

# **OMC System Software**






**High-performanceHMI**

**APL**

**Configuration Guide**

| Notices  |
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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.  |

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# APL Configuration Guide

## Section 1 About This Manual

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This section mainly introduces how to configure the APL system. The following manuals might provide you with more information.

- *UIO831-S01 User Manual*
- *AEF6512-2T-S User Manual*
- *AEP6101-1E-S User Manual*
- *TM Series Intelligent Temperature Front-End Manual*
- *IDM User Manual*

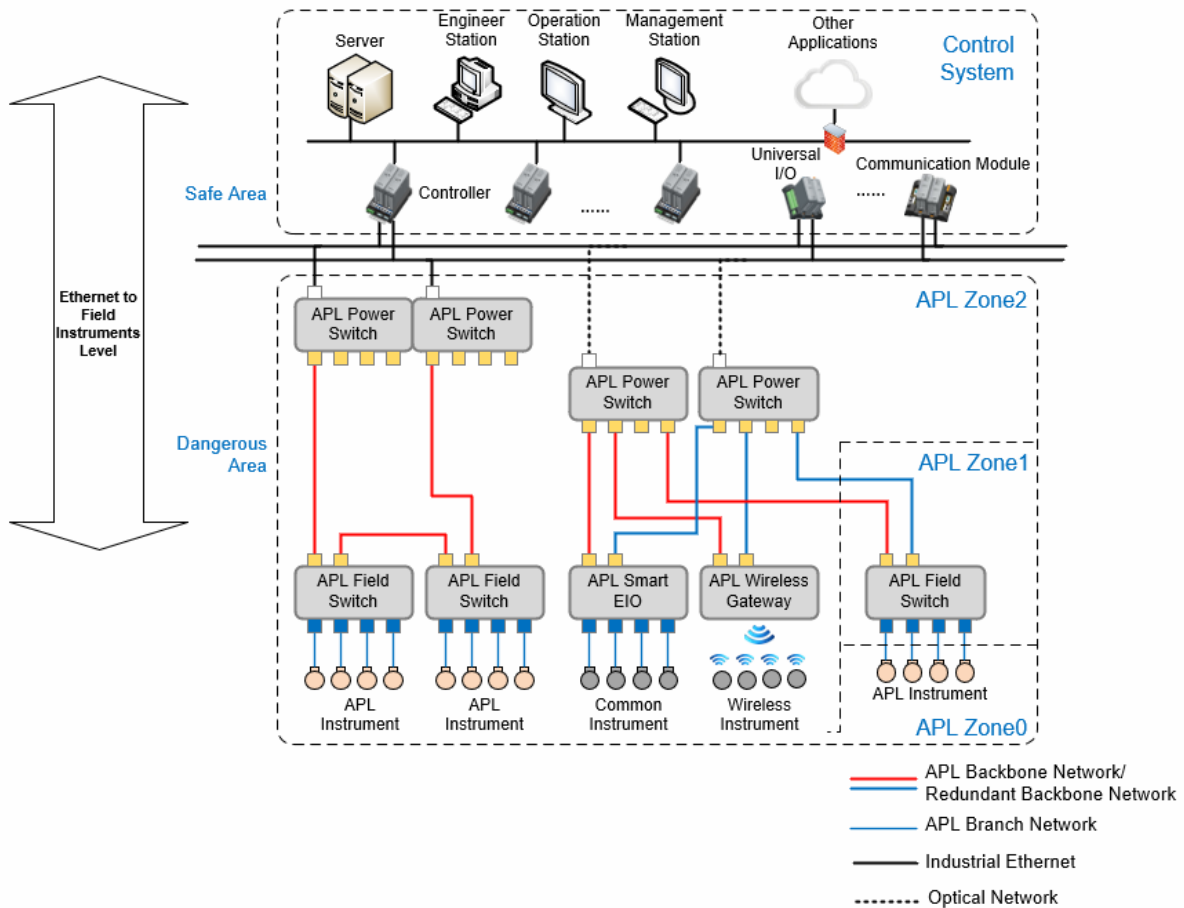
## Section 2 Terminology

| Term               | Definition  |
|--------------------|---|
| APL                | Advanced Physical Layer, the two-wire Ethernet designed for the process industry.   |
| APL Trunk          | Connects the industrial Ethernet and APL spur. APL Trunk has the following features: <ul style="list-style-type: none"> <li>● Communication rate: 10 Mbps, full-duplex</li> <li>● Communication distance: up to 1,000 m</li> <li>● Installation area: Zone 2</li> <li>● Power: up to 57.5 W/50 V</li> </ul>               |
| APL Spur           | Connects APL Trunk and APL field instruments. APL Spur has the following features: <ul style="list-style-type: none"> <li>● Communication rate: 10 Mbps, full-duplex</li> <li>● Communication distance: up to 200 m</li> <li>● Installation area: Zone 1 and Zone 2</li> <li>● Power: 0.54 W/15 V, 1.11 W/15 V</li> </ul> |
| Non-hazardous Area | An area where an explosive atmosphere is not expected to be present. In a non-hazardous area, preventive measures are not required to protect the structure, installation, and using of electrical equipment.   |
| Hazardous Area     | An area where an explosive atmosphere would present or is expected to be present in quantities such as to require special precautions to protect the structure, installation, and using of electrical equipment.  |
| Zone 0             | An area where an explosive atmosphere is present continuously for a long time or will frequently occur.   |
| Zone 1             | An area where an explosive atmosphere is likely to occur occasionally in normal operation.  |
| Zone 2             | An area where an explosive atmosphere is not likely to occur in normal operation but, if it does occur, will persist for a short period only.   |

## Section 3 Typical Network Structure

SUPCON APL system utilizes Ethernet APL technology to connect APL devices to the control system and help you centrally manage the APL devices, such as APL field devices ( such as APL Pressure Transmitter and APL Temperature Transmitter and other APL devices), APL SmartEIO, APL field switch, APL power switch, and APL wireless gateway.

The figure below shows a typical network structure of the control system connecting with APL system.



**Figure 3-1 APL network topology**

SUPCON APL components included in this figure are listed below:

**Table 3-1 APL components list**

| Name | Model | Functions |
|------|-------|-----------|
|------|-------|-----------|

| Name              | Model  | Functions   |
|-------------------|--|---|
| APL Trunk Coupler | AEP6101-1E-S   | Connects the industrial Ethernet and APL Trunk.<br>Provides 2 ports. 1 RJ45 port is used to connect with the industrial Ethernet and the APL Trunk port connects with APL Ethernet.<br>Power supply: 24 VDC (redundant)   |
| APL Power Switch  | AEP6204-2E2F-S<br>AEP6208-2E2F-S<br>AEP6212-2E2F-S<br>AEP6216-2E2F-S | Connects industrial Ethernet by means of its network ports and SFP fiber ports) and APL Trunk.<br>Offers 2 Fast Ethernet RJ45 ports and 2 SFP fiber ports to connect with industrial Ethernet.<br>Power supply: 48 VDC (redundant)  |
| APL Field Switch  | AEF6512-2T-S   | Connects APL Trunk and APL Spur.<br>Provides 14 ports. 2 APL Trunk ports connects with APL Trunk and 12 APL Spur ports connects with APL instruments.   |
| SmartEIO          | UIO831-S01   | UIO831-S communicates with the controller through APL trunk and APL power switch to acquire configuration, output defined value, and send back the current module status. Downwards, it controls field equipment (such as valves, locators) via the transmission of current or digital signals. |
| APL Device        | TM58A0<br>CXT-SKC<br>CVP2000   | APL instrument supports a variety of protocols, such as APL and FF. It satisfies the measurement and control of field signals and devices. For example, CXT-SKC and TM58A0 measures and controls field pressure temperature respectively.   |

## Section 4 Configuration Procedure

You can use High-performanceHMI software to configure APL system, which includes two parts:

- APL SmartEIO UIO831-S configuration
- APL instrument configuration



Figure 4-1 APL configuration procedure



Tip:

When creating a control station, the FCU713-S and FCU714-S controllers should be used. Here taking the FCU713-S as an example. Introduce the configuration of APL.



## Section 5 APL SmartEIO Configuration

When configuring APL SmartEIO, you should add APL devices step by step in the consequence of **Controller FCU713-S > APL power switch > APL\_TRUNK > SmartEIO**.

Before starting SmartEIO configuration, you should add APL power switch or backbone coupler in control station in advance. You can add up to 31 pairs of APL power switch or backbone coupler in one control station.

### 1) Adding Control Station

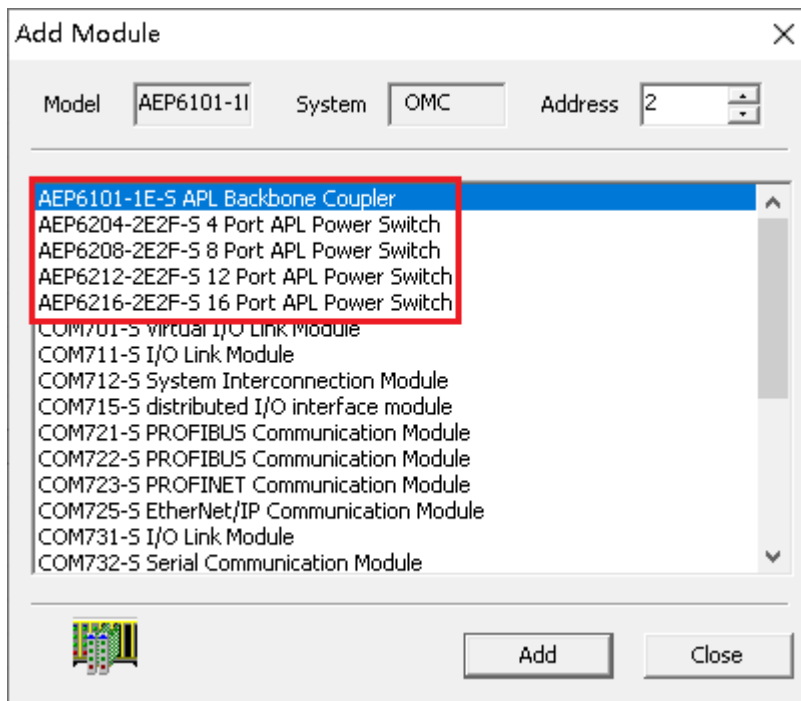
You can add control station on VFSysBuilder, and then select **Type** as **FCU713-S**. After saving the project, set it as the default project.

