

# General Specifications

GS 33J60F52-01EN

ANT411, ANT512, A2EE2A, A2EE3A  
Optical ESB Bus Repeater Modules  
for 5 km to 50 km (for N-IO/FIO)  
ESB Bus Adapter(for ANT4□1)  
ESB Bus Adapter(for ANT5□2)



[Release 6]

## ■ GENERAL

The Optical ESB Bus Repeater Module for 5 km to 50 km converts the ESB bus to an optical signal and transmits it. The ESB bus transmission distance can be extended within the range from 5 km to 50 km by connecting the ANT411 Optical ESB Bus Repeater Master Module and ANT512 Optical ESB Bus Repeater Slave Module with an optical fiber cable.

The ESB bus transmission distance can be extended within the range of 5 km to 50 km by connecting the ANT411 Optical ESB Bus Repeater Master Module to A2EN501 N-ESB Bus Repeater Slave Module and A2EN501 N-ESB Bus Repeater Slave Module to ANT512 Optical ESB Bus Repeater Slave Module with an optical fiber cable.

### ● ANT411 Optical ESB Bus Repeater Master Module for 5 km to 50 km

This module can be installed in the Field Control Unit, FIO Node Unit (ESB Bus Node Unit, Optical ESB Bus Node Unit) and Optical ESB Bus Repeater Unit.

To connect ANT411 to ESB Bus, ANT411 requires the ESB Bus Adapter “Connector unit for ESB Bus” (A2EE2A-N).

To terminate ESB Bus at ANT411, ANT411 requires the ESB Bus Adapter “Connector unit with terminator for ESB Bus” (A2EE2A-T). The ESB Bus Adapter A2EE2A should be ordered separately.

### ● ANT512 Optical ESB Bus Repeater Slave Module for 5 km to 50 km

ANT512 is installed as standard in Optical ESB Bus Node Unit as a slave module of the optical ESB bus. It can also be installed in Optical ESB Bus Repeater Unit.

To connect ANT512 to ESB Bus, ANT512 requires the ESB Bus Adapter “Connector unit for ESB Bus” (A2EE3A-N□).

To terminate ESB Bus at ANT512, ANT512 requires the ESB Bus Adapter “Connector unit with terminator for ESB Bus” (A2EE3A-T□).

To monitor the temperatures and fans in the cabinet, specify “With HKU interface” (A2EE3A-□H).

The ESB Bus Adapter A2EE3A should be ordered separately.

### ● Installation Position

The following table shows the units and numbers of slots in which the ANT411 and the ANT512 can be installed.

For the installation positions corresponding to the slot numbers, see “FIO System Overview” (GS 33J60A10-01EN), “N-IO System Overview” (GS 33J62A10-01EN), and “Field Control Unit, Cabinet Utility Kit (for RIO System Upgrade)” (GS 33J64E10-01EN).

Table ANT411 Optical ESB Bus Repeater Master Module for 5 km to 50 km

	Installable Unit and Slot Number		
	FCU Base Plate(for FCU)	FIO Node Unit Base Plate(for FIO)	Optical ESB Bus Repeater Unit Base Plate(for FIO)
	AFV30□, AFV40□, A2FV50□, A2FV70□, A2BE1D	ANB10□, ANB11□, A2BE2D (*3)	ANT10U, A2BE2D (*3)
Single configuration (*1)	IO1, 3, 5	IO1, 3, 5, 7	IO1, 3, 5, 7, B1
Dual-redundant configuration (*2)	IO1 to 6	IO1 to 8	IO1 to 8, B1, 2

\*1: A dummy cover is to be attached to the even-numbered slot of a pair of slots in which the module is installed.

\*2: Install the module in the slots with the following numbers: IO1-2, IO3-4, IO5-6, IO7-8, and B1-2

\*3: Base plate A2BE2D constitutes FIO node unit (ESB Bus Node Unit, Optical ESB Bus Node Unit) or Optical ESB bus repeater unit with each function modules. Refer to “A2BE2D Base Plate (for FIO)” (GS 33J60G30-01EN) for detail.

