General Specifications

Digital I/O Modules (for FIO)

CENTUM VP

GS 33J60F70-01EN

[Release 6]

■ GENERAL

This GS covers the hardware specifications of the Digital I/O Modules (FIO) that can be installed in the ESB Bus Node Unit (ANB10S, ANB10D), Optical ESB Bus Node Unit (ANB11S, ANB11D), and the Field Control Unit (AFV30S, AFV30D, AFV40S, AFV40D).

■ STANDARD SPECIFICATIONS

● Digital Input Modules

The Digital Input Modules receive 32-channel or 64-channel 24 V DC ON/OFF signals.
The ADV151 and ADV161 can be used in dual redundant configuration.

Item	Specifications	
Model	**ADV151-P/ADV151-E (*1)**	**ADV161**
Number of input channels	32	64
Rated input voltage (*2)	24 V DC (sink/source)	24 V DC (sink/source)
Input ON voltage	18 to 26.4 V DC	20 to 26.4 V DC
Input OFF voltage	5.0 V DC or less	5.0 V DC or less
Input current (at rated input voltage)	4.1 mA±20 % / channel	2.5 mA±20 % / channel
Maximum allowable input voltage	30.0 V DC	30.0 V DC
Withstanding voltage	Between input signal and system: 2 kV AC, For 1 minute Between commons: 500 V AC, For 1 minute, common every 16-channel (*3)	
Functions		
Status input	Function for detecting ON/OFF status	Function for detecting ON/OFF status
Pushbutton input	Function for counting the pushbutton edges	Function for counting the pushbutton edges
SOE input	Function for capturing the SOE data	—
Input response time	8 ms or less (for status input)	
Minimum ON detection time	20 ms (for pushbutton input)	
Maximum ON/OFF cycle	25 Hz (for pushbutton input)	
Maximum current consumption	500 mA (5 V DC)	550 mA (5 V DC)
Weight	Approx. 0.30 kg	Approx. 0.30 kg
External connection	Pressure clamp terminal, Dedicated cable (AKB331), MIL connector cable	Dedicated cable (AKB337), MIL connector cable

*1: ADV151-E cannot be installed in the ER Bus Node Unit.
*2: ADV151 and ADV161 are common every 16-channel. All voltage input signals to be connected (24 V DC) must be in the same polarity.
*3: The withstanding voltage for using a dedicated cable is 500 V AC (between input signal and system).
The withstanding voltage for using MIL connector cable depends on the electrical specifications of its cable.

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● Digital Output Modules

The Digital Output Modules output 32-channel or 64-channel transistor contact signals.
The ADV551 and ADV561 can be used in dual redundant configuration.

Item	Specifications	
Model	**ADV551**	**ADV561**
Number of output channels	32	64
Rated applied voltage	24 V DC	24 V DC
Load voltage	24 V DC, 50 mA	24 V DC, 100 mA
External power supply voltage range	20.4 to 26.4 V DC	20.4 to 26.4 V DC
Output ON voltage maximum value	2 V DC	2 V DC
Leak current maximum value when output OFF	0.1 mA	0.1 mA
Output format	Current sink	Current sink
Maximum load current (*1)	100 mA/channel, 26.4 V	100 mA/channel, 26.4 V
Withstanding voltage	Between output signal and system: 2 kV AC, For 1 minute Between commons: 500 V AC, For 1 minute, common minus (–) side every 16-channel (*2)	
Functions		
Status output	ON/OFF status output function	ON/OFF status output function
Pulse width output	One-shot pulse width output function	One-shot pulse width output function
Time-proportioning output	Time-proportioning ON/OFF	Time-proportioning ON/OFF
Output response time	3 ms or less (for status output) 10 ms or less (for mixed status and pulse outputs)	
Pulse width	8 ms to 7200 s	
Pulse width resolution	8 ms, but ON/OFF delay of maximum 1 ms is added	
Maximum current consumption	700 mA (5 V DC) 60 mA (external power supply)	700 mA (5 V DC) 120 mA (external power supply)
Weight	Approx. 0.20 kg	Approx. 0.30 kg
External connection	Pressure clamp terminal, Dedicated cable (AKB331), MIL connector cable	Dedicated cable (AKB337), MIL connector cable

*1: Connect a spark killer diode when driving DC relay.
*2: The withstanding voltage for using a dedicated cable is 500 V AC (between output signal and system).
The withstanding voltage for using MIL connector cable depends on the electrical specifications of its cable.