### 2) Starting Control Station Configuration

Open VFExplorer, and then click **Hardware Configuration** in the control station configuration node to enter the hardware configuration software.

### 3) Adding APL Power Switch or Backbone Coupler

Select FCU713-S controller, and then click **Add** on the right-click menu. Select APL power switch or APL backbone coupler on the **Add Module** page.



**Figure 5-1 Add APL power switch or backbone coupler**

As shown in the figure above, you can add one APL backbone coupler or four APL power switch. According to the TRUNK number of APL power switch, the maximum number of APL\_TRUNK that

can be added to the node displays in the following table.

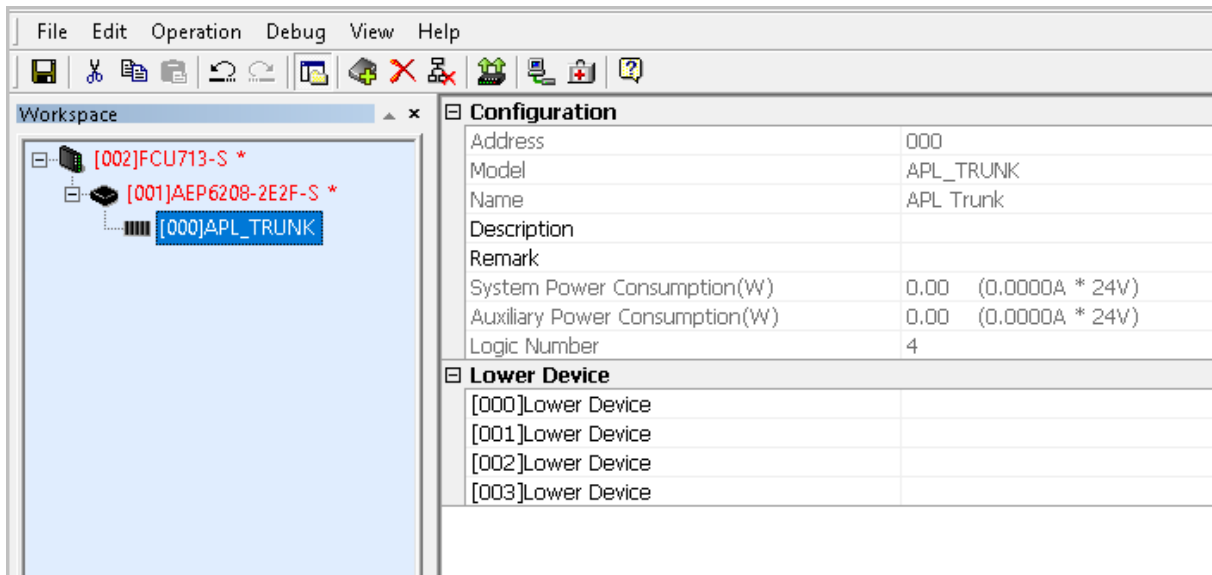
**Table 5-1 The number of APL TRUNK supported by APL power switch or backbone coupler**

| Model          | Number of APL_TRUNK |
|----------------|---------------------|
| AEP6101-1E-S   | 1                   |
| AEP6204-2E2F-S | 4                   |
| AEP6208-2E2F-S | 8                   |
| AEP6212-2E2F-S | 12                  |
| AEP6216-2E2F-S | 16                  |

## 5.1 Adding APL Trunk

APL Trunk is used to connect APL power switch/backbone coupler and APL SmartEIO. Every APL Trunk can only connect to the APL card of the same type. For example, if a APL Trunk has already added SmartEIO, no additional APL device can be added.

Taking 8-port APL power switch AEP6208-2E2F-S as an example, after adding APL\_TRUNK, the following figure displays.



**Figure 5-2 Add APL\_TRUNK**

Every APL\_TRUNK node supports adding at most one UIO831-S module (or one pair UIO831-S module). Select APL\_TRUNK node, and then click **Add** on the right-click menu, as shown in the following figure.

**Figure 5-3 Add UI831-S module**

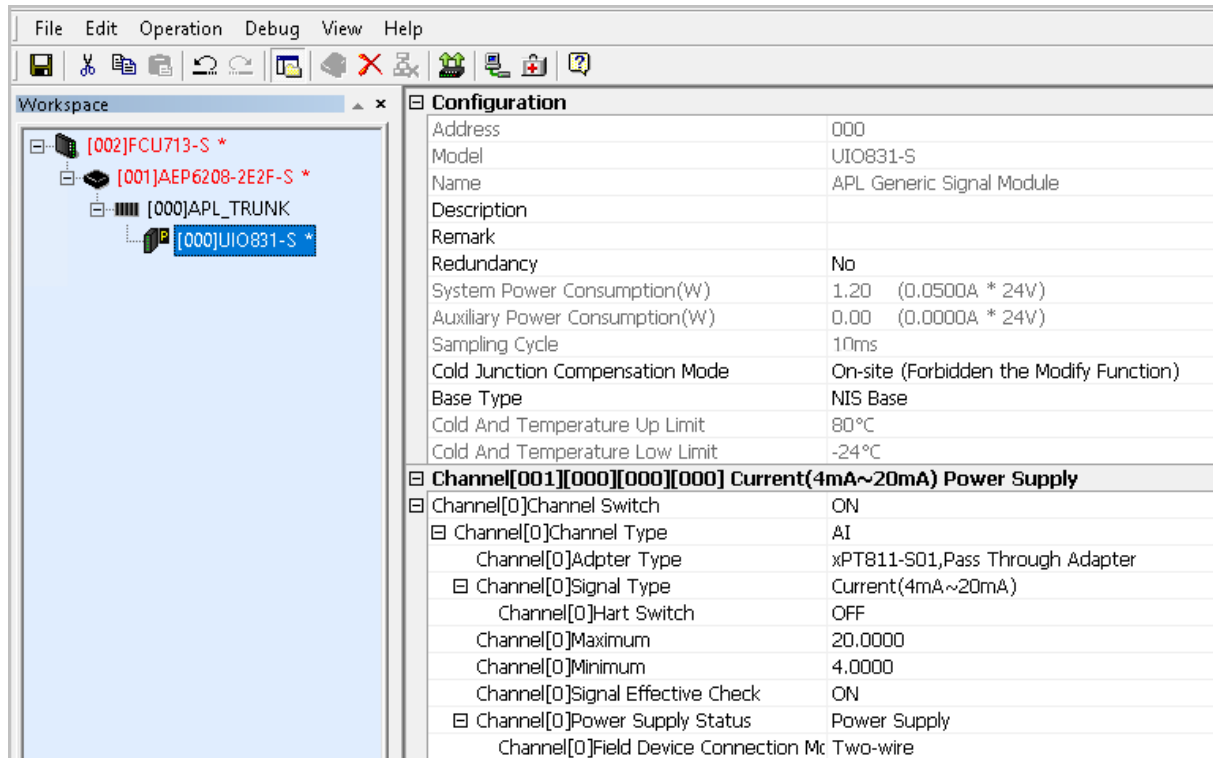


**Tips:**

You can click  to scan for the UIO831-S modules that actually connected in the APL network segment.

Through setting UIO831-S parameters, you can specify the sampling signal of each module channel, so that various signals can be collected and output.

The parameter setting page of UIO831-S configuration is shown as the figure below.



**Figure 5-4 UI831-S configuration parameter setting page**

The instruction of UIO831-S hardware configuration parameters is shown as the table below.

**Table 5-2 Hardware configuration parameters description**

| Parameters                      | Range  | Description  |
|---------------------------------|--|--|
| Address                         | 0-15   | Consistent with the communication address of the module in the rack, cannot be edited.   |
| Model                           | —  | UIO831-S, cannot be edited.  |
| Name                            | —  | APL generic signal module, cannot be edited.   |
| Description                     | 0-32 characteristics   | The description of this module.  |
| Remark                          | 0-32 characteristics   | The remark of this module.   |
| Redundancy                      | Yes/No   | Configure whether to consist an I/O module with two synchronized I/O modules.  |
| System Power Consumption (W)    | —  | Cannot modify in the configuration software, the software will calculate automatically.  |
| Auxiliary Power Consumption (W) | —  | Cannot modify in the configuration software, the software will calculate automatically.  |
| Sampling Cycle                  | —  | Cannot modify in the configuration software, the software will calculate automatically.  |
| Cold Junction Compensation Mode | Remote<br>On-site (Forbidden the Modify Function)<br>On-site (Allow the Modify Function) | <b>Remote:</b> Actual temperature = set value of TC_CJC module;<br><b>On-site (Forbidden the Modify Function):</b> Do not perform cold junction compensation, actual temperature = the current temperature of the module.<br><b>On-site (Allow the Modify Function):</b> Actual temperature = set value of TC_CJC module + real-time PV. |
| Base Type                       | Non-intrinsically safe base  | The module can only configure non-intrinsically safe base.   |

## AI Channel Type

The following table displays the parameters and their descriptions when the channel type of generic signal module is set as AI.

