

Digital Input Module






DI711-S11

User manual

IM23H40-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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Digital Input Module DI711-S11

Section 1 Description

DI711-S11 module is a 24V digital input module, which can collect 16-loop multi-type switch value signals and support redundancy configuration.

As for regular digital value input signal, it can be directly connected to the connection terminal of the module base; as for 220 V AC input signal or digital value input signal needs to be isolated, special terminal unit should be used as well.

Section 2 Technical Specifications

Table 2-1 technical specifications of DI711-S11

Parameter		Description
Module model		DI711-S11
Type		Digital input module
Channel number		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 condensation
	Storage humidity	5%RH~95%RH, no condensation
System power supply		24V DC±10%
24V system power consumption		<1.2W
24V auxiliary cabinet power consumption		<0.12W/channel
Signal type	Passive contact input	Common terminal can be set, NPN and PNP optional
	Active contact input	
ON and OFF condition	Contact	ON:<1kΩ; OFF:>100kΩ
	Active contact	ON:(15~30)V; OFF:<5V

Section 3 Usage Instruction

3.1 Led indicators

Table 3-1 LED indicators in DI711-S11

LED indicator	Fault (red)	Status (green)	Duplex (green)	L-Bus (green)	Supply (green)
Description Status	Fault	Operation	Work/standby	Communication	Cabinet power supply status
Off	Normal	--	Standby	Communication link break	Abnormal cabinet power supply
On	Fault	Normal	Work	Normal	Normal
Blink	--	No configuration	--	IP confliction	--

3.2 Installation of I/O modules

DI711-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

DI711-S11 module can collect many types of digital signals through signal input interface circuit.

3.3.1 Connection of Passive Contact Signal Input

If the signal source is passive contact signal input, the base connection terminals 33 and 35, 34 and 36 should in short connection respectively (recommended), or 33 and 36, 34 and 35 in short connection respectively. The connection diagram is show in Figure 3-1.

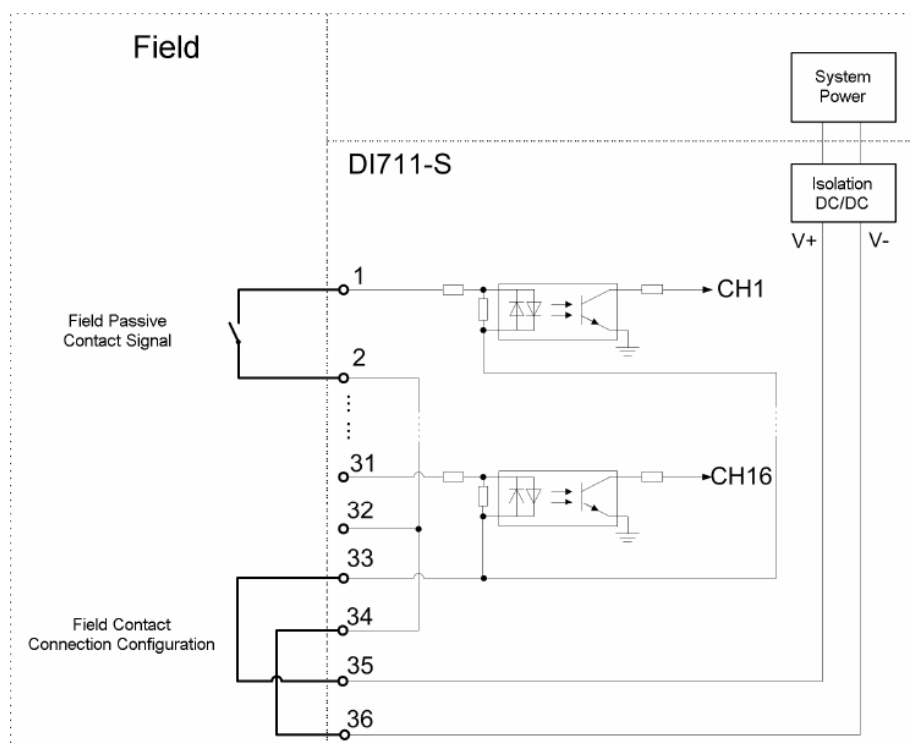


Figure 3-1 Passive contact signal input interface circuit

3.3.2 Connection of active contact signal input

If the signal source is active contact signal input, the connection terminals of base 33 and 34, 35 and 36 should be suspended. The connection principle is shown in Figure 3-2.

