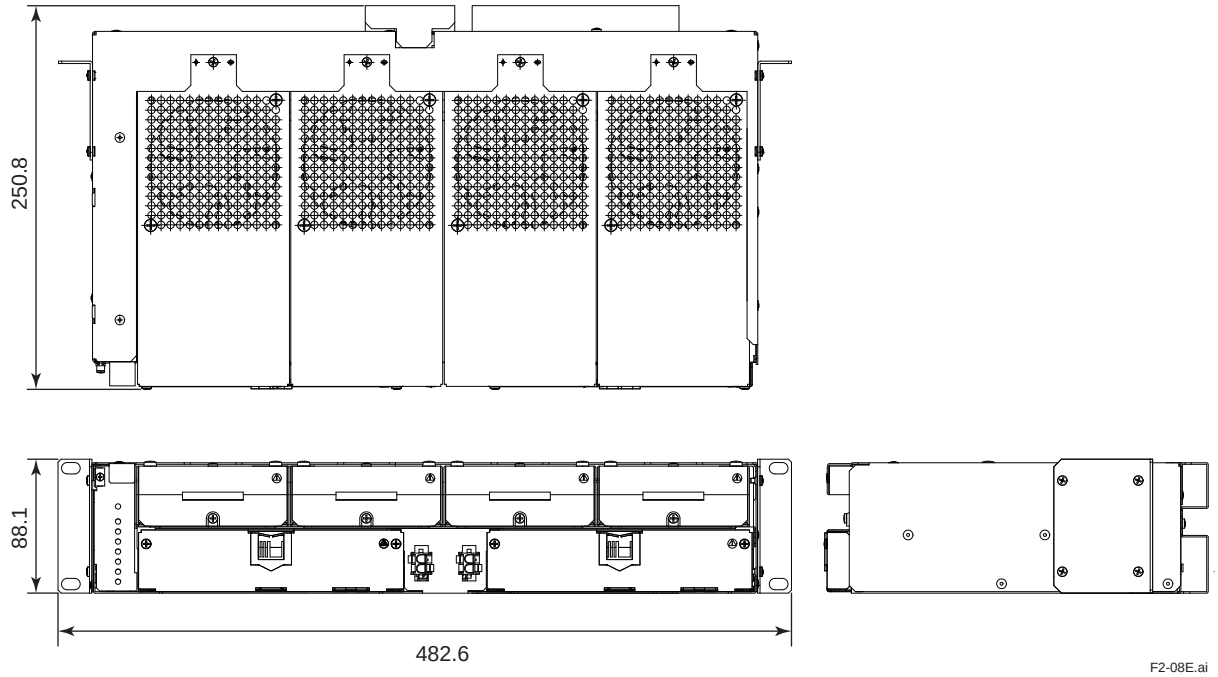

Figure FCU fan unit (with a built-in HKU) (for A2CUKT3-C□□□ only)

● Fan power supply unit

Unit: mm

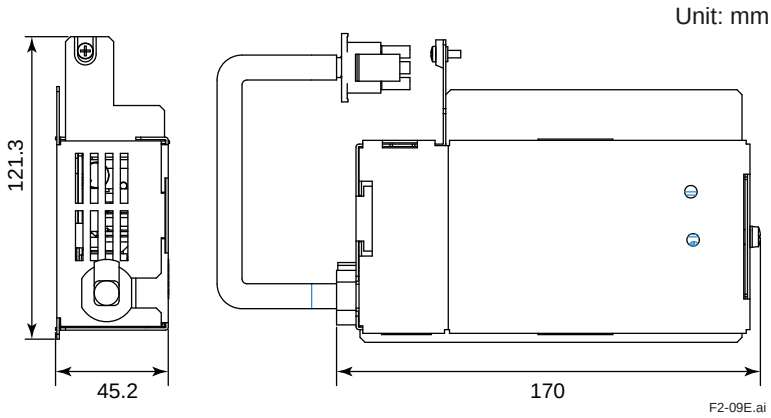

Figure Fan power supply unit (for A2CUKT3-N□□□ only)

Nominal tolerance:

Nominal tolerance is ± 0.8 mm for the dimensions of 0.5 mm or more and 120 mm or less, and the combined nominal tolerance is ± 1.5 mm.

The nominal tolerance is in accordance with JEM 1459 for the dimensions over 120 mm.

