Multi-instruments

4418932003 2F

I/O modules

Description of Options

Improve Tomorrow

1. General information

1.1 Symbols and notation

Symbols for general notes

NOTE This shows general information.

More information
This shows where you can find more information.

Example

This shows an example.

How to ...
This shows a link to a video for help and guidance.

Symbols for hazard statements

DANGER!

This shows dangerous situations.

If the guidelines are not followed, these situations will result in death, serious personal injury, and equipment damage or destruction.

WARNING

This shows potentially dangerous situations.

If the guidelines are not followed, these situations could result in death, serious personal injury, and equipment damage or destruction.

CAUTION

This shows low level risk situation.

If the guidelines are not followed, these situations could result in minor or moderate injury.

NOTICE

This shows an important notice

Make sure to read this information.

1.2 Warnings and safety

Safety during installation and operation

When you install and operate the equipment, you may have to work with dangerous currents and voltages. The installation must only be carried out by authorised personnel who understand the risks involved in working with electrical equipment.

DANGER!

Hazardous live currents and voltages

Do not touch any terminals, especially the AC measurement inputs or any relay terminals, as this could lead to injury or death.

1.2.1 Disconnect the equipment

DANGER!

Disconnect the equipment

Disconnect the MIC-2 MKII from live currents and voltages before you carry out the installation.

1.3 Legal information

Third party equipment

DEIF takes no responsibility for installation or operation of any third party equipment. In no event shall DEIF be liable for any loss of profits, revenues, indirect, special, incidental, consequential, or other similar damages arising out of or in connection with any incorrect installation or operation of any third party equipment.

Warranty

NOTICE

Warranty

The equipment is not to be opened by unauthorised personnel. If opened anyway, the warranty will be lost.

Disclaimer

DEIF A/S reserves the right to change any of the contents of this document without prior notice.

The English version of this document always contains the most recent and up-to-date information about the product. DEIF does not take responsibility for the accuracy of translations, and translations might not be updated at the same time as the English document. If there is a discrepancy, the English version prevails.

Copyright

2. MIC-2 MKII I/O modules

2.1 About

The optional I/O extension module can be installed to increase the number of input and output connections. Available module types include: Digital input, digital output, pulse output, relay output, analogue input and analogue output.

The following I/O modules are available:

- AXM-IO1: used for low-voltage power distribution
- AXM-IO2: used in factory Distributed Control Systems (DCS) or building automation
- AXM-IO3: used with electrical devices

Each MIC-2 MKII unit supports one communication module and up to two I/O modules. When two I/O modules of the same type are installed, each module is identified by a unique name. A number is added to the end of the module name.

Example: AXM-IO2-1 and AXM-IO2-2.

Each MIB 8000C unit can connect to one I/O module. The function and connection are the same as described in the following sections. These are limited to the capabilities of the MIB 8000C.

2.1.1 Available I/O modules

Module	Inputs	Outputs	Isolated Power Supply
AXM-IO1	6 x DI	2 x RO	24 V for DI
AXM-IO2	4 x DI	2 x DO , 2 x AO	–
AXM-IO3	4 x DI, 2 x AI	2 x RO	–

- Digital Inputs (DI): Detect remote signals or count input pulses. Supports Sequence of Events (SOE) logging with time stamps.
- Digital Outputs (DO): Operate in alarm or energy pulse output mode. Both outputs use the same mode.
- Relay Outputs (RO): Operate in controlling or alarm mode. In controlling mode, outputs can be latching or pulse. In alarm mode, only latching is available.
- Analogue Inputs/Outputs (AI/AO): Support current ranges of 0–20 mA or 4–20 mA depending on the module.

2.2 Functions

The I/O modules can be connected to extend the functionality of the MIC-2 MKII.

Functions	AXM-IO1	AXM-IO2	AXM-IO3
Detect of remote signals	●	●	●
Record of SOE (sequence of events)	●	●	●
Count input pulses	●	●	●
Remote control with relay output	●		●
Alarm with relay output	●		●
Alarm with digital output		●	
Power pulses with digital output		●	
Analogue output		●	

Functions	AXM-IO1	AXM-IO2	AXM-IO3
Analogue input			●
24 V isolated voltage output	●		●

3. Installation

3.1 Prepare for installation

The MIC-2 MKII and the extension modules must be installed in a dry and dust-free environment as specified in the data sheet. Avoid heat, radiation, and high electrical noise sources. If the equipment is installed in an area subject to constant high vibrations, the equipment must be isolated from the vibrations. The installation environment must comply with the electrical and environmental specifications of the equipment as described in the Data sheet.

3.2 Tools and materials

Tools

Tools	Used to
Screwdriver	Tighten the installation screws.
Screwdriver, flat-bladed bit	Remove the external port cover.
Wire stripper, pliers and cutters	Prepare wiring. Trim cable ties.
Safety equipment	Personal protection according to local standards and requirements.

Materials

Materials	Used to
Installation screws	Mount the extension module on the MIC-2 MKII.
Wires	Wiring measuring points, DEIF equipment or any third party equipment to the terminals on the extension modules.

3.3 Install the equipment

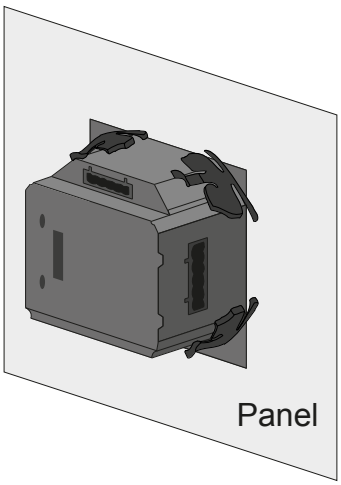
The linking pins on the extension modules are used to link the modules to the MIC-2 MKII and to link modules. The modules include the I/O module, the Ethernet module, and the PROFIBUS module.

NOTICE

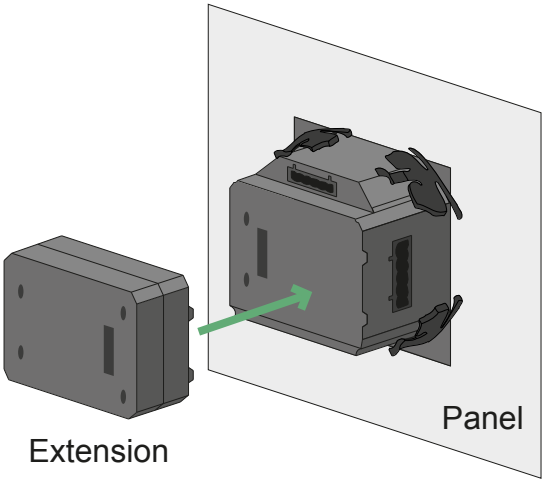
Communication module

If you need a communication module, you must install it before you install any other extension modules.

1. Use a flat-bladed bit screwdriver to remove the external port cover from the back of the MIC-2 MKII and the I/O module. The linking socket should be visible on the MIC-2 MKII and the module.



2. Align the linking socket on the extension module with the linking socket on the MIC-2 MKII.



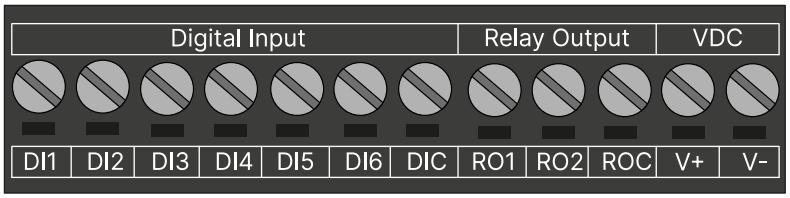
3. Push the module onto the MIC-2 MKII and make sure that the module is firmly in place.
4. Use a screwdriver to tighten the installation screws.

4. Wiring the equipment

4.1 About the wiring

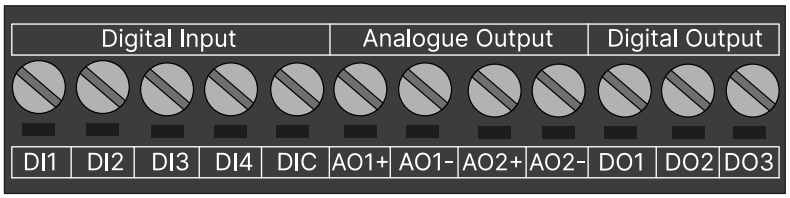
4.1.1 Terminal locations

AXM-IO1 module



Terminal	Name	Notes
DI1	Digital input 1	
DI2	Digital input 2	
DI3	Digital input 3	
DI4	Digital input 4	
DI5	Digital input 5	
DI6	Digital input 6	
DIC	Digital input common	Common terminal for Digital inputs 1 to 6.
RO1	Relay output 1	
RO2	Relay output 2	
ROC	Relay output common	Common terminal for relay outputs 1 and 2.
V+	Supply voltage, +24 V	Auxiliary power supply.
V-	Supply voltage, -24 V	Auxiliary power supply.

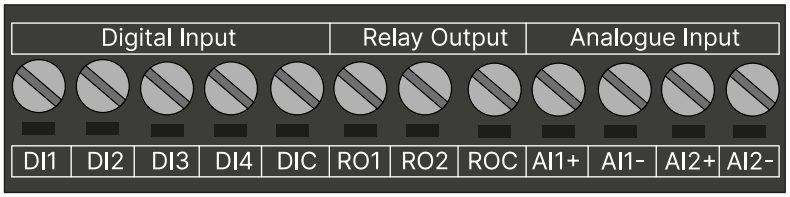
AXM-IO2 module



Terminal	Name	Notes
DI1	Digital input 1	
DI2	Digital input 2	
DI3	Digital input 3	
DI4	Digital input 4	
DIC	Digital input common	Common terminal for Digital inputs 1 to 6.
AO1+	Analogue output 1+	Positive terminal.
AO1-	Analogue output 1-	Negative terminal.
AO2+	Analogue output 2+	Positive terminal.
AO2-	Analogue output 2-	Negative terminal.

Terminal	Name	Notes
DO1	Digital output 1	
DO2	Digital output 2	
DOC	Digital output common	Common terminal for digital outputs 1 and 2.

AXM-IO3 module



Terminal	Name	Notes
DI1	Digital input 1	
DI2	Digital input 2	
DI3	Digital input 3	
DI4	Digital input 4	
DIC	Digital input common	Common terminal for Digital inputs 1 to 6.
RO1	Relay output 1	
RO2	Relay output 2	
ROC	Relay output common	Common terminal for relay outputs 1 and 2.
AO1+	Analogue output 1+	Positive terminal.
AO1-	Analogue output 1-	Negative terminal.
AO2+	Analogue output 2+	Positive terminal.
AO2-	Analogue output 2-	Negative terminal.