Table ANT512 Optical ESB Bus Repeater Slave Module for 5 km to 50 km

	Installable Unit and Slot Number	
	Optical ESB Bus Node Unit Base Plate (for FIO)	Optical ESB Bus Repeater Unit Base Plate (for FIO)
	ANB11□, A2BE2D (*3)	ANT10U, A2BE2D (*3)
Single configuration (*1)	B1	IO1, 3, 5, 7, B1
Dual-redundant configuration (*2)	B1, 2	IO1 to 8, B1, 2

- \*1: A dummy cover is to be attached to the even-numbered slot of a pair of slots in which the module is installed.  
 \*2: Install the module in the slots with the following numbers: IO1-2, IO3-4, IO5-6, IO7-8, and B1-2  
 \*3: Base plate A2BE2D constitutes FIO node unit (ESB Bus Node Unit, Optical ESB Bus Node Unit) or Optical ESB bus repeater unit with each function modules. Refer to "A2BE2D Base Plate(for FIO)" (GS 33J60G30-01EN) for detail.

## ■ STANDARD SPECIFICATIONS

Function: ESB bus optical transport

Topology: chain and star connection

Maximum number of hops: 2 hops (for chain connection)

Maximum number of hops for each FCU (\*1) (\*3):

FCU (for FIO): 8 hops (for chain and star connection)

FCU (for N-IO): 16 hops (for chain and star connection) (\*2)

FCU (for RIO System Upgrade): 8 hops (for chain and star connection)

Maximum transmission distance: 50 km (one hop)

Optical connector type: LC (IEC61754-20-compliant)

Number of optical fiber cores: 2

Current consumption: 0.5 A

Weight: Approx. 0.25 kg (main body only)

- \*1: The number of paired connection between Master Module and Slave Module.  
 \*2: Up to 24 hops are possible only when FCU (for N-IO) and star connection is configured with ANT4□1 via EC402. (Supported by CENTUM VP R6.06 or later.)  
 \*3: For detail about each FCU, refer to "FIO System Overview" (GS 33J60A10-01EN), "N-IO System Overview" (GS 33J62A10-01EN), and "Field Control Unit, Cabinet Utility Kit (for RIO System Upgrade)" (GS 33J64E10-01EN)

## ● Optical Fiber Cable Specifications

		Optical fiber specifications
Optical connector type		LC (compliant with IEC61754-20)
Max. Permissible Optical Loss		3 to 16 dB at 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 between the ANT411 and ANT512 is less than 3 dB, use the attenuator to reduce the attenuation by 3 dB.  
 \*2: JIS C 6835 SSMA -9.3/125 or IEC 60793-2-50 B1.1 type

## ● HKU Interface (ANT512) (\*1)

When ESB Bus Adapter A2EE3A-□H (With HKU Interface) is connected to ANT512, the environmental information of the cabinet where the modules are installed can be transmitted to FCU via optical ESB bus.

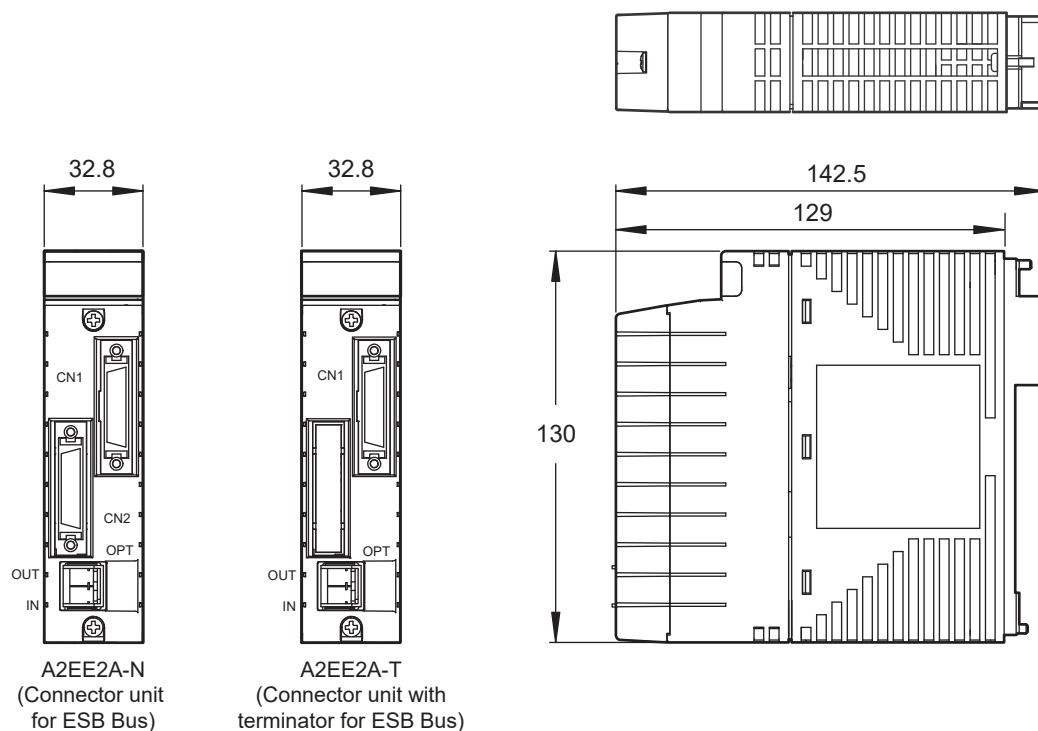
The FCU monitors the connected cabinet's environmental conditions and displays HKU's operating status as well as system alarm on HIS.

