

● **Voltage Output Module (Non-Isolated)**

This module provides 16 outputs of -10 to +10 V DC signal. It can be used in dual-redundant configuration.

Items	Specifications
Model	AAV542
Number of output channels	16, non-isolated
Output signal	-10 to 10 V
Withstanding voltage	—
Allowable load resistance	10 kΩ or larger
Accuracy	Larger of ±0.3 %/FS and ±12 mV
Data update period	10 ms
Output step response time	40 ms
Temperature drift	Larger of ±0.1 %/10 °C and ±10 mV/10 °C
Maximum current consumption	450 mA (5 V DC)
Weight	0.2 kg
External connection	Pressure clamp terminal, KS cable, MIL connector cable

● **Current Input Modules (Isolated)**

This module provides 16 inputs of 4 to 20 mA signal. It can be used in dual-redundant configuration.

Items	Specifications	
Model	AAI143 (*1)	
Number of input channels	16, isolated	
Input signal	4 to 20 mA	
Allowable input current	24 mA	
Withstanding voltage	Between input and system: 1500 V AC, for 1 minute (*4)	
Input resistance	Power ON	270 Ω (20 mA) to 350 Ω (4 mA) (*2)
	Power OFF	500 kΩ or larger
Accuracy	±16 μA	
Data update period	10 ms	
Transmitter power supply	19.0 V or higher (at 20 mA) 25.5 V or less (at 0 mA) (output current limit: 25 mA) (*5)	
Setting of 2-wire or 4-wire transmitter	For each channel by setting pin	
Drift due to ambient temperature change	±16 μA/10 °C	
Maximum current consumption	230 mA (5 V DC), 540 mA (24 V DC)	
Weight	0.3 kg	
External communication	Pressure clamp terminal, MIL connector cable, dedicated cable (KS1)	
HART communication (*3)	Available	

\*1: A Zener barrier is not allowed to be connected with this module. Use an isolation barrier when the module is used in intrinsically safe application.

\*2: The module input resistance viewed from the terminals depends on the current strength as calculated as below:

$$250 \Omega + \frac{\text{voltage drop in the input protection circuit}}{\text{current value}} \quad \text{F04E.ai}$$

\*3: When this module is installed to a ER bus node unit with HART function, the EB401 firmware must be rev. 2 or later.

\*4: When the dedicated cable is used, the withstanding voltage is 500 V AC (between the input signal and the system). When the ML connector cable is used, the withstanding voltage depends on the electrical specifications of the cable.

\*5: This voltage is generated between the connecting terminals for 2-wire transmitters for this module. When calculating the minimum operating voltage for transmitters, consider to allow margins for voltage drop in external wiring.

### ■ ANALOG I/O MODULE (WITH HART COMMUNICATION)

The analog I/O module (with HART communication function) connected to a transmitter or a valve positioner receives HART variable (\*1) in addition to exchange analog input/output data by 4 – 20 mA signal with field control stations (FCS). There are 8 types of analog I/O modules (with HART communication function).

\*1: HART variable can be read by HART Command #3.

There are 8 types of analog I/O modules (with HART communication function).

Model	Model Name	Function
AAI141-H	Analog Input Module (Current Input)	16-channel, 4 to 20 mA, non-isolated
AAB141-H	Analog Input Module (Voltage/current Input)	16-channel, 1 to 5 V/4 to 20 mA, non-isolated
AAI841-H	Analog I/O Module (Current I/O)	8-channel input/8-channel output, 4 to 20 mA, non-isolated
AAB842-H	Analog I/O Module (Voltage/current Input, Current Output)	8-channel input/8-channel output, 1 to 5 V/4 to 20 mA input, 4 to 20 mA output, non-isolated
AAI135-H	Analog Input Module (Current Input)	8-channel, 4 to 20 mA, isolated channels
AAI835-H	Analog I/O Module (Current I/O)	4-channel input/4-channel output, 4 to 20 mA, isolated channels
AAI143-H	Analog Input Module (Current Input)	16-channel, 4 to 20 mA, isolated
AAI543-H	Analog Output Module (Current Output)	16-channel, 4 to 20 mA, isolated

### ● Communication with HART Devices

The analog I/O modules (with HART communication function) communicate with field devices and store analog data and HART variables in the Input/Output image area in the communication module. An FCS refers to and sets the Input/Output image by accessing the analog I/O modules (with HART communication function). The FCS utilizes the field device data via I/O terminals of the function block in the same way as other analog/digital I/O signals.

