Yokogawa AAI141-S00

Technical Reference

Yokogawa AAI141-S00 is a standard 16-channel non-isolated analog input module for 4 to 20 mA field signals.

PRODUCT ROLE AND VERIFIED FEATURES

Feature 1

Acquires sixteen 4 to 20 mA process signals.

Feature 2

Updates the module data every 10 ms.

Feature 3

Accepts both two-wire and four-wire transmitter arrangements.

Feature 4

Uses a non-isolated channel architecture for the documented FIO application.

VERIFIED DATA SNAPSHOT

Input channels	16
Input signal	4 to 20 mA DC
Channel isolation	Non-isolated
Input update period	10 ms
Step response	100 ms
Allowable input	27 mA
Transmitter wiring	2-wire and 4-wire
External connection	Pressure clamp terminal, MIL cable or KS cable

SYSTEM RELATIONSHIP

Field signal → **Termination** → **Input module** → **Control database**

APTERPOWER SALES TEAM
WhatsApp / Phone: +86 180 3023 5313
Email: sales13@apterpower.com
Scan the approved WhatsApp code for model-specific support.

Technical profile

Verified technical values for the complete product string are arranged below for selection and engineering review.

Input channels	16
Input signal	4 to 20 mA DC
Channel isolation	Non-isolated
Input update period	10 ms
Step response	100 ms
Allowable input	27 mA
Transmitter wiring	2-wire and 4-wire
External connection	Pressure clamp terminal, MIL cable or KS cable

SELECTION ANCHORS

- Acquires sixteen 4 to 20 mA process signals.
- Updates the module data every 10 ms.
- Accepts both two-wire and four-wire transmitter arrangements.
- Uses a non-isolated channel architecture for the documented FIO application.

IMPORTANT NOTICE	Use the values as one matched configuration. Do not substitute a nearby ordering code without a separate check.

CONFIGURATION CONTROL

Configuration identity	Yokogawa AAI141-S00
Technical boundary	Apply only the functions and interfaces shown for this product or its identified system family.
Selection control	Match the complete ordering string and installed interfaces before purchase or installation.

ADDITIONAL ENGINEERING CHECKS

Can Yokogawa AAI141-S00 accept both two-wire and four-wire transmitters?	Yes. The documented wiring arrangements include two-wire and four-wire transmitters.
Which termination choices are documented for Yokogawa AAI141-S00?	Pressure-clamp terminal blocks, MIL connector cabling and the dedicated KS cable arrangement are supported.

System role and architecture

Field signal → **Termination** → **Input module** → **Control database**

APPLICATION POINTS

Process transmitter inputs

Collects flow, pressure, level and temperature current signals.

FIO node modernization

Maintains a sixteen-loop analog input position in the documented node.

Two-wire loop integration

Connects powered transmitters through the approved terminal hardware.

Four-wire instrument inputs

Accepts independently powered 4 to 20 mA sources.

INTEGRATION RECORD

Identity	Record the complete marking and installed position.
Mechanical interface	Confirm mounting, support, clearance and connector engagement.
Electrical interface	Confirm signal path, shield, common and receiving-channel assignment.
Configuration	Retain the controlled channel settings and acceptance criteria.
Functional evidence	Record the expected static value, dynamic response and system status.

AAI141-S00 should be matched to the documented system position, companion hardware and retained project configuration before the channel or station is returned to control.

ENGINEERING REVIEW QUESTIONS

How many current loops does Yokogawa AAI141-S00 acquire?	AAI141-S00 provides sixteen analog input channels.
Which field signal is assigned to Yokogawa AAI141-S00?	The module accepts 4 to 20 mA DC current inputs.
Are the channels of Yokogawa AAI141-S00 individually isolated?	No. The AAI141 channel architecture is non-isolated.
How quickly does Yokogawa AAI141-S00 refresh its input data?	Its documented input update period is 10 ms.