- \*1: HKU Interface is only available in case of configured with FCU is installed in the Rittal cabinet by using ACUKT1 and A2CUKT4 Cabinet Utility Kit.

## ■ EXTERNAL DIMENSION

### ● Optical ESB Bus Repeater Master Module for 5 km to 50 km (ANT411)

Unit: mm



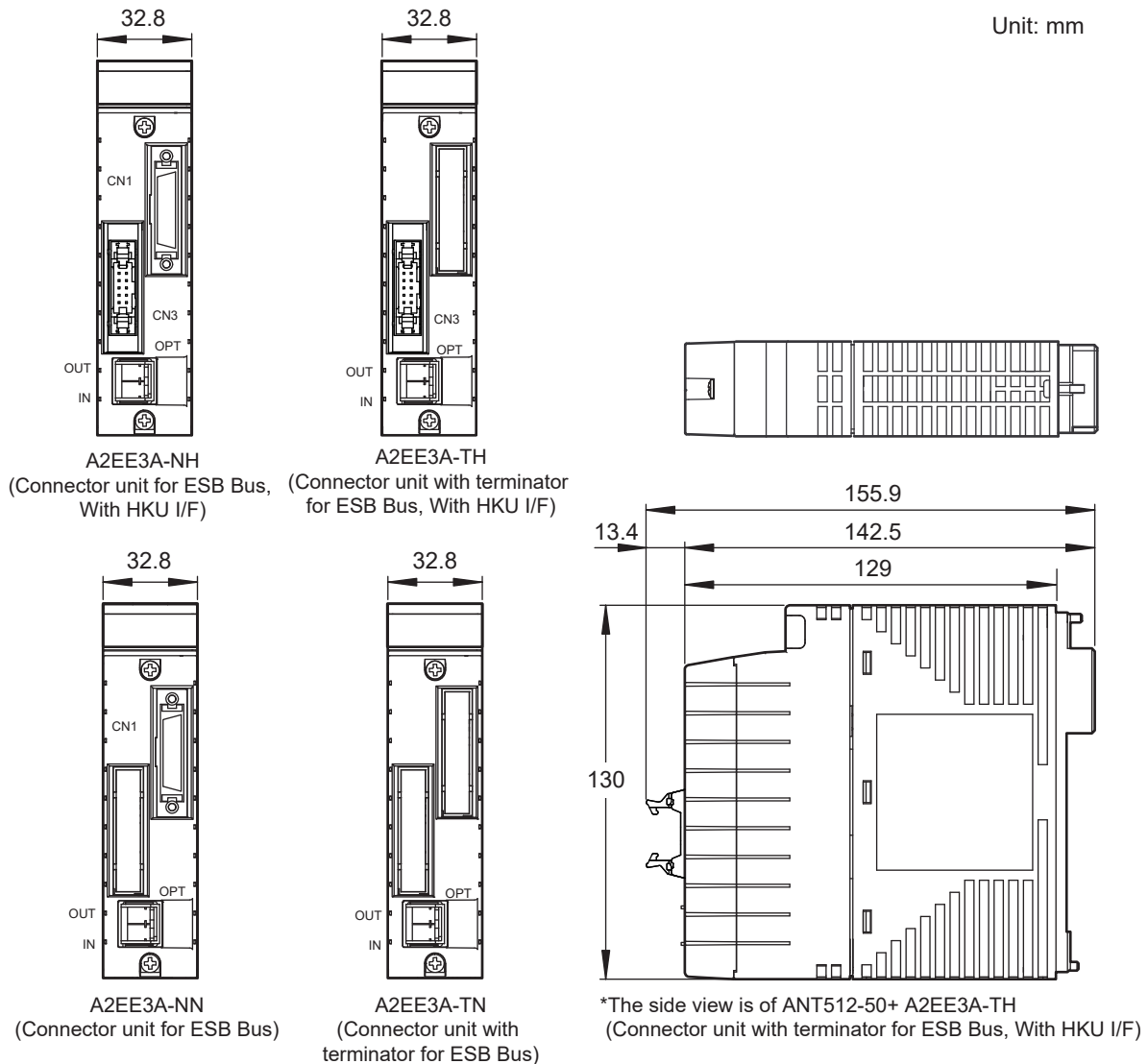
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#### Nominal tolerances :