**Table 5-3 Description of configuration parameters when the channel type of UIO831-S is AI**

| Parameters             | Range  | Default                                       | Description   |
|------------------------|--|---|---|
| Tag Name               | —  | —   | It is the same as the tag name of the corresponding tag in the tag configuration software.  |
| Channel Switch         | ON/OFF   | ON  | Configure the switch status of the channel.   |
| Adapter Type           | xPT811- S01, pass-through I/O signal adapter;<br>xPT812- S01, pass-through I/O signal adapter;<br>xAI811- I01, point-to-point isolated AI adapter; | xPT811- S01, pass-through I/O signal adapter; | Configure according to the adapter type matching the actual module channel.   |
| Signal type            | Current (4mA~20mA);<br>Current (0A~20mA);<br>Current (0mA~10mA)  | Current (4mA~20mA)                            | Used to specify the signal type for channel access.   |
| Hart Switch            | ON/OFF   | OFF   | Configure whether to enable Hart function.  |
| Maximum                | Power range low limit ~power range high limit  | Change according to signal type.              | Configure the maximum of current signal.  |
| Minimum                | Power range low limit ~power range high limit  | Change according to signal type.              | Configure the minimum of current signal.  |
| Signal Effective Check | ON/OFF   | ON  | Configure whether to enable the signal effective check of the channel.  |
| Power Supply Status    | Power Supply/External Power Supply   | Power Supply                                  | When the external device is external power supply mode and you select <b>Power Supply</b> as <b>Power Supply Status</b> , the module outputs 24V voltage. When the external device is power supply mode and you select <b>External Power Supply</b> as <b>Power Supply Status</b> , the module has no voltage output. |

## AO Channel Type

**Table 5-4 Description of configuration parameters when the channel type of UIO831-S is AO**

| Parameters     | Range  | Default                                       | Description  |
|----------------|--|---|--|
| Tag Name       | —  | —   | It is the same as the tag name of the corresponding tag in the tag configuration software. |
| Channel Switch | ON/OFF   | ON  | Configure the switch status of the channel.  |
| Adapter Type   | xPT811- S01, pass-through I/O signal adapter;<br>xPT812- S01, pass-through I/O signal adapter;<br>xAO811- I01, point-to-point isolated AO adapter; | xPT811- S01, pass-through I/O signal adapter; | Configure according to the adapter type matching the actual module channel.                |

|                     |  |                    |  |
|---------------------|--|--------------------|--|
| Signal type         | Current (4mA~20mA)<br>Current (0mA~20mA)<br>Current (0mA~10mA) | Current (4mA~20mA) | Used to specify the signal type for channel access.  |
| Hart Switch         | ON/OFF   | OFF                | Configure whether to enable Hart function.   |
| Maximum             | Power range low limit ~20                                      | 20.0000            | Configure the maximum of current signal.   |
| Minimum             | 4~power range high limit                                       | 4.0000             | Configure the minimum of current signal.   |
| Line Fault Verify   | ON/OFF   | OFF                | Used to configure whether to enable line fault verify function.  |
| Fault Security Mode | Output Hold/Output Preset Value                                | Output Hold        | <b>Output Hold:</b> When the fault occurs, the output retains the previous period value.<br><b>Output Preset Value:</b> When the fault occurs, it outputs the preset fault output value. |

## DI Channel Type

**Table 5-5 Description of configuration parameters when the channel type of UI0831-S is DI**

| Parameters                               | Range   | Default                                      | Description  |
|--|---|--|--|
| Tag Name                                 | —   | —  | It is the same as the tag name of the corresponding tag in the tag configuration software.   |
| Channel Switch                           | ON/OFF  | ON   | Configure the switch status of the channel.  |
| Adapter Type                             | xPT811- S01, pass-through I/O signal adapter;<br>xPT812- S01, pass-through I/O signal adapter;<br>xDI811-S01, opt coupler isolated DI adapter;<br>xDIR811-I01, relay isolated DI adapter; | xPT811- S01, pass-through I/O signal adapter | Configure according to the adapter type matching the actual module channel.  |
| Signal type                              | GroundPassive;<br>NPN;<br>Active;<br>SourcePassive<br>PNP   | GroundPassive                                | Used to specify the signal type for channel access.  |
| Filter time (ms)                         | 4ms, 8ms, 16ms, 32ms  | 4ms  | Configure the filter time of the channel.<br>Line Fault Verify<br>ON/OFF<br>OFF<br>Used to configure whether to enable line fault verify function.                                 |
| Latch Function                           | ON/OFF  | OFF  | Configure whether to enable the latch function of the channel.   |
| Latch Time (ms)                          | 150ms, 300ms, 600ms, 1200ms   | 150 ms                                       | When you enable latch function, you can configure the latch time of the signal.  |
| Signal Dithering Process                 | ON/OFF  | OFF  | Configure whether to enable the signal dithering process function of the channel.  |
| Dithering Parameter (Dithering Times/S ) | 0~150   | 0  | When you enable the signal dithering process function, you can configure this parameter.<br>When the dithering times per second exceeds the set value, an alarm will be triggered. |

## DO Channel Type

**Table 5-6 Description of configuration parameters when the channel type of UIO831-S is DO**

| Parameters                    | Range  | Default                                     | Description  |
|-------------------------------|--|---|--|
| Tag Name                      | —  | —   | It is the same as the tag name of the corresponding tag in the tag configuration software.   |
| Channel Switch                | ON/OFF   | ON  | Configure the switch status of the channel.  |
| Adapter Type                  | xPT811-S01, pass-through I/O signal adapter;<br>xPT812-S01, pass-through I/O signal adapter;<br>xDOR811-I01, relay isolated DO adapter;<br>xDOR812-I01, relay isolated DO adapter; | xPT811-S01, pass-through I/O signal adapter | Configure according to the adapter type matching the actual module channel.  |
| Output Type                   | Status Output/Pulse Width Output   | Status Output                               | When you select <b>Status Output</b> , you need to configure the <b>Fault Security Mode</b> of the channel. When you select <b>Pulse Width Output</b> , you need to configure the <b>Output Pulse Width Value (ms)</b> of the channel. |
| Fault Security Mode           | Output Hold/Output Preset Value  | Output Hold                                 | <b>Output Hold</b> : When the fault occurs, the output retains the previous period value.<br><b>Output Preset Value</b> : When the fault occurs, it outputs the preset fault output value.   |
| Fault Output Value            | OFF/ ON  | OFF   | Configure the fault output value under <b>Fault Security Mode</b> .  |
| Output Pulse Width Value (ms) | 10~60,000  | 10  | When the <b>Output Type</b> is <b>Pulse Width Output</b> , you can configure this parameter.   |
| Break Fault Verify            | ON/OFF   | OFF   | Configure whether to enable the break fault verify function of the channel.  |

## PI Channel Type

**Table 5-7 Description of configuration parameters when the channel type of UIO831-S is PI**

| Parameters            | Range  | Default                                     | Description  |
|-----------------------|--|---|--|
| Tag Name              | —  | —   | It is the same as the tag name of the corresponding tag in the tag configuration software. |
| Switch Status         | ON/OFF   | On  | Configure the switch status of the channel.  |
| Adapter Type          | xPT811-S01, pass-through I/O signal adapter;<br>xPT812-S01, pass-through I/O signal adapter;<br>xDI811-S01, opt coupler isolated DI adapter; | xPT811-S01, pass-through I/O signal adapter | Configure according to the adapter type matching the actual module channel.                |
| Pulse Connection Mode | Active Contact<br>Passive Contact<br>PNP Proximity Switch  | Active Contact                              | Configure the pulse connection mode of the channel.  |
| Signal Type           | 0Hz~1000Hz,<br>0Hz~10000Hz   | 0Hz~1000Hz                                  | Configure the signal type of the channel.  |
| Maximum               | Power range low limit ~power range high limit  | Change according to signal type.            | Configure the maximum of current signal.   |

|         |   |                                  |  |
|---------|---|----------------------------------|--|
| Minimum | Power range low limit ~power range high limit | Change according to signal type. | Configure the minimum of current signal. |
|---------|---|----------------------------------|--|

### NAMUR Channel Type

**Table 5-8 Description of configuration parameters when the channel type of UIO831-S is NAMUR**

| Parameters                               | Range  | Default                                      | Description   |
|--|--|--|---|
| Tag Name                                 | —  | —  | It is the same as the tag name of the corresponding tag in the tag configuration software.  |
| Switch Status                            | ON/OFF   | ON   | Configure the switch status of the channel.   |
| Adapter Type                             | xPT811- S01, pass-through I/O signal adapter<br>xPT812- S01, pass-through I/O signal adapter | xPT811- S01, pass-through I/O signal adapter | Configure according to the adapter type matching the actual module channel.   |
| Filter time (unit: millisecond)          | 4ms, 8ms, 16ms, 32ms   | 4 ms   | Configure the filter time of the channel.   |
| Line Fault Detection                     | ON/OFF   | OFF  | Configure whether to enable line fault verify function of the channel.  |
| Latch Function                           | ON/OFF   | OFF  | Configure whether to enable the latch function of the channel.  |
| Latch Time (ms)                          | 150ms, 300ms, 600ms, 1200ms  | 150 ms                                       | When you enable latch function, you can configure the latch time of the signal.   |
| Signal Dithering Process                 | ON/OFF   | OFF  | Configure whether to enable the signal dithering process function of the channel.   |
| Dithering Parameter (Dithering Times/S ) | 0  | 0  | When you enable the signal dithering process function, you can configure this parameter. When the dithering times per second exceeds the set value, an alarm will be triggered. |

### TC Channel Type

**Table 5-9 Description of configuration parameters when the channel type of UIO831-S is TC**

| Parameters    | Range  | Default  | Description  |
|---------------|--|--|--|
| Tag Name      | —  | —  | It is the same as the tag name of the corresponding tag in the tag configuration software. |
| Switch Status | ON/OFF   | ON   | Configure the switch status of the channel.  |
| Adapter Type  | xTI811- I01, point-to-point isolated TI adapter;   | xTI811- I01, point-to-point isolated TI adapter; | Configure according to the adapter type matching the actual module channel.                |
| Signal Type   | Voltage (-100mV~+100mV)<br>Voltage (-20mV~+80mV)<br>Mode E((-200~900)°C)<br>Mode J((-200~750)°C)<br>Mode K((-200~1300)°C)<br>Mode N((0~1300)°C)<br>Mode B((-500~1800)°C)<br>Mode T((-200~350)°C)<br>Mode S((0~1600)°C)<br>Mode R((0~1600)°C) | K((-200~1300)°C)                                 | Configure the signal type of the channel.  |
| Maximum       | Power range low limit ~power range high limit  | Change according to signal type.                 | Configure the maximum of current signal.   |



|         |   |                                  |  |
|---------|---|----------------------------------|--|
| Minimum | Power range low limit ~power range high limit | Change according to signal type. | Configure the minimum of current signal. |
|---------|---|----------------------------------|--|

