General Specifications

GS 33J60F55-01EN

ANT421, ANT522, A2EE2A , A2EE3A
Optical ESB Bus Repeater
Module for 4 km (for N-IO/FIO Multimode Fiber)
ESB Bus Adapter(for ANT4☐1)
ESB Bus Adapter(for ANT5☐2)

CENTUM VP

[Release 6]

■ GENERAL

The Optical ESB Bus Repeater Module converts the ESB bus to an optical signal and transmits it. The ESB bus transmission distance can be extended within the range of up to 4 km by connecting the ANT421 Optical ESB Bus Repeater Master Module and ANT522 Optical ESB Bus Repeater Slave Module with an optical fiber cable.

These modules can replace existing ER bus and RIO bus to the optical ESB bus by utilizing the existing multimode fiber cables.

● ANT421 Optical ESB Bus Repeater Master Module for 4 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 ANT421 to ESB Bus, ANT401 requires the ESB Bus Adapter “Connector unit for ESB Bus” (A2EE2A-N).

To terminate ESB Bus at ANT421, ANT421 requires the ESB Bus Adapter “Connector unit with terminator for ESB Bus” (A2EE2A-T). ESB Bus Adapter A2EE2A should be ordered separately.

● ANT522 Optical ESB Bus Repeater Slave Module for 4 km

ANT522 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 ANT522 to ESB Bus, ANT522 requires the ESB Bus Adapter “Connector unit for ESB Bus” (A2EE3A-N☐).

To terminate ESB Bus at ANT522, ANT522 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 ANT421 and ANT522 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 ANT421 Optical ESB Bus Repeater Master Module for 4 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.

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Table ANT522 Optical ESB Bus Repeater Slave Module for 4 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) (*4):
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 (*3): 4 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 A2FV50□ is used for FCU and star connection is configured with ANT4□1 via EC402. (Supported by CENTUM VP R6.06 or later.)
*3: Depending on the characteristics of the optical fiber cable, the maximum transmission distance is different. Please refer to the section “Optical fiber cable specifications”.
*4: 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)

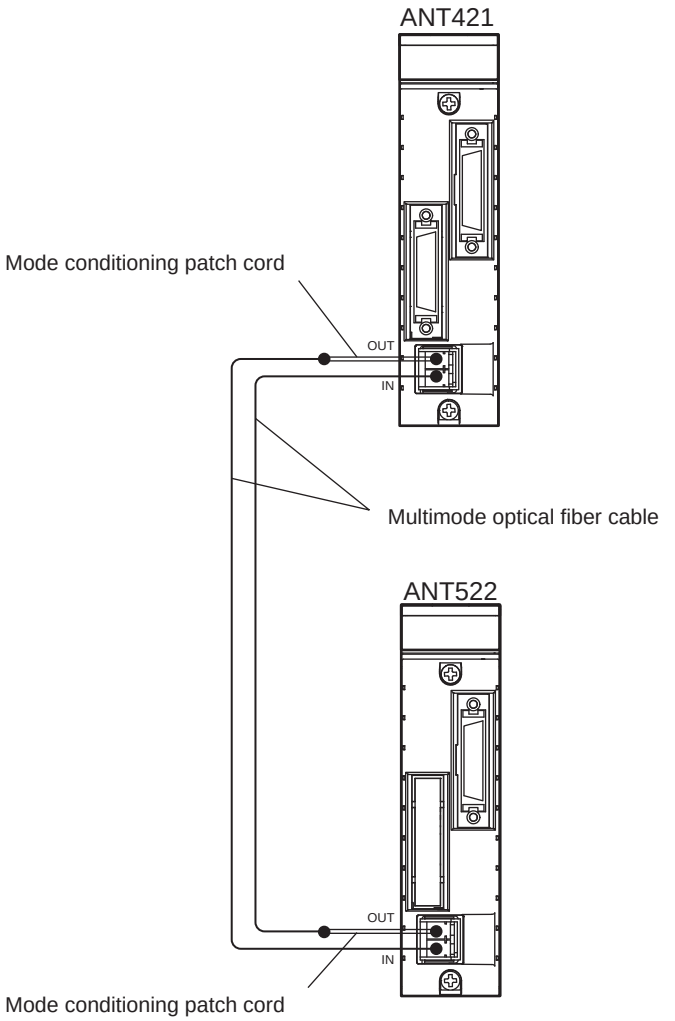
● HKU Interface (ANT522)

When ESB Bus Adapter A2EE3A-□H (With HKU Interface) is connected to ANT522, 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.