Engineering checks and acceptance

PRODUCT PRECAUTIONS

01	Confirm the AAI141-S00 marking and assigned node slot.
02	Record all sixteen loop tags and terminal numbers.
03	Place affected process loops in the approved maintenance state.
04	Remove field power before changing pressure-clamp or cable connections.
05	Keep channel commons and shields in their documented positions.
06	Do not copy HART settings to this standard non-HART execution.
07	Inject controlled current points and compare every used channel.
08	Review open-loop diagnostics and controller quality before release.

RELEASE EVIDENCE

Exact identity	Product marking and intended system position agree.
Interface condition	Mounting, connectors, terminals and cable routing are secure.
Signal response	The expected static and dynamic behavior has been observed.
Protection state	Channel status, alarms and controlled bypass state are restored.

IMPORTANT NOTICE	Confirm the complete AAI141-S00 marking, assigned system position and mating interfaces before installation.

APPLICATION BOUNDARIES

Process transmitter inputs	Collects flow, pressure, level and temperature current signals.
FIO node modernization	Maintains a sixteen-loop analog input position in the documented node.
Two-wire loop integration	Connects powered transmitters through the approved terminal hardware.
Four-wire instrument inputs	Accepts independently powered 4 to 20 mA sources.

Technical questions and related models

MODEL-SPECIFIC QUESTIONS

How many current loops does Yokogawa AAI141-S00 acquire?	AAI141-S00 provides sixteen analog input channels.
Which field signal is assigned to Yokogawa AAI141-S00?	The module accepts 4 to 20 mA DC current inputs.
Are the channels of Yokogawa AAI141-S00 individually isolated?	No. The AAI141 channel architecture is non-isolated.
How quickly does Yokogawa AAI141-S00 refresh its input data?	Its documented input update period is 10 ms.
What response time should be expected from Yokogawa AAI141-S00?	The documented step response is 100 ms.
What maximum current may reach Yokogawa AAI141-S00 during checking?	The allowable input is 27 mA; test equipment should remain within the documented limit.

RELATED MODELS ON APTERPOWER

Yokogawa AAI835-S00 S2	Related product reference. Review the complete ordering string before selection.
Yokogawa AIP830-101 S2	Related product reference. Compare the required interface and system position.
Yokogawa ADV161-P50 S2	Related product reference. Confirm the execution independently for the intended task.

CONFIGURATION AND SELECTION RECORD

Configuration identity	Yokogawa AAI141-S00
Technical boundary	Apply only the functions and interfaces shown for this product or its identified system family.
Selection control	Match the complete ordering string and installed interfaces before purchase or installation.

APTERPOWER SALES TEAM
WhatsApp / Phone: +86 180 3023 5313
Email: sales13@apterpower.com
Scan the approved WhatsApp code for model-specific support.

■ STANDARD SPECIFICATIONS

● Current/Voltage Input Modules (Non-Isolated)

These modules provide 16 inputs of mainly 4 to 20 mA DC or 1 to 5 V DC standardized signals from 2-wire/4-wire transmitters.

They can be used in dual-redundant configuration.

Items		Specifications		
Model		AAI141 (*1)	AAV141	AAB141(*1) (*4)
Number of input channels		16, non-isolated	16, non-isolated (differential input)	16, non-isolated When the voltage input is selected the differential input is applied.
Input signal		4 to 20 mA DC	1 to 5 V DC (allowable common mode voltage ± 1 V or less)	Voltage input : 1to 5 V DC (allowable common mode voltage ±1 V or less) Current input : 4 to 20 mA DC(*5)
Allowable input current/voltage		27 mA	±7.5 V	Voltage input : ±7.5 V Current input : 25 mA
Withstanding voltage		—		
Input resistance	Power ON	400 Ω (at 20 mA) to 1000 Ω (at 4 mA) (*2)	1 MΩ or larger	Voltage input : 1 MΩ or larger Current input : 290 Ω (at 20 mA) to 450 Ω (at 4 mA) (*6)
	Power OFF	500 kΩ or larger	340 kΩ or larger	Voltage input : 340 kΩ or larger Current input : 500 kΩ or larger
Accuracy		±16 μA	±4 mV	Voltage input : ±4 mV Current input : ±16 μA
Data update period		10 ms		
Step response time		100 ms		
Transmitter power supply		14.8 V or higher (at 20 mA) (*3) 26.4 V or less (at 0 mA) (output current limit: 27 mA)	—	
Setting of 2-wire or 4-wire transmitter		For each channel by setting pin	—	
Drift due to ambient temperature change		±16 μA/10 °C	±4 mV/10 °C	±0.1 %/10 °C
Maximum current consumption		310 mA (5 V DC), 450 mA (24 V DC)	350 mA (5 V DC)	480 mA (5 V DC), 120 mA (24 V DC)
Weight		Approx. 0.20 kg	Approx. 0.20 kg	Approx. 0.30 kg
External connection		Pressure clamp terminal, KS cable, MIL connector cable		KS cable
HART communication		Available	—	Available (at current input)

