

Current Input Module






AI713-S11

User manual

IM23H33-E

| Notices |
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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 Input Module AI713-S11

Section 1 Description

The 16-channel current signal input module AI713-S11 is a current signal input module. AI713-S11 can realize III current signal input. AI713-S11 has the free-span function. According to the span setting, it can realize high-accuracy measurement by changing the measurement range automatically in the range of (4~20) mA. It supports 1:1 redundancy.

Indicators on the front panel of the module indicate status of module, network and power supply directly.

Section 2 Technical Specifications

Table 2-1 AI713-S11 module Specification

| Parameter | | Description |
|--|------------------------|------------------------------|
| Module Model | | AI713-S11 |
| Type | | Current signal input module |
| Channel No. | | 16 |
| Redundancy | | Support |
| Isolation type | | Isolated |
| Temperature | Operation Temperature | (-20~70) °C |
| | Storage Temperature | (-40~85) °C |
| Humidity | Operation humidity | 10%RH~90%RH, No Condensation |
| | Storage humidity | 5%RH~95%RH, No Condensation |
| System Power Supply | | 24V DC $\pm 10\%$ |
| Module System Power consumption | | <1.2W |
| Module auxiliary power consumption | | <0.7W/Channel |
| Short Protection Current | | <40mA |
| Signal Type | Current | (4~ 20)mA |
| Precision | | 0.1% |
| Max. scope of signal input | | (2.4~ 21.6)mA |
| Sampling Period(Selected by Software) | Anti-working Frequency | 400ms |
| | Fast | 100ms |
| Input Impedance | Power on | 230 Ω ~ 650 Ω |
| | Power off | >1M Ω |
| Common-Mode Rejection Ratio | | ≥ 120 dB |
| Series-Mode Rejection Ratio | | ≥ 60 dB |
| Offline check | | Support |

Section 3 Usage Instruction

3.1 Led Indicators Instruction

Table 3-1 Instruction of Module Indication Light

| LED Indicator | Fault (Red) | Status (Green) | Duplex (Green) | L-Bus (Green) | Supply (Green) |
|-----------------------|-----------------|-------------------|---------------------------|----------------------------------|---|
| Description Status | Fault Indicator | Running Indicator | Working/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 | Working | Normal | Normal |
| Flashing | -- | No Configuration | -- | Address Conflication | -- |

3.2 Installation of I/O Module

AI713-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

The connection of current signal without power supply can be performed when AI713-S11 work with I/O module bases, the connection circuit is shown as channel 1 in Figure 3-1

The connection of current signal without power supply and current signal with power supply can be performed when AI713-S11 work with I/O change-over bases and change-over terminal unit, the connection circuit is shown as channel 1 and channel 2 in Figure 3-2, please refer to terminal unit user manual for the specific.

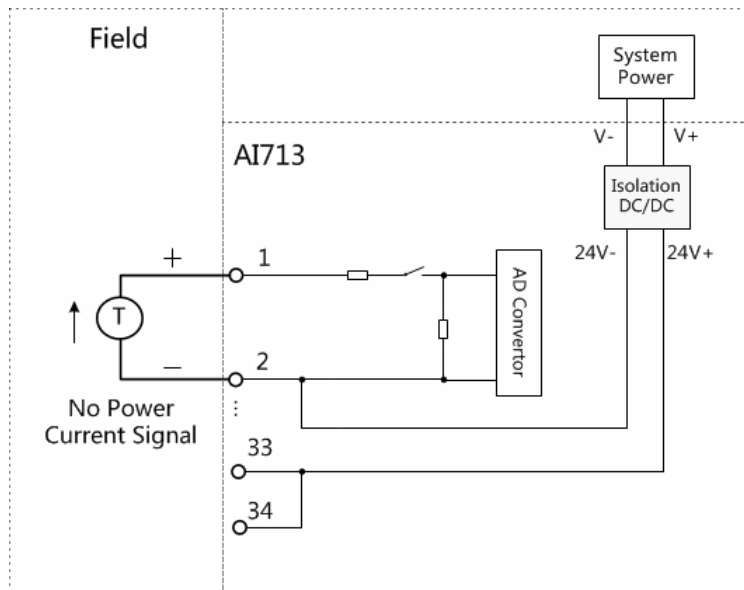


Figure 3-1 interface circuit (I/O module base or universal terminal unit)