■ CONNECTING OPTICAL FIBER CABLE

The figure below shows how optical fiber cables are connected. A single mode fiber side of a mode conditioning patch cord has to be connected to an output side of ANT421 and ANT522.



● Optical fiber cable specifications

Maximum permissible optical loss		0 to 7 dB @ 1.3 µm (*1)
Optical Fiber	**Type**	Quartz multimode fiber GI 50/125 (*2) GI 62.5/125 (*3)
	Transmission bandwidth	Up to 2 km transmission distance : 200 MHz · km or over @1.3 µm (*1)
		2 to 4 km · transmission distance : 400 MHz · km or over @1.3 µm (*1)

*1: In case existing optical fiber cables are used, check that these has not deviated from the specifications by aging degradation.
*2: IEC 60793-2A1a-compliant
*3: IEC 60793-2A1b-compliant

● Mode conditioning patch cord specifications

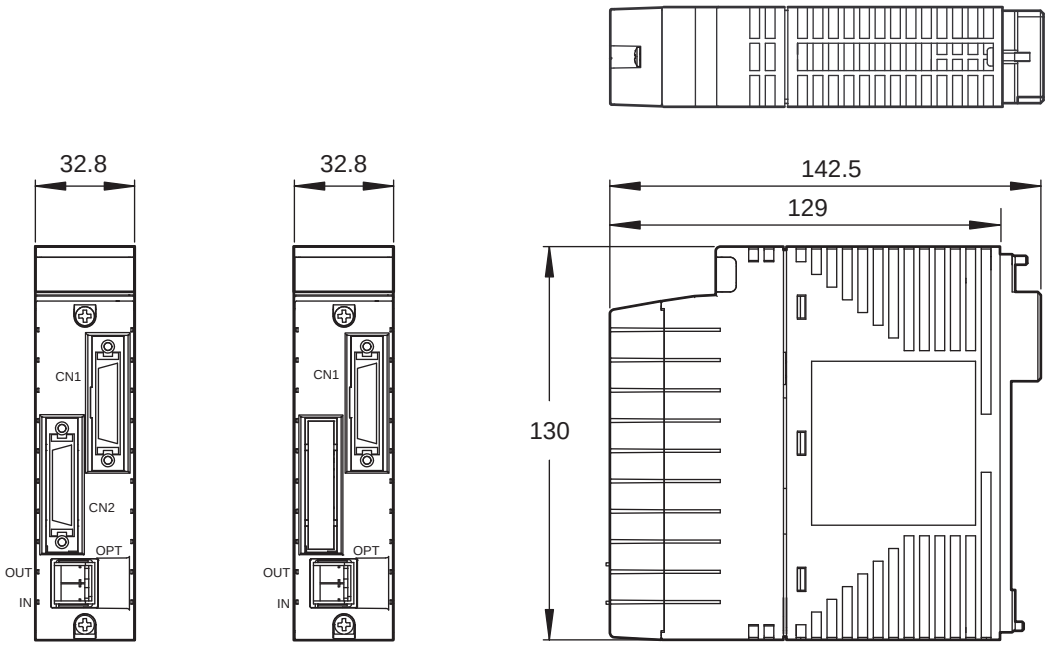
Item	GI 62.5/125	GI 50/125
Maximum insertion loss (*1)	0.5 dB	0.5 dB
Coupled power ratio (CPR) (*1)	28 dB < CPR < 40 dB	12 dB < CPR < 20 dB

*1: IEEE 802.3z-compliant

■ EXTERNAL DIMENSION

● Optical ESB Bus Repeater Master Module for 4 km (ANT421)

Unit: mm



A2EE2A-N
(Connector unit for ESB Bus)

A2EE2A-T
(Connector unit with terminator for ESB Bus)