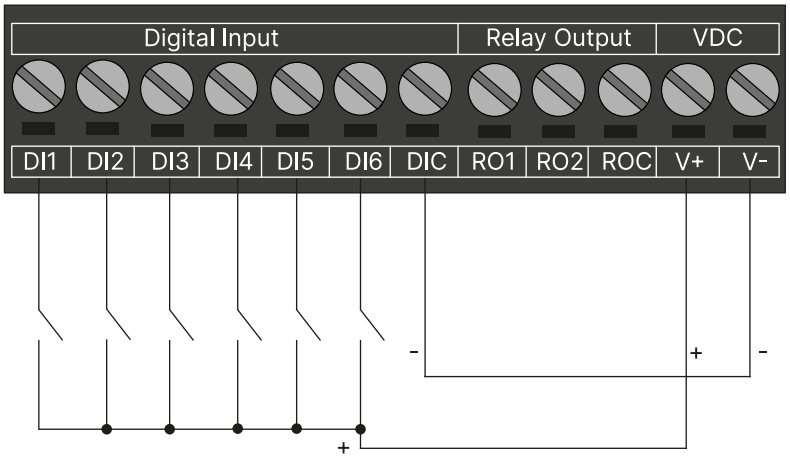
4.3 I/O module wiring

4.3.1 Digital inputs

Digital input ratings:

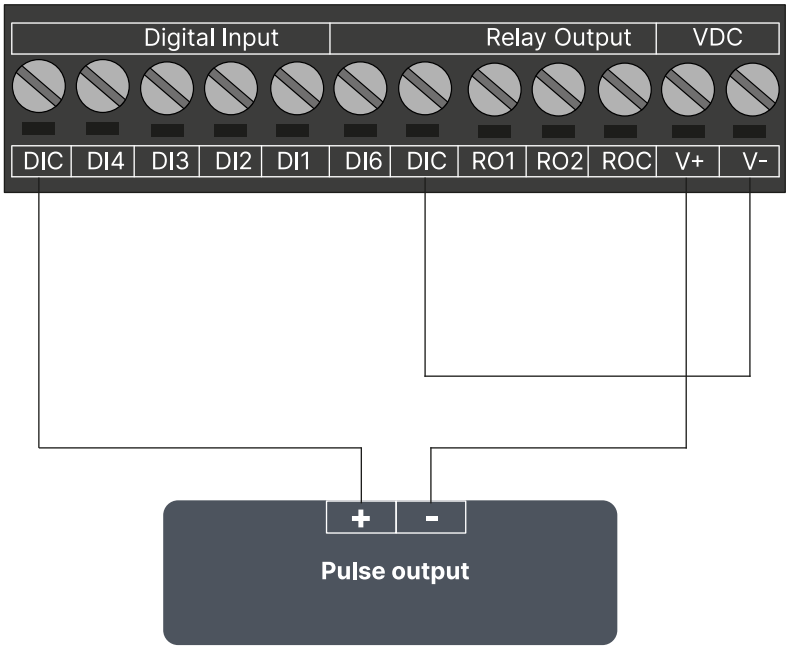
- External power supply rating: 24 to 160 V AC/DC
- Maximum current loop: 2 mA
- Maximum pulse frequency: 100 Hz, 50 % duty cycle (5 ms on and 5 ms off)
- Auxiliary power supply: 24 V DC. Should not be used for other purposes

AXM-IO1 digital input wiring for multiple terminals

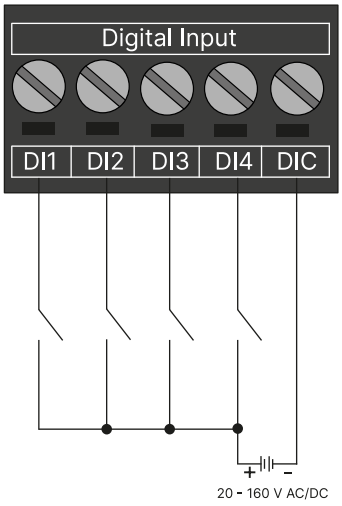


V DC is the supply for the digital inputs.

AXM-IO digital input wiring for pulse counter



AXM-IO2 and AXM-IO3 DI wiring



DEIF recommends this cable: AWG 22 to 16 (0.5 to 1.3 mm^2).

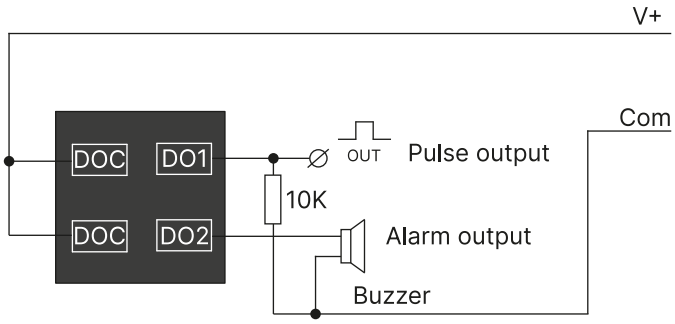
4.3.2 Digital outputs

The digital output is a dry contact and requires a voltage supply to generate the pulse signal.

Digital output ratings:

- Voltage range: 0 to 250 V DC
- Maximum load current: 100 mA
- Isolation voltage: 2500 V AC
- Output frequency: 40 Hz (20 ms on, 5 ms off)
- Minimum pulse width: 20 ms
- Minimum pulse interval: 5 ms

Digital output as alarm mode with a buzzer

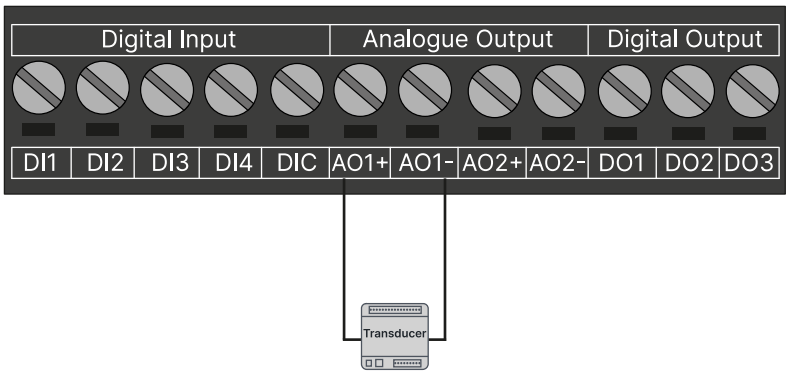


DEIF recommends this cable: AWG 22 to 16 (0.5 to 1.3 mm^2).

4.3.3 Analogue inputs

There are two analogue inputs on the AXM-IO3 module and can support both voltage and current.

Analogue input wiring



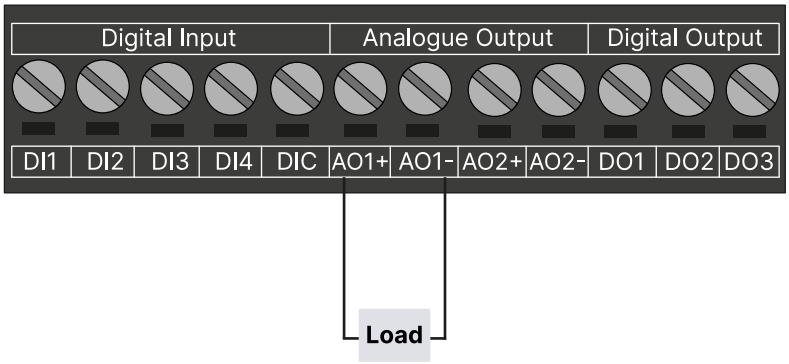
4.3.4 Analogue outputs

There are two analogue outputs in the AXM-IO2 module. The analogue outputs can convert the metering parameters into either an analogue voltage signal or an analogue current signal.

Analogue output ratings:

- Current output (0 to 20 mA/ 4 to 20 mA): maximum load resistance is 500 Ω
- Voltage output (0 to 5 V / 1 to 5 V): maximum load current is 20 mA
- Accuracy: 0.5 %
- Temperature drift: 50 ppm/°C typical
- Isolation voltage: 500 V DC
- Open circuit voltage: 15 V

Analogue output wiring

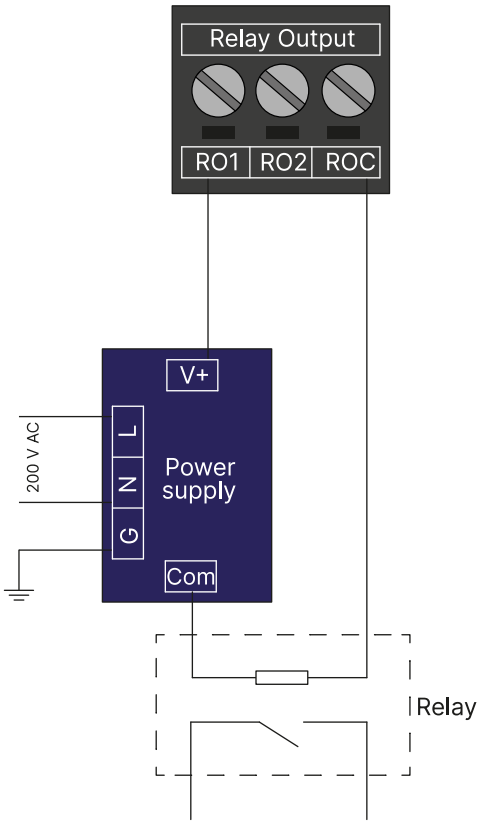


4.3.5 Relay outputs

Relay output ratings:

- Maximum switching voltage: 250 V AC, 30 V DC
- Load current: 5 A (R), 2 A (L)
- Maximum set time: 10 ms
- Maximum contact resistance: 30 mΩ
- Isolation voltage: 2500 V AC
- Mechanical life: 1.5 x 10^7

Relay output wiring



DEIF recommends this cable: AWG 22 to 16 (0.5 to 1.3 mm^2).

5. I/O functions

5.1 Digital inputs

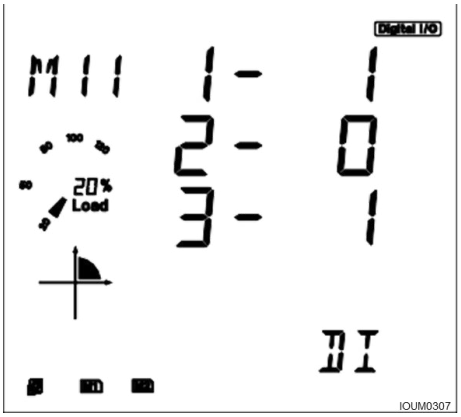
5.1.1 Detection of remote signals

Digital signal status

By default, the digital inputs are configured in State mode. In this mode, the MIC-2 MKII provides a digital signal status (ON/OFF). When a digital input detects a sufficient voltage input, a **1** is shown on the display screen and **ON** in the DEIF utility software.