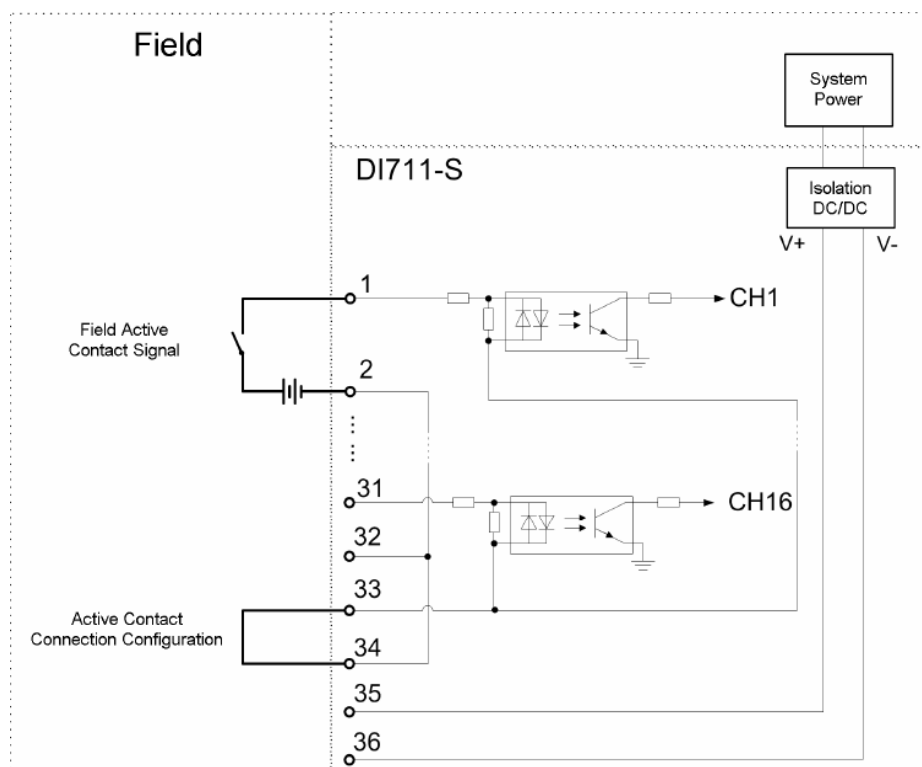


Figure 3-2 Active contact signal input interface circuit

3.3.3 Connection of proximity switch signal input

If the signal source is PNP proximity switch signal input and the power source is periphery power source, the connection terminals of base 33 and 34, 35 and 36 should be suspended. The connection principle is shown in Figure 3-3.

If the signal source is NPN proximity switch signal input and the power source is periphery power source, the connection terminals of base 33 and 34, 35 and 36 should be suspended. The connection principle is shown in Figure 3-4.

Proximity switch signals of PNP and NPN cannot connect the same DI module simultaneously, as shown in Figure 3-3 and Figure 3-4.