*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:

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

F01E.ai

*3: 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.

*4: This module can be used only with the following AFV10□, AFV30□, or AFV40□.

*5: Input mode for each channel is selectable by software.

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

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

F02E.ai

All Rights Reserved. Copyright © 2015, Yokogawa Electric Corporation

■ 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.

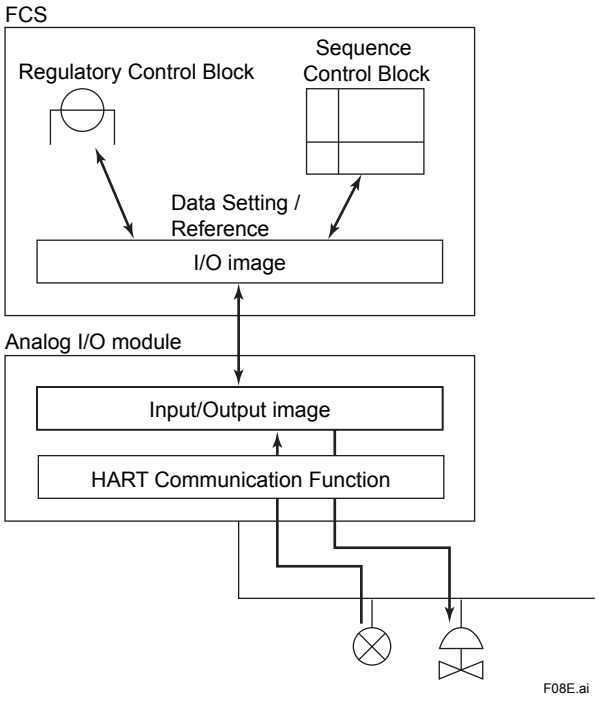
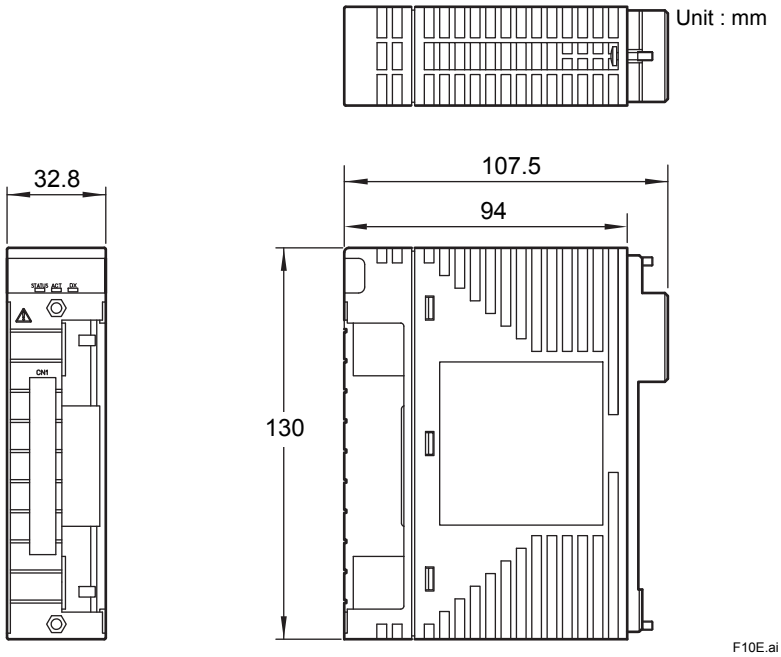