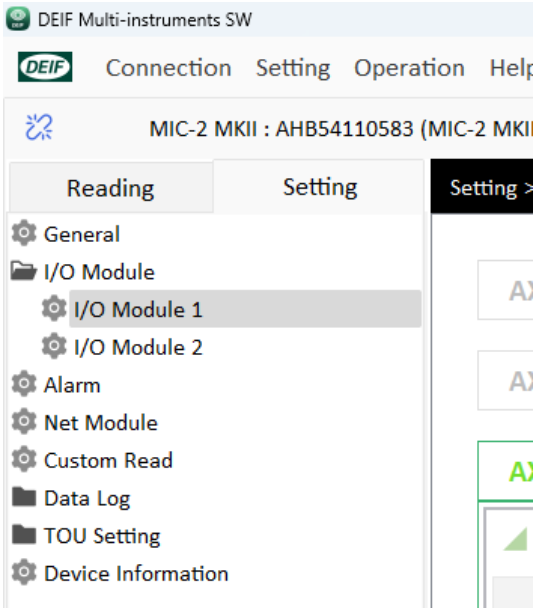
How to see the digital status on the display

1. Push the **H** and **V/A** buttons at the same time. The screen goes blank and you see **Meter** flashing on the screen.
2. Use the **P** and **E** buttons to move the cursor to **Digital I/O** and push the **V/A** button.
3. On the I/O selection screen, select the relevant I/O module and push the **V/A** button.
4. Move the cursor to **DI** and push **V/A** to see the digital input status.

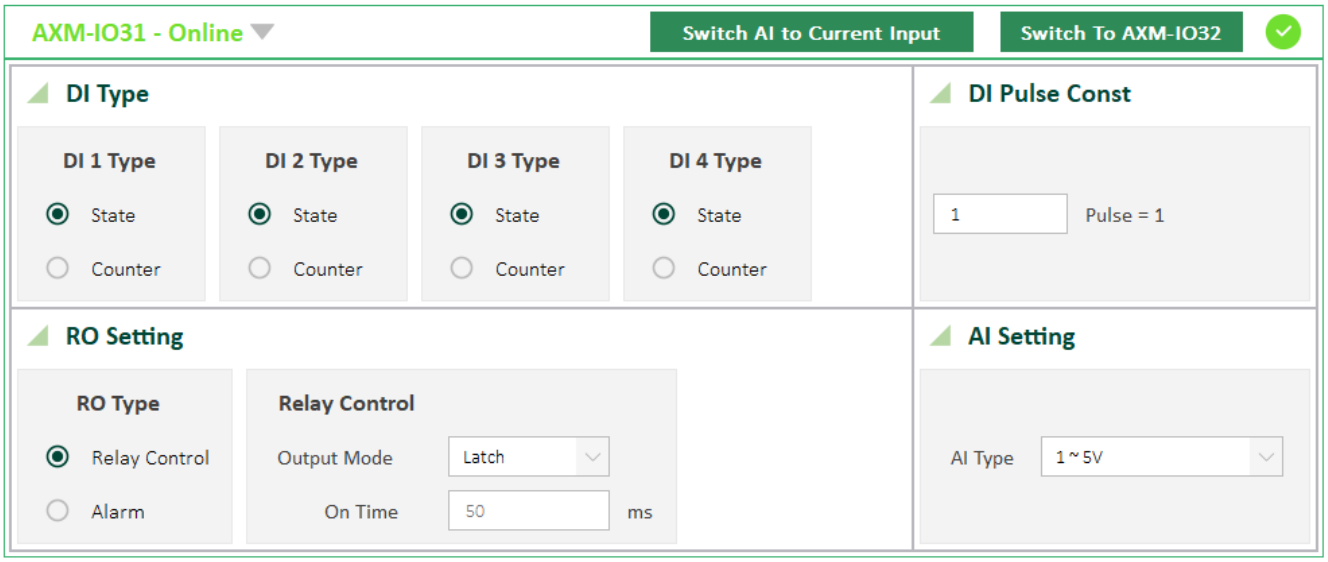


How to configure and see the digital status with the utility software

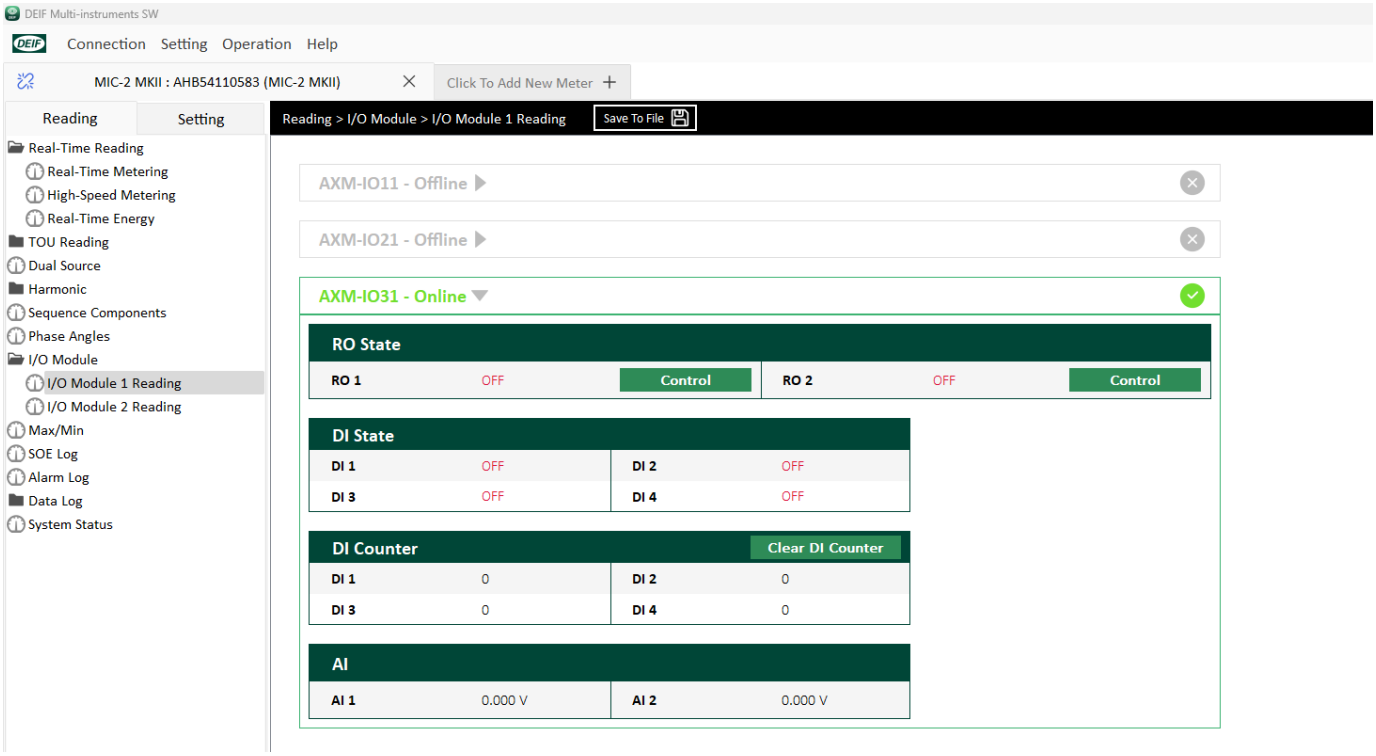
1. To configure a digital input, go to the Settings tab and select either I/O Modules 1 or I/O Modules 2 from the I/O Module tab. The I/O Module number depends on the number of connected I/O modules.



2. Make sure the DI Type is set to State. If you make changes to the I/O settings, click Update  to save the configurations.



3. Go the Reading tab and select I/O Modules 1 Reading or I/O Modules 2 Reading. This depends on the number of modules.
4. You should be able to see the digital input status as either ON or OFF.



Sequence of events (SOE) record

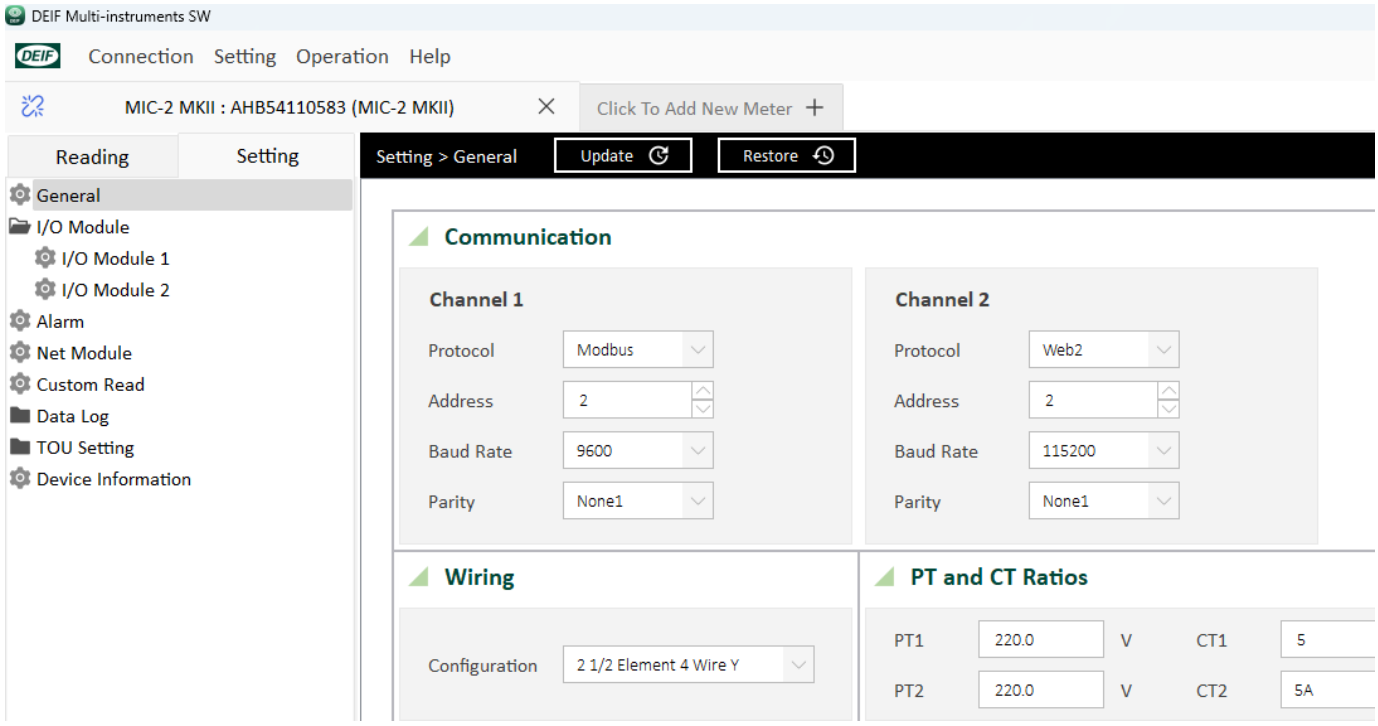
When the digital inputs are configured to detect remote signals, you can enable the SOE function. Use this function to record when a change has taken place, which also includes a time stamp.

