

Analog Input Module






AI711-H11

User manual

IM23H30-E

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Symbol Definition	
	WARNING: Indicates information that a potentially hazardous situation which, if not avoided, could result in serious injury or death.
	RISK OF ELECTRICAL SHOCK: Indicates information that Potential shock hazard where HAZARDOUS LIVE voltages greater than 30V RMS, 42.4V peak, or 60V DC may be accessible.
	ESD HAZARD: Indicates information that Danger of an electro-static discharge to which equipment may be sensitive. Observe precautions for handling electrostatic sensitive devices
	ATTENTION: Identifies information that requires special consideration.
	TIP: Identifies advice or hints for the user.

Security& Caution Symbols

The following table lists Security& Caution symbols used on equipments.














No.	Symbol	Description
1		Direct current (DC)
2		Alternating current (AC)
3		Ground (Earth) terminal
4		Protective earth (ground) terminal
5		Reference ground (Earth) terminal
6		Frame or chassis
7		Equipotentiality
8		On (power)
9		Off (power)
10		Caution, risk of electric shock
11		Caution, hot surface
12		Caution, risk of danger
13		Electrostatic sensitive devices (ESD)

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Analog Input Module AI711-H11

Section 1 Description

AI711-H11 is an 8-channel and channel-channel isolated current signal input HART module of the ECS-700 system, which can be connected to 8 HART intelligent instruments. It supports 1:1 redundancy.

Every channel of AI711-H11 has four terminals to implement power distribution or no power distribution without Jumpers. AI711-H11 has provided the optional power distribution function.

The sampling and digital filtering technology that can restrain the signal noise and power supply noise better make AI711-H11 have higher precision and quick sampling capability. Generally, 200ms of sampling updating rate of 8 channels can be achieved under the configuration of anti-frequency interference; 50ms of sampling updating rate of 8 channels can be achieved under the quick sampling configuration.

The indicators on the module panel indicate the status of module, network, and power distribution directly.

Section 2 Technical Specifications

The table below shows the technical specifications of AI711-H11.

Table 2-1 Technical specifications of AI711-H11

Parameter		Description
Module model		AI711-H11
Type		Analog input module
Channel No.		8
Redundancy		Support
Type of isolation		Channel-channel isolated
Isolated power		500V AC
Temperature	Operating temperature	(-20~70)°C
	Storage temperature	(-40~85)°C
Humidity	Operating humidity	10%RH~90%RH. No vapor condensation
	Storage humidity	5%RH~95%RH. No vapor condensation
System power supply		24V DC±10%
24V system power consumption		<2W
24V auxiliary power consumption		<0.7W/channel
Short-circuit protection current		<40 mA
Signal type	Current	(4~20) mA+ HART
Precision		0.1%
Max. scope of signal input	Current	(2~24) mA
Sampling cycle (software selection)	Anti-working frequency	200ms
	Fast	50ms
Static input impedance	Power on	280Ω~300Ω
	Power off	≥2MΩ
common-mode rejection ratio		≥120dB
series-mode rejection ratio(SMRR)		≥60dB
Offline check		Support
Response time of communication between the device management software and HART communication module	Response time to single instrument configuration, adjustment, rectification etc. operation	<2 sec.
	Response time to reading real time data of HART equipment (8pcs)	<0.2 sec.

Section 3 Usage Instruction

3.1 Led Indicators

Table 3-1 LED indicators in AI711-H11

LED indicator	Fault (red)	Status (green)	Duplex (green)	L-Bus (green)	Supply (green)
Description Status	Fault indicator	Running indicator	Work/Standby indicator	Communication indicator	Auxiliary power supply status indicator
OFF	Normal	--	Standby	Communication link is broken off.	Abnormal auxiliary power supply
ON	Severe fault	Normal	Work	Normal	Normal
Flashing	--	No configuration	--	address confliction	--

3.2 Installation of I/O Modules

AI711-H11 is installed on I/O Module base, which equips with power terminal and field signal terminal.

Please refer to *Control Station Hardware User Manual*.

3.3 Interface Features

AI711-H11 can provide interchannel isolated distribution supply for driving field transmitter at the place where power distribution is needed.

Each channel of AI711-H11 occupies 4 connecting terminals and signals of different type have different connecting methods.

1. Current signal by module power supply

If current signals output devices in the field need power provided by AI711-H11, the connection circuit is shown as channel 1 in Figure 3-1. (The arrows indicate the directions of current.)