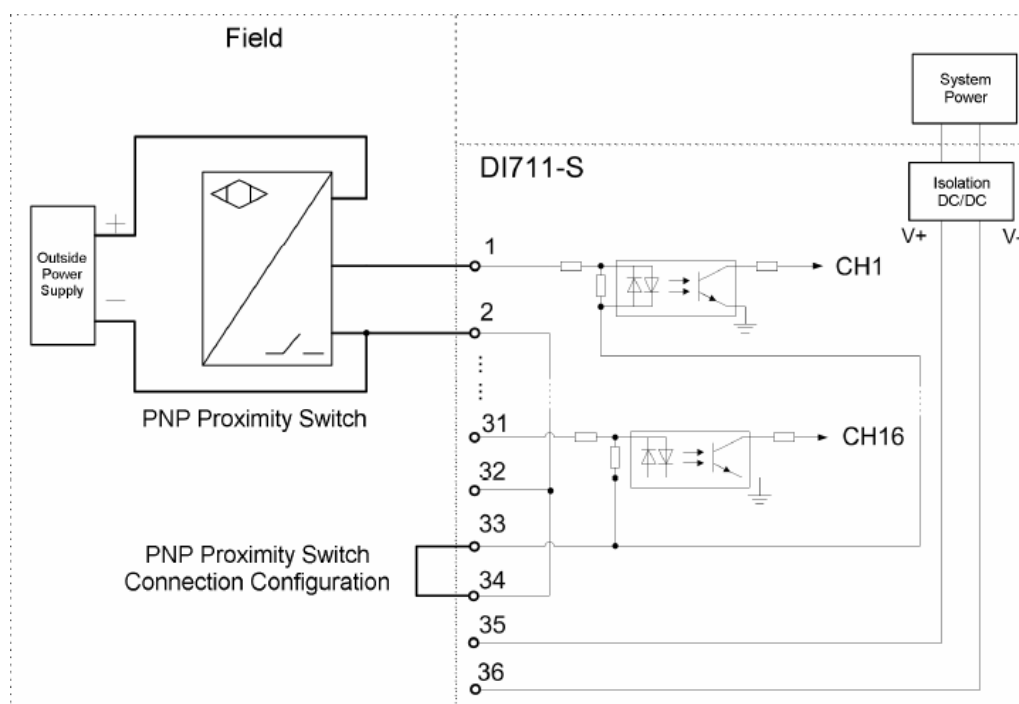


Figure 3-3 PNP proximity switch signal input interface circuit

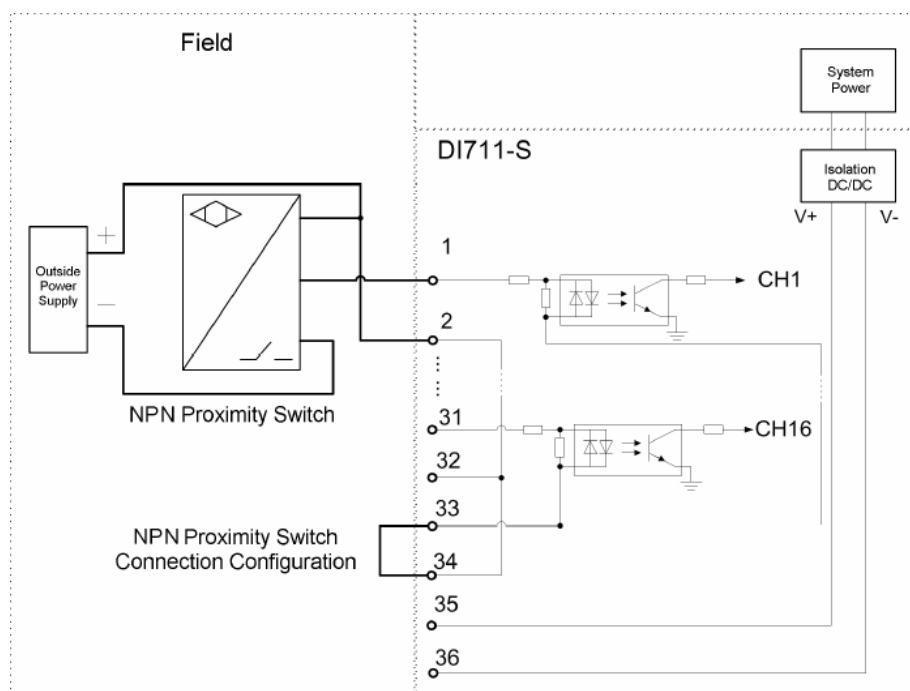


Figure 3-4 NPN proximity switch signal input interface circuit

3.4 Terminals definition & connection

The terminal wiring of DI711-S11 working with the change-over bases MB745-S11 and MB746-S11 and the change-over terminal unit TUA711-DIR16 in *TUA711-DIR16 User Manual*.

The terminal wiring of DI711-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.

DI711-S11 module base input connection instruction is shown as follow. CH* refers to the channel number.

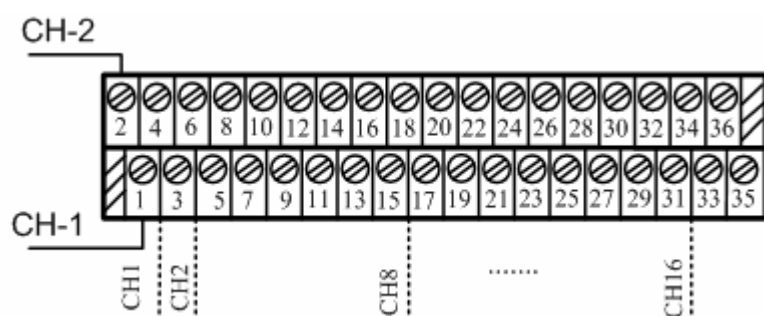


Figure 3-5 Terminal Connection Diagram

Table 3-2 Connections of terminals of DI711-S11

terminals	Description	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	
31	CH-1	CH16
32	CH-2	
33	Collocation terminal	-
34		
35		
36		

Table 3-3 Power distribution terminal instruction table

Signal type	Connection instruction
Passive contact	Mode 1: Terminals 33 and 35, terminals 34 and 36 in short connection respectively(recommended); Mode 2: Terminals 33 and 36, and terminals 34 and 35 in short connection respectively
Active contact	Terminals 33 and 34 in short connection, and terminals 35 and 36 in disconnection

Signal type	Connection instruction
PNP proximity switch	Terminals 33 and 34 in short connection and terminals 35 and 36 in disconnection
NPN proximity switch	Terminals 33 and 34 in short connection and terminals 35 and 36 in disconnection

3.5 Base/Terminal Unit Selection

Selection of bases/terminal unit matching DI711-S11 is shown in Table 3-4.