You can select which I/O module to record the SOE with the utility software or from the display.

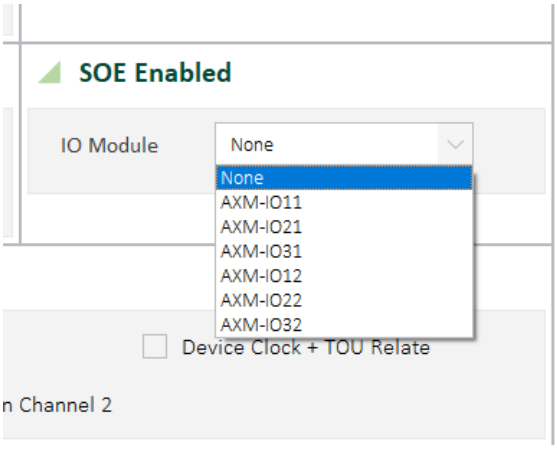
More information
See the **MIC-2 MKII Installation instructions and reference handbook** for how to configure the SOE function from the display.

Configure the SOE function with the utility software

1. Go to the Setting tab and click on General.

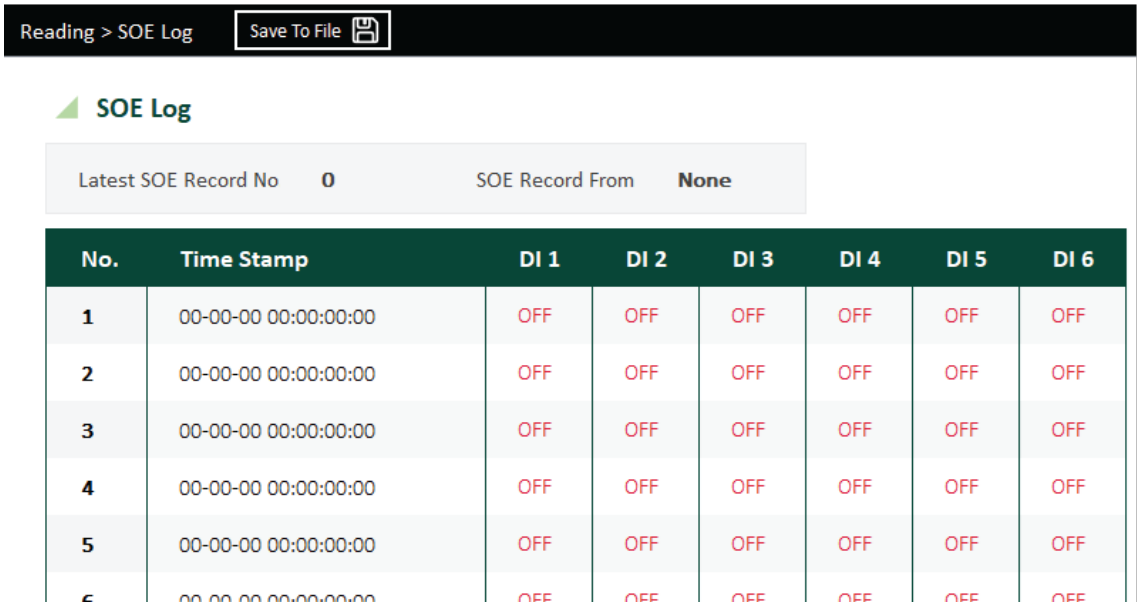


2. You might have to scroll down to see the SOE Enabled section.
3. To enable the SOE function, select the relevant I/O module to record the events. Select None to disable the SOE function.



4. Click the Update  button to save your changes.

The SOE log can record up to twenty events. When more than twenty events have been recorded, the SOE overwrites the record with the oldest time stamp, and continues with recording. The record includes the status for all digital inputs as well as time stamps for when the change occurred. The SOE data is available from the utility software, but not from the display.



The SOE begins to record immediately when the MIC-2 MKII is powered on. The data is not lost in the event of a power outage or a shutdown. If you change the I/O module in which the SOE function is configured, the SOE records are lost.

SOE Modbus addresses and configuration

The Sequence of Events (SOE) data is stored in Modbus addresses from 4399H to 4439H.

- Event records are stored from 4399H to 4438H. These addresses contain up to 20 events.
- Address 4439H identifies the I/O module that generated the events.

  Example: If 4439H = 1, the events were generated by AXM-IO11.

Each event uses the same data format:

- The first event is stored from 4399H to 439FH. These addresses contain the time stamp: year, month, day, hour, minute, second, and millisecond.
- Address 43A0H stores the digital input state as an unsigned integer.
  - Bit 0 = state of digital input 1
  - Bit 1 = state of digital input 2

  Example: If 43A0H = 1, only digital input 1 is ON.

SOE configuration example

- Register 101EH defines the working mode of each digital input:
  - Bit = 1 → digital input is a pulse counter
  - Bit = 0 → digital input is used to detect remote signals
- Register 101BH selects the I/O module with SOE enabled. Only one module can be active at a time. If the register is:
  - 0 = No module has SOE enabled
  - 1 = AXM-IO11
  - 2 = AXM-IO21
  - 3 = AXM-IO31
  - 4 = AXM-IO41
  - 5 = AXM-IO51
  - 6 = AXM-IO61

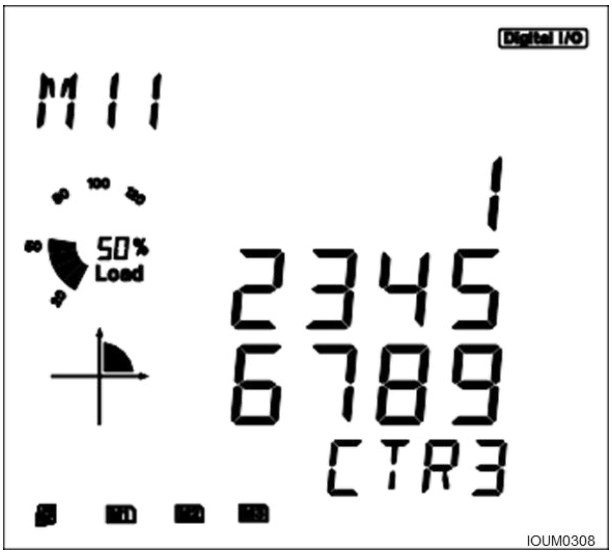
5.1.2 Pulse counter

You can set a digital input to count pulses. Once configured, the pulse count appears on both the display and in the utility software.

View pulse count on display

1. Press **H** and **V/A** together. Screen goes blank, then “Meter” flashes.
2. Use **P** and **E** buttons to move to **Digital I/O**, then press **V/A**.
3. Select the I/O module and press V/A.
4. Move to CTR and press **V/A** to view pulse data.
5. Use **P** and **E** buttons to scroll through counters.

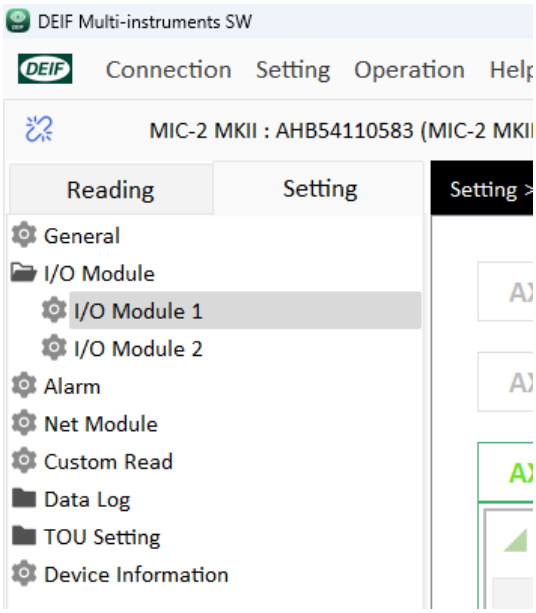
If the count value is 123456789, 1 is shown on the first line on the display, 2345 on the second line, and 6789 on the third.



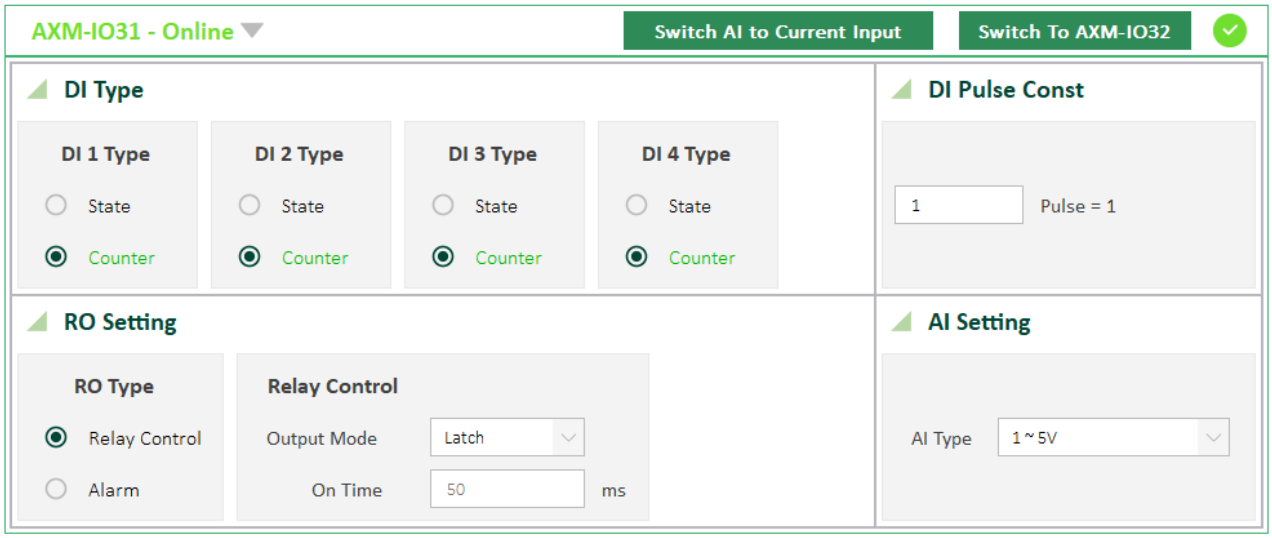
More information
See the **MIC-2 MKII Installation instructions and reference handbook** for how to configure the pulse counter from the display.