2. Current signal

If the current signals output devices in the field don't need power provided by AI711-H11, the connection circuit is shown as channel 8 in Figure 3-1. (The arrows indicate the directions of current.)

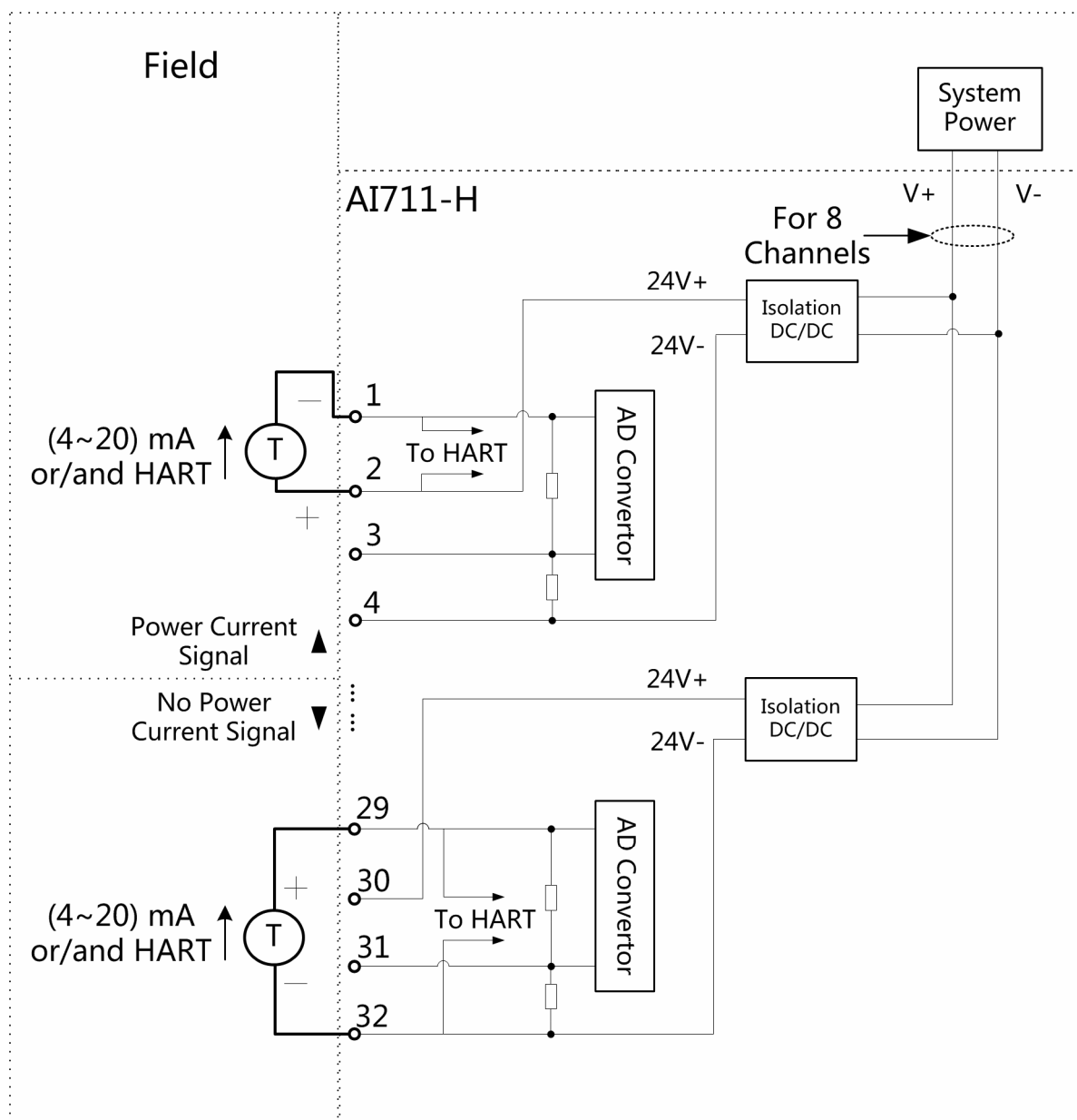


Figure 3-1 interface circuit

3.4 Terminals Definition & Connection

Each channel of AI711-H11 occupies 4 terminals to implement the introducing of two type signals.