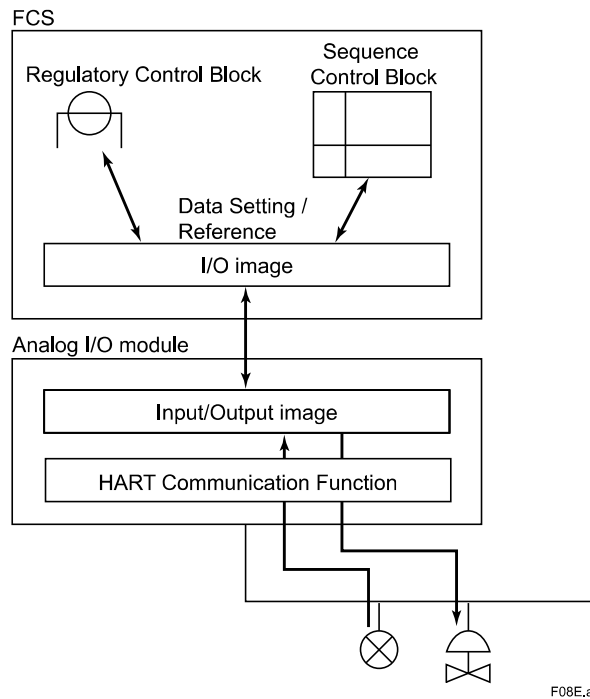
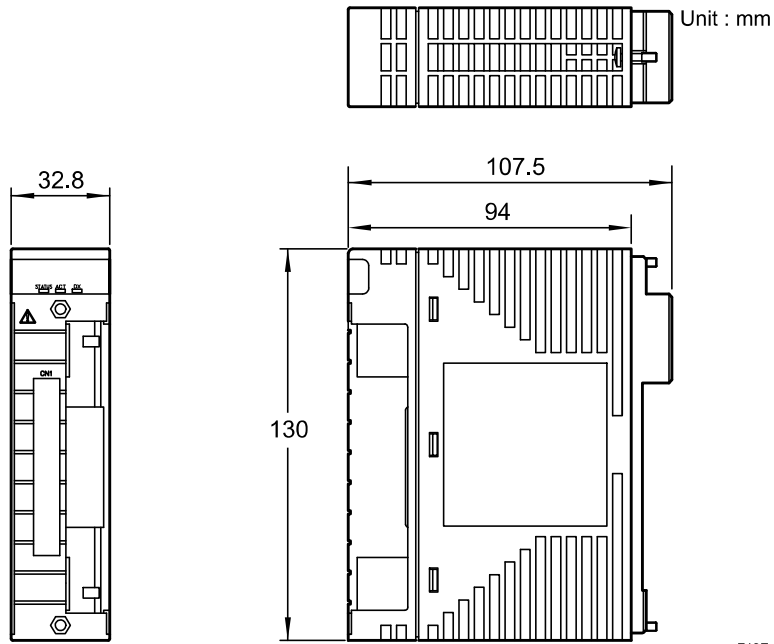


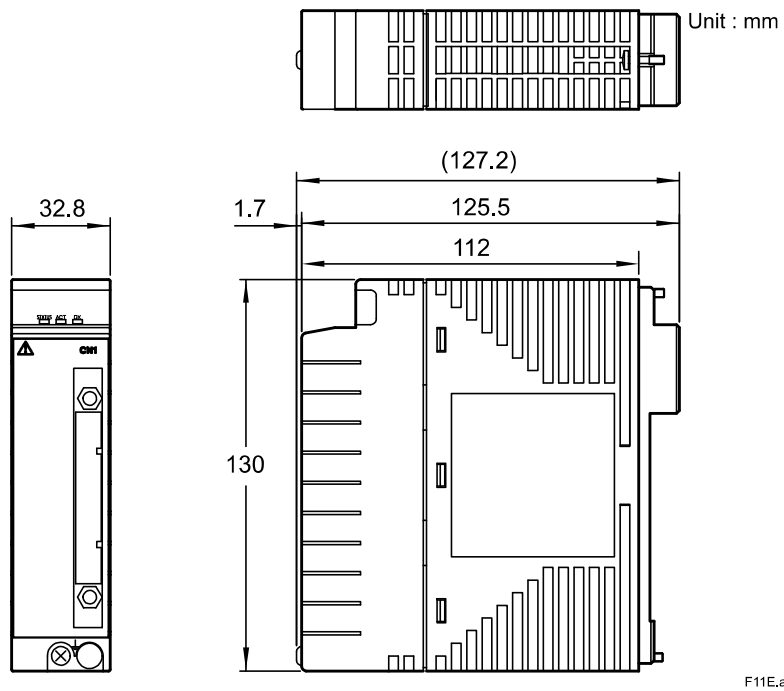
Figure Process Data Flow of HART Communications