Figure Process Data Flow of HART Communications

All Rights Reserved. Copyright © 2015, Yokogawa Electric Corporation

■ EXTERNAL DIMENSIONS

● AAI141, AAV141, AAV144, AAI841, AAB841, AAV544, AAI143, AAI543, AAI135, AAI835, AAP135, AAB141, AAB842

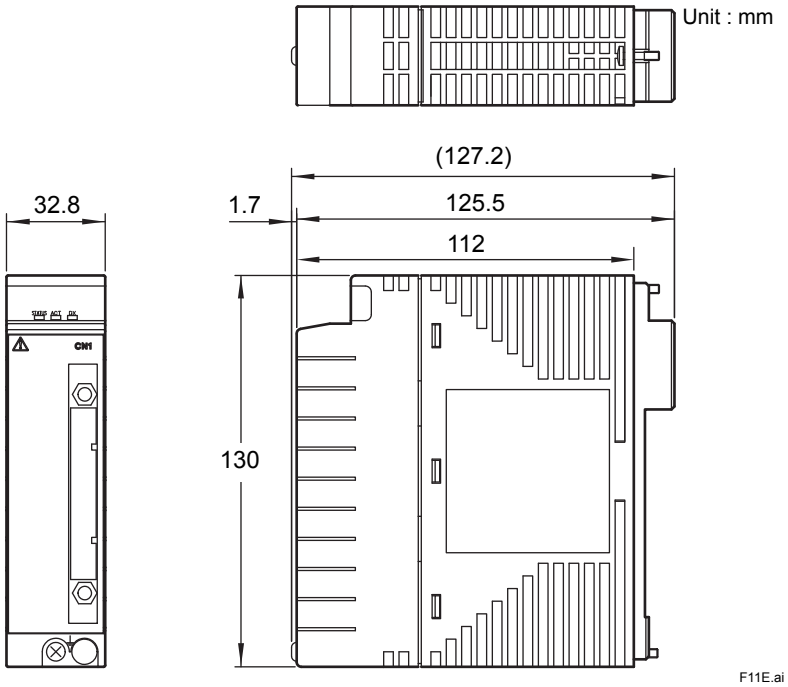


Nominal Tolerances :

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.

● AAT145, AAP849



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.

All Rights Reserved. Copyright © 2015, Yokogawa Electric Corporation

■ MODEL AND SUFFIX CODES

		Description
Model	AAI141	Analog Input Module (4 to 20 mA, 16-channel, Non-Isolated)
Suffix Codes	-S	Standard type
	-H	With digital communication (HART protocol)
	5	With no explosion protection
	E	With explosion protection
	0	Basic type
	3	With ISA Standard G3 option and temperature (-20 to 70 °C) option
Option Codes	/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]

		Description
Model	AAV141	Analog Input Module (1 to 5 V, 16-channel, Non-Isolated)
Suffix Codes	-S	Standard type
	5	With no explosion protection
	E	With explosion protection
	0	Basic type
	3	With ISA Standard G3 option and temperature (-20 to 70 °C) option
Option Codes	/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]

		Description
Model	AAB141	Analog Input Module (1 to 5 V/4 to 20 mA, 16-channel, Non-Isolated)
Suffix Codes	-H	With digital communication (HART protocol)
	5	With no explosion protection
	E	With explosion protection
	0	Basic type
	3	With ISA Standard G3 option and temperature (-20 to 70 °C) option
Option Codes	/K4A00	With KS Cable Interface Adapter [Model: ATK4A-00]

		Description
Model	AAI841	Analog I/O Module (4 to 20 mA input , 4 to 20 mA output, 8-channel input/8-channel output, Non-Isolated)
Suffix Codes	-S	Standard type
	-H	With digital communication (HART protocol)
	5	With no explosion protection
	E	With explosion protection
	0	Basic type
	3	With ISA Standard G3 option and temperature (-20 to 70 °C) option
Option Codes	/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]

All Rights Reserved. Copyright © 2015, Yokogawa Electric Corporation