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

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

## ● Optical ESB Bus Repeater Slave Module for 5 km to 50 km (ANT512)



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### Nominal tolerances :

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

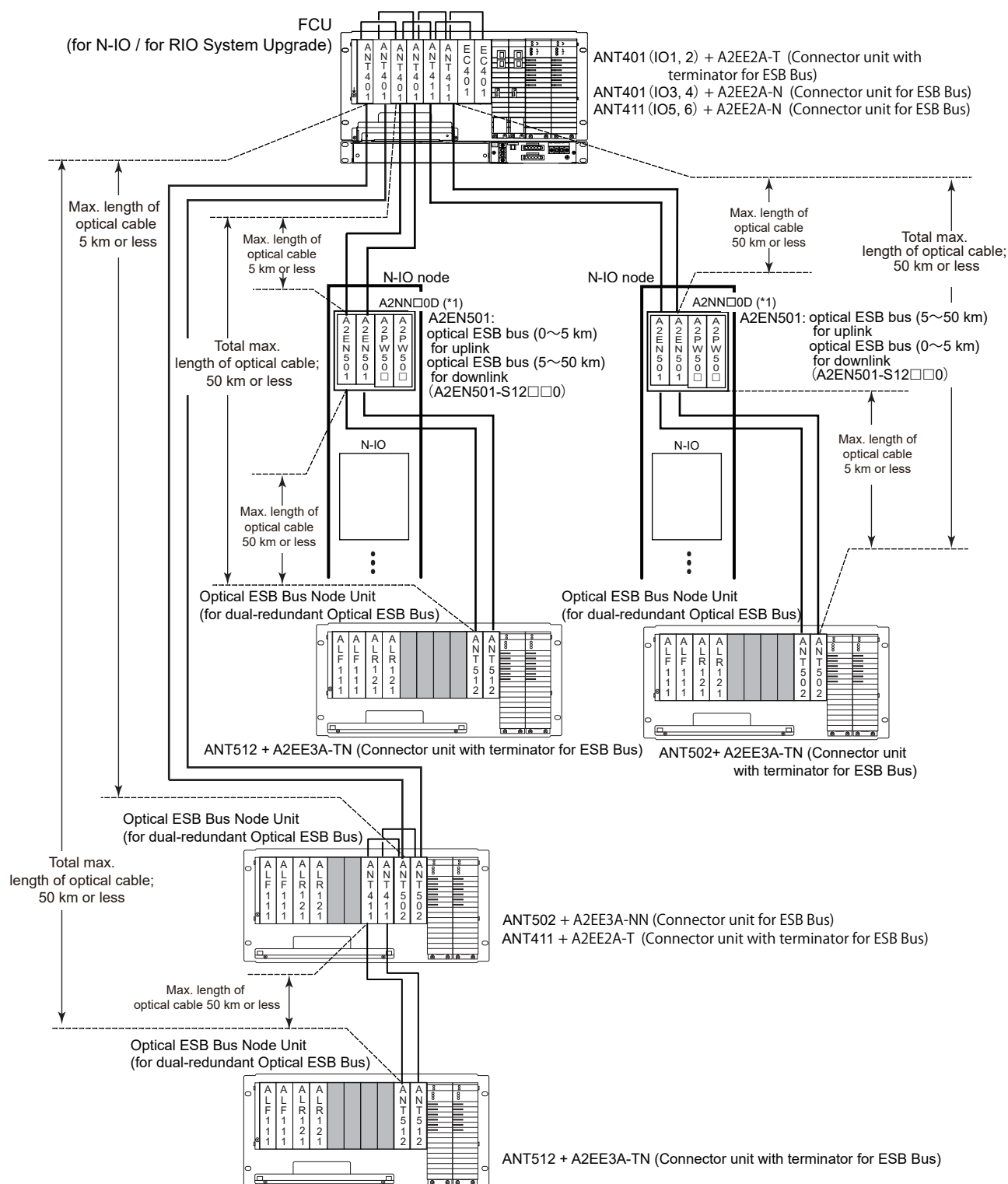
The nominal tolerance is in accordance with JEM 1459 for the dimensions over 120 mm.