The terminal wiring of AI711-H11 working with the change-over bases MB745-S11 and MB746-S11 and the change-over terminal unit TUA711-GS00 or with the I/O bases MB735-S11 and MB736-S11 is shown below. TUA711-GS00 corresponds to the 36 terminals of I/O base respectively.

3.4.1 Current Signal

CH* is channel No., means 1 is CH1. The 4 terminals of each channel are described as CH-1, CH-2, CH-3, and CH-4 respectively.

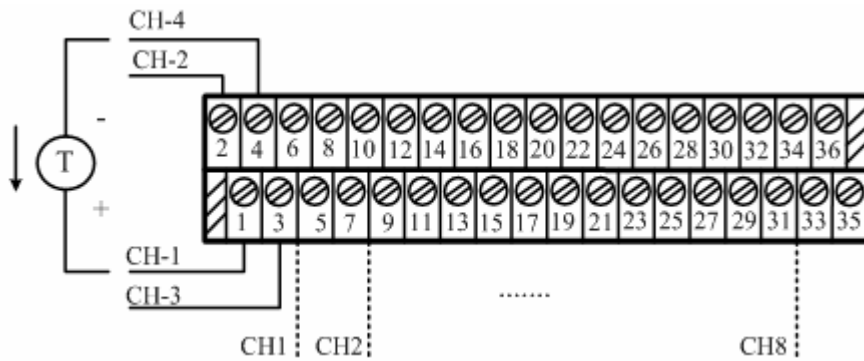
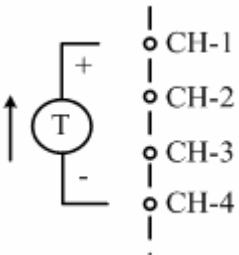


Figure 3-4 terminal interface circuit of current signals

Table 3-2 connection of current signal

Wiring diagram(current signal)	Terminal	Channel	Description	Remarks	
	1	CH-1	+	CH1	
	2	CH-2	No connection		
	3	CH-3	No connection		
	4	CH-4	-		
	5	CH-1	+	CH2	
	6	CH-2	No connection		
	7	CH-3	No connection		
	8	CH-4	-		
	9	CH-1	+	CH3	
	10	CH-2	No connection		
	11	CH-3	No connection		
	12	CH-4	-		
	13	CH-1	+	CH4	
	14	CH-2	No connection		
	15	CH-3	No connection		
	16	CH-4	-		
	17	CH-1	+	CH5	
	18	CH-2	No connection		
	19	CH-3	No connection		
	20	CH-4	-		
	21	CH-1	+	CH6	
	22	CH-2	No connection		
	23	CH-3	No connection		
	24	CH-4	-		
	25	CH-1	+	CH7	
	26	CH-2	No connection		
	27	CH-3	No connection		
	28	CH-4	-		
	29	CH-1	+	CH8	
	30	CH-2	No connection		
	31	CH-3	No connection		
	32	CH-4	-		
	33	No connection			
	34				

Wiring diagram(current signal)	Terminal	Channel	Description	Remarks
	35			
	36			

3.4.2 Current Signal by Module Power Supply

CH* is channel No., means 1 is CH1. The 4 terminals of each channel are described as CH-1, CH-2, CH-3, and CH-4 respectively.