### RTD Channel Type

**Table5-10 Description of configuration parameters when the channel type of UIO831-S is RTD**

| Parameters    | Range   | Default  | Description  |
|---------------|---|--|--|
| Tag Name      | —   | —  | It is the same as the tag name of the corresponding tag in the tag configuration software. |
| Switch Status | ON/OFF  | ON   | Configure the switch status of the channel.  |
| Adapter Type  | xTI811- I01, point-to-point isolated TI adapter;                                  | xTI811- I01, point-to-point isolated TI adapter; | Configure according to the adapter type matching the actual module channel.                |
| Signal Type   | Pt100 (-200 °C to 850 °C )<br>Cu50 (-50 °C to 150 °C )<br>1Ω~400Ω :<br>2Ω~1000Ω : | Pt100 (-200 °C to 850 °C )                       | Configure the signal type of the channel.  |
| Maximum       | Power range low limit<br>~power range high limit                                  | Change according to signal type.                 | Configure the maximum of current signal.   |
| Minimum       | Power range low limit<br>~power range high limit                                  | Change according to signal type.                 | Configure the minimum of current signal.   |
| Sampling Mode | Three-wire/Four wire  | Three-wire                                       | Configure according to the instrument type on site.  |

### DI(SOE) Channel Type

**Table5-11 Description of configuration parameters ) when the channel type of UIO831-S is DI(SOE)**

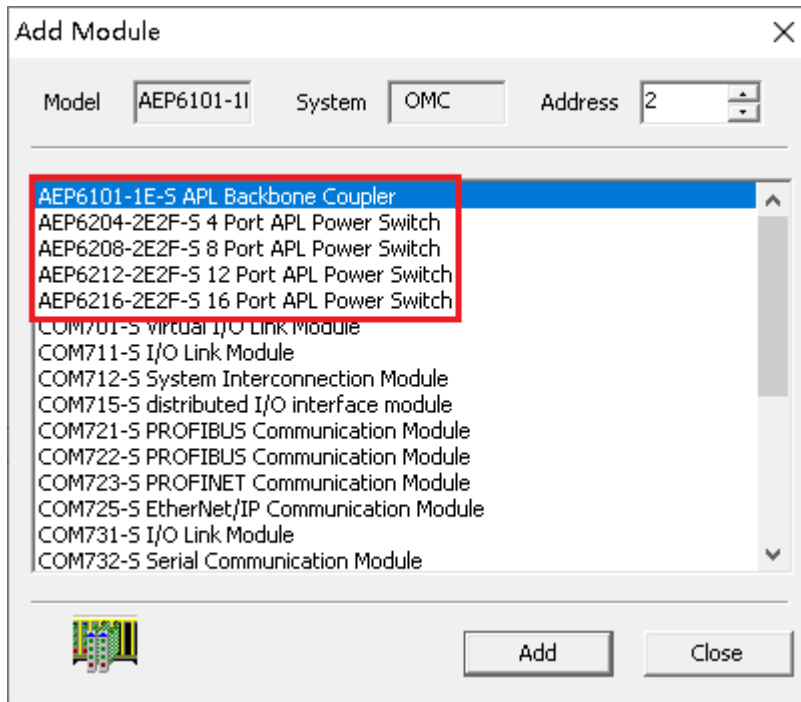
| Parameters               | Range  | Default                                      | Description  |
|--------------------------|--|--|--|
| Tag Name                 | —  | —  | It is the same as the tag name of the corresponding tag in the tag configuration software. |
| Switch Status            | ON/OFF   | On   | Configure the switch status of the channel.  |
| Adapter Type             | xPT811- S01, pass-through I/O signal adapter;<br>xTI812- I01, point-to-point isolated TI adapter;<br>xDI811-S01, opt coupler isolated DI adapter;<br>xDIR811-I01, relay isolated DI adapter; | xPT811- S01, pass-through I/O signal adapter | Configure according to the adapter type matching the actual module channel.                |
| Signal Type              | GroundPassive;<br>NPN<br>Active<br>SourcePassive<br>PNP  | GroundPassive                                | Used to specify the signal type for channel access.  |
| Filter Time (ms)         | 4ms, 8ms, 16ms, 32ms   | 4ms  | Configure the filter time of the channel.  |
| Dithering-free Time (ms) | 4ms, 8ms, 16ms, 32ms   | 4ms  | Configure to dithering-free time of channel signal.  |

## Section 6 APL Instrument Configuration

APL instrument is the configuration of CXT series APL intelligent pressure transmitter and TM58A0 intelligent temperature collector.

When configuring APL instrument, you should add APL devices step by step in the consequence of **Controller FCU713-S > APL power switch > APL\_TRUNK > APL field switcher > APL instrument**.

- 1) You can add control station on VFSysBuilder, and then select Type as FCU713-S. After saving the project, set it as the default project.
- 2) Open **VFExplorer > Hardware Configuration**, select FCU713-S controller and then click Add on the right-click menu. Select APL power switcher on the Add Module page.



**Figure 6-1 Adding APL Power Switch**

- 3) As shown in figure above, you can add five types of APL power switch, which are AEP6101-1E-S, AEP6204-2E2F-S, AEP6208-2E2F-S, AEP6212-2E2F-S and AEP6216-2E2F-S. You can add at most 31 pairs, therefore the node address ranges from 1 to 31, and the start address is 1.
- 4) According to the TRUNK number of APL power switch, the maximum number of APL\_TRUNK that can be added to the node displays in the following table.

**Table 6-1 The quantitative relation between APL power switch and APL\_TRUNK**

| APL Power Switch | Number of APL_TRUNK |
|------------------|---------------------|
|------------------|---------------------|

| APL Power Switch | Number of APL_TRUNK |
|------------------|---------------------|
| AEP6101-1E-S     | 1                   |
| AEP6204-2E2F-S   | 4                   |
| AEP6208-2E2F-S   | 8                   |
| AEP6212-2E2F-S   | 12                  |
| AEP6216-2E2F-S   | 16                  |

- 5) Taking 8-port APL power switch AEP6208-2E2F-S as an example, after adding APL\_TRUNK, the following figure displays.

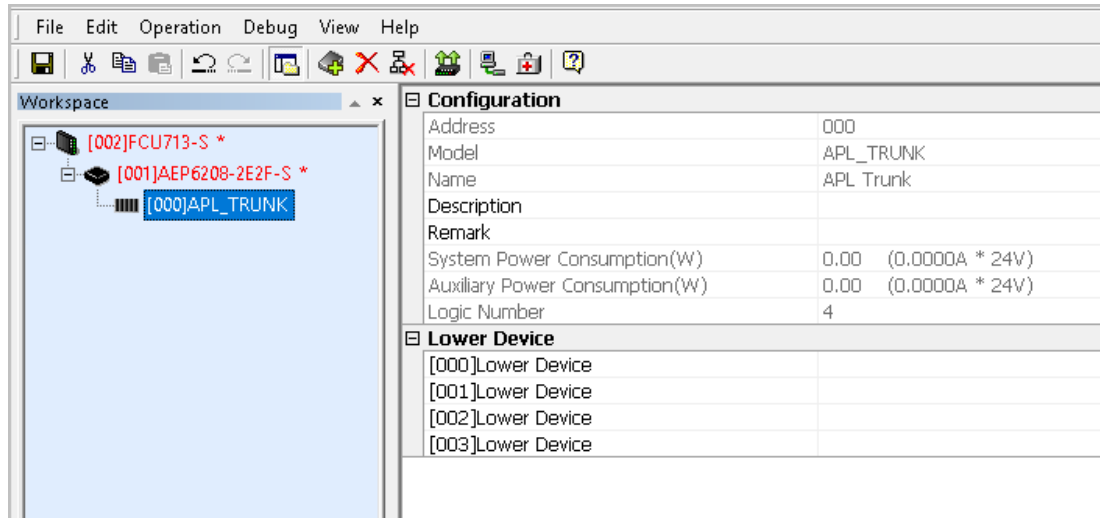
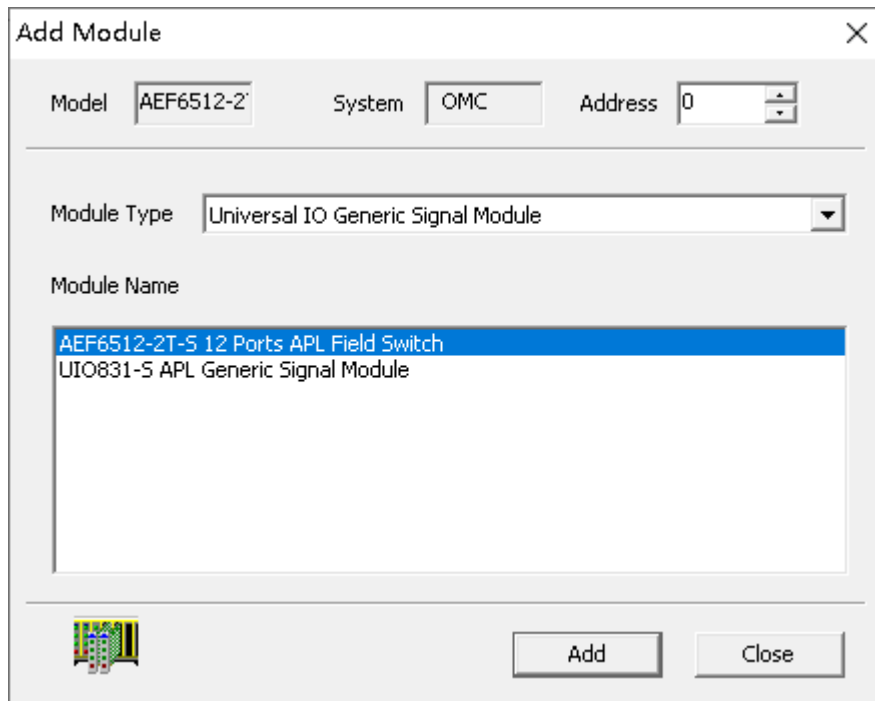


Figure 6-2 Add APL\_TRUNK

Every APL\_TRUNK node supports adding at most four APL field switcher. Select APL\_TRUNK node, and then click **Add** on the right-click menu, as shown in the following figure.