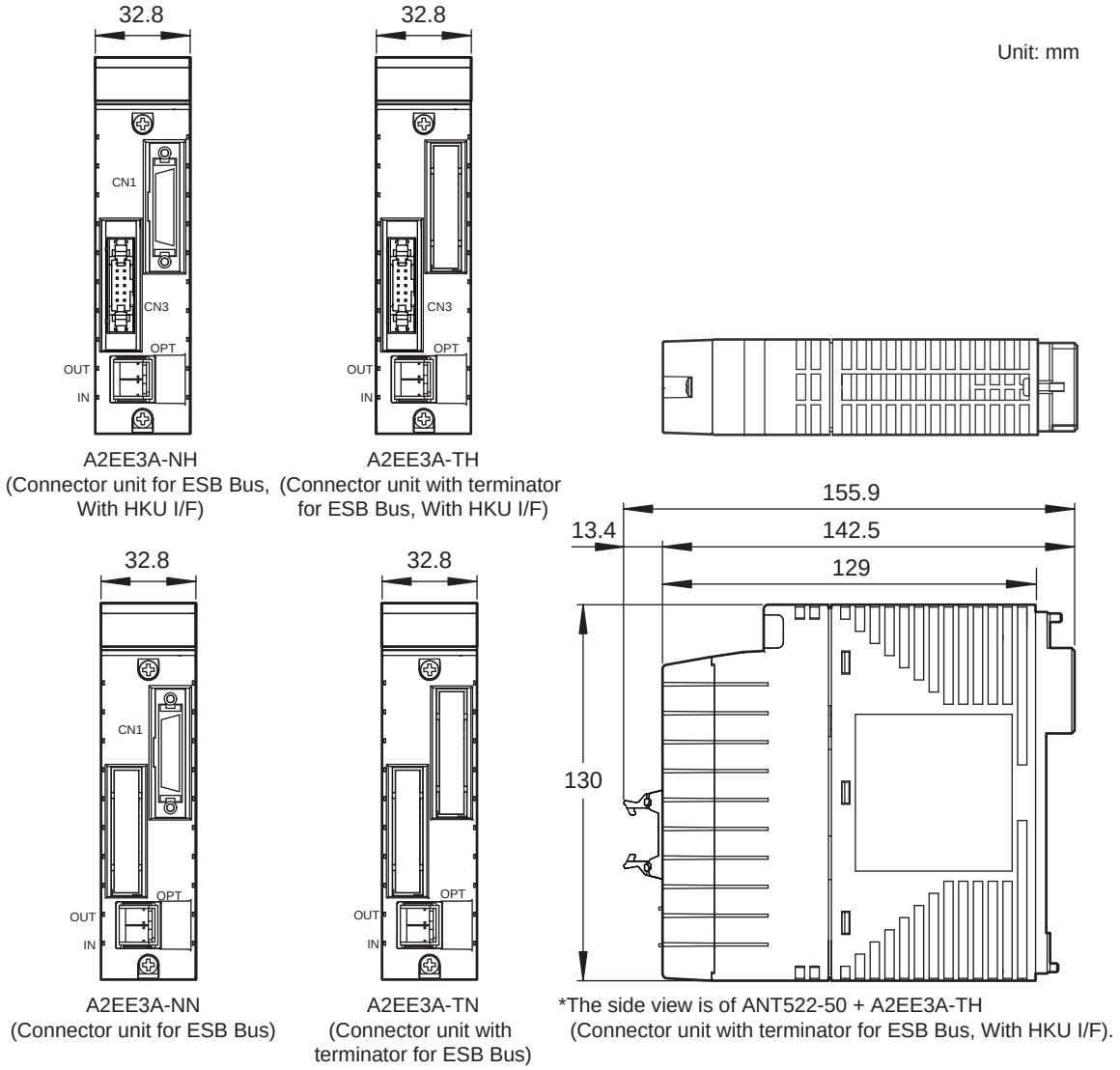
Nominal tolerances :

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.

● Optical ESB Bus Repeater Slave Module for 4 km (ANT522)

Unit: mm



A2EE3A-NH
(Connector unit for ESB Bus, With HKU I/F)

A2EE3A-TH
(Connector unit with terminator for ESB Bus, With HKU I/F)

A2EE3A-NN
(Connector unit for ESB Bus)

A2EE3A-TN
(Connector unit with terminator for ESB Bus)

*The side view is of ANT522-50 + A2EE3A-TH
(Connector unit with terminator for ESB Bus, With HKU I/F).

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Nominal tolerances :

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.