● Digital I/O Modules (CENTUM-ST Compatible)

The Digital I/O Modules (CENTUM-ST Compatible) receive contact or voltage status signals from the field, and/or output status signals to the field via transistor contacts.

Item	Specifications		
Model	**ADV859**	**ADV159**	**ADV559**
Number of I/O channels	16-channel input, 16-channel output	32-channel input	32-channel output
Signal isolation	Isolated channels	Isolated channels	Isolated channels
Input signal	Contact input: OFF signal 100 kΩ or more ON signal 200 Ω or less Minimum current value when contact is short-circuited: 1.25 mA Voltage input: OFF signal 4.5 to 25 V DC ON signal ±1 V DC, 200 Ω or less		—
Input contact rating	5 V DC, 20 mA or more		—
Pushbutton input function	Not supported	Supported	—
Input response time	8 ms (for status input)	8 ms (for status input)	—
Minimum ON detection time	—	20 ms (for pushbutton input)	—
Maximum ON/OFF cycle	—	25 Hz (for pushbutton input)	—
Output signal	Transistor contact	—	Transistor contact
Output contact rating	Inductive load, resistive load: 30 V DC, 100 mA (*1)	—	Inductive load, resistive load: 30 V DC, 100 mA (*1)
Output response time	16 ms or less	—	16 ms or less
Pulse width	8 ms to 7200 s	—	8 ms to 7200 s
Pulse width resolution	8 ms, add max. 1ms for ON/OFF delay time	—	8 ms, add max. 1ms for ON/OFF delay time
Maximum current consumption	450 mA (5 V DC)	330 mA (5 V DC)	570 mA (5 V DC)
Weight	Approx. 0.30 kg	Approx. 0.40 kg	Approx. 0.30 kg
External connection	Dedicated cable (KS2)	Dedicated cable (KS2)	Dedicated cable (KS2)
Compatible card	ST2 compatible	ST3 compatible	ST4 compatible

*1: Connect a spark killer diode when driving DC relay.

Item	Specifications		
Model	**ADV869**	**ADV169**	**ADV569**
Number of I/O channels	32-channel input, 32-channel output	64-channel input	64-channel output
Signal isolation	Common every 16-channel	Common every 16-channel	Common every 16-channel
Input signal	Contact input: OFF signal 100 kΩ or more ON signal 200 Ω or less Minimum current value when contact is short-circuited: 1.25 mA Voltage input: OFF signal 4.5 to 25 V DC ON signal ±1 V DC, 200 Ω or less		—
Input contact rating	5 V DC, 20 mA or more		—
Pushbutton input function	Not supported	Not supported	—
Input response time	8 ms (for status input)	8 ms (for status input)	—
Output signal	Transistor contact	—	Transistor contact
Output contact rating	Inductive load, resistive load: 30 V DC, 100 mA (*1)	—	Inductive load, resistive load: 30 V DC, 100 mA (*1)
Output response time	16 ms or less	—	16 ms or less
Pulse width	8 ms to 7200 s	—	8 ms to 7200 s
Pulse width resolution	8 ms, add max. 1 ms for ON/OFF delay time	—	8 ms, add max. 1 ms for ON/OFF delay time
Maximum current consumption	800 mA (5 V DC)	800 mA (5 V DC)	800 mA (5 V DC)
Weight	Approx. 0.30 kg	Approx. 0.30 kg	Approx. 0.30 kg
External connection	Dedicated cable (KS9)	Dedicated cable (KS9)	Dedicated cable (KS9)
Compatible card	ST5 compatible	ST6 compatible	ST7 compatible