Configure pulse counter in utility software

1. Go to the Settings tab.
2. Select I/O Modules 1 or 2 under the I/O Module tab (depends on how many modules you have).

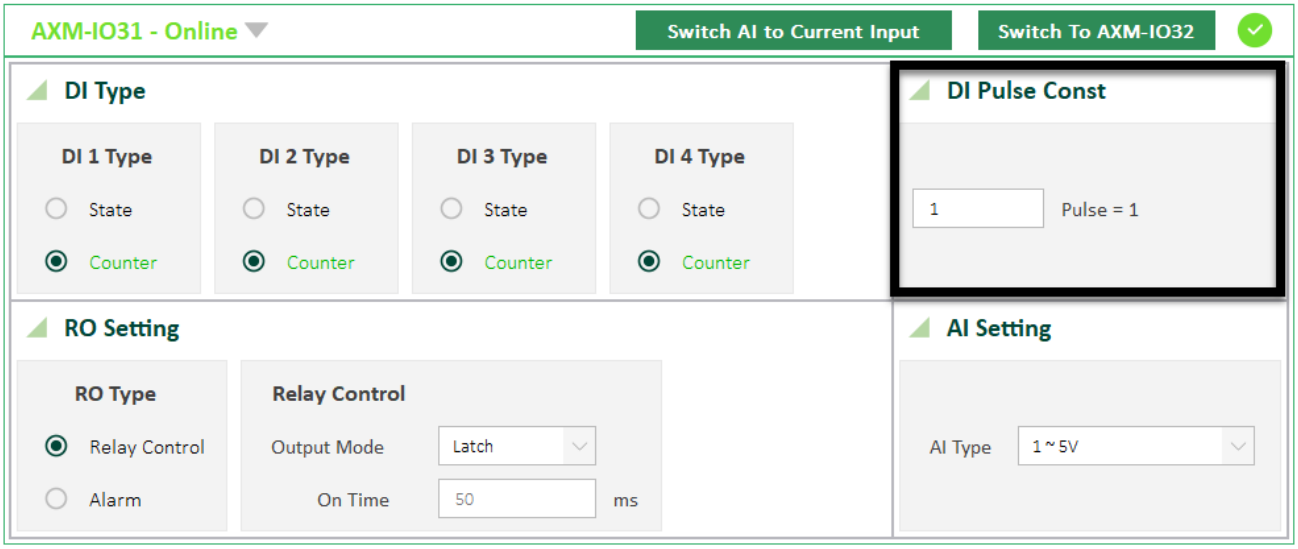


3. Set DI Type to “Counter".

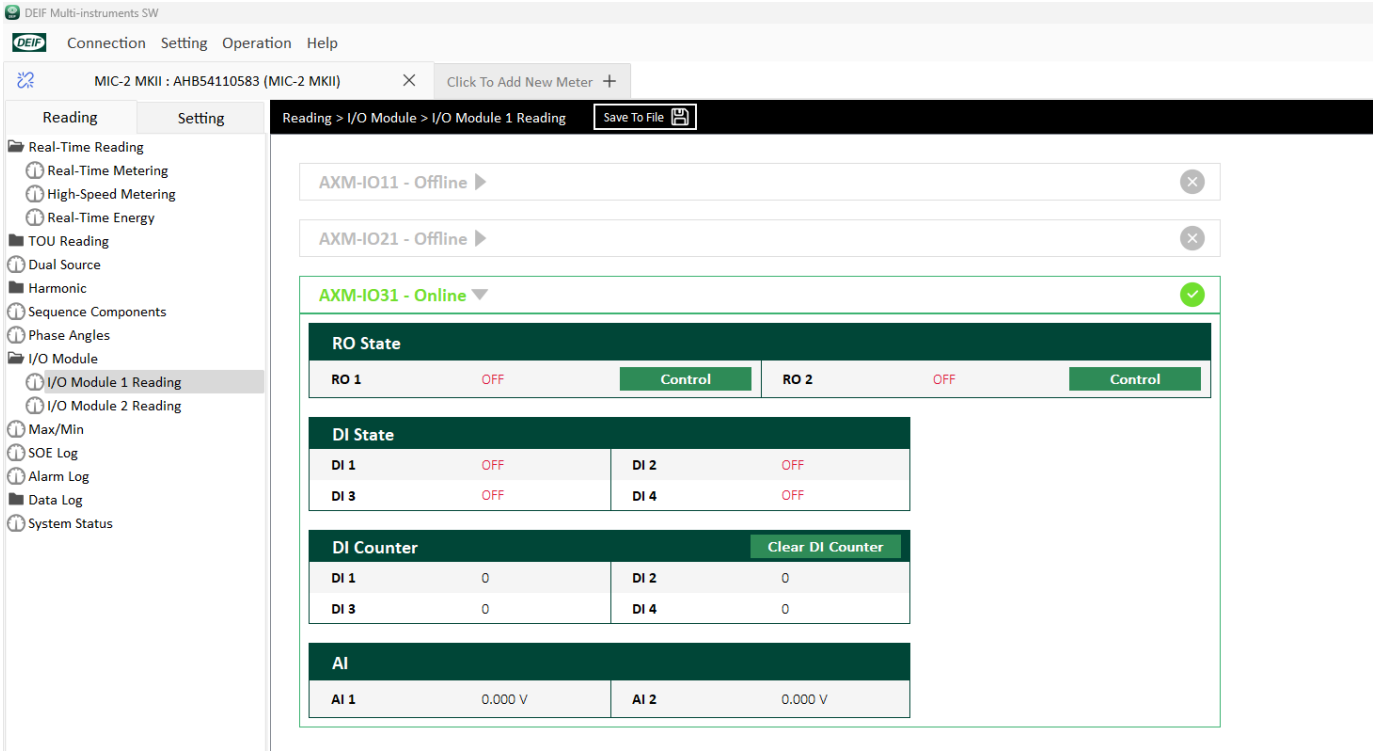


4. Click 

to save changes.
5. Set the pulse constant in the “DI Pulse Const” section (range: 1–65535). This defines how many pulses equal one count.



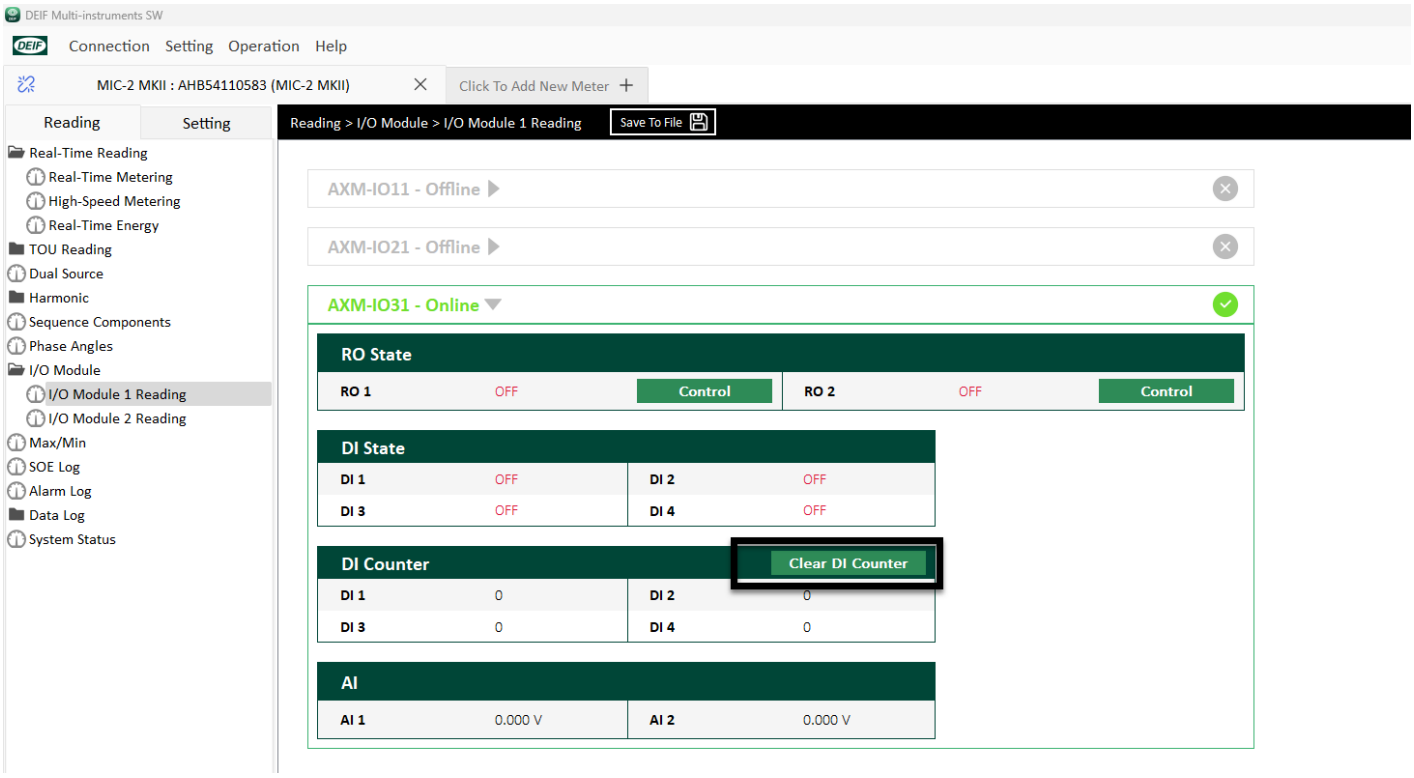
6. To view the count, go to the Reading tab, select the I/O module, and check the counter data.



Clear the pulse count

You can clear the pulse count from the display, with the utility software or Modbus. In the utility software:

1. Go to the Reading tab.
2. Select the module.
3. In the DI Counter section, click “Clear DI Counter.”



More information
See the **MIC-2 MKII Installation instructions and reference handbook** for how to clear the pulse count from the display or with Modbus.