Table 3-4 Selection table of bases/terminal unit matching DI711-S11

Signal Type	Working mode of DI711-S11	Base No.	Terminal unit model
24V DI signal	Single	MB735-S11	-
	Redundancy	MB736-S11	-
24V DI change-over signal	Single	MB745-S11	TUA711-GS00
	Redundancy	MB746-S11	
Relay isolated signal (24V DI signal)	Single	MB745-S11	TUA711-DIR16
	Redundancy	MB746-S11	
220VAC DI change-over signal	Single	MB745-S11	TUA712-DI16
	Redundancy	MB746-S11	

DI711-S11 of this version is totally compatible with last version.

3.6 Configuration instruction

Please refer to *Hardware Module Builder User Manual* and *Tag Builder User Manual*.

The module address is determined according to the module position in the rack. When configuring, according to the module position in the rack, choose corresponding control domain addresses (0~15), control machine address (2~126), IO link module address (1~7), IO rack address (0~3), module address (0~15) and channel NO. (0~15).

3.7 Module state diagnose

The current working state of I/O module can be displayed in the I/O module state diagnose display of the system state diagnose display. Modules diagnosis include: module active/standby, module failure level, module auxiliary power, module connection detection, module address detection, module A Bus, module B Bus, module type detection, module configuration correction, channel state, etc.

Please refer to *Diagnosis Software User Manual* for the details of diagnose display.

3.8 Maintenance

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

Vacuum the modules, bases, racks, fan unit, power supply terminal unit, etc via static-resistant vacuum every six months (or 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 relay terminal unit or safety barrier.

In channel-channel isolation, the selection of base, terminal unit and safety barrier is shown in Table 4-1. The achievement of channel-channel isolation for relay terminal unit is shown in Figure 4-1. The achievement of channel-channel isolation for safety barrier is shown in Figure 4-2. The safety barrier should support the output of passive contact signal.

Table 4-1 Selection of base, terminal unit and safety barrier

Field Signal Type	I/O Module Base	I/O Change-over Base	Relay Terminal Unit	Baseplate Isolated Barrier	Rail Isolated Barrier
Passive Signal	✓	-	-	-	✓
	-	✓	-	✓	-
Active Signal	-	✓	✓	-	-