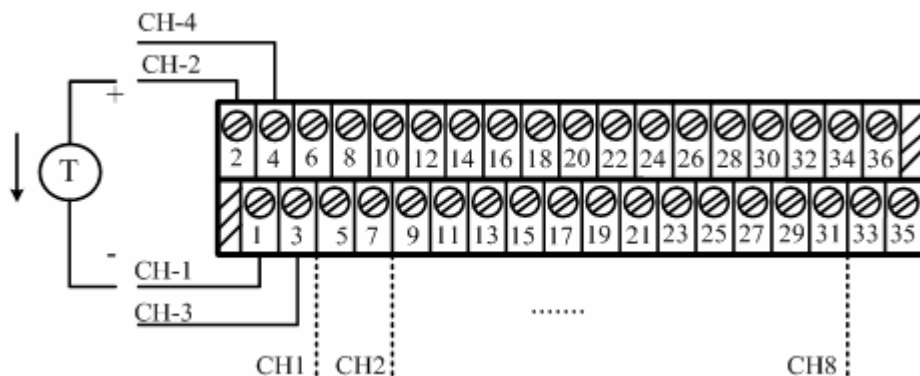


Figure 3-5 terminal interface circuit of current signals by module power supply

Table 3-3 connection of current signal by module power supply

Wiring diagram(current signal by module power supply)	terminal	Channel	Description	Remarks
	1	CH-1	-	CH1
	2	CH-2	+	
	3	CH-3	No connection	
	4	CH-4	No connection	
	5	CH-1	-	CH2
	6	CH-2	+	
	7	CH-3	No connection	
	8	CH-4	No connection	
	9	CH-1	-	CH3
	10	CH-2	+	
	11	CH-3	No connection	
	12	CH-4	No connection	
	13	CH-1	-	CH4
	14	CH-2	+	
	15	CH-3	No connection	
	16	CH-4	No connection	
	17	CH-1	-	CH5
	18	CH-2	+	
	19	CH-3	No connection	
	20	CH-4	No connection	
	21	CH-1	-	CH6
	22	CH-2	+	
	23	CH-3	No connection	
	24	CH-4	No connection	
	25	CH-1	-	CH7
	26	CH-2	+	

Wiring diagram(current signal by module power supply)	terminal	Channel	Description	Remarks
	27	CH-3	No connection	
	28	CH-4	No connection	
	29	CH-1	-	CH8
	30	CH-2	+	
	31	CH-3	No connection	
	32	CH-4	No connection	
	33	No connection		
	34			
	35			
	36			

3.5 Base/Terminal Unit Selection

Selection of bases/terminal unit matching AI711-H11 is shown in Table 3-4.

Table 3-4 Selection of bases/terminal unit matching AI711-H11

Signal connection requirement	Working mode	Base model	Terminal unit
Direct connection	Single	MB735-S11	-
	Redundancy	MB736-S11	
Terminal changeover	Single	MB745-S11	TUA711-GS00
	redundancy	MB746-S11	

AI711-H11 of this version is totally compatible with last version.

3.6 Configuration Instruction

Please refer to *Hardware Module Builder User Manual* for details.

The address of AI711-H11 is determined by its position in the rack. Please refer to *Hardware Module Builder User Manual* for details. When configuring, select the corresponding control domain address (0~15), controller address (2~126), IO link module address (1~7), IO rack address (0~3), AI711-H11 address (0~15) and channel number (0~7) according to the position of the module in the rack.

3.7 Maintenance

Clean and fasten all the power and grounding points every six months (or during the time system stops running).

Vacuum the modules, bases, racks, fan unit, power supply terminal unit, etc via static-resistant vacuum every six months (or during the time system stops running).

Please refer to *Control Station Hardware User Manual* for the installation and disassembly.

Section 4 Application

4.1 Notices

- AI711-H11 allows input signals to exceed a certain configuration range within the over-range limit. When input signals exceed the configuration range but within the over-range limit, AI711-H11 can continue measuring and sending sampling data. While input signals exceed the over-range limit, AI711-H11 will record the phenomenon and the sampling data value will be within the limited range.
- AI711-H11 only supports one signal type within scope of 4mA~ 20mA and the over-range limit is -12.5%~12.5% of the configuration range (including free range configuration).

4.2 Fault Diagnosis and Troubleshooting

1. The Fault indicator being ON all the time indicates that module has the severe fault. The solution is to replace the fail module.
2. The L-Bus indicator being OFF all the time indicates communication fault or damage of L-Bus indicator circuit or there is no other node in the I/O bus. Please check the communication connection.
3. If the L-Bus indicator is flashing, there is address confliction. Please check if there is module confliction in the bus.
4. If Power Supply indicator is OFF, there is bad connection of auxiliary 24V power source or unreliable module connection. Please check the auxiliary power supply connection and the connection between module and base.
5. If all indicators are OFF when the module is energized, the power supply of module has problem. Check the system power connection. If the connection is reliable, please replace the module.

Section 5 Revision

Table 5-1 Retrofit list of the version

Document Version	Applicable Module Model	Remarks
V1.1	AI711-H-11.11.00	
V1.2	AI711-H-12.12.00	Some specifications have been modified from last version.
V1.3	AI711-H-13.13.00	Some specifications have been modified from last version.
V1.4	AI711-H V14.14.00	Bases selection has been changed.
V2.0(20131223)	AI711-H11 V16.16.00 and later versions	Bases selection and power distribution have been changed, Add model information
V2.1(20150917)	AI711-H11 V16.16.00 and later versions	Modify IO link module address
V2.2(20161108)	AI711-H11 V16.16.00 and later versions	Add Code