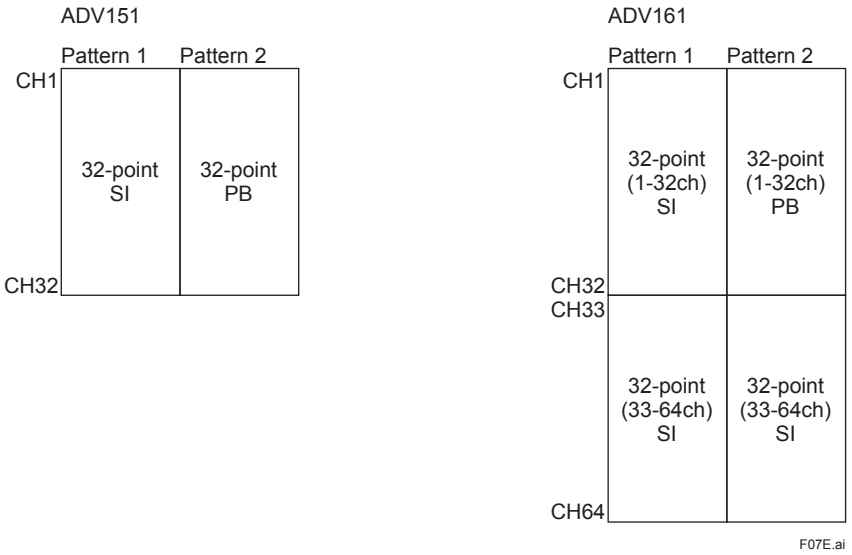
*1: Connect a spark killer diode when driving DC relay.

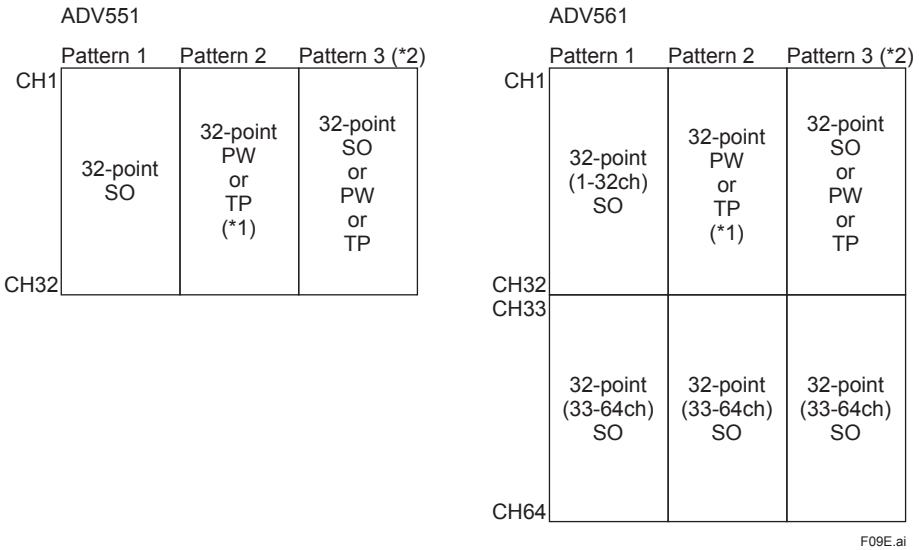
● Function Assignment in Digital Modules

Select the patterns for assigning functions channel-by-channel in digital modules.
The following table lists the correspondence between the module types and point modes.