## ■ RESTRICTIONS AND CAUTIONS FOR INSTALLATION

- Dual-redundant modules should be installed in a pair of continuous slots.
- The module for ESB bus 1 should be installed in an odd-numbered slot, and the module for ESB bus 2 in an even-numbered slot.

## ■ EXAMPLE OF CONNECTION STRUCTURE

### ● Example of Chain and Star Connection (In the case of FCU (for N-IO) or FCU (for RIO System Upgrade)) (\*2)



\*1: Connectable Node Interface Unit  
A2NN30D for FCU (for N-IO)

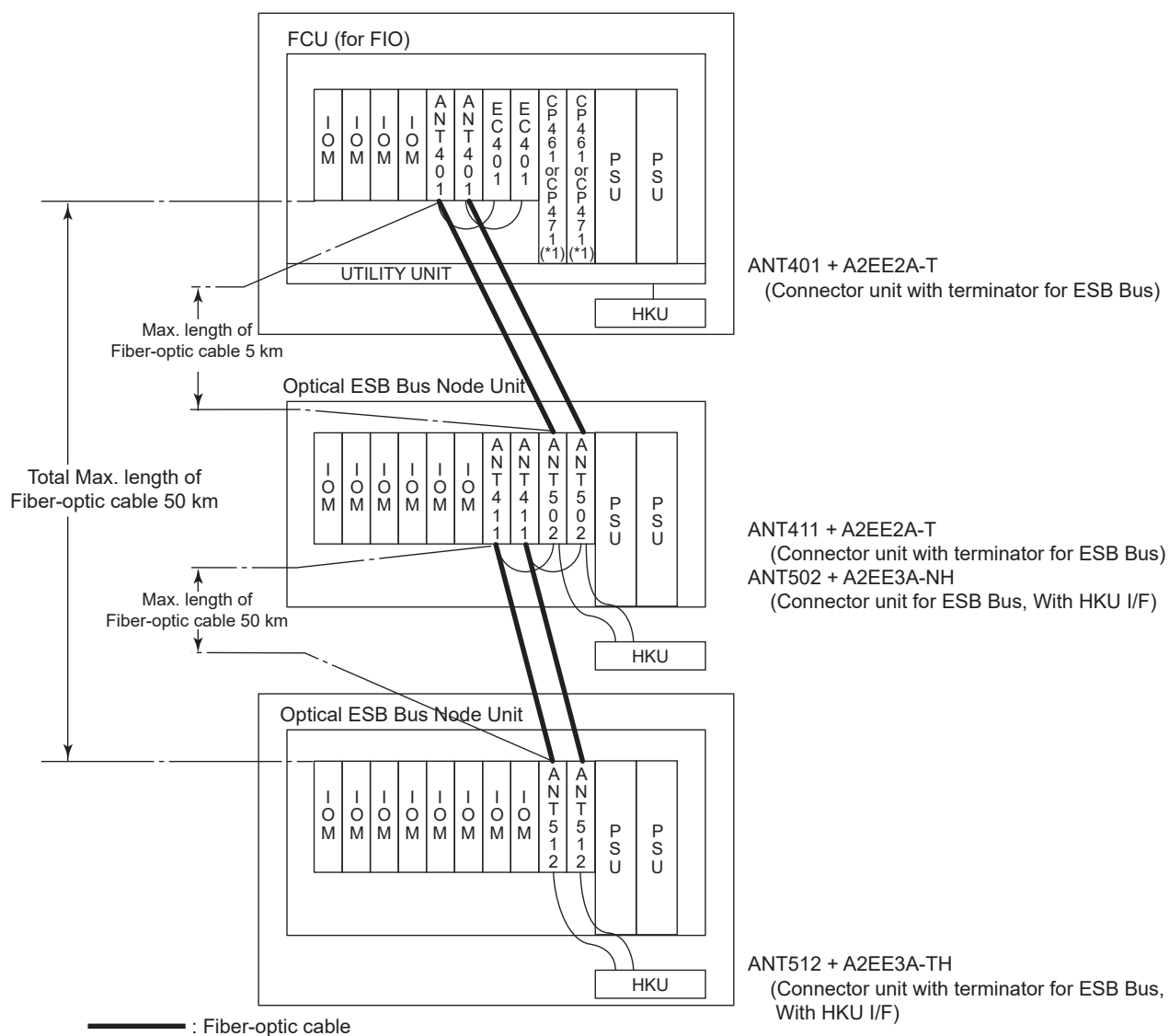
A2NN10D or A2NN20D for FCU (for RIO System Upgrade)