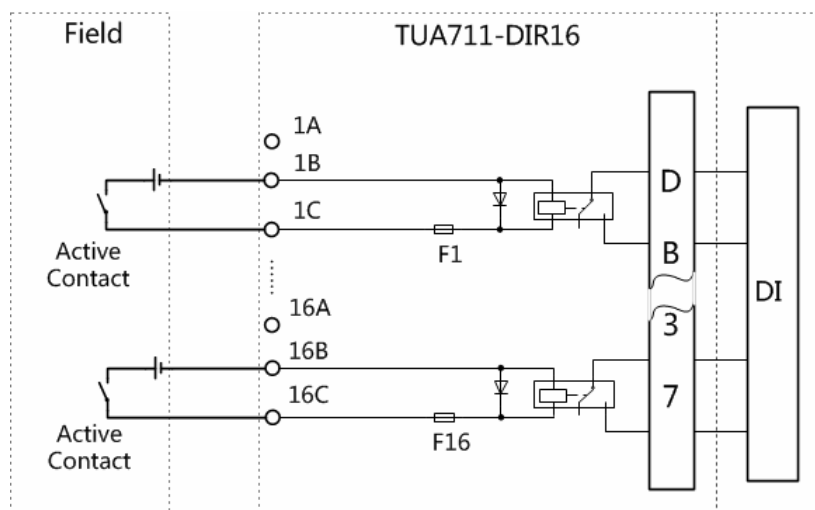


Figure 4-1 Achievement of channel-channel isolation for relay terminal unit

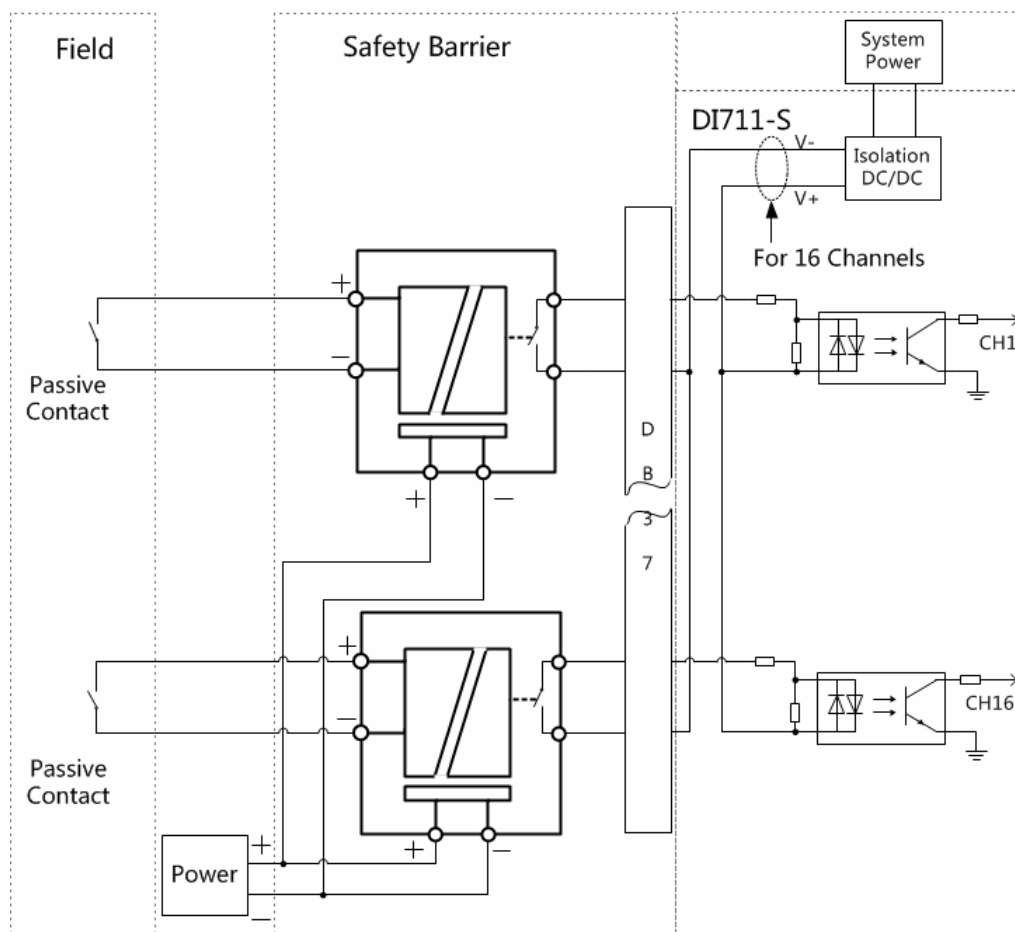


Figure 4-2 Achievement of channel-channel isolation for safety barrier

4.2 Notices

- Because there are many types of digital input signals, proper connection method should be selected according to the site signal type. As for some types of signals (such as 220V AC switch signal etc.), change-over base and special terminal unit should be provided. When using terminal unit from outside, pay attention to the signal type selection and module connection method etc.
- When the module is connected to relay terminal unit, relay's affect on DI jitter should be considered. Generally, when relay terminal unit is connected, DI jitter parameter can be set bellow 30 time per second, but it should be determined according to the parameter of specific relay.

4.3 Fault diagnosis and troubleshooting

1. If the Fault indicator is ON all the time, there is a severe module fault. Module replacement is required.
2. If L-Bus indicator is OFF, there is a communication fault or L-Bus indicator circuit damage or there is no other node in the I/O bus. Please check the communication connection.
3. If the L-Bus indicator flashes, there is IP conffliction. Please check if there is module

confliction in the bus.

4. If Supply indicator is OFF, there is bad connection of periphery 24V power source or unreliable module connection. Please check the auxiliary power connection and the connection between module and base.
5. If all indicators are OFF when the module is energized, the power of module system 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 Version	Remarks
V1.0	DI711-S-11.11.00	
V2.0	DI711-S-12.12.00	Modify the base selection
V2.1(20131223)	DI711-S11 V14.13.00 and later version	Bases selection and power distribution have been changed Add achievement of channel-channel isolation Add model information
V2.2(20141218)	DI711-S11 V14.13.00 and later version	Modify figure 4-2
V2.3(20150917)	DI711-S11 V14.13.00 and later version	Modify IO link module address
V2.4(20161116)	DI711-S11 V14.13.00 and later version	Add code
V2.5(20210823)	DI711-S11 V14.13.00 and later version	Add TUA712-DI16 in Table 3-4