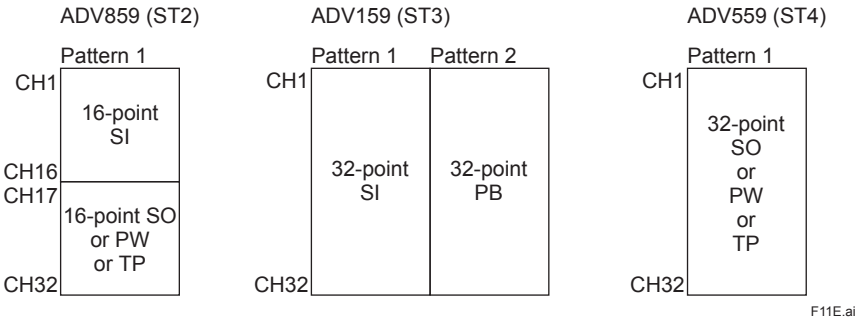
Table: Correspondence Between the Module Types and Point Modes

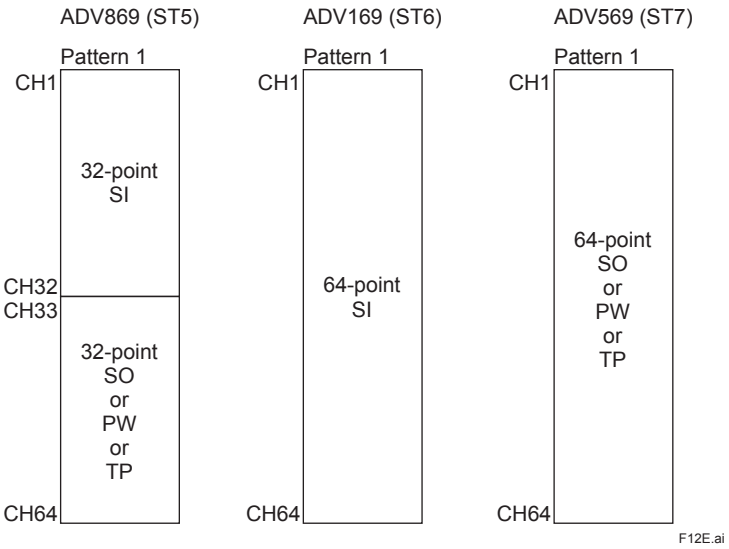
Point Mode	Module Type
SI	Status input
PB	Pushbutton input
SO	Status output
PW	Pulse width output
TP	Time-proportioning ON/OFF output





*1: If an odd-numbered terminal is specified as PW or TP, the next terminal cannot be specified as a different type.
*2: This pattern applies only for direct-connected nodes. Dual redundancy is not possible.





For PW (pulse width output), use two contiguous terminal numbers; the first of these must be odd-numbered. If both PW and TP (time-proportioning ON/OFF output) are used together, successive pairs of terminals must be either PW or TP terminals, as shown in the example below.

Example:

Terminals 1 and 2	PW (one PW output, two contiguous terminal nos.)
Terminals 3 and 4	TP (two outputs, two contiguous terminal nos.)
Terminals 5 and 6	TP (two outputs, two contiguous terminal nos.)
⋮	⋮
Terminals 15 and 16	PW (one PW output, two contiguous terminal nos.)

For PW output, use two contiguous terminal numbers; the first of these must be odd-numbered. Also if SO and TP terminals are used together with PW, individual terminals that are not PW can be either SO or TP terminals.

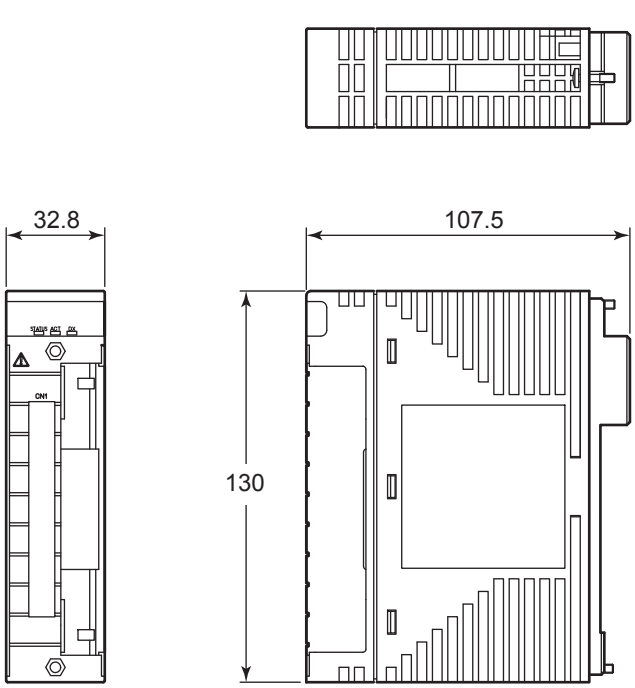
Example:

Terminals 1 and 2	PW (one PW output, two contiguous terminal nos.)
Terminal 3	TP or SO
Terminal 4	TP or SO
⋮	⋮
Terminal 16	TP or SO

■ EXTERNAL DIMENSIONS

● ADV151, ADV551 Digital I/O Module

Unit: mm



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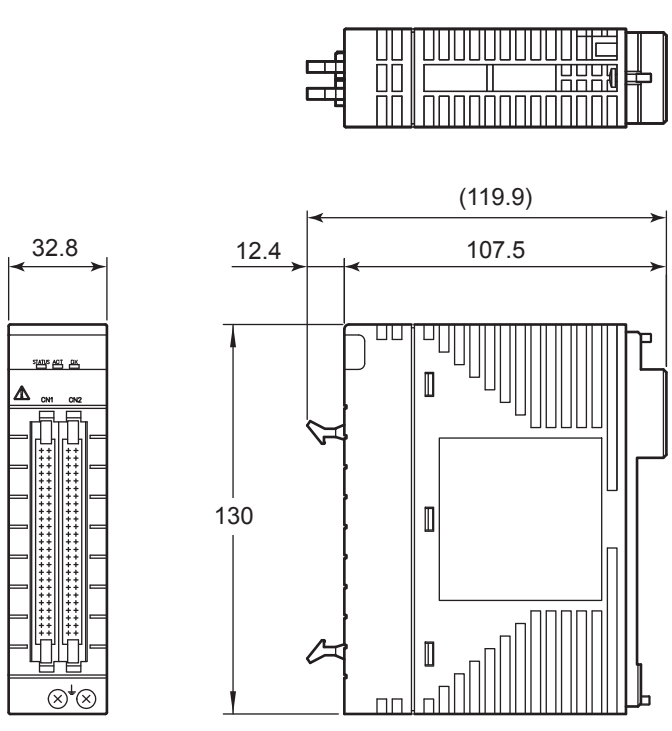
Nominal Tolerances :

When the reference dimension is over 0.5 mm and equal or less than 120 mm, its nominal tolerance is ± 0.8 mm, while its combination of nominal tolerance is ± 1.5 mm.

When the reference dimension is over 120 mm, its nominal tolerance is in accordance with JEM 1459.

● ADV161, ADV561 Digital I/O Module

Unit: mm



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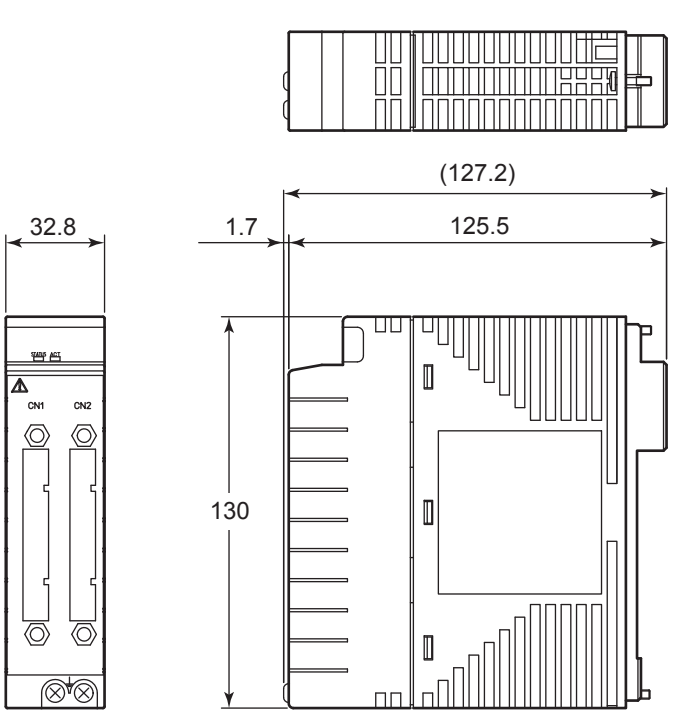
Nominal Tolerances :