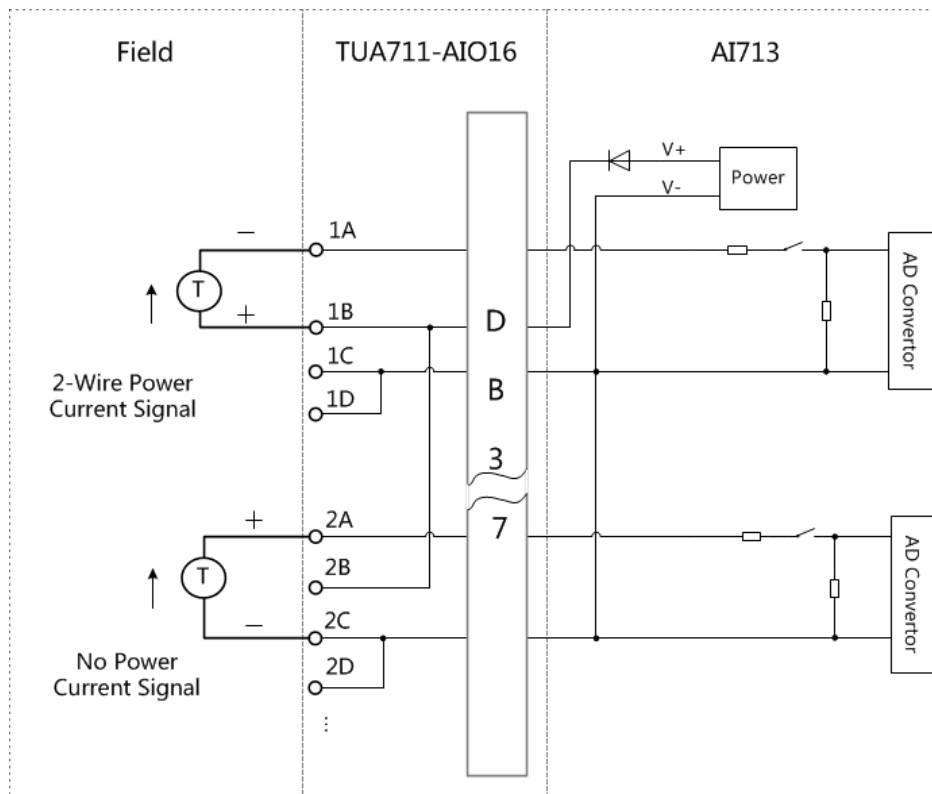


Figure 3-2 interface circuit (16-channel change-over terminal unit)

3.4 Terminals Definition & Connection

The connections of two-wire current signal with power supply and current signal without power supply can be performed when AI713-S11 works with change-over bases MB745-S11, MB746-S11 and change-over terminal unit TUA711-AIO16. Please refer to *TUA711-AIO16 User Manual* for connection details.

The connections of current signal without power supply can be performed when AI713-S11 works with I/O base MB735-S11, MB736-S11 or change-over bases MB745-S11, MB746-S11 and change-over terminal unit TUA711-GS00. Take I/O base as an example and the terminal wiring is shown below. TUA711-GS00 corresponds to the 36 terminals of I/O base respectively.

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

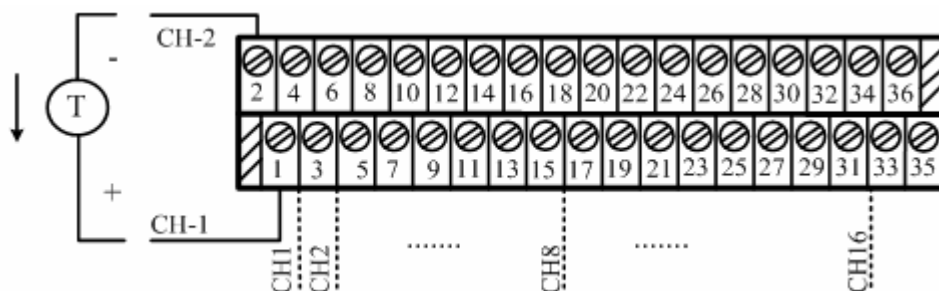


Figure 3-3 Terminal Connection Diagram

Table 3-2 Connection Instruction

| 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 |

| Connection Diagram | Terminal | Description | Instruction | Channel |
|--------------------|----------------|-------------|-------------|---------|
| | 28 | CH-2 | - | CH15 |
| | 29 | CH-1 | + | |
| | 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 AI713-S11 is shown in Table 3-3.

Table 3-3 Selection of bases/terminal unit matching AI713-S11

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

AI713-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 AI713-S11 is determined by its position in the rack. Please refer to *Control Station Hardware User Manual*. 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.

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 six 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, AI713-S11 should work with I/O module terminal change-over base.

For rail isolated barriers, AI713-S11 should work with I/O module base, and only connect active III current signal.