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● HKU (for I/O expansion cabinet)

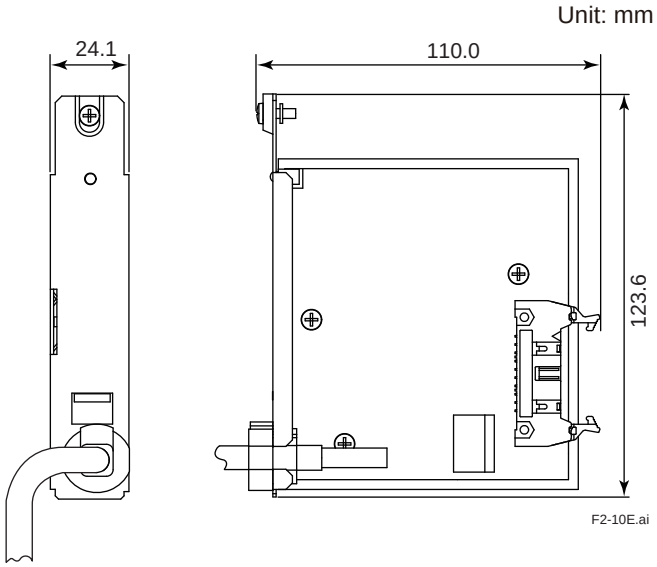

Figure HKU for I/O expansion cabinet (for A2CUKT3-N□□□ only)

● Door fan flame (for I/O expansion cabinet)

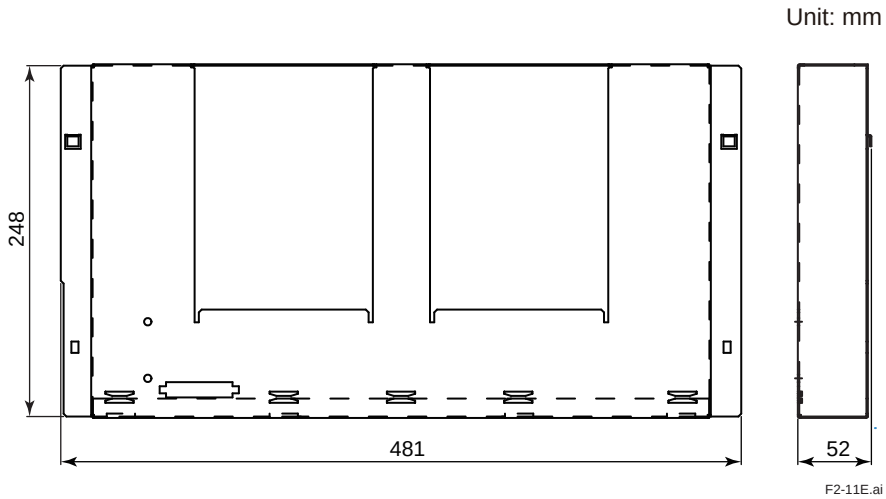

Figure Door fan flame

Nominal tolerance:

Nominal tolerance is ± 0.8 mm for the dimensions of 0.5 mm or more and 120 mm or less, and the combined nominal tolerance is ± 1.5 mm.

The nominal tolerance is in accordance with JEM 1459 for the dimensions over 120 mm.

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● **Junction adaptor (for I/O expansion cabinet)**

Unit: mm

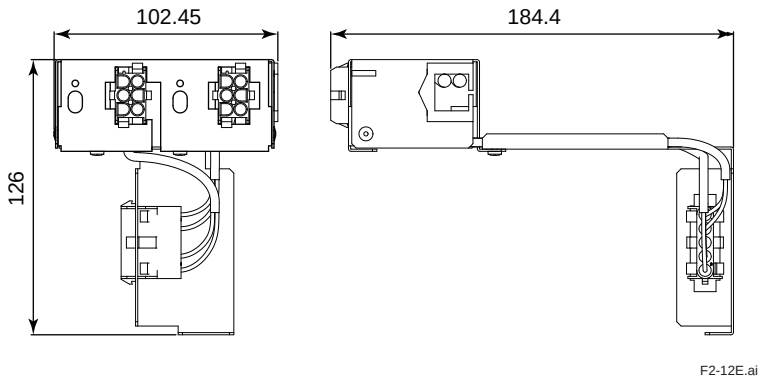

Figure Junction adaptor (for A2CUKT3-N□□□ only)

Nominal tolerance:

Nominal tolerance is ± 0.8 mm for the dimensions of 0.5 mm or more and 120 mm or less, and the combined nominal tolerance is ± 1.5 mm.
The nominal tolerance is in accordance with JEM 1459 for the dimensions over 120 mm.

