

Current Output Module






AO713-H11

User manual

IM23H38-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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Current Output Module AO713-H11

Section 1 Description

The 16-channel current signal output module AO713-H11 is a current signal output module with HART communication function. AO713-H11 can realize III current signal output. The HART communication supports connecting to the handheld communicator and is compatible with break-out communication mode. It supports 1:1 redundancy.

User can set the module corresponding fault-safety mode through configuration. When there is any problem with network corresponding between the module and main controller, the module will enter the fault-safety mode. The module configuration will output previous configuring value or the configuration will be held on. Meanwhile, the module will hold on the output state and work normally when heat-resetting occurs.

The AO713-H11 also has functions of exceeding output, free span, and freely setting fault-safety mode. Configure freely according to the engineering field.

Section 2 Technical Specifications

Table 2-1 AO713-H11 Module Specification

Parameter		Description
Module Model		AO713-H11
Type		Current output module
Channel No.		16
Redundancy		Support
Isolation type		Isolated
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%
Module System Power consumption (24V)		<1.8W
Module auxiliary power consumption		<0.7W/Channel
Signal type		(4~20) mA +HART
Precision		0.1%
Max. scope of signal output		(2.4~ 21.6) mA
Responding time		10%~90% step-up<10ms
Max load		750Ω
Temperature excursion		±0.1μV/°C
Whole span excursion		±30 PPM/°C
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(16pcs)	<0.4 sec

Section 3 Usage Instruction

3.1 Led Indicators

Table 3-1 Instruction of Module Indicator

Led Indicator	Fault (Red)	Status (Green)	Duplex (Green)	L-Bus (Green)	Supply (Green)
Description Status	Fault Indicator	Running Indicator	Working/Stand by Indicator	Communication Indicator	Auxiliary Power Supply Status Indicator
OFF	Normal	Fault-safety state	Standby	Communication Link is Broken off	Abnormal Auxiliary Power Supply
ON	Severe Fault	Normal	Working	Normal	Normal
Flashing	--	No Configuration	--	Address Conflicition	--

3.2 Installation of I/O Modules

AO713-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

AO713-H11 module realizes current output and can control field execution

The terminal connection is illustrated in Figure 3-1.