Table 4-1 Selection of base and safety barrier

| Field Signal Type | I/O Module Base | I/O Change-over Base | Baseplate Isolated Barriers | Rail Isolated Barriers |
|---------------------------|-----------------|----------------------|-----------------------------|------------------------|
| Active III Current Signal | ✓ | - | - | ✓ |
| III Current Signal | - | ✓ | ✓ | - |

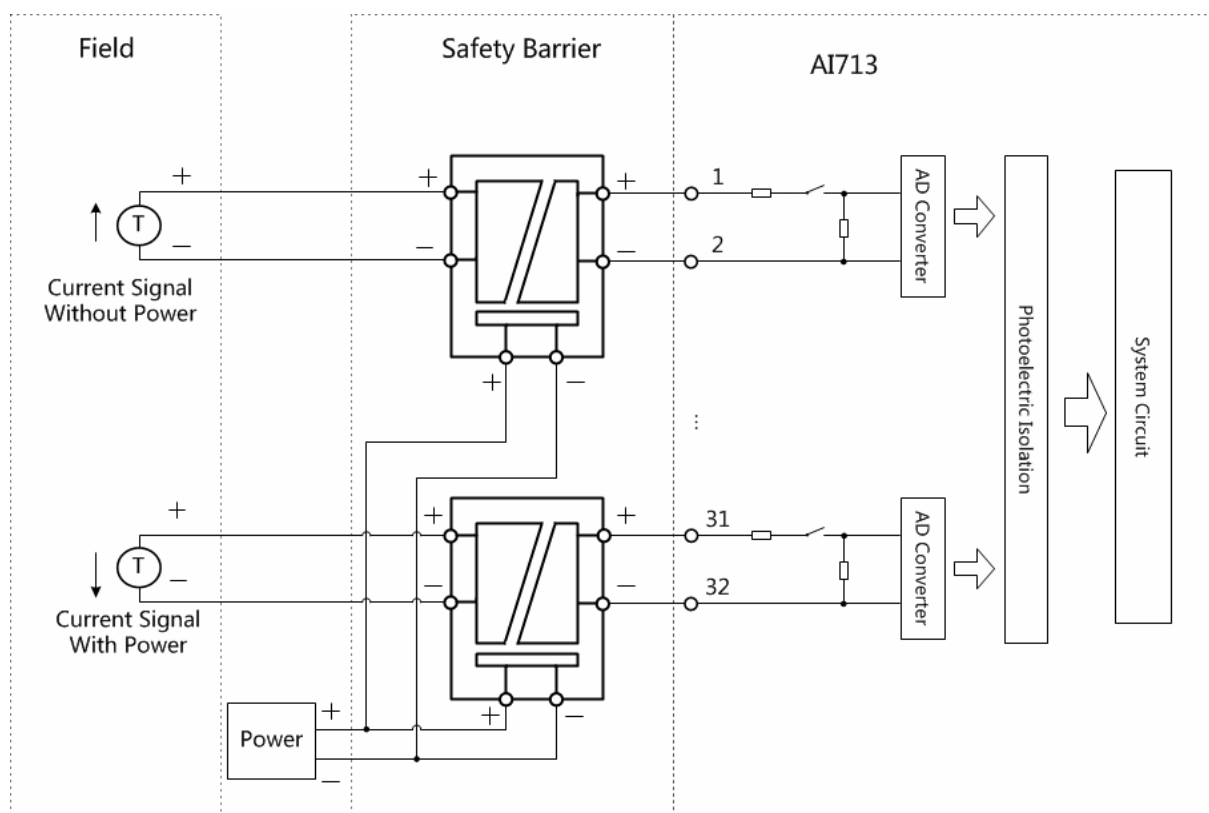


Figure 4-1 Achievement of channel-channel isolation for safety barrier

4.2 Notices

- AI713-S11 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, AI713-S11 can continue measuring and sending sampling data. While input signals exceed the over-range limit, AI713-S11 will record the phenomenon and the sampling data value will be within the limited range.
- AI713-S11 only supports one signal type within scope of 4mA~ 20mA and the over-range limit is -10%~110% of the configuration range (including free range configuration).

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

Table 5-1 Retrofit list of the version

| Document Version | Applicable Module Model | Remarks |
|------------------|--|---|
| V1.0 | AI713-S-10.10.00 | |
| V1.1(20131223) | AI713-S11 V20.20.00 and later versions | Bases selection and power distribution have been changed Add Achievement of Channel-channel Isolation Add model information |
| V1.2(20141218) | AI713-S11 V20.20.00 and later versions | Modify the Interface Features |
| V1.3(20150917) | AI713-S11 V20.20.00 and later versions | Modify IO link module address |
| V1.4(20161116) | AI713-S11 V20.20.00 and later versions | Add code |