**Figure 6-3 Adding APL Field Switch**



**Tips:**

You can click  to scan for the APL modules that actually connected in the APL network segment.

## 6.1 Setting AEF6512-2T-S Parameters

After adding APL field switch, its configuration parameters are shown as follows.

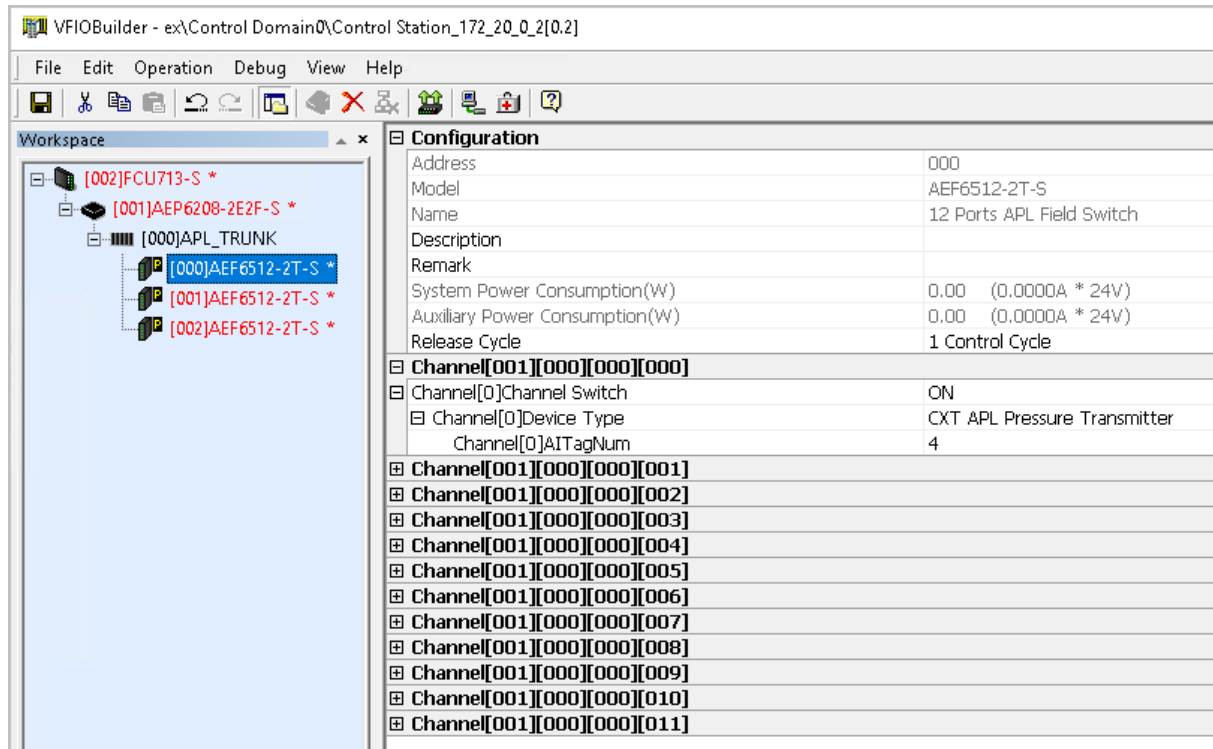


Figure 6-4 Configuration parameter page of APL field switch

The instruction of AEF6512-2T-S hardware configuration parameters is shown as the table below.

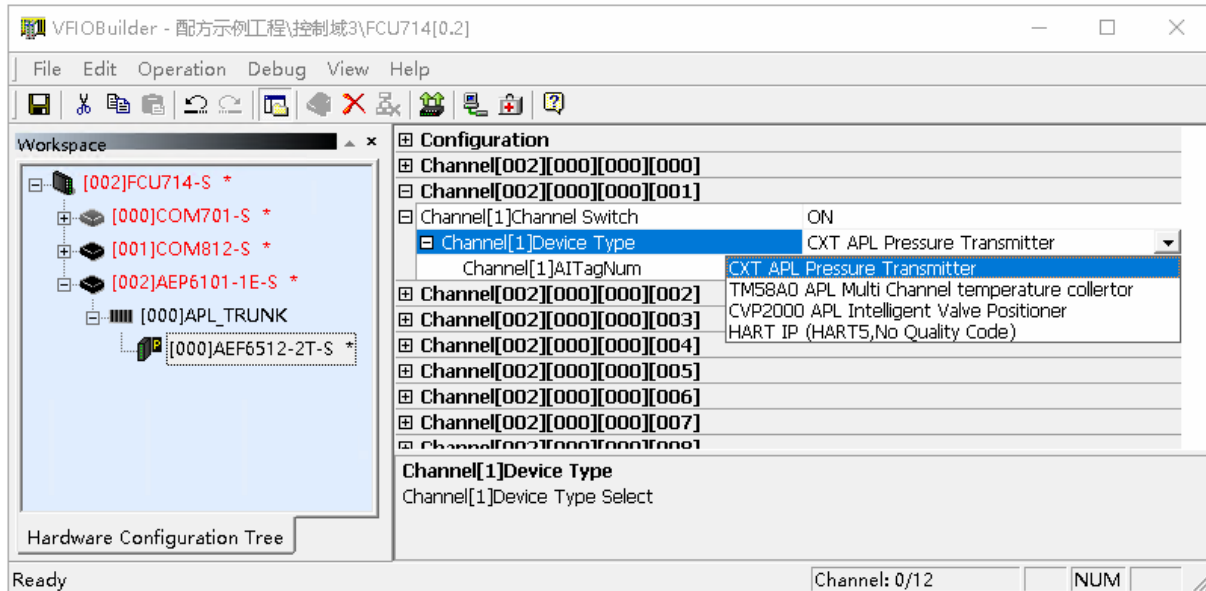
Table6-2 Hardware configuration parameters description

| Parameters                      | Range  | Description   |
|---------------------------------|--|---|
| Configuration Instruction       |  |   |
| Address                         | 000  | Consistent with the address of the module in the rack. The default value is 0.  |
| Model                           | —  | AEF6512, cannot be edited.  |
| Name                            | —  | 12 Ports APL Field Switch, cannot be edited.  |
| Description                     | 0-32 characteristics   | The description of this module.   |
| Remark                          | 0-32 characteristics   | The remark of this module.  |
| Redundancy                      | Yes/No   | Configure whether to consist an I/O module with two synchronized I/O modules.   |
| System Power Consumption (W)    | —  | Cannot modify in the configuration software, the software will calculate automatically.                                       |
| Auxiliary Power Consumption (W) | —  | Cannot modify in the configuration software, the software will calculate automatically.                                       |
| Release Cycle                   | 1/2 Control Cycle<br>1 Control Cycle<br>2 Control Cycle<br>4 Control Cycle   | Select the cycle at which the switch sends real-time input and output data to the controller. The default is 1 Control Cycle. |
| Channel Parameters              |  |   |
| Channel[0] Channel Switch       | ON/OFF   | Select whether to open or close the channel.  |
| Channel[0] Device Type          | TM58A0 APL Multi Channel temperature collector<br>CXT APL Pressure Transmitter<br>CVP2000 APL Intelligent Valve Positioner<br>HART IP (HART5, No Quality Code) | Select the device type.   |
| Channel[0] AITagNum             | 9/4  | You can connect to different device types.  |

| Parameters | Range | Description  |
|------------|-------|--|
|            |       | When the device type is set as TM58A0 APL Multi Channel temperature collector, the tag number is 9, otherwise the tag number is 4. |

The range of n is 0 to 11.

In the channel of APL field switch, you can add APL field instrument, as shown in the following figure.



**Figure 6-5 Adding APL instruments**

You can manage and maintain APL instruments through VxIDM (SUPCON device management system).

TM58A0 intelligent temperature terminal and CXT intelligent pressure transmitter use DD (Device Description) file to communicate with the field devices. Before using intelligent device management software to configure TM58A0, you need to import the DD file corresponding to the instrument in advance, and then you can perform operations such as modifying parameters and comparing parameters on the configuration page.

For details on the configuration of APL instrument parameters, see the related User Manual.

For details on the configuration operations, see *VxIDM User Manual*.

## Section 7 APL Tag Configuration

After completing hardware configuration, you can open the tag table to configure tags.

Select **Operations > Scan Tags from Channels > Scan New Added**, and then the tag configuration software generates tag numbers automatically according to hardware configuration, as shown in the following figure.