■ RESTRICTIONS AND CAUTIONS FOR INSTALLATION

The master side, ANT421 must be paired with the slave side, ANT522 as described below.
- ANT421 for master side and ANT522 for slave side
- ANT421 for master side and A2EN501 for slave side
- A2EN501 for master side and ANT522 for slave side

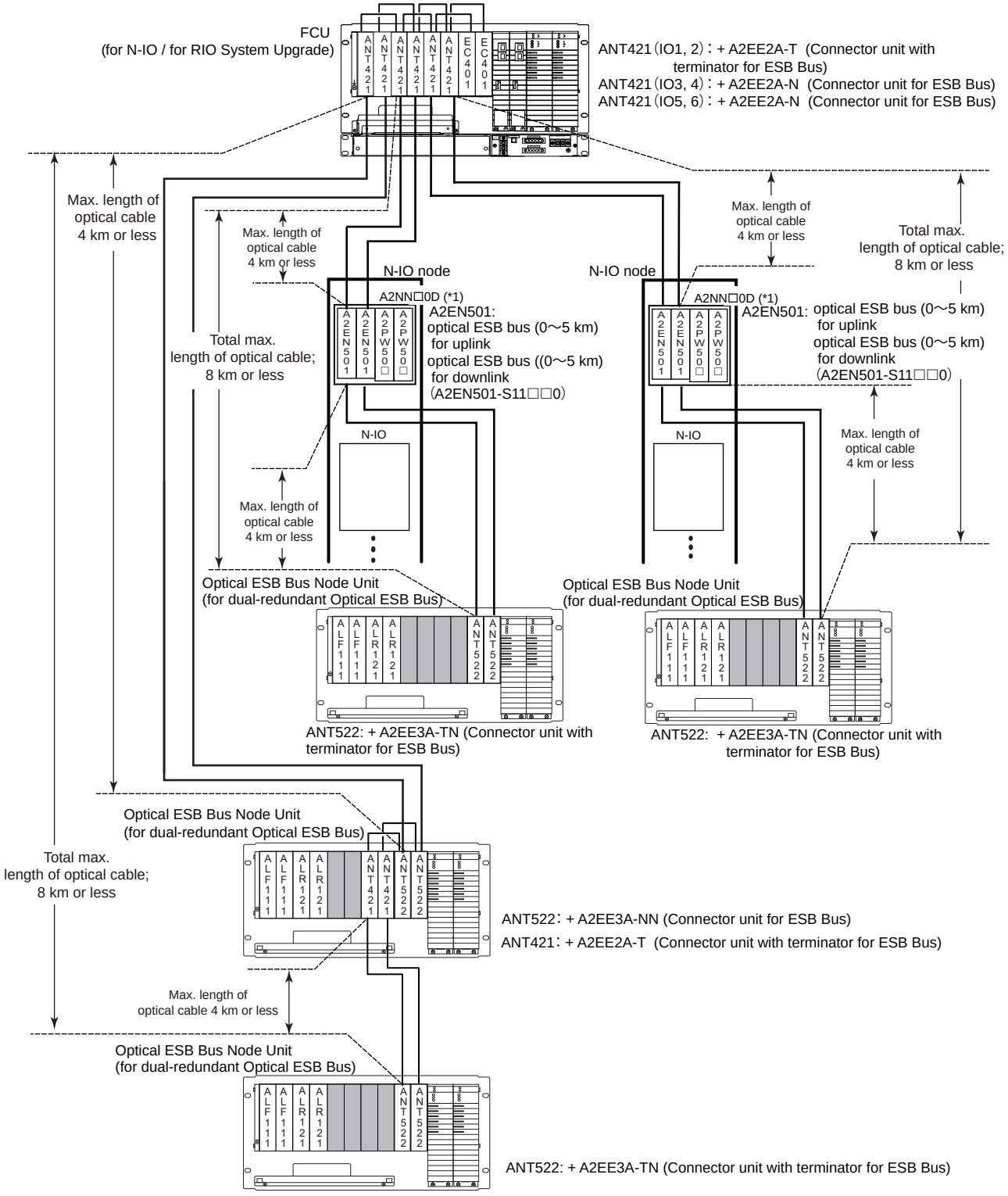
• Dual-redundant modules should be installed in a pair of continuous slots.
• The module for ESB bus 1 should be installed in an odd-numbered slot, and the module for ESB bus 2 in an even-numbered slot.
• Refer to the GS “N-IO System Overview” (GS 33J62A10-01EN), “FIO System Overview” (GS 33J60A10-01EN), and “Field Control Unit, Cabinet Utility Kit (for RIO System Upgrade)” (GS 33J64E10-01EN) for restrictions in mounting “ANT401” and “ANT502”.