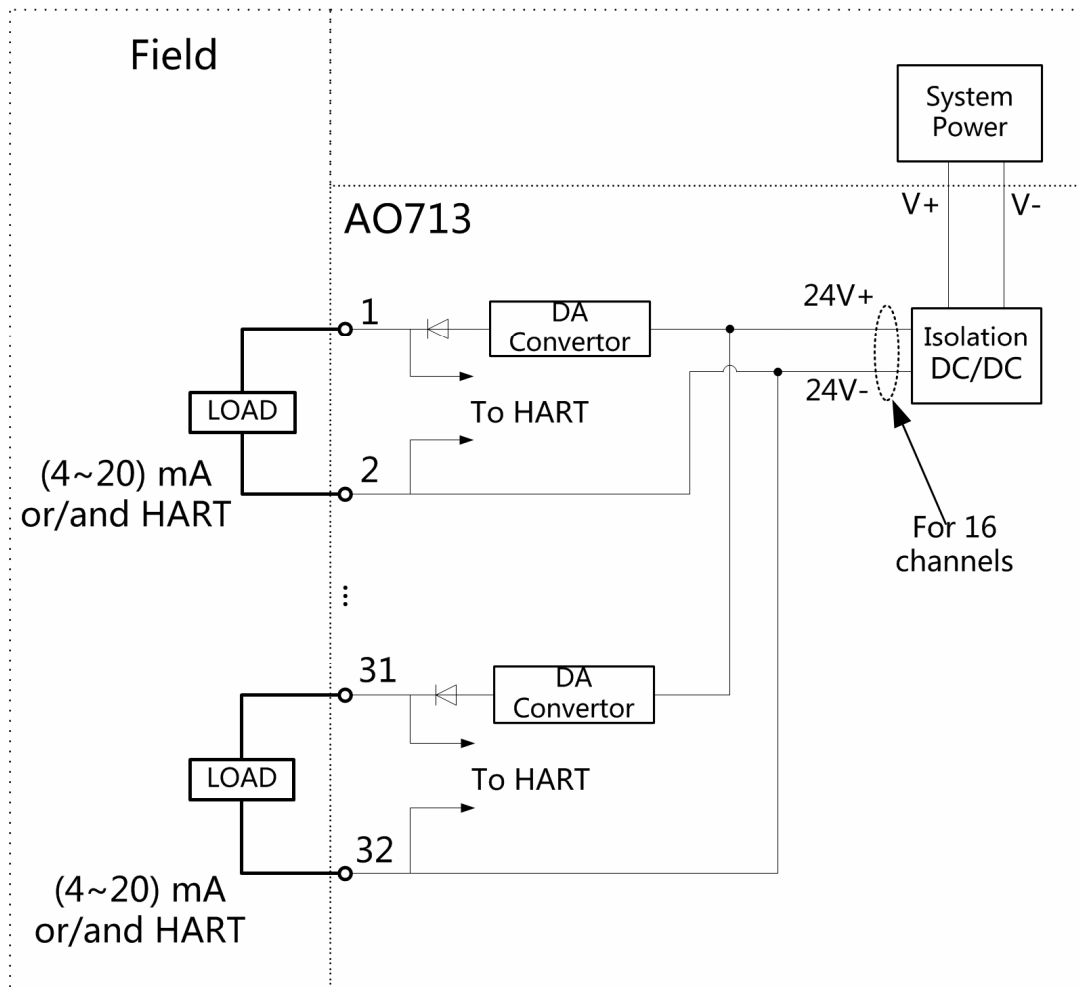


Figure 3-1 Interface Circuit of Current Signals by Module Power Supply

3.4 Terminal Definition & Connection

The terminal wiring of AO713-H11 working with the change-over bases MB745-S11 and MB746-S11 and the change-over terminal unit TUA711-AIO16 in *TUA711-AIO16 User Manual*.

The terminal wiring of AO713-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.

CH* refers to channel number. 1 means CH1. CH-1 and CH-2 refer to the 2 terminals of each channel.

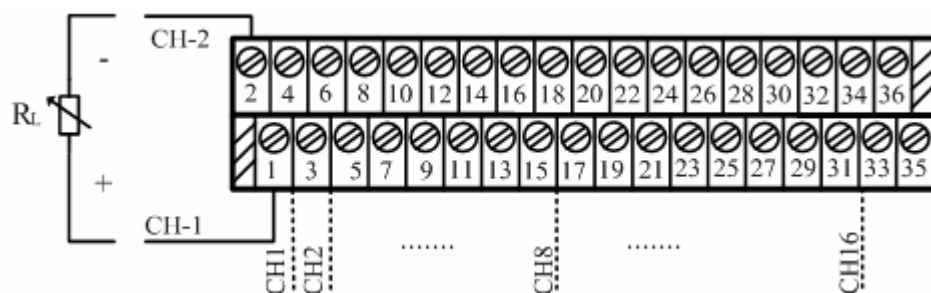


Figure 3-2 Terminal Connection Diagram

Table 3-2 Terminal Connection

Connection Diagram	Terminal	Description	Instruction	Channel
	1	CH-1	+	CH1
	2	CH-2	-	
	3	CH-1	+	CH2
	4	CH-2	-	
	5	CH-1	+	CH3
	6	CH-2	-	
	7	CH-1	+	CH4
	8	CH-2	-	
	9	CH-1	+	CH5
	10	CH-2	-	
	11	CH-1	+	CH6
	12	CH-2	-	
	13	CH-1	+	CH7
	14	CH-2	-	
	15	CH-1	+	CH8
	16	CH-2	-	
	17	CH-1	+	CH9
	18	CH-2	-	
	19	CH-1	+	CH10
	20	CH-2	-	
	21	CH-1	+	CH11
	22	CH-2	-	
	23	CH-1	+	CH12
	24	CH-2	-	
	25	CH-1	+	CH13
	26	CH-2	-	
	27	CH-1	+	CH14
	28	CH-2	-	
	29	CH-1	+	CH15
	30	CH-2	-	

Connection Diagram	Terminal	Description	Instruction	Channel
	31	CH-1	+	CH16
	32	CH-2	-	
		33, 34, 35, 36		Unconnected

3.5 Base/Terminal Unit Selection

Selection of bases/terminal unit matching AO713-H11 is shown in Table 3-3.

Table 3-3 Selection of bases/terminal unit matching AO713-H11

Signal Connection Requirement	Working Mode	Base Model	Terminal Unit
Direct Connection	Single	MB735-S11	-
	Redundancy	MB736-S11	-
Terminal Change-over	Single	MB745-S11	TUA711-AIO16 TUA711-GS00
	Redundancy	MB746-S11	

AO713-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 AO713-H11 is determined by its position in the rack. 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), module address (0~15) and channel No. (0~15) according to the position of the module in the rack. Please refer to *Control Station Hardware User Manual*.

3.7 Maintenance

Clean and fasten all power and ground points for every 6 months or during the time when system stops running.

Vacuum the modules, bases, racks, fan unit, power supply terminal unit, etc via static-resistant vacuum every 6 months or during the time when system stops running.

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

Section 4 Application

4.1 Achievement of Channel-channel Isolation

Module can achieve the channel-channel isolation of field signal by setting the safety barrier.

In channel-channel isolation, the selection of base and safety barrier is shown in Table 4-1. The achievement of channel-channel isolation for safety barrier is shown in Figure 4-1.

For baseplate isolated barriers, AO713-H11 should work with I/O module terminal change-over base.

For rail isolated barriers, AO713-H11 should work with I/O module base.