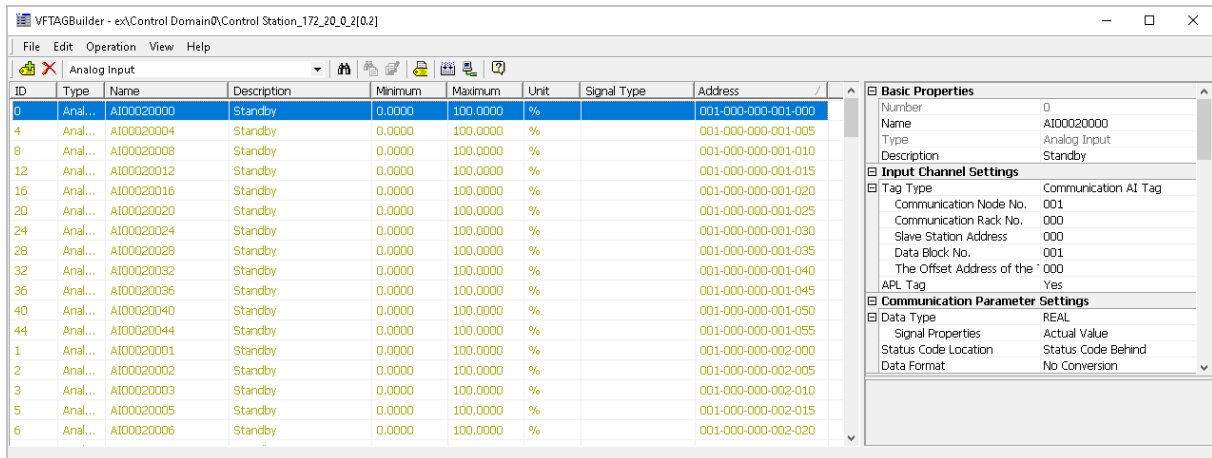


Figure 7-1 UI0831-S tag configuration

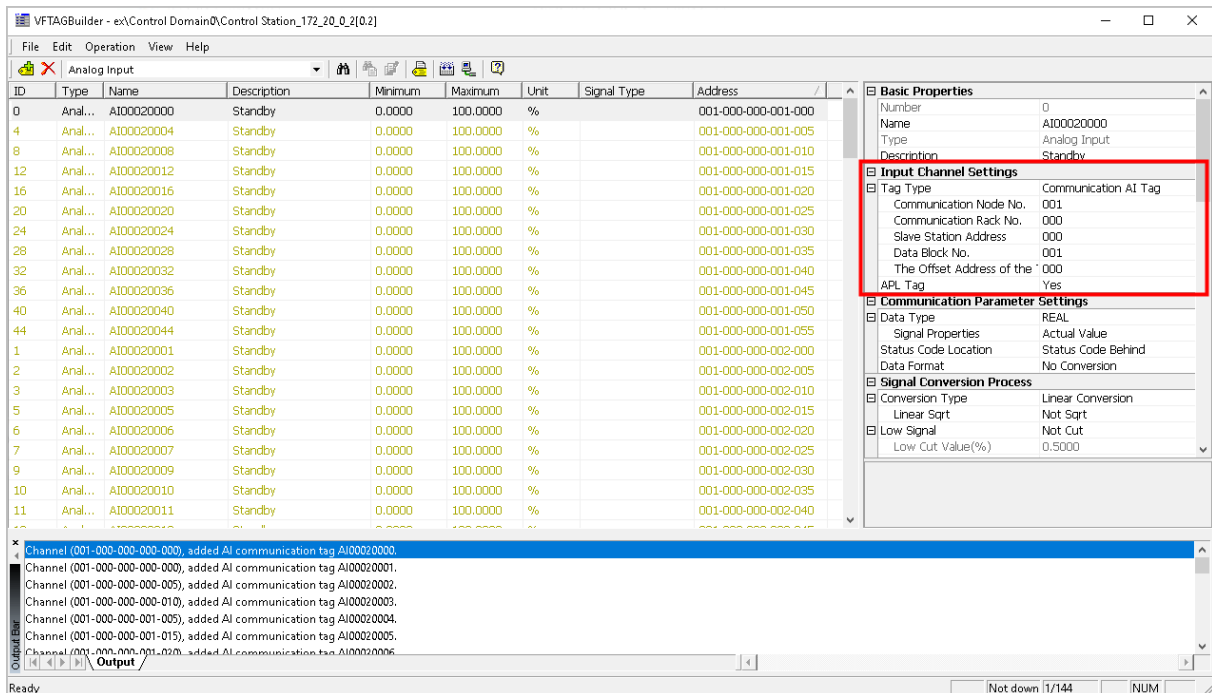


Figure 7-2 APL field switch tag configuration



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**Attention:**

**Different from common tag numbers, the tag number scanned by AEF6512-2T-S is APL tag number and the tag number type is communication AI tag number.**

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After completing tag number configuration, exit to complete the compilation.



## **Section 8 Control Strategy Configuration**

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Control strategy configuration of APL system is to control the APL devices through the program such as function diagram. For details on the configuration method of APL control strategy, see *VFSTModule User Manual*.

## **Section 9 Compiling and Downloading**

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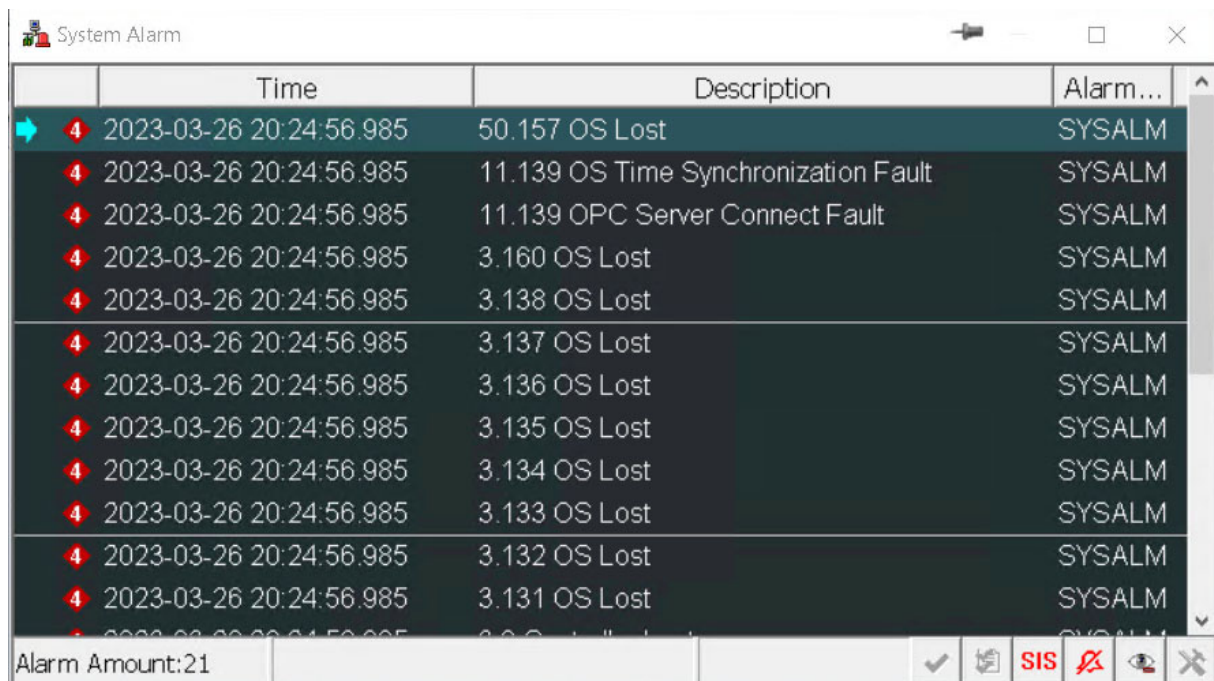
After completing configuration, you can compile and download it in VFExplorer.

## Section 10 Status Monitoring

After the configuration is published, you can view the tag panel and diagnosis information of module status in VFLaunch.

### 10.1 System Alarm

In VFLaunch, you can view the communication status of APL system in **System Alarm**. As shown in the figure below, you can locate the communication status of APL devices according to the control station address, node number, rack number and module number.



|   | Time                    | Description                          | Alarm... |
|---|-------------------------|--------------------------------------|----------|
| ⚡ | 2023-03-26 20:24:56.985 | 50.157 OS Lost                       | SYSALM   |
| ⚡ | 2023-03-26 20:24:56.985 | 11.139 OS Time Synchronization Fault | SYSALM   |
| ⚡ | 2023-03-26 20:24:56.985 | 11.139 OPC Server Connect Fault      | SYSALM   |
| ⚡ | 2023-03-26 20:24:56.985 | 3.160 OS Lost                        | SYSALM   |
| ⚡ | 2023-03-26 20:24:56.985 | 3.138 OS Lost                        | SYSALM   |
| ⚡ | 2023-03-26 20:24:56.985 | 3.137 OS Lost                        | SYSALM   |
| ⚡ | 2023-03-26 20:24:56.985 | 3.136 OS Lost                        | SYSALM   |
| ⚡ | 2023-03-26 20:24:56.985 | 3.135 OS Lost                        | SYSALM   |
| ⚡ | 2023-03-26 20:24:56.985 | 3.134 OS Lost                        | SYSALM   |
| ⚡ | 2023-03-26 20:24:56.985 | 3.133 OS Lost                        | SYSALM   |
| ⚡ | 2023-03-26 20:24:56.985 | 3.132 OS Lost                        | SYSALM   |
| ⚡ | 2023-03-26 20:24:56.985 | 3.131 OS Lost                        | SYSALM   |

Alarm Amount: 21

Figure 10-1 APL System Alarm

### 10.2 Tag Panel

Taking AEF6512-2T-S tag panel as an example, the address information of APL tag number is different from the common tag, as shown in the following figure.

