

**Current Output Module**






**AO713-S11**

**User manual**

**IM23H39-E**














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| Symbol Definition   |   |
|---|---|
|  | <b>WARNING:</b> Indicates information that a potentially hazardous situation which, if not avoided, could result in serious injury or death.  |
|  | <b>RISK OF ELECTRICAL SHOCK:</b> Indicates information that Potential shock hazard where HAZARDOUS LIVE voltages greater than 30V RMS, 42.4V peak, or 60V DC may be accessible.           |
|  | <b>ESD HAZARD:</b> Indicates information that Danger of an electro-static discharge to which equipment may be sensitive. Observe precautions for handling electrostatic sensitive devices |
|  | <b>ATTENTION:</b> Identifies information that requires special consideration.   |
|  | <b>TIP:</b> 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-S11

## Section 1 Description

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The 16-channel current signal output module AO713-S11 is a current signal output module with HART communication function. AO713-S11 can realize III current signal output. 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-S11 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

The characteristics of AO713-S11 are shown in Table 2-1.

**Table 2-1 AO713-S11 module Specification**

| Parameter                             |                       | Description                        |
|---------------------------------------|-----------------------|------------------------------------|
| Module Model                          |                       | AO713-S11                          |
| 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) |                       | <1.2W                              |
| Module auxiliary power consumption    |                       | <0.7W/Channel                      |
| Signal Type                           |                       | (4-20) mA                          |
| 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                            |

## Section 3 Usage Instruction

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### 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<br>Status | Fault Indicator | Running Indicator  | Working/Standby 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-S11 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-S11 module realizes current output and can control field execution.

The terminal connection is shown in Figure 3-1.

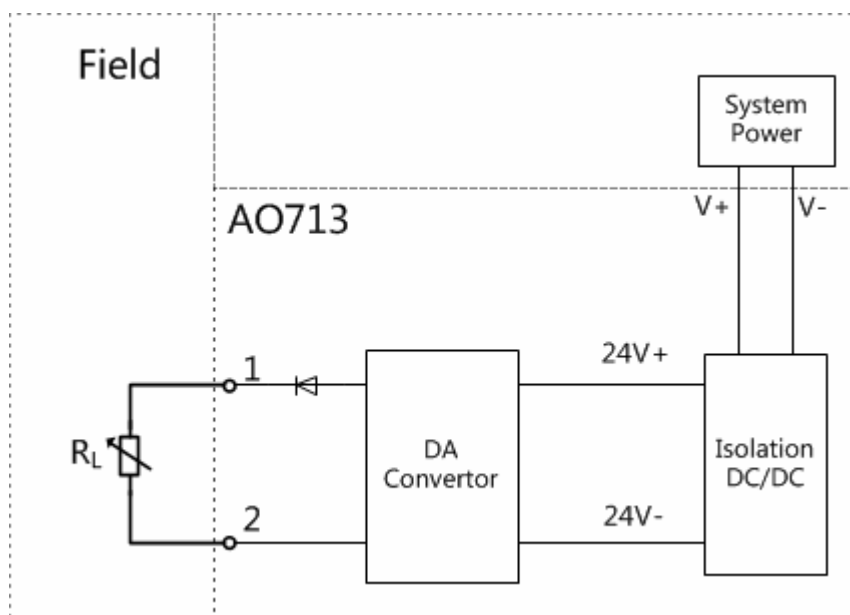


Figure 3-1 Interface Circuit of Current Signals by Module Power Supply

### 3.4 Terminals Definition & Connection

The terminal wiring of AO713-S11 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-S11 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.

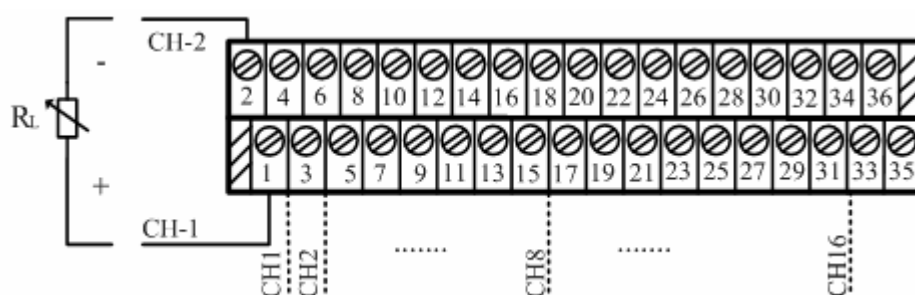
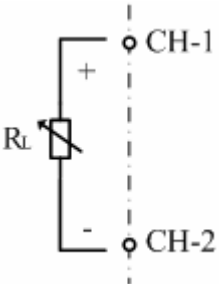


Figure 3-2 Terminal Connection Diagram

Table 3-2 Terminal Connection

| Connection Diagram | Terminal | Description | Instruction | Channel |
|--------------------|----------|-------------|-------------|---------|
|                    | 1        | CH-1        | +           | CH1     |
|                    | 2        | CH-2        | -           |         |



| Connection Diagram  | Terminal       | Description | Instruction | Channel |  |
|---|----------------|-------------|-------------|---------|--|
|  | 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        | -           |         |  |
|   | 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-S11 is shown in Table 3-3.