■ STANDARD ACCESSORIES

Table Accessories for A2CUKT3

Part Name	Part Number	Quantity	Remarks
Bolt	G9307EM	4 pcs	M5
Nut	S9062PB	8 pcs	M5
Band	B1003JB	16 pcs	—
Band	S9072PB	6 pcs	—

■ SOFTWARE

The A2CUKT3 is supported by CENTUM VP R6.03 or later.

■ MODEL AND SUFFIX CODES

Cabinet Utility Kit (for RIO System Upgrade)

		Description
Model	A2CUKT3	Cabinet Utility Kit (for RIO System Upgrade)
Suffix Codes	-C	For FCU with Cabinet (for A2FV70□/HKU)
	-N	For I/O Expansion Cabinet (for ACB21)
	1	Single power source
	2	Dual power sources
	1	100 - 120 V AC power supply
	2	220 - 240 V AC power supply
	4	24 V DC power supply
	0	Basic type
Option Code	/NHKU	Without HKU interface (*1)

Note: When upgrading the existing field control unit (AFE20□, AFM20□, AFH20□, AFS20□, or AFG20□), specify "/HKU" on ordering A2FV70□.

*1: "/HKU" can be selected in combination with the suffix code of "-N□□0".

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■ ORDERING INFORMATION

When the A2FV70☐ field control unit is used in combination with the A2CUKT3 kit, specify the option code of "/HKU" when ordering the A2FV70☐.

When directly connecting the HKU (for I/O expansion cabinet) of the A2CUKT3-N with A2NN20D node interface unit, the suffix code of "-☐☐5" is required for ordering so that a connector for HKU is provided.

■ RELATED PRODUCTS

The following products are not included in the A2CUTK3. Please orders of these models/parts separately as necessary.

Product name	Model/Part no.
Fan unit	AIP601
Air filter	T9070CB

The following part is included in the A2CUTK3 as a standard accessory, however, in case a spare part is required, place an order by the following model/part no.

Product name	Model/Part no.	Note
Terminal cover of main power distribution board	T9089KH	—
Power supply unit for FCU fan (100 - 120 V AC / 220 - 240 V AC)	S9976FA	for A2CUKT3-C☐☐☐
Power supply unit for FCU fan (24 V DC)	S9977FA	
Fan unit for FCU fan	S9978FA	
Fan power supply unit (100 - 120 V AC / 220 - 240 V AC)	S9111FE	for A2CUKT3-N☐☐☐
Fan power supply unit (24 V DC)	S9112FE	

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3. Field Control Station (RIO System Upgrade)

■ INSTALLATION ENVIRONMENT

The following shows the applicable products and installation environment specifications.

Field Control Unit (*1)
Node Interface Unit: A2NN10D, A2NN20D
Cabinet Utility Kit: A2CUKT3

*1: For detail, refer to "■Field Control Unit (for RIO System Upgrade) ".

Item		Specifications
Ambient temperature	Normal operating	0 to 50 °C
	Transporting	-20 to 60 °C
Ambient humidity	Normal operating	5 to 95% RH (no condensation)
	Transporting	5 to 95% RH (no condensation)
Ambient temperature change rate	Normal operating	Within ± 10 °C/h
	Transporting	Within ± 20 °C/h
Power supply	Voltage range	100 - 120 V AC ±10% 220 - 240 V AC ±10% 24 V DC ±10%
	Frequency	50/60 ±3 Hz
	Distortion factor	10 % or less
	Peak value	125 V or more (100 V system) 274 V or more (220 V system)
	Instantaneous power failure	20 ms or less (when receiving rated AC voltage)
	DC power supply ripple rate	1 % p-p or less
	Withstanding voltage (between input and FG terminal)	1500 V AC for 1 minute (100 V /220 V AC system) 500 V AC for 1 minute (24 V DC system)
	Insulation resistance (between input and FG terminal)	20 MΩ at 500 V DC
Grounding		The ground suitable for the power distribution system of the country or region has to be used for protective grounding system.
Dust		0.3 mg/m^3 or less
Corrosive gas		ANSI/ISA S71.04 G2
Vibration	Continuous vibration	Displacement amplitude 0.25 mm or less (1 to14 Hz) Acceleration 2.0 m/s^2 or less (14 to 100 Hz)
	Earthquake	Acceleration 4.9 m/s^2 or less
	Transport vibration	Horizontal: 4.9 m/s^2 or less, vertical: 9.8 m/s^2 or less, Vertical: 9.8 m/s^2 or less (packed state)
Shock	Transport shock	Horizontal: 49.0 m/s^2 or less, Vertical: 98 m/s^2 or less (packed state)
Noise	Electric field	3 V/m or less (26 M-1 GHz) 3 V/m or less (1.4 GHz - 2.0 GHz) 1 V/m or less (2.0 GHz - 2.7 GHz)
	Magnetic field	30 A/m or less (AC), 400 A/m or less (DC)
	Static electricity	4 kV or less (contact discharge), 8 kV or less (aerial discharge)
Altitude		2000 m or less