\*2: For detail about each FCU, refer to "N-IO System Overview" (GS 33J62A10-01EN), and "Field Control Unit, Cabinet Utility Kit (for RIO System Upgrade)" (GS 33J64E10-01EN)

**Figure Example of Chain and Star Connection (In the case of FCU for N-IO or FCU for RIO System Upgrade)**

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● Example of Chain Connection (In the case of FCU(for FIO)) (\*2)

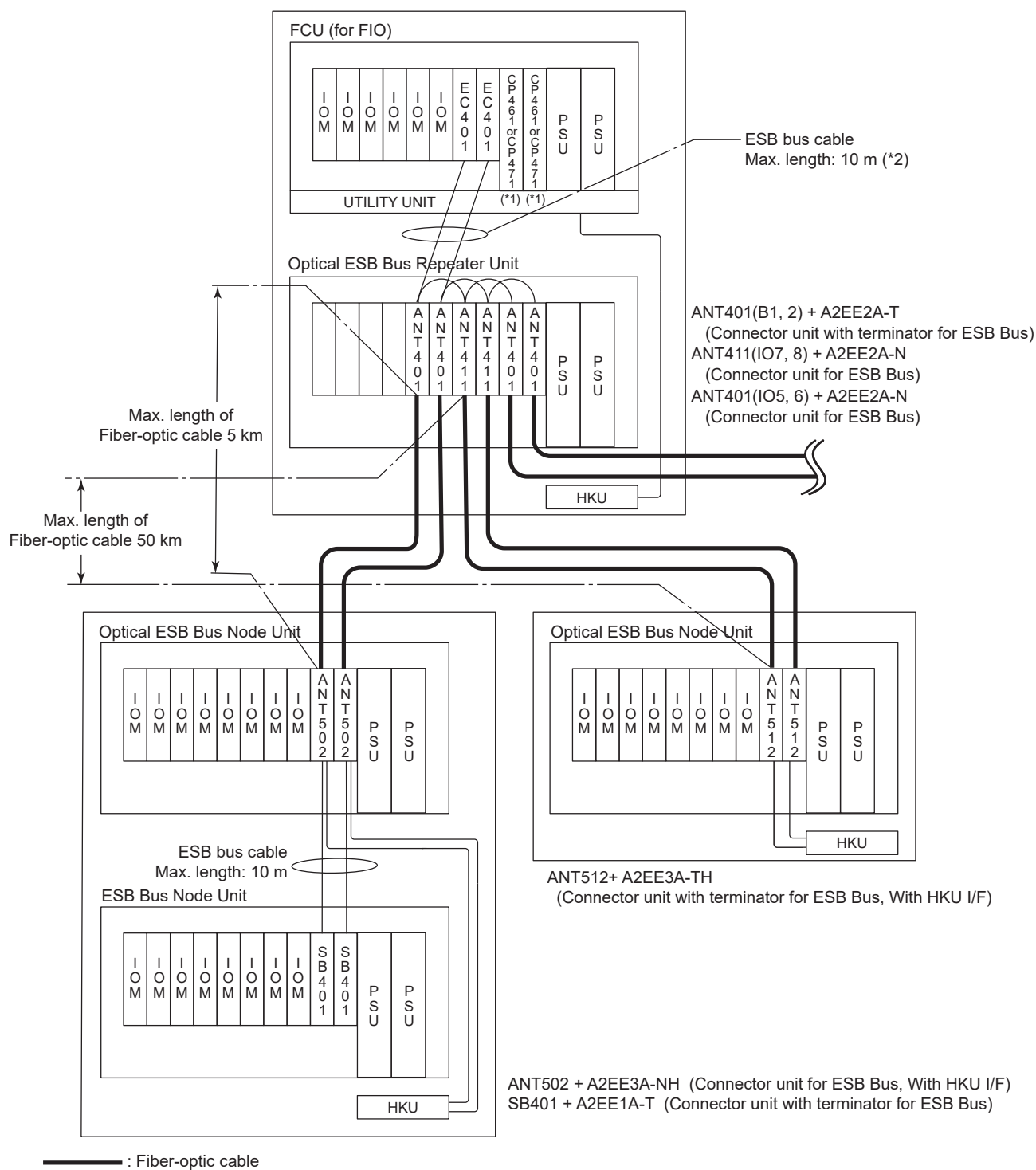


\*1: A dual-redundant configuration is enabled by using 2 identical modules with same model code (CP461 or CP471).

\*2: For detail about FCU, refer to "FIO System Overview" (GS 33J60A10-01EN).

Figure Example of Chain Connection Using HK Function

### ● Example of Star Connection (In the case of FCU(for FIO)) (\*3)



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- \*1: A dual-redundant configuration is enabled by using 2 identical modules with same model code (CP461 or CP471).  
 \*2: The above diagram shows an example of ESB Bus wiring and its termination.  
 The wiring can be done from left to right or vice versa in between EC401 and ANT401 and among ANT401 modules.  
 \*3: For detail about FCU, refer to "FIO System Overview" (GS 33J60A10-01EN).

**Figure Example of Star Connection Using HK Function**

## ■ MODEL AND SUFFIX CODES

### Optical ESB Bus Repeater Master Module

		Description
<b>Model</b>	ANT411	Optical ESB Bus Repeater Master Module 5 - 50 km (for N-IO/FIO)
<b>Suffix Codes</b>	-5	Standard type with no explosion protection
	-E	Standard type with explosion protection
	0	Basic type (only for maintenance purpose)
	3	With ISA Standard G3 option and temperature (-20 °C to 70 °C) option (only for maintenance purpose)
	E	Basic type (for ANT512-□E, -□F, and A2EN501-□2)
	F	With ISA Standard G3 option and temperature (-20 to 70 °C) option (for ANT512-□E, -□F, and A2EN501-□2)