Table 4-1 Selection of base and safety barrier

Field Signal Type	I/O Module Base	I/O Change-over Base	Baseplate Isolated Barrier	Rail Isolated Barrier
III Current Signal	√	-	-	√
	-	√	√	-

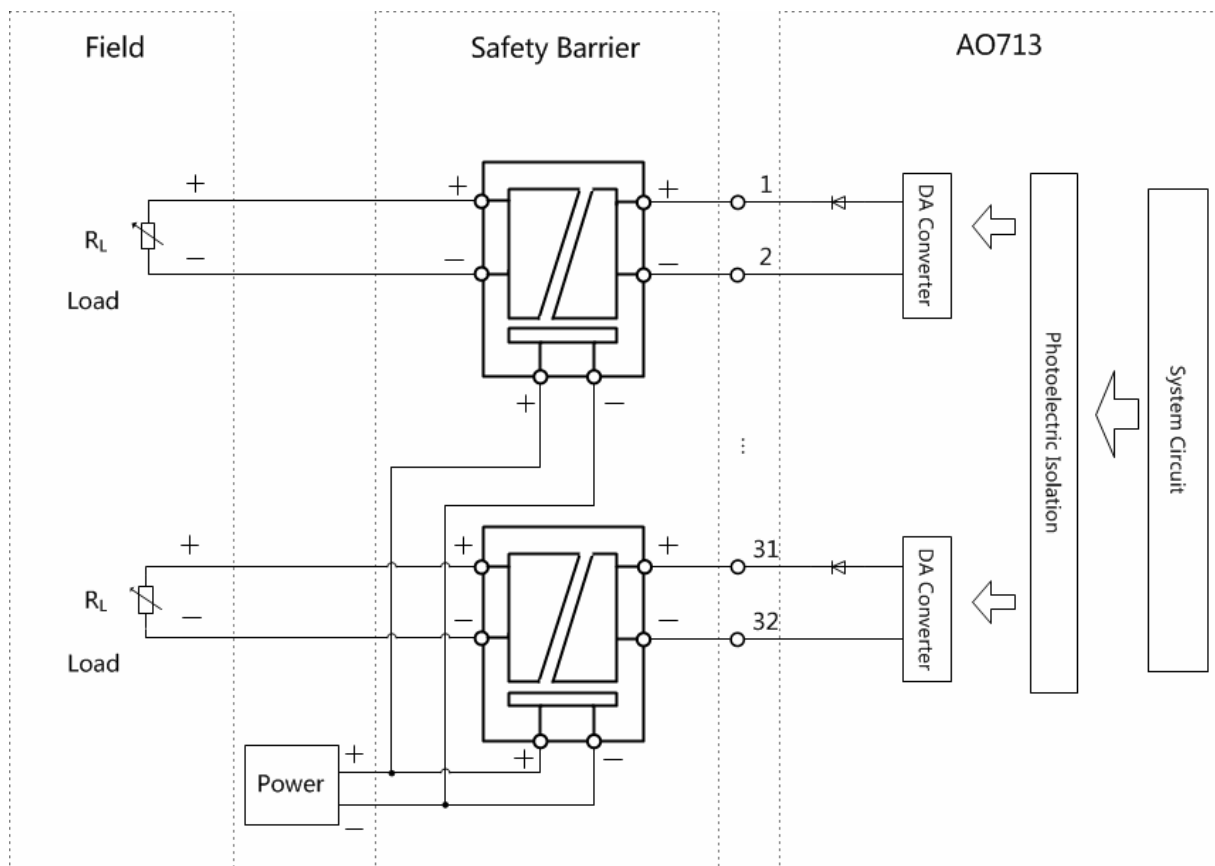


Figure 4-1 Achievement of channel-channel isolation for safety barrier

4.2 Notices

AO713-H11 module can realize function of span-exceeding output by setting the bit number configuration. (4~20) mA can realize -10%~110% exceeding output.

The setting of bit-number configuration is shown below.

Table 4-2 Setting in Configuration

Parameter	Description
Expand the upper-limit percentage of the span(%)	The percentage that exceed the span; Example : input 10 means the max signal model is 110%
Expand the lower-limit percentage of the span(%)	The percentage that exceed the span; Example : input 10 means the minimum signal model is -10%
Output the upper limit	The output must below the upper limit; the max value is the max value of signal model. Example: the exceeding percentage with the upper limit (%) =5, output upper limit can be maximally set to 105%, and the output is limited in 105%. If setting upper limit to 110%, the output is limited in 110%.
Output the lower limit	The output must above the lower limit; the minimum value set is the minimum value of signal model. Example: the exceeding percentage with the upper limit (%) =5, output upper limit can be maximally set to -5%, and the output is limited in -5%. If setting upper limit to -10%, the output is limited in -10%.
Upper limit of span	Represent the engineering max value of bit-number. 100 for the most time
Lower limit of span	Represent the engineering minimum value of bit-number. 0 for the most time

4.3 Fault Diagnosis and Troubleshooting

1. The Fault indicator being ON all the time indicates that AO713-H11 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	Product Model	Remarks
V1.0	AO713-H-10.10.00	
V2.0	AO713-H-10.10.00	Modify the base selection.
V2.0(20131209)	AO713-H11 V20.20.00 and later versions	Bases selection and power distribution have been changed Add Achievement of Channel-channel Isolation Add model information
V2.1(20150917)	AO713-H11 V20.20.00 and later versions	Modify IO link module address
V2.2(20161116)	AO713-H11 V20.20.00 and later versions	Add code