■ REMARKS BEFORE USE

• ANT421/ANT522 can be used with ANT401/ANT502 in two hops with the maximum total distance of 9 km. ANT421/ANT522 can also be used with ANT411/ANT512 in two hops with the maximum total distance of 50 km.
• When installing ANT421/ANT522, conformance to the instructions for “ANT401” and “ANT502” of “CENTUM VP Installation Guidance (TI 33J01J10-01EN)” is required.
• As for engineering of ANT421/ANT522, conform to the instructions for “ANT401” and “ANT502” of “Electronic Instruction Manual : VP6C5495”.

■ 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)



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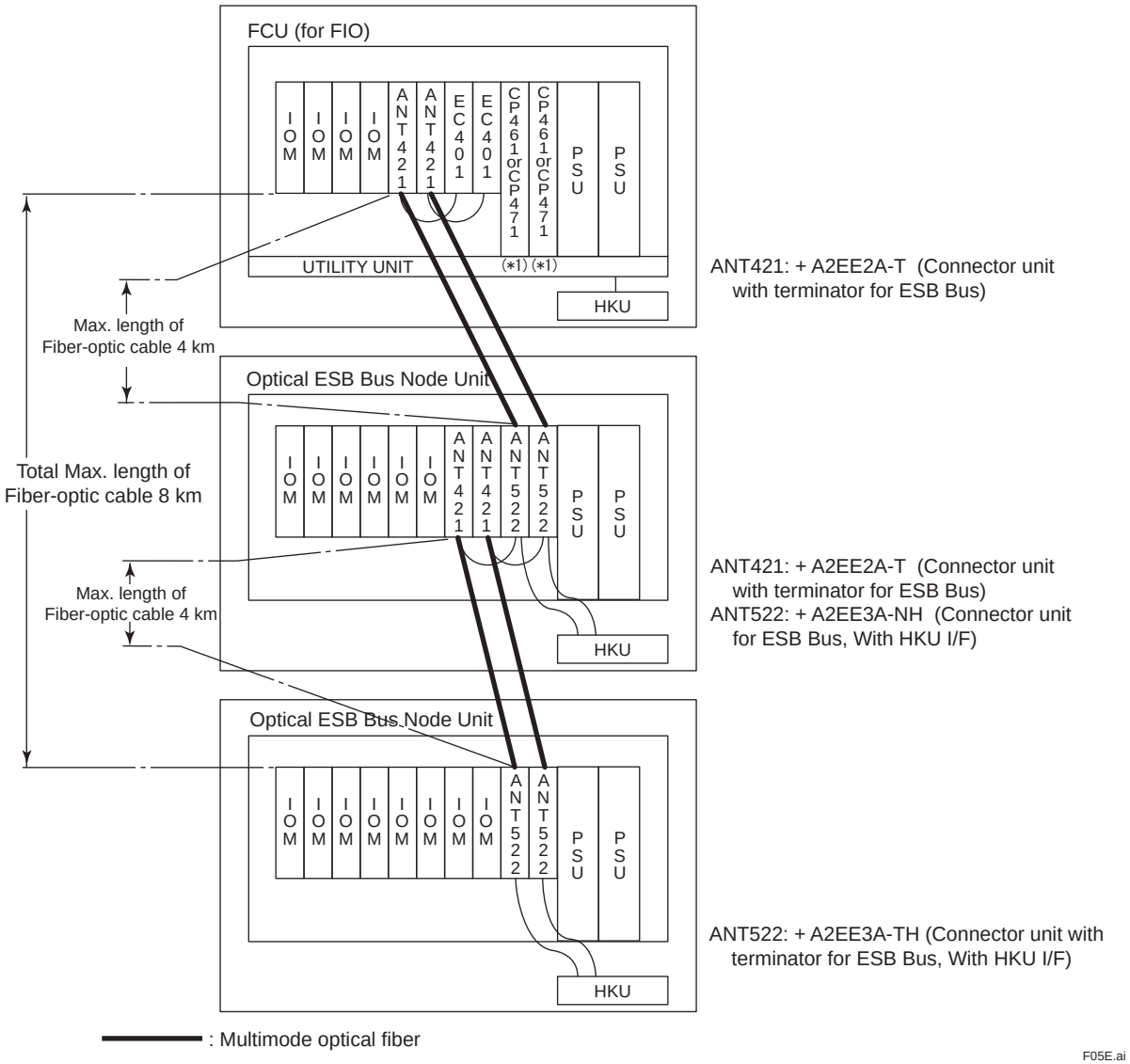
*1: Connectable Node Interface Unit
A2NN30D for FCU (for N-IO)
A2NN10D or A2NN20D for FCU (for RIO System Upgrade)