**Table 3-3 Selection of bases/terminal unit matching AO713-S11**

| Signal Connection Requirement | Working Mode | Base Model | Terminal Unit |
|-------------------------------|--------------|------------|---------------|
| Direct Connection             | Single       | MB735-S11  |               |
|                               | Redundancy   | MB736-S11  |               |
| Terminal                      | Single       | MB745-S11  | TUA711-AIO16  |

| Signal Connection Requirement | Working Mode | Base Model | Terminal Unit |
|-------------------------------|--------------|------------|---------------|
| Change-over                   | Redundancy   | MB746-S11  | TUA711-GS00   |

AO713-S11 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-S11 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.

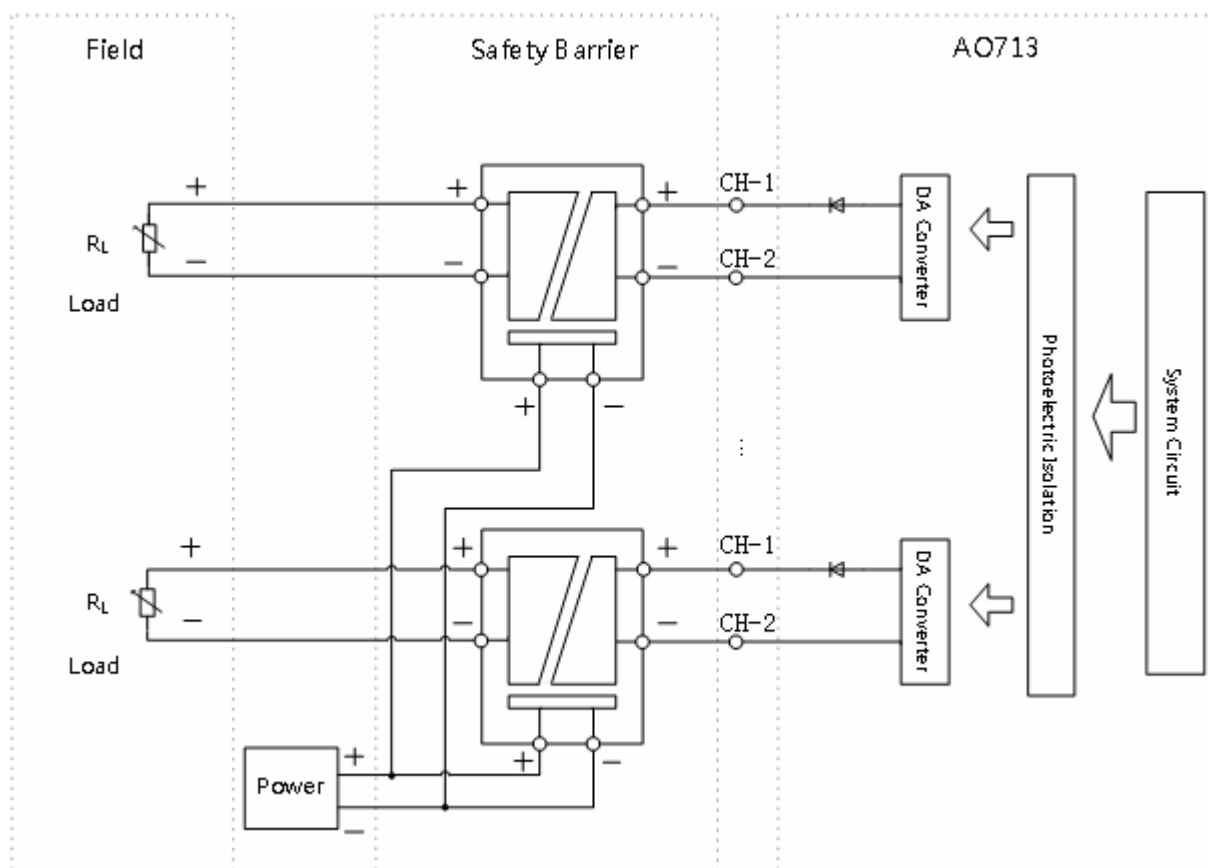
In channel-channel isolation, the selection of base and safety barrier is shown in Table 4-1. The achievement of channel-channel isolation for safety barrier is shown in Figure 4-1.

For baseplate isolated barriers, AO713-S11 should work with I/O module terminal change-over base.

For rail isolated barriers, AO713-S11 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-S11 module can realize the 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 software 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;<br>Example : input 10 means the max signal model is 110%   |
| Expand the lower-limit percentage of the span(%) | The percentage that exceed the span;<br>Example : input 10 means the minimum signal model is -10%   |
| Output the upper limit                           | The output must below the upper limit; the max value set is the max value of signal model.<br>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.<br>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 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

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*Table 5-1 Retrofit List of the Version*

| Document Version | Applicable Module Model                | Remarks   |
|------------------|--|---|
| V1.0             | AO713-S-10.10.00                       |   |
| V2.0(20131209)   | AO713-S11 V20.20.00 and later versions | Bases selection and power distribution have been changed<br>Add Achievement of Channel-channel Isolation<br>Add model information |
| V2.1(20150917)   | AO713-S11 V20.20.00 and later versions | Modify IO link module address   |
| V2.2(20170801)   | AO713-S11 V20.20.00 and later versions | Add code  |