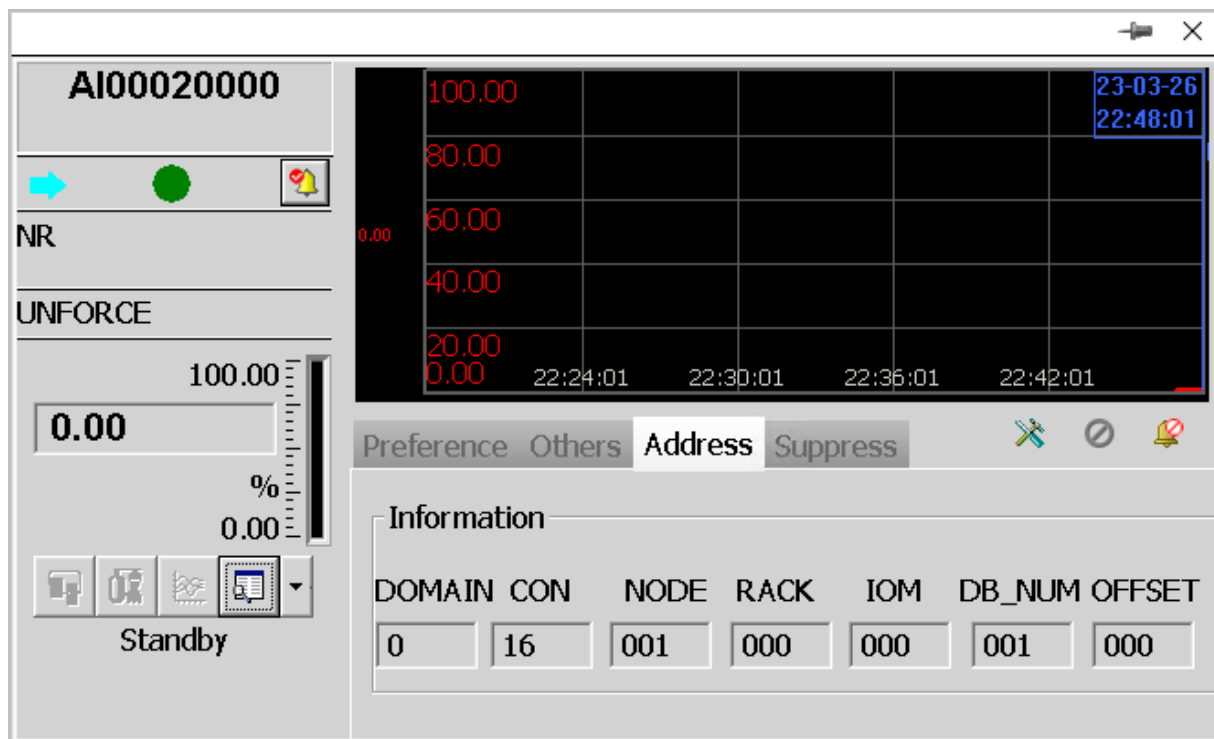


Figure 10-2 Address information of APL tag panel

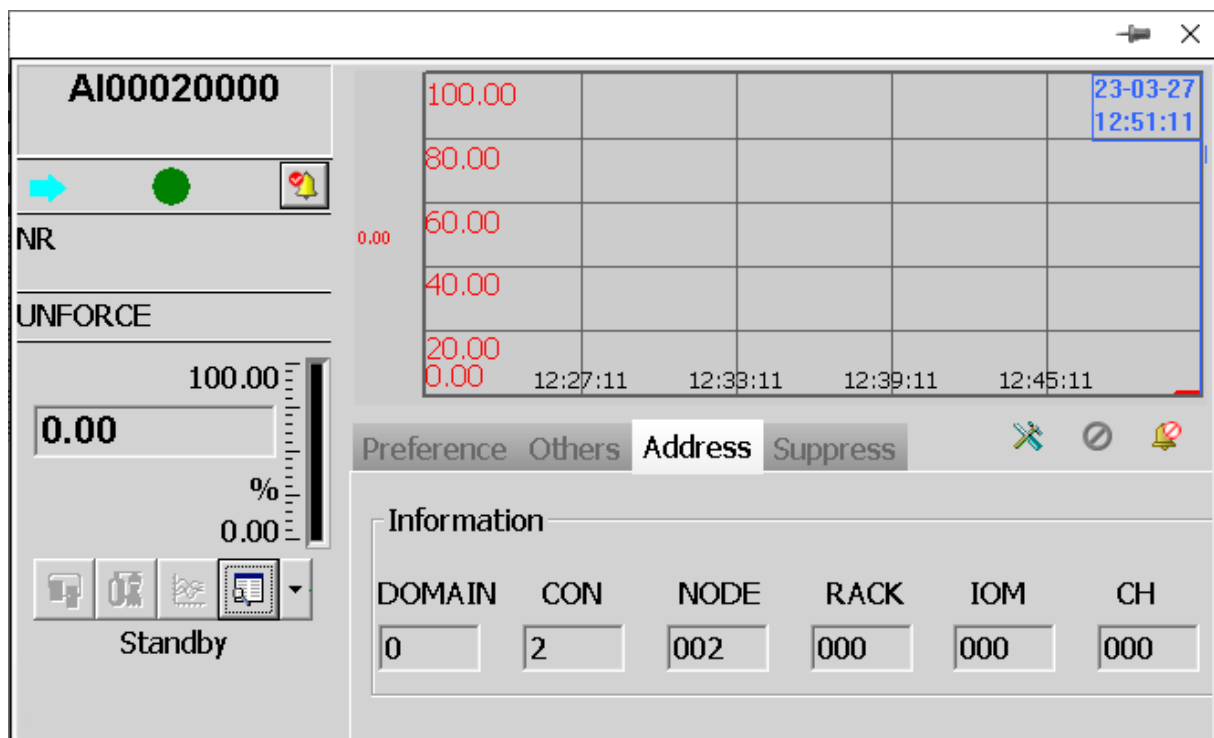


Figure 10-3 Address information of common tag

## 10.3 Status Diagnose



### Tips:

After the APL is connected to the control system, you can use VFLaunch to diagnose the status of the system and modules.

Click **System Status** from the drop-down list in VFLaunch, and then the system diagnosis page is displayed. Click **Remote Node** in the **Control Domain** to view the status of modules attached to nodes in APL\_TRUNK, as shown in the figure below.

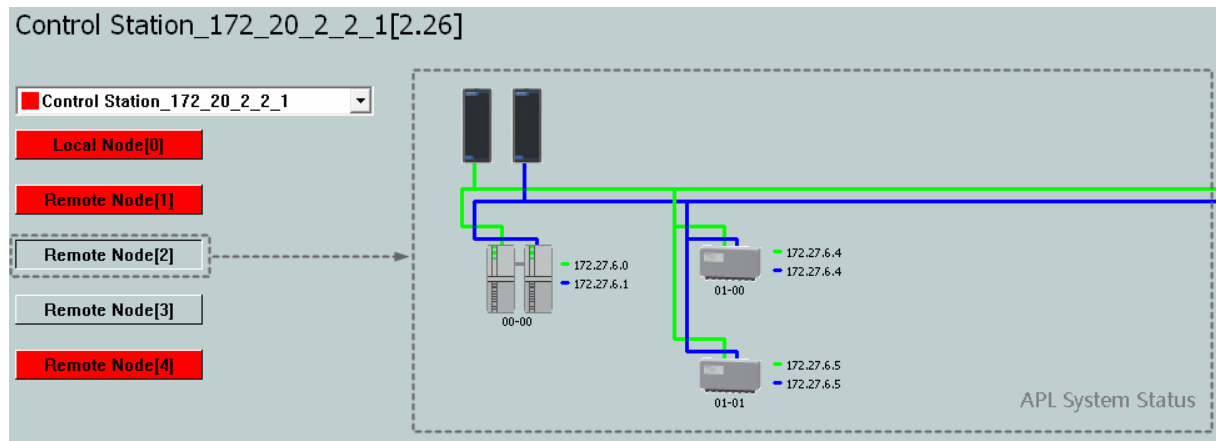


Figure 10-4 APL system diagnosis entry

### 10.3.1 APL Trunk Coupler

After entering the remote node, double-click APL trunk coupler to enter the detailed diagnosis page as shown in the following figure.

[1](AEP6101-1E-S)

|                           | Left                 | Right                |
|---------------------------|----------------------|----------------------|
| Device Type               | APL Backbone Coupler | APL Backbone Coupler |
| Work Status               | Work                 | Standby              |
| 24V Status-A              | Normal               | Normal               |
| 24V Status-B              | Normal               | Normal               |
| EBUS Communication Sta... | Normal               | Normal               |
| Redundant Status          | Redundancy           | Redundancy           |
| Address Conflict          | Normal               | Normal               |
| Config Status             | Configured           | Configured           |
| Start Status              | Started              | Started              |

**Figure10-5 APL trunk coupler and its network diagnosis**

The following table describes each diagnostic items of APL trunk coupler.

**Table10-1 Descriptions of APL trunk coupler diagnostic items**

| Item                         | Meaning   | Troubleshooting   |
|------------------------------|---|---|
| Device Type                  | Display the product type of the device.   | —   |
| Work Status                  | Display the work/standby status of current device.  | —   |
| 24V Status-A<br>24V Status-B | Normal: The module has power supply.<br>Fault: The module has no power supply.  | <ul style="list-style-type: none"> <li>● Check the power cables.</li> <li>● Cold start or change the module.</li> </ul>   |
| EBus Communication Status    | When the device cannot communicate with the controller through the E-BUS, it will display as <b>Fault</b> .   | <ol style="list-style-type: none"> <li>1. Check whether the network cable of E-BUS network is normal. If the network cable quality is poor, please change it.</li> <li>2. Try to connect to another network port on the switch.</li> <li>3. Check the load of E-BUS network and whether abnormal nodes send a large number of data packets. If exists, please solve this problem first.</li> <li>4. If preceding problems are rectified, please change another controller.</li> </ol> |
| Redundancy Status            | Display whether the device is configured as redundancy.   | —   |
| Address Conflict             | IP Conflict   | Check the indicators of all nodes on the network. If the EBUS indicator is blinking on a module, and both EBUS diagnostic channels are normal, the module may have the same dial number. Check the address and then correct the incorrect dial address.   |
| Config Status                | Display whether the device is configured. When the device has no configuration, it will display as <b>Not Configured</b> ; When the device has configuration, it will display as <b>Configured</b> .        | <ol style="list-style-type: none"> <li>1. Reset the module.</li> <li>2. Change the module.</li> </ol>   |
| Start Status                 | Display whether the device is started. When the device is started, it will display as <b>Started</b> ; When the device is not started or has no communication data, it will display as <b>Not Started</b> . | <ol style="list-style-type: none"> <li>1. Reset the module.</li> <li>2. Change the module.</li> </ol>   |

### 10.3.2 APL Power Switch

Double-click APL power switch on the overall diagnosis page of APL system, and then the following page will display.

[31](AEP6208-2E2F-S)

|                           | Left             | Right            |
|---------------------------|------------------|------------------|
| Device Type               | APL Power Switch | APL Power Switch |
| Work Status               | Work             | Standby          |
| 48V Status-A              | Normal           | Normal           |
| 48V Status-B              | Normal           | Normal           |
| EBUS Communication Sta... | Normal           | Normal           |
| Redundant Status          | Redundancy       | Redundancy       |
| Address Conflict          | Normal           | Normal           |
| Config Status             | Configured       | Configured       |
| Start Status              | Started          | Started          |

Figure 10-6 APL power switch diagnosis

The following table describes each diagnostic items of APL power switch.