### EXTERNAL DIMENSIONS

- AAI141, AAV141, AAV142, AAV144, AAI841, AAB841, AAV542, AAV544, AAI143, AAI543, AAT141, AAR181, AAI135, AAI835, AAP135, AAB141, AAB842



- AAT145, AAP849



		Description
<b>Model</b>	AAI143	Analog Input Module (4 to 20 mA, 16-channel, Isolated)
<b>Suffix Codes</b>	-S	Standard type
	-H	With digital communication (HART protocol)
	5	With no explosion protection
	E	With explosion protection
	0	Basic type
<b>Option Codes</b>	3	With ISA Standard G3 option and temperature (-20 to 70 °C) option
	/K4A00	With KS Cable Interface Adapter (For connecting AEA4D Terminal Board) [Model: ATK4A-00]
	/A4S00	With Pressure Clamp Terminal Block [Model: ATA4S-00]
	/A4S10	With Pressure Clamp Terminal Block (surge absorber) [Model: ATA4S-10]
	/A4D00	With Dual Pressure Clamp Terminal Block [Model: ATA4D-00]
	/A4D10	With Dual Pressure Clamp Terminal Block (surge absorber) [Model: ATA4D-10]
	/CCC01	With Connector Cover for MIL Cable [Model: ACCC01]

		Description
<b>Model</b>	AAI543	Analog Output Module (4 to 20 mA, 16-channel, Isolated)
<b>Suffix Codes</b>	-S	Standard type
	-H	With digital communication (HART protocol)
	5	Standard switch-over response in redundant configuration with no explosion protection(*1)
	6	Fast switch-over response in redundant configuration with no explosion protection(*2)
	E	Standard switch-over response in redundant configuration with explosion protection(*1)
	F	Fast switch-over response in redundant configuration with explosion protection(*2)
	0	Basic type
	1	With ISA Standard G3 option
<b>Option Codes</b>	3	With ISA Standard G3 option and temperature (-20 to 70 °C) option
	/K4A00	With KS Cable Interface Adapter (For connecting AEA4D Terminal Board) [Model: ATK4A-00]
	/A4S00	With Pressure Clamp Terminal Block [Model: ATA4S-00]
	/A4S10	With Pressure Clamp Terminal Block (surge absorber) [Model: ATA4S-10]
	/A4D00	With Dual Pressure Clamp Terminal Block [Model: ATA4D-00]
	/A4D10	With Dual Pressure Clamp Terminal Block (surge absorber) [Model: ATA4D-10]
	/CCC01	With Connector Cover for MIL Cable [Model: ACCC01]

\*1: If "standard switch-over response in redundant configuration" is selected, "basic type" or "with ISA Standard G3 option and temperature (-20 to 70 °C) option" may be specified.

\*2: If "fast switch-over response in redundant configuration" is selected, "basic type" or "with ISA Standard G3 option" may be specified.

		Description
<b>Model</b>	AAV144	Analog Input Module (-10 to +10 V, 16-channel, Isolated)
<b>Suffix Codes</b>	-S	Standard type
	5	With no explosion protection
	E	With explosion protection
	0	Basic type
<b>Option Codes</b>	3	With ISA Standard G3 option and temperature (-20 to 70 °C) option
	/K4A00	With KS Cable Interface Adapter [Model: ATK4A-00]
	/A4S00	With Pressure Clamp Terminal Block for Analog [Model: ATA4S-00]
	/A4S10	With Pressure Clamp Terminal Block for Analog (surge absorber) [Model: ATA4S-10]
	/A4D00	With Dual Pressure Clamp Terminal Block for Analog [Model: ATA4D-00]
	/A4D10	With Dual Pressure Clamp Terminal Block for Analog (surge absorber) [Model: ATA4D-10]
	/CCC01	With Connector Cover for MIL Cable [Model: ACCC01]