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The following shows the main applicable products and installation environment specifications.
They are supported by CENTUM VP R6.04 or later.

Node Interface Unit:	A2NN30D
Base Plates for N-IO I/O:	A2BN4D, A2BN5D
24 V DC Output Power Supply Unit:	A2PW503, A2PW504

Item		Specifications
Ambient temperature	**Normal operating**	0 to 60°C :A2NN30D, A2PW503, A2PW504 -20 to 60°C :A2BN4D (*1) -20 to 70°C :A2BN5D (*1) (*2) -40 to 70°C :temperature option for A2NN30D (*3), A2PW503, A2PW504
	Transporting/storing	-20 to 60 °C (A2BN3D, A2NN30D, A2PW503, A2PW504, avoid direct sunlight) -40 to 85 °C (A2BN4D (*1), A2BN5D (*1), temperature option for A2NN30D (*3), A2PW503, A2PW504, avoid direct sunlight)
Ambient humidity	**Normal operating**	5 to 95 %RH (should have no condensation)
	Transporting/storing	5 to 95 %RH (should have no condensation)
Ambient temperature change rate	**Normal operating**	Within ±10 °C/h
	Transporting/storing	Within ±20 °C/h
Power supply (*4) (*5)	**Voltage range**	100 to 120 V AC -15 to +10 % 220 to 240 V AC -15 to +10 % 24 V DC -15 to +20 %
	Frequency	50/60 ±3 Hz
	Distortion factor	10 % or less
	Peak value	118 V or more (100 V system) 258 V or more (220 V system)
	Instantaneous power failure	20 ms or less (when receiving rated AC voltage)
	DC power supply ripple rate	1 % p-p or less
Grounding		The ground suitable for the power distribution system in the country or region has to be used for protective grounding system.
Dust		0.3 mg/m^3 or less
Corrosive gas		ANSI/ISA S71.04 G2 (standard) ANSI/ISA S71.04 G3 (For A2BN4D and A2BN5D: standard) (For others: environment-proof support (temperature environment support, G3 support) options)
Vibration	**Continuous vibration**	Displacement amplitude 1.75 mm or less (5 to 8.4 Hz) Acceleration 4.9 m/s^2 or less (8.4 to 150 Hz)
	Non-continuous vibration	Displacement amplitude 3.5 mm or less (5 to 8.4 Hz) Acceleration 9.8 m/s^2 or less (8.4 to 150 Hz)
	Earthquake	Acceleration 4.9 m/s^2 or less
	Transport vibration	Horizontal 4.9 m/s^2 or less, vertical 9.8 m/s^2 or less (packed state)
Shock	**Transport shock**	147 m/s^2 or less, 11 ms
Noise	**Electric field**	10 V/m or less (80 MHz to 1.0 GHz) 3 V/m or less (1.4 to 2.0 GHz) 1 V/m or less (2.0 to 2.7 GHz)
	Magnetic field	30 A/m or less (AC), 400 A/m or less (DC)
	Static electricity	4 kV or less (contact discharge), 8 kV or less (aerial discharge)
Altitude		3000 m or less (*6) 2000 m or less (A2BN4D, A2BN5D)

*1: To use A2BN4D or A2BN5D at -20 to 0°C, specify the temperature environment support option for the I/O modules to be mounted. The environment in which A2BN4D or A2BN5D is used depends on the specifications of the barrier mounting to A2BN4D or A2BN5D.

*2: The maximum ambient temperature specifications for A2BN5D depend on style code and compliance criteria.For details, refer to GS 33J01A10-01EN “Integrated Production Control System CENTUM VP System Overview”.

*3: To maintain A2NN30D with the temperature environment support option (at -40 to 70°C), specify the temperature environment support option for the power supply units and N-ESB bus modules as well.