### Optical ESB Bus Repeater Slave Module

		Description
<b>Model</b>	ANT512	Optical ESB Bus Repeater Slave Module 5 - 50 km (for N-IO/FIO)
<b>Suffix Codes</b>	-5	Standard type with no explosion protection
	-E	Standard type with explosion protection
	0	Basic type (only for maintenance purpose)
	3	With ISA Standard G3 option and temperature (-20 °C to 70 °C) option (only for maintenance purpose)
	E	Basic type (for ANT411-□E, -□F, and A2EN501-□2)
	F	With ISA Standard G3 option and temperature (-20 to 70 °C) option (for ANT411-□E, -□F and A2EN501-□□2)

Note: When Optical ESB bus repeater modules are connected via Optical ESB bus, the master side must be paired with one of the slave sides as described below.

- ANT411-□0 or -□3 for master side and ANT512-□0, -□3, ANB11S-3□□, -4□□, or ANB11D-4□□ for slave side
- ANT411-□E or -□F for master side and ANT512-□E, -□F, A2EN501-□2, ANB11S-C□□, -D□□, or ANB11D-D□□ for slave side
- A2EN501-□□2 for master side and ANT512-□E or -□F for slave side

When using by dual-redundant configuration, the module for ESB bus1 should be the same as the module for ESB bus2.

### ESB Bus Adapter

		Description
<b>Model</b>	A2EE2A	ESB Bus Adapter (for ANT4□1)
<b>Suffix Codes</b>	-N	Connector unit for ESB Bus (G3)
	-T	Connector unit with terminator for ESB Bus (G3)

		Description
<b>Model</b>	A2EE3A	ESB Bus Adapter (for ANT5□21)
<b>Suffix Codes</b>	-N	Connector unit for ESB Bus (G3)
	-T	Connector unit with terminator for ESB Bus (G3)
	H	With HKU I/F
	N	Without HKU I/F

## ■ APPLICABLE STANDARDS

Refer to the GS "Integrated Production Control System CENTUM VP System Overview" (GS 33J01A10-01EN).

## ■ ORDERING INFORMATION

Specify the model and suffix codes when ordering.

For selecting the right products for explosion protection, please refer to TI 33Q01J30-01E without fail.

## ■ TRADEMARK ACKNOWLEDGMENT

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