*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)

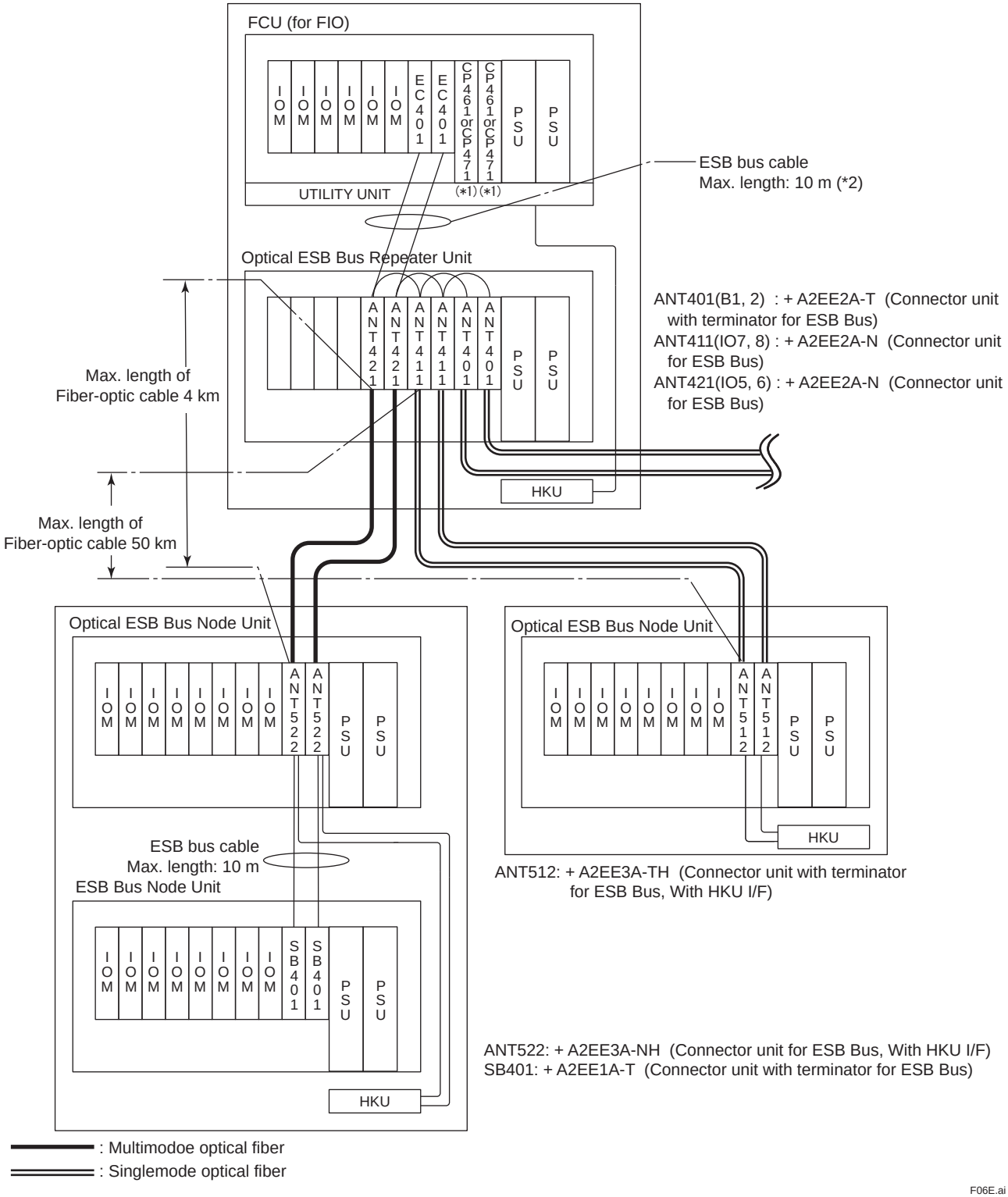
● Example of Chain Type Connection In the case of FCU(for FIO) (*2)



*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 Type Connection In the case of FCU (for FIO) (*3)



*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 ANT421 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 (for Multimode Fiber)