*4: Power supply specifications in the case of the Node Interface Unit (A2NN30D) installed in N-IO Node.

*5: For the power supply specifications for 24 V DC Output Power Supply Units (A2PW503 and A2PW504), refer to the GS “24 V DC Output Power Supply Units” (GS 33J62K51-01EN).

*6: When the Node Interface Unit (A2NN30D) with the following optical ESB bus specifications is used at an altitude of 2000 m or higher, the ambient temperature range is -40 to 60°C.

A2NN30D- □□□□□ 01 □□ A2NN30D- □□□□□ 02 □□ A2NN30D- □□□□□ 10 □□
A2NN30D- □□□□□ 11 □□ A2NN30D- □□□□□ 12 □□ A2NN30D- □□□□□ 20 □□
A2NN30D- □□□□□ 21 □□ A2NN30D- □□□□□ 22 □□

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■ COMMUNICATION SPECIFICATIONS

Item	CENUTM CS/CS1000/ CS3000/VP RIO system	CENTUM VP for RIO System Upgrade		
Bus type	RIO Bus	N-ESB Bus	Optical ESB Bus	ESB Bus
Number of connectable nodes (/FCU)	RIO node: Max. 8	N-IO node (*1): Max. 8		—
		—	FIO Node Unit (for dual-redundant ESB Bus) (*2): Max. 8	
Network topology	Chain connection only	Star connections: Max. 8 lines Chain connections: Max. 8 rows (*3)	Star connections: Max. 8 lines Chain connections: Max. 2 rows (*3)	Star connections: Max. 2 lines Chain connections: Max. 8 rows
Transmission redundancy	Dual-redundant or Single	Dual-redundant only	Dual-redundant only	Dual-redundant only
Transmission speed	2 Mbps	100 Mbps	192 Mbps	128 Mbps
Transmission cable	Twisted pair cableC or Optical fiber cable	UTP straight cable of CAT5e	Optical fiber cable	Dedicated cable (YCB301)
Transmission distance	Twisted pair cable : Max. 750 m Optical fiber cable : Max. 4 km	Max. 100 m	Max. 50 km	Max. 10 m

*1: An N-IO node refers to an I/O node consisting of a Node Interface Unit (for RIO system upgrade) [A2NN10D, A2NN20D, A2NN30D].
*2: FIO Node Unit (for dual-redundant ESB Bus) refers to Optical ESB Bus Node Unit(for dual-redundant Optical ESB Bus) or ESB Bus Node Unit (for dual-redundant ESB Bus). For detail, refer to "■FIO Node Unit(for dual-redundant ESB Bus)".
*3: If the N-ESB bus / optical ESB bus communication module (relay function) stops operating due to a power failure or the like, communication with the N-IO node connected thereafter stops. If there is a possibility that power distribution to some nodes during chain connection may be lost, such as when the power supply system is different, please make a star connection.

Cable Specifications

UTP straight cable:
Connector: RJ45 connector (ISO/IEC8877 compliant)
Recommended cable: CAT5e (enhanced category 5) or better (ANSI Standard TIA/EIA-568-B compliant)

Optical fiber cable:

		Optical fiber specifications
Optical connector type		LC (compliant with IEC61754-20)
Max. Permissible Optical Loss	**5 km**	0 to 10 dB@1.3 µm
	5-50 km	3 to 16 dB@1.55 µm (*1)
Optical fiber	**Type**	Quartz single-mode optical fiber (*2)
	Required number of cores	2
	Max. Length	50 km

*1: When the optical attenuation in the following connections is less than 3 dB, use an attenuator to reduce the attenuation by 3 dB.
Between ANT411-□E and A2NN10D-□□□□□2□□□
Between ANT411-□F and A2NN10D-□□□□□2□□□
Between A2NN10D-□□□□□□2□□ and A2NN10D-□□□□□2□□□
Between A2NN10D-□□□□□□2□□ and ANT512-□E
Between A2NN10D-□□□□□□2□□ and ANT512-□F

Between ANT411-□E and A2NN20D-□□□□□2□□□
Between ANT411-□F and A2NN20D-□□□□□2□□□
Between A2NN20D-□□□□□□2□□ and A2NN20D-□□□□□2□□□
Between A2NN20D-□□□□□□2□□ and ANT512-□E
Between A2NN20D-□□□□□□2□□ and ANT512-□F
*2: JIS C 6835 SSMA -9.3/125 or IEC 60793-2-50 B1.1 type

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■ Field control unit (for N-IO)

The following types of field control units (for RIO System Upgrade) are available.