Table 10-2 Descriptions of APL power switch diagnostic items


| Item                         | Meaning  | Troubleshooting   |
|------------------------------|--|---|
| Device Type                  | Display the product type of the device.  | —   |
| Work Status                  | Display the work/standby status of current device.   | —   |
| 48V Status-A<br>48V Status-B | Normal: The module has power supply.<br>Fault: The module has no power supply.   | <ul style="list-style-type: none"> <li>● Check the power cables.</li> <li>● Cold start or change the module.</li> </ul>   |
| EBus Communication Status    | When the device cannot communicate with the controller through the E-BUS, it will display as <b>Fault</b> .  | <ol style="list-style-type: none"> <li>1. Check whether the network cable of E-BUS network is normal. If the network cable quality is poor, please change it.</li> <li>2. Try to connect to another network port on the switch.</li> <li>3. Check the load of E-BUS network and whether abnormal nodes send a large number of data packets. If exists, please solve this problem first.</li> <li>4. If preceding problems are rectified, please change another controller.</li> </ol> |
| Redundancy Status            | Display whether the device is configured as redundancy.  | —   |
| Address Conflict             | IP Conflict  | Check the indicators of all nodes on the network. If the EBUS indicator is blinking on a module, and both EBUS diagnostic channels are normal, the module may have the same dial number. Check the address and then correct the incorrect dial address.   |
| Config Status                | Display whether the device is configured. When the device has no configuration, it will display as <b>Not Configured</b> ; When the device has configuration, it will display as <b>Configured</b> . | <ol style="list-style-type: none"> <li>1. Reset the module.</li> <li>2. Change the module.</li> </ol>   |

| Item         | Meaning  | Troubleshooting                               |
|--------------|--|---|
| Start Status | Display whether the device is started.<br>When the device is started, it will display as <b>Started</b> ; When the device is not started or has no communication data, it will display as <b>Not Started</b> . | 1. Reset the module.<br>2. Change the module. |

### 10.3.3 APL Field Switch

Double-click APL field switch on the overall diagnosis APL system, and then the following page will display.

AEF6512-2T-S 12 Ports APL Field Switch[(2.26)-2-0-0]



|                        |         | Tag Name | Real-time Value | Description |
|------------------------|---------|----------|-----------------|-------------|
| Module Work/Standby    | Work    |          |                 |             |
| Module Fault Level     | Normal  |          |                 |             |
| Module Auxiliary Power | Normal  |          |                 |             |
| Module Connect Test    | Normal  |          |                 |             |
| Module Address Test    | Normal  |          |                 |             |
| Module A Bus           | Normal  |          |                 |             |
| Module B Bus           | Normal  |          |                 |             |
| Module Type Test       | Matched |          |                 |             |
| Module Config Check    | Normal  |          |                 |             |
| Status of Channel 0    | Normal  |          |                 |             |
| Status of Channel 1    | Normal  |          |                 |             |
| Status of Channel 2    | Normal  |          |                 |             |
| Status of Channel 3    | Normal  |          |                 |             |
| Status of Channel 4    | Normal  |          |                 |             |
| Status of Channel 5    | Normal  |          |                 |             |
| Status of Channel 6    | Normal  |          |                 |             |
| Status of Channel 7    | Normal  |          |                 |             |
| Status of Channel 8    | Normal  |          |                 |             |
| Status of Channel 9    | Normal  |          |                 |             |
| Status of Channel 10   | Normal  |          |                 |             |
| Status of Channel 11   | Normal  |          |                 |             |

**Figure 10-7 APL field switch diagnosis**

The following table describes each diagnostic items of APL field switch.

**Table 10-3 Descriptions of APL field switch diagnostic items**

| Item                | Meaning                                | Troubleshooting |
|---------------------|--|-----------------|
| Module Work/Standby | Work: the module is in working status; | —               |

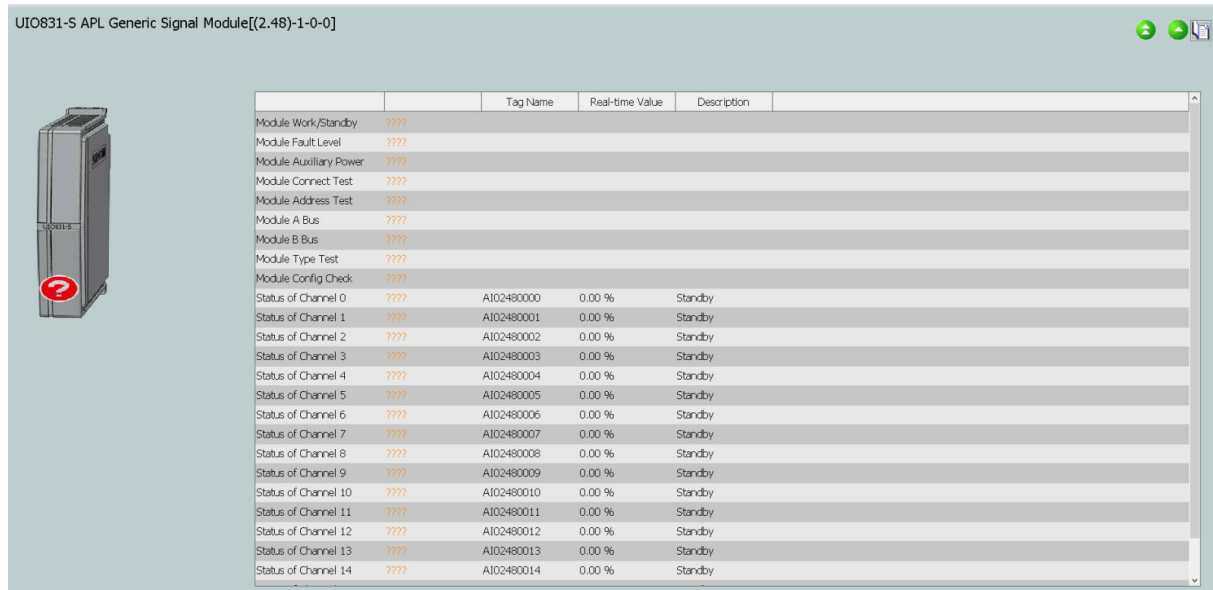


| Item                   | Meaning  | Troubleshooting   |
|------------------------|--|---|
| Module Fault Level     | Normal: The module runs normally without fault.<br>Slight fault: One of the channels in the module has fault, but does not diffuse. The module can still work normally.<br>Serious fault: The public channel of the module is damaged. | Check whether the connections of module is normal or change the module.   |
| Module Auxiliary Power | Normal: The module has auxiliary power supply.<br>Fault: The module has no auxiliary power supply.   | <ul style="list-style-type: none"> <li>● Check the power cables.</li> <li>● Cold start or change the module.</li> </ul>   |
| Module Connect Test    | Normal: The communication between module and controller is normal.<br>Module lost: The communication between module and controller is interrupted.   | <ul style="list-style-type: none"> <li>● Check whether the configuration address is the same as the actual one.</li> <li>● Check the cable connection of the module.</li> <li>● Change the module.</li> </ul> |
| Module Address Test    | Normal: There is no conflict between module addresses.<br>Fault: There is a conflict between module addresses.   | Check whether the configuration address is the same as the module actual address.   |
| Module A Bus           | Normal: The bus line of Trunk0 is normal.<br>Fault: The bus line of Trunk0 is faulty,  | <ul style="list-style-type: none"> <li>● Check APL Trunk wiring.</li> <li>● Cold start or change the module.</li> </ul>   |
| Module B Bus           | Normal: The bus line of Trunk1 is normal.<br>Fault: The bus line of Trunk1 is faulty,  | <ul style="list-style-type: none"> <li>● Check APL Trunk wiring.</li> <li>● Cold start or change the module.</li> </ul>   |
| Module Type Test       | Matched: The module ID is consistent with the host module ID.<br>Mismatched: The module ID is inconsistent with the host module ID.  | <ul style="list-style-type: none"> <li>● Check whether the configuration address is the same as the actual one.</li> <li>● Check the cable connection of the module.</li> <li>● Change the module.</li> </ul> |
| Module Config Check    | Normal: The configuration of the controller is consistent with that of the host.<br>Fault: The configuration of the controller is inconsistent with that of the host.  | Re-download configuration or change the module.   |
| Status of Channel N    | Invalid: Module channel has no actual signal connected.<br>Close: Module channel is closed.<br>Normal: Module channel has actual signal connected and is correct.<br>Fault: Module channel fault.<br>Unknown: Unknown channel fault.   | Check whether the connections of channel is normal or change the module.  |

The range of n is 0 to 11.

#### 10.3.4 SmartEIO

Double-click SmartEIO on the overall diagnosis APL system, and then the following page will display.



**Figure 10-8 SmartEIO diagnosis**

The following table describes each diagnostic items of SmartEIO.

**Table 10-4 Descriptions of UI0831-S diagnostic items**

| Item                   | Phenomenon and processing approach   |
|------------------------|--|
| Module Fault Level     | Serious fault: Check whether the module is properly inserted or change the module.<br>Slight fault: Check whether the connection is normal or change the module. |
| Module Auxiliary Power | Cold start or change the module if fault exists.   |
| Module Connect Test    | Check whether the configuration address is the same as the actual one if fault exists.<br>Check module installation, APL Trunk connection or change the module.  |
| Module A Bus           | Check APL Trunk connection if fault exists. If the problem cannot be solved, change the module.  |
| Module B Bus           | Check APL Trunk connection if fault exists. If the problem cannot be solved, change the module.  |
| Module Type Test       | When the module is displayed as inconsistent, please check the two module models on the base. The models should be the same.                                     |
| Module Config Check    | Re-download configuration or change the module if fault exists.  |
| Status of Channel 0~15 | Check whether the connections of channel is normal or change the module if fault exists.   |

## Section 11 Revision History

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*Table 11-1 Revision history*

| Version         | Applicable product model            | Remarks   |
|-----------------|-------------------------------------|---|
| V1.0 (20230328) | OMC High-performanceHMI V4.70.00.00 | First release.  |
| V1.1 (20230830) | OMC High-performanceHMI V5.10.00.00 | <ul style="list-style-type: none"><li>● Updated screenshots.</li><li>● Fixed some bugs.</li></ul> |