		Description
Model	ANT421	Optical ESB Bus Repeater Master Module 4 km (for Multimode Fiber)
Suffix Codes	-5	Standard type with no explosion protection
	-E	Standard type with explosion protection
	0	Basic type
	3	With ISA Standard G3 option and temperature (-20 °C to 70 °C) option

Optical ESB Bus Repeater Slave Module (for Multimode Fiber)

		Description
Model	ANT522	Optical ESB Bus Repeater Slave Module 4 km (for Multimode Fiber)
Suffix Codes	-5	Standard type with no explosion protection
	-E	Standard type with explosion protection
	0	Basic type
	3	With ISA Standard G3 option and temperature (-20 °C to 70 °C) option

ESB Bus Adapter

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

		Description
Model	A2EE3A	ESB Bus Adapter (for ANT5□21)
Suffix Codes	-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

Node Unit for Single ESB Bus with Optical Repeater (for Multimode Fiber)
This model is the optical ESB bus node unit equipped with ANT522.

For standard specifications, limitations of installation and notices for installation, external dimensions, and standard accessories, conform to ANB11 optical ESB bus node unit (GS 33J60F30-01EN).

		Description
Model	ANB11S	Node Unit for Single ESB Bus with Optical Repeater
Suffix Codes	-5	Single power supply, for 4 km multimode optical repeater (*1)
	-6	Dual-redundant power supply, for 4 km multimode optical repeater (*1)
	1	100 - 120 V AC power supply (*2)
	2	220 - 240 V AC power supply (*2)
	4	24 V DC power supply (*2)
	5	Basic type with no explosion protection
	6	With ISA standard G3 option, temperature (-20 ˚C to 70 ˚C) option, and no explosion protection
	E	Basic type with explosion protection
	F	With ISA standard G3 option, temperature (-20 ˚C to 70 ˚C) option, and explosion protection
Option Codes	/BU1A	Connector unit for ESB Bus
	/BU1B	Connector unit with terminator for ESB Bus
	/HU1A	Connector unit for ESB Bus with HKU I/F (*3)
	/HU1B	Connector unit with terminator for ESB Bus with HKU I/F (*3)
	/ATDOC	Explosion Protection Manual (*4)

*1: Model of Optical ESB Bus Repeater Slave Modules is ANT522.
*2: To meet the safety standards and EMC standards, the unit must be installed in a keyed metallic cabinet.
*3: Monitoring of temperatures and fans in the cabinet to be installed needs to be specified.
*4: Select the option code "/ATDOC" to follow the ATEX Directive and UKEX Regulation for use in potentially explosive atmospheres.

Node Unit for Dual-Redundant ESB Bus with Optical Repeater (for Multimode Fiber)
This model is the optical ESB bus node unit equipped with ANT522.

For standard specifications, limitations of installation and notices for installation, external dimensions, and standard accessories, conform to ANB11 optical ESB bus node unit (GS 33J60F30-01EN).

		Description
Model	ANB11D	Node Unit for Dual-Redundant ESB Bus with Optical Repeater
Suffix Codes	-6	Dual-redundant power supply, for 4 km multimode optical repeater (*1)
	1	100 - 120 V AC power supply (*2)
	2	220 - 240 V AC power supply (*2)
	4	24 V DC power supply (*2)
	5	Basic type with no explosion protection
	6	With ISA standard G3 option, temperature (-20 ˚C to 70 ˚C) option, and no explosion protection
	E	Basic type with explosion protection
	F	With ISA standard G3 option, temperature (-20 ˚C to 70 ˚C) option, and explosion protection
Option Codes	/BU2A	Connector unit for ESB Bus
	/BU2B	Connector unit with terminator for ESB Bus
	/HU2A	Connector unit for ESB Bus with HKU I/F (*3)
	/HU2B	Connector unit with terminator for ESB Bus with HKU I/F (*3)
	/ATDOC	Explosion Protection Manual (*4)

*1: Model of Optical ESB Bus Repeater Slave Modules is ANT522.
*2: To meet the safety standards and EMC standards, the unit must be installed in a keyed metallic cabinet.
*3: Monitoring of temperatures and fans in the cabinet to be installed needs to be specified.
*4: Select the option code "/ATDOC" to follow the ATEX Directive and UKEX Regulation for use in potentially explosive atmospheres.

■ 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 and option codes when ordering.

For selecting the right products for explosion protection, please refer to TI 33J01J30-01EN without fail.

■ TRADEMARK ACKNOWLEDGMENT

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