A2FV70S: Field control unit (for RIO System Upgrade, 19-inch Rack Mountable)

A2FV70D: Duplexed field control unit (for RIO System Upgrade, 19-inch Rack Mountable)

For details, refer to “1. A2FV70S/A2FV70D Field Control Unit (for RIO System Upgrade)”.

FCU can also be constructed by combining the following models. Apply Control Function VP6F1900 (for AFV70□) to FCU constructed by the following models, it can be used as FCU (for RIO System Upgrade).

Model	Name	GS No.
A2BE1D	Base Plate (for FCU)	GS 33J60E60-01EN
A2FU1	HKU Interface Unit	GS 33J60E60-01EN
A2FU2	Primary Power Distribution Unit	GS 33J60E60-01EN
PW481, PW482, PW484	Power Supply Module	GS 33J60E70-01EN
CP471	Processor Module	GS 33J60E30-01EN

These models can be ordered individual or as a set. Refer to GS 33J01N20-01EN for details of the model for ordering multi-product. Refer to the GS of each individual model for the functions and the installation of modules on the Base Plate.

■ FIO NODE UNIT (FOR DUAL-REDUNDANT ESB BUS)

Optical ESB Bus Node Unit (for dual-redundant Optical ESB Bus)
ESB Bus Node Unit(for dual-redundant ESB Bus)

Power supply modules, bus interface modules, and communication modules are installed in a FIO node unit. The following

types are available.

ANB11D:Optical ESB Bus Node Unit(for dual-redundant Optical ESB Bus)
ANB10DESB Bus Node Unit(for dual-redundant ESB Bus)

FIO Node Unit(for dual-redundant ESB Bus) can also be constructed by combining the following models.

Model	Name	GS No.
A2BE2D	Base Plate (for FIO)	GS 33J60G30-01EN
PW481, PW482, PW484	Power Supply Module	GS 33J60E70-01EN
Bus Interface Module		
SB401	ESB Bus Slave Interface Module	GS 33J60G40-01EN
A2EE1A	ESB Bus Adapter (for SB401)	GS 33J60G40-01EN
ANT502	Optical ESB Bus Repeater Module (for 5 km)	GS 33J60F51-01EN
ANT512	Optical ESB Bus Repeater Module (for 50 km)	GS 33J60F52-01EN
A2EE3A	ESB Bus Adapter (for ANT5□2)	GS 33J60F51-01EN GS 33J60F52-01EN

These models can be ordered individual or as a set. Refer to GS 33J01N20-01EN for details of the model for ordering multi-product. Refer to the GS of each individual model for the functions and the installation of modules on the Base Plate.

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■ Optical ESB Bus Repeater Unit

Power supply modules and optical ESB bus repeater modules are installed in Optical ESB Bus repeater Unit.
For details, refer to the GS “Unit for optical ESB bus repeater modules (for N-IO/FIO)” (GS 33J60F50-01EN).
Optical ESB Bus Repeater Unit can also be constructed by combining the following models.

Model	Name	GS No.
A2BE2D	Base Plate (for FIO)	GS 33J60G30-01EN
PW481, PW482, PW484	Power Supply Module	GS 33J60E70-01EN
Optical ESB Bus Repeater Module		
ANT401,ANT502	Optical ESB Bus Repeater Module (for 5 km)	GS 33J60F51-01EN
ANT411,ANT512	Optical ESB Bus Repeater Module (for 50 km)	GS 33J60F52-01EN
A2EE2A	ESB Bus Adapter (for ANT4□1)	GS 33J60F51-01EN GS 33J60F52-01EN
A2EE3A	ESB Bus Adapter (for ANT5□2)	GS 33J60F51-01EN GS 33J60F52-01EN

These models can be ordered individual or as a set. Refer to GS 33J01N20-01EN for details of the model for ordering multi-product. Refer to the GS of each individual model for the functions and the installation of modules on the Base Plate.

■ INSTALLATION OF COMMUNICATION MODULE AND BUS INTERFACE MODULE

When installing a communication module or a bus interface module FIO Node Unit (for dual-redundant ESB Bus) or Optical ESB Bus Repeater Unit, refer to the GS of “N-IO System Overview” (GS33J62A10-01EN).

4. Applicable Standards

Refer to the General Specifications of “Integrated Production Control System CENTUM VP System Overview” (GS 33J01A10-01EN).

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