Pulse counter Modbus addresses

Address range: 4349H to 4380H. There are 28 groups of pulse records:

- 6 for AMX-IO11
- 4 for AXM-IO21
- 4 for AMX-IO31
- 6 for AMX-IO12 (2 modules)
- 4 for AMX-IO22 (2 modules)
- 4 for AMX-IO32 (2 modules)

Each group is an unsigned integer, for example 4349H to 434aH records the number of pulses from digital input 1 in the AXM-IO11 module.

Parameter configuration example (AXM-IO1)

In this example, the pulse counter parameters are set for AXM-IO11 with Modbus:

1. 109eH register: set the bit to 1 for the digital input to count pulses.
2. 109fH register: this register is an unsigned integer. If the integer is A, and the digital input is set to count pulses, the actual number of pulses counted by the digital input is calculated as shown below. Actual number of pulses = A * recorded number of pulses.

For example, if A = 20 and the recorded number of pulses by the digital input is 100, the actual number of pulses is: 20 * 100 = 2000.

5.2 Digital output

The AXM-IO2 module has two digital outs that you can configure in alarm mode or energy pulse mode. You can do the configuration from the display, with Modbus or the utility software.

More information
See the **MIC-2 MKII Installation instructions and reference handbook** for how to configure the digital outputs from the display and with Modbus.

5.2.1 Energy pulse mode

In energy pulse mode, the digital output sends pulses based on the energy measured by the meter.

The configuration can be done from the display, Modbus, or the utility software. The output can be linked to one of the following energy types:

- Import energy (Ep_Imp)
- Export energy (Ep_Exp)
- Import reactive energy (Eq_Imp)
- Export reactive energy (Eq_Exp)

The pulse width is adjustable between 20 ms and 1000 ms. The default value is 80 ms.

A pulse icon flashes on the MIC-2 MKII display when a pulse is sent.

Manual calculation of the pulse constant

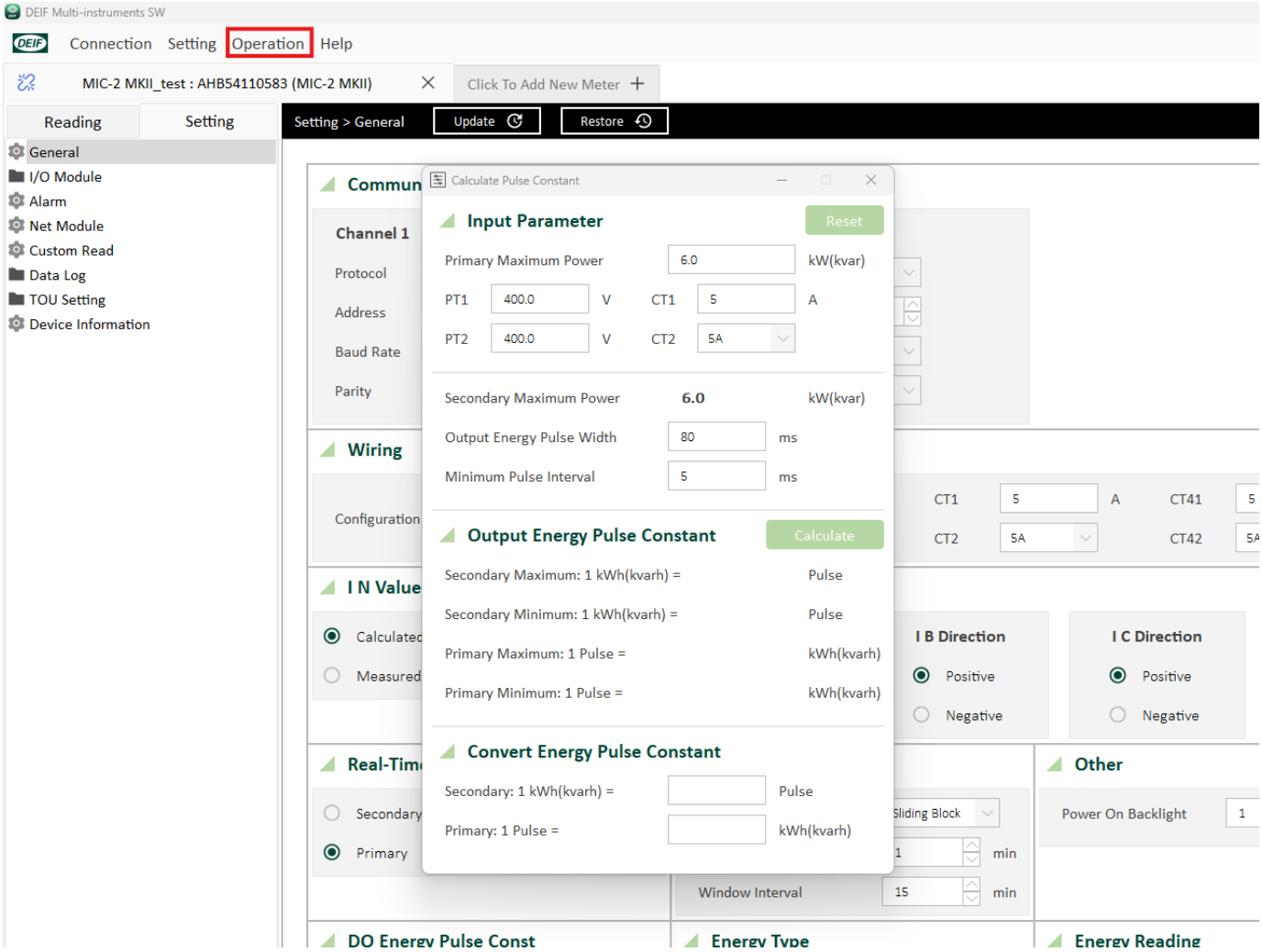
The pulse constant defines how often the digital output sends a pulse. This value depends on the rated current and voltage of the system.

How to find the pulse constant:

1. Find the energy per pulse
   - Check how many pulses equal 1 kilowatt-hour (kWh), or how many kWh equal 1 pulse.
   - Example: 1 pulse = 1 kWh.
2. Calculate the transformer ratio
   - Multiply the Potential Transformer (PT) ratio by the Current Transformer (CT) ratio.
   - Formula: PT1 / PT2 × CT1 / CT2
   - Example: PT ratio = 6000 V / 120 V, CT ratio = 2000 A / 5 A
   - If no PT is used, use 400 V / 400 V as default.
   - If CT2 output is 333 mV, RCT, or 80 / 100 / 200 mA, use 1 for CT2.
3. Convert kWh to pulses
   - Divide 1 kWh by 22,000.
   - This means: 1 pulse = 1 / 22,000 kWh
4. Define the pulse constant
   - 22,000 pulses = 1 kWh
   - So, the pulse constant is 22,000 pulses per kWh

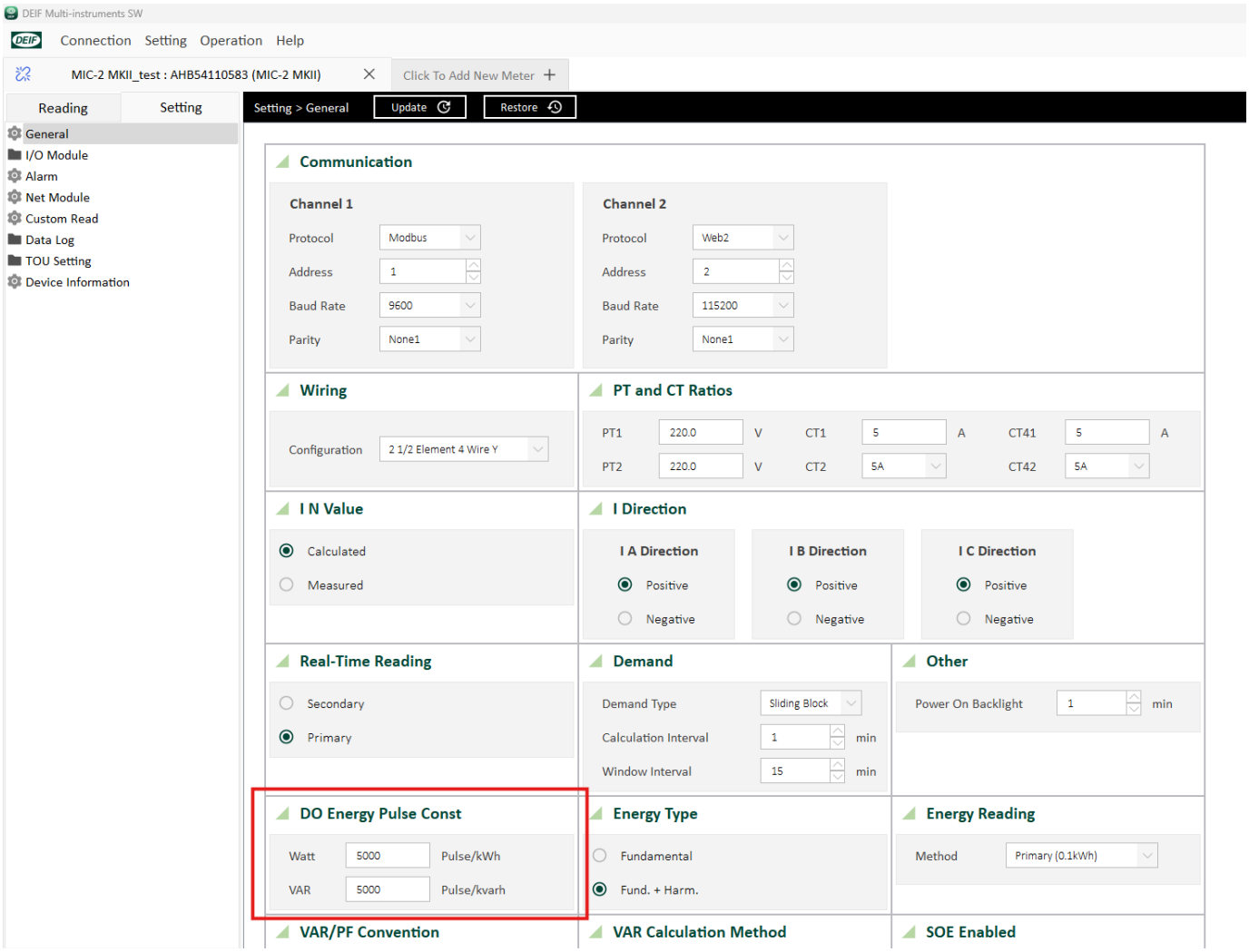
Calculation of the pulse constant with the utility software

1. Go to the Operation menu and select Calculate Pulse Constant.



2. In the pop-up window, insert your values and click Calculate to calculate the pulse constant.
3. Note down the calculated pulse constant as you need it for the next step.
4. Go to the Setting menu and click on the General tab.