When the reference dimension is over 0.5 mm and equal or less than 120 mm, its nominal tolerance is ± 0.8 mm, while its combination of nominal tolerance is ± 1.5 mm.

When the reference dimension is over 120 mm, its nominal tolerance is in accordance with JEM 1459.

● ADV859, ADV159, ADV559 Digital I/O Module for Compatible ST

Unit: mm



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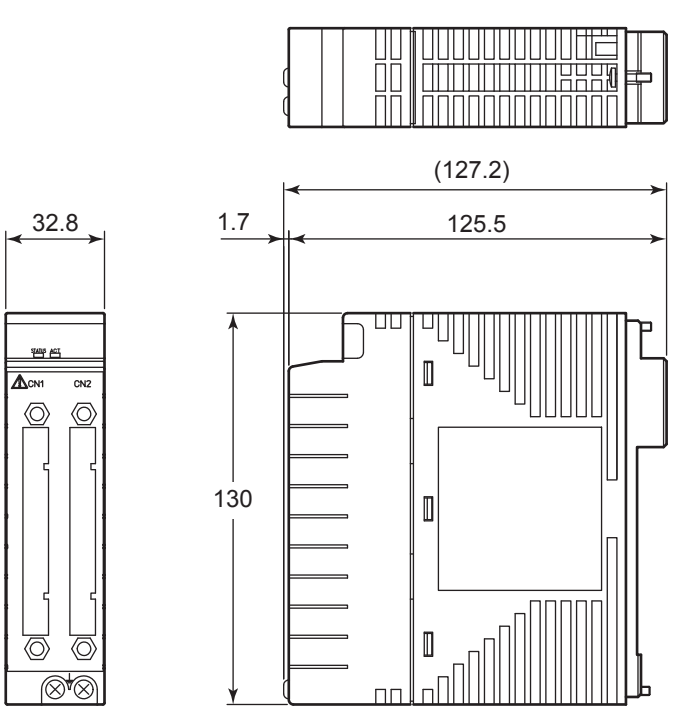
Nominal Tolerances :

When the reference dimension is over 0.5 mm and equal or less than 120 mm, its nominal tolerance is ± 0.8 mm, while its combination of nominal tolerance is ± 1.5 mm.

When the reference dimension is over 120 mm, its nominal tolerance is in accordance with JEM 1459.

● ADV869, ADV169, ADV569 Digital I/O Module for Compatible ST

Unit: mm



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Nominal Tolerances :

When the reference dimension is over 0.5 mm and equal or less than 120 mm, its nominal tolerance is ± 0.8 mm, while its combination of nominal tolerance is ± 1.5 mm.

When the reference dimension is over 120 mm, its nominal tolerance is in accordance with JEM 1459.