5. Go to the DO Energy.



Once you have calculated the pulse constant, you can configure the pulse constant setting from the display, with Modbus, or using the utility software.

In the utility software, go the Setting tab and select the General page. You can configure the pulse constant for real energy (pulse/kWh) or reactive energy (pulse/varh).

More information
See the **MIC-2 MKII Installation and reference handbook** for how to set the constant from the display or with Modbus.

Modbus addresses

You can configure the energy pulse mode with Modbus.

1. The digital output mode is set with register 10a5H. If the register is 0, the digital outputs are in energy mode. If the register is set to 1, the outputs are in alarm mode.
2. The pulse width is set with register 10a6H, which is only relevant for energy pulse mode.
3. The energy output type is set with register 10a7H for digital output 1 and 10a8H for digital output 2.
   - If the register is set to 0, the output is nothing.
   - If it is set to 1 the output is import energy.
   - If it is set to 2 the output is export energy.
   - If the register is set to 3 the output is import reactive energy.
   - If the register is set to 4, the output is reactive energy.

4. You can set the energy output type for digital output 1 and digital output 2 as the same value.

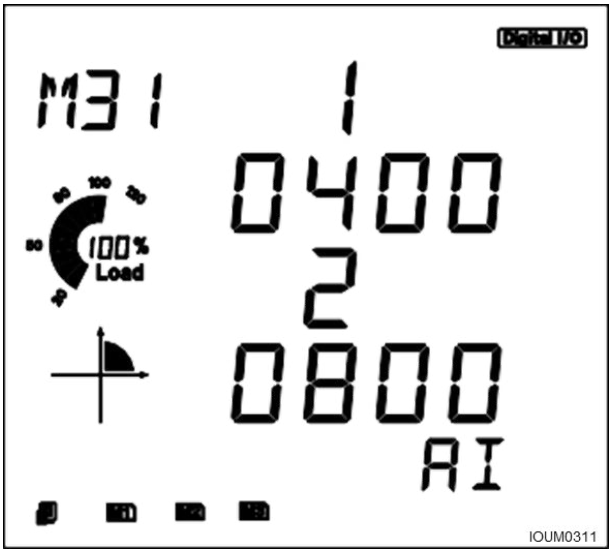
5.3 Analogue inputs and outputs

5.3.1 Analogue input

The AXM-IO3 module has two analogue inputs that you can configure to measure either currents or voltages.

See the analogue input readings from the display

1. Push **H** and **V/A** at the same time. The screen goes blank and Meter flashes on the screen.
2. Push **P** or **E** to move the cursor to **Digital I/O**. Push **V/A** to select.
3. Select the relevant I/O module and use the **V/A** button to confirm.
4. Move the cursor to **AI** and push the **V/A** button to see the analogue input readings.

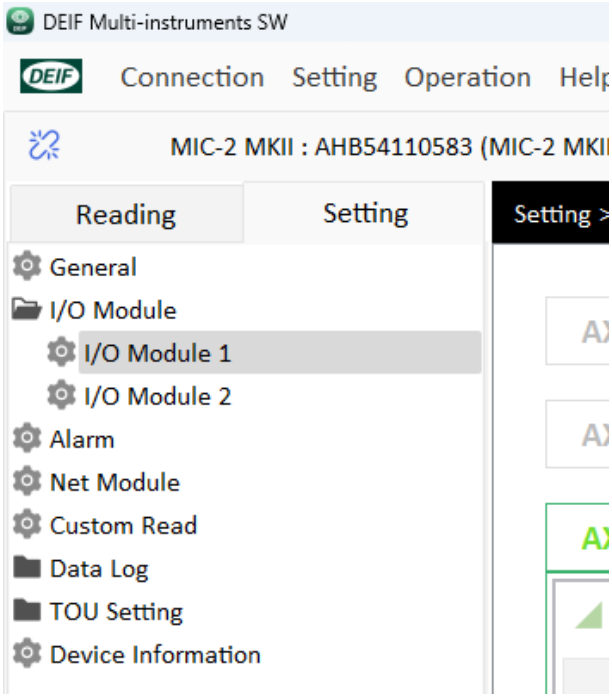


The value on the display is a hex number. See Convert hex values to actual values on page 27 for how to convert from hex number to the actual value.

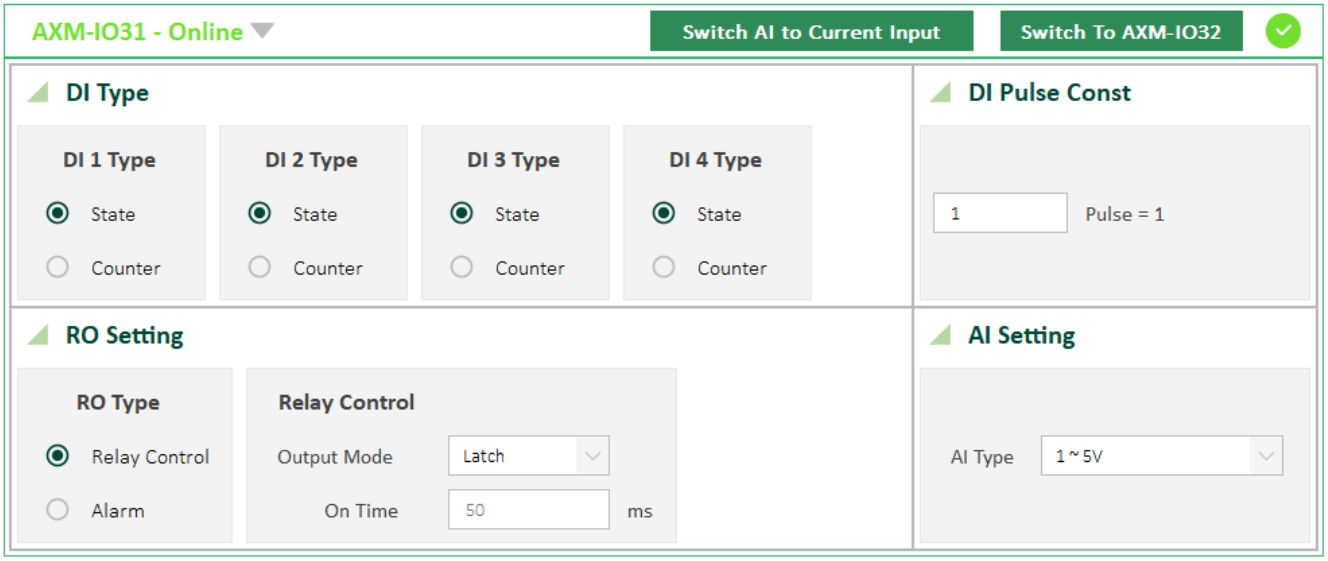
More information
See the **MIC-2 MKII Installation instructions and reference handbook** for how to configure the analogue inputs from the display and using Modbus.

Configure the analogue input readings with the utility software

1. Go to the Settings tab and select the relevant I/O module from the I/O Module tab.



2. From the AI Setting section, you can configure the AI type. The default type is voltage, where you can configure the input as 0 to 5 V or 1 to 5 V.



3. To see the current AI types, you need to click the Switch AI to Current Input button 

. You can configure the input as 0 to 20 mA or 4 to 20 mA.

The analogue input readings are shown as hex numbers. See section Convert hex values to actual values on page 27 for how to convert hex numbers to actual values.

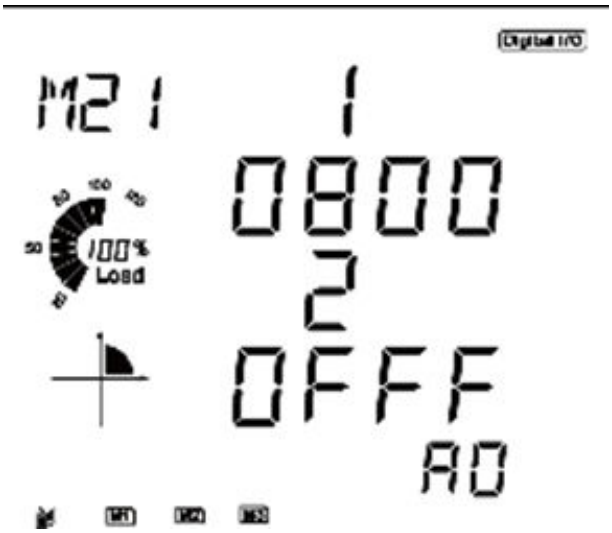
5.3.2 Analogue output

Use the analogue output in the AXM-IO2 module to convert electrical parameters, measured by MIC-2 MKII, to analogue voltage or current values. The analogue output supports four outputs:

- 0 to 20 mA
- 4 to 20 mA
- 0 to 5 V
- 1 to 5 V

See the analogue output values on the display

1. Push the **H** and **V/A** buttons at the same time. The display goes blank and Meter flashes on the screen.
2. Use **P** and **E** to move the cursor to **Digital I/O**, and push the **V/A** button to select.
3. Select the relevant I/O module. Push **V/A** to confirm.
4. Use **P** and **E** to move the cursor to **AO**, and push the **V/A** button to see the analogue output values.

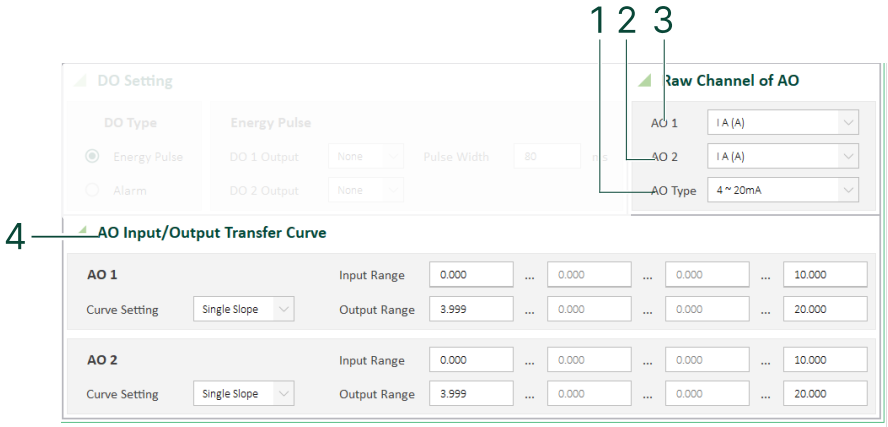


The values are in hex, and you need to convert the displayed value to the real value. See Convert hex values to actual values on page 27 for how to convert the hex values to actual values.

More information
See the **MIC-2 MKII Installation instructions and reference handbook** for how to configure the analogue outputs from the display.

Configure the analogue output values with the utility software

Go to the Settings page and select the relevant I/O Module tab.

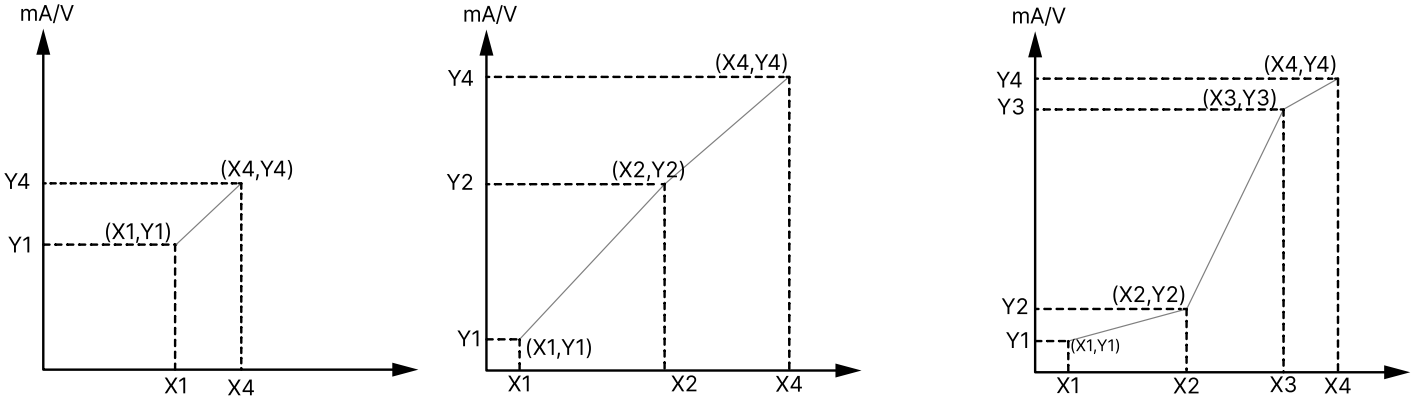


Number	Section	Text	Description
1	Raw Channel of AO	AO Type	Configure the type of output. You can select 0 to 20 mA, 4 to 20 mA (mA model), or 0 to 5 V, 1 to 5 V (V model).
2	Raw Channel of AO	AO 2	Set the electrical parameter analogue output 2 is used to convert.

Number	Section	Text	Description
3	Raw Channel of AO	AO 1	Set the electrical parameter analogue output 1 is used to convert.
4	AO Input/Output Transfer Curve	AO 1/AO 2	Configure the scaling of the analogue outputs relative to the configured electrical parameter.

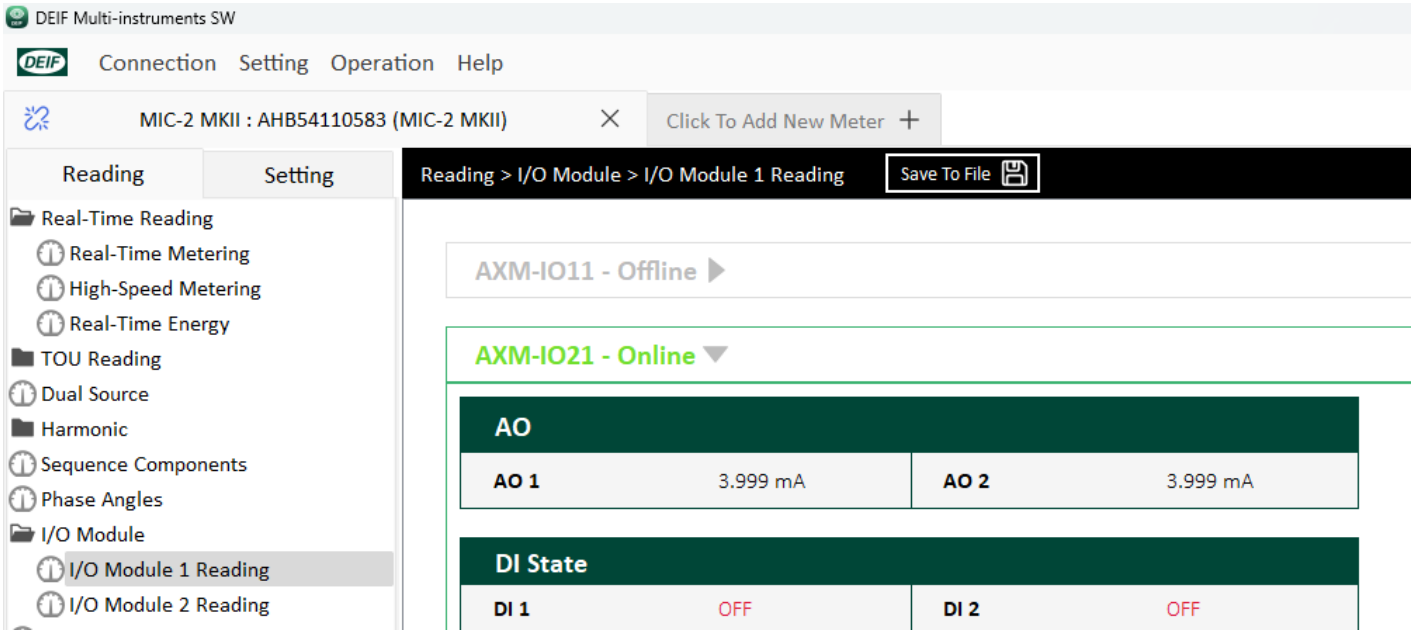
You can select between three different transfer curve:

- Single slope: only the minimum (X1) and maximum (X4) values are required to represent the AO signal. For example, for a 4 to 20 mA signal, the minimum value is 4 mA (Y1) and the maximum value is 20 mA (Y2).
- Dual slope: the minimum (X1), maximum (X4), and middle value (X2) are required to represent the AO signal. For example, for a 4 to 20 mA signal, the minimum value (Y1) is 4 mA, the middle value is 12 mA (Y2), and the maximum value is 20 mA (Y4).
- Triple slope: four points are required to represent the AO signal. Configure the four points in ascending order.



See the analogue output values with the utility software

To see the output values, go to the Reading tab and select the relevant I/O module from the I/O Module tab.



5.3.3 Convert hex values to actual values

The analogue input value is shown as a hex number. The value ranges from 0 to 4095. You can calculate the real voltage or current values from the displayed values using these equations:

Analogue input 0 to 20 mA

$$Real\,Value = \frac{Displayed\ value}{4096} \times 20mA$$

Analogue input 4 to 20 mA

$$Real\,Value = 4mA + \frac{Displayed\ value}{4096} \times 16mA$$

Analogue input 0 to 5 V

$$Real\,Value = \frac{Displayed\ value}{4096} \times 5V$$

Analogue input 1 to 5 V

$$Real\,Value = 1V + \frac{Displayed\ value}{4096} \times 4V$$

5.4 Relay output

Relay outputs are available on the AXM-IO1 and AXM-IO3 modules.Each relay can operate in control mode or alarm mode.

- In control mode, the relay switches ON or OFF immediately.
- In alarm mode, the relay is triggered by an alarm condition.

Two relay types are available:

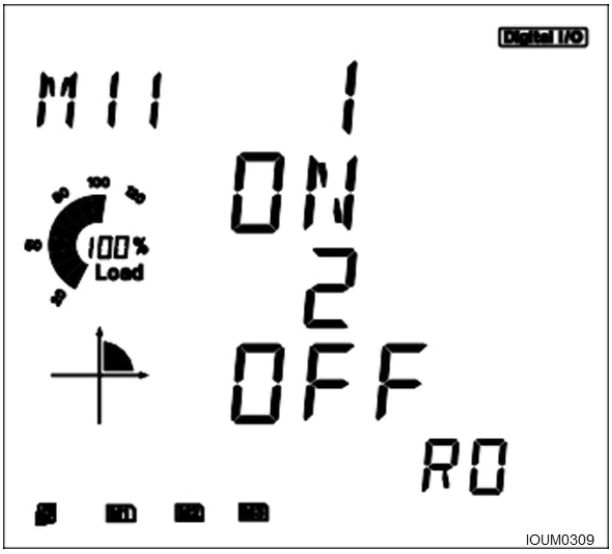
- Pulse relay: The output changes from OFF to ON for a set time between 50 ms and 3000 ms.
- Latching relay: The output remains in either ON or OFF state until changed. In alarm mode, the default relay type is latching.

The relay output status is available on the display, in the utility software, and via Modbus.

How to see the relay output status on the display

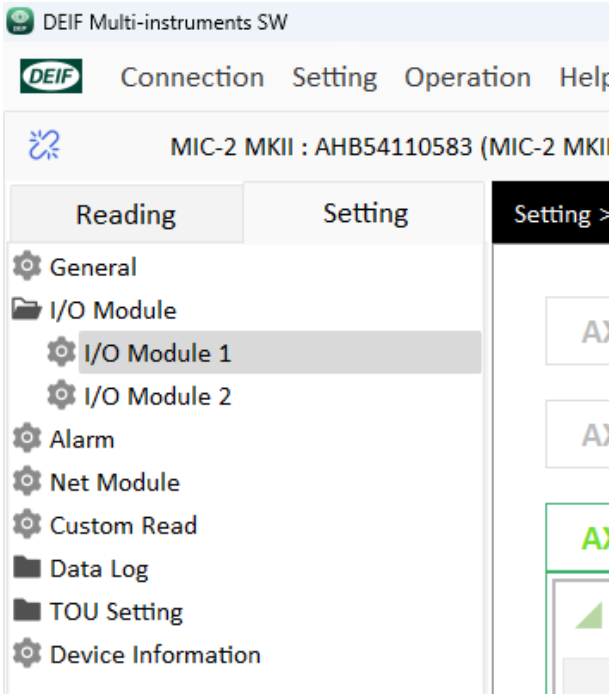
1. Push the **H** and **V/A** buttons at the same time. The screen goes black and then **Meter** starts to flash on the screen.
2. Use the **P** and **E** buttons to move the cursors to **Digital I/O** and push the **V/A** button to select.
3. Select the relevant I/O module and push the **V/A** button to confirm.
4. Use the **P** and **E** buttons to move the cursors to **RO** and push the **V/A** button to see the states of the relay outputs.

By default, the relay is in OFF state (normally open), and when the output is triggered, the relay switches to ON.