■ MODELS AND SUFFIX CODES

Digital Input Module

		Description
Model	ADV151	Digital Input Module (32-channel, 24 V DC, Isolated)
Suffix Codes	-P	With pushbutton input
	-E	With SOE capture (*1)
	5	Without status display; with no explosion protection
	6	With status display; with no explosion protection
	E	Without status display; with explosion protection
	F	With status display; with explosion protection
	0	Basic type
	3	With ISA Standard G3 option and temperature (-20 to 70 °C) option
Option Codes	/D5A00	With KS Cable Interface Adapter for 32-channel digital [Model: ATD5A-00]
	/B5S00	With Pressure Clamp Terminal Block for Digital Input [Model: ATB5S-00]
	/B5S10	With Pressure Clamp Terminal Block for Digital Input (surge absorber) [Model: ATB5S-10]
	/B5D00	With Dual Pressure Clamp Terminal Block for Digital Input [Model: ATB5D-00]
	/B5D10	With Dual Pressure Clamp Terminal Block for Digital Input (surge absorber) [Model: ATB5D-10]
	/CCC01	With Connector Cover for MIL Cable [Model: ACCC01]

*1: Please refer to GS 33J30D10-01EN when using it.

		Description
Model	ADV161	Digital Input Module (64-channel, 24 V DC, Isolated)
Suffix Codes	-P	With pushbutton input
	5	Without status display; with no explosion protection
	E	Without status display; with explosion protection
	0	Basic type
	1	With ISA Standard G3 option

Digital Output Module

		Description
Model	ADV551	Digital Output Module (32-channel, 24 V DC, Isolated)
Suffix Codes	-P	With pulse width output function/time-proportional output function
	5	Without status display; with no explosion protection
	6	With status display; with no explosion protection
	E	Without status display; with explosion protection
	F	With status display; with explosion protection
	0	Basic type
	3	With ISA Standard G3 option and temperature (-20 to 70 °C) option
Option Codes	/D5A00	With KS Cable Interface Adapter for 32-channel Digital [Model : ATD5A-00]
	/D5S00	With Pressure Clamp Terminal Block for Digital Output [Model : ATD5S-00]
	/D5S10	With Pressure Clamp Terminal Block for Digital Output (surge absorber) [Model : ATD5S-10]
	/D5D00	With Dual Pressure Clamp Terminal Block for Digital Output [Model : ATD5D-00]
	/D5D10	With Dual Pressure Clamp Terminal Block for Digital Output (surge absorber) [Model : ATD5D-10]
	/CCC01	With Connector Cover for MIL Cable [Model : ACCC01]

		Description
Model	ADV561	Digital Output Module (64-channel, 24 V DC, Isolated)
Suffix Codes	-P	With pulse width output function/time-proportional output function
	5	Without status display; with no explosion protection
	E	Without status display; with explosion protection
	0	Basic type
	1	With ISA Standard G3 option

Digital I/O Module

		Description
Model	ADV859	Digital I/O Module for Compatible ST2 (16-channel input/16-channel output, Isolated channels)
Suffix Codes	-P	With pulse width function/time-proportional output function
	0	Always 0
	0	Basic type
	1	With ISA Standard G3 option

		Description
Model	ADV159	Digital Input Module for Compatible ST3 (32-channel, Isolated channels)
Suffix Codes	-P	With pushbutton input
	0	Always 0
	0	Basic type
	1	With ISA Standard G3 option

		Description
Model	ADV559	Digital Output Module for Compatible ST4 (32-channel output, Isolated channels)
Suffix Codes	-P	With pulse width function/time-proportional output function
	0	Always 0
	0	Basic type
	1	With ISA Standard G3 option

		Description
Model	ADV869	Digital I/O Module for Compatible ST5 (32-channel input/32-channel output, Isolated, Common Minus Side Every 16-channel)
Suffix Codes	-P	With pulse width function/time-proportional output function
	0	Always 0
	0	Basic type
	1	With ISA Standard G3 option

		Description
Model	ADV169	Digital Input Module for Compatible ST6 (64-channel, Isolated, Common Minus Side Every 16-channel)
Suffix Codes	-P	Standard type
	0	Always 0
	0	Basic type
	1	With ISA Standard G3 option

		Description
Model	ADV569	Digital Output Module for Compatible ST7 (64-channel output, Isolated, Common Minus Side Every 16-channel)
Suffix Codes	-P	With pulse width function/time-proportional output function
	0	Always 0
	0	Basic type
	1	With ISA Standard G3 option

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

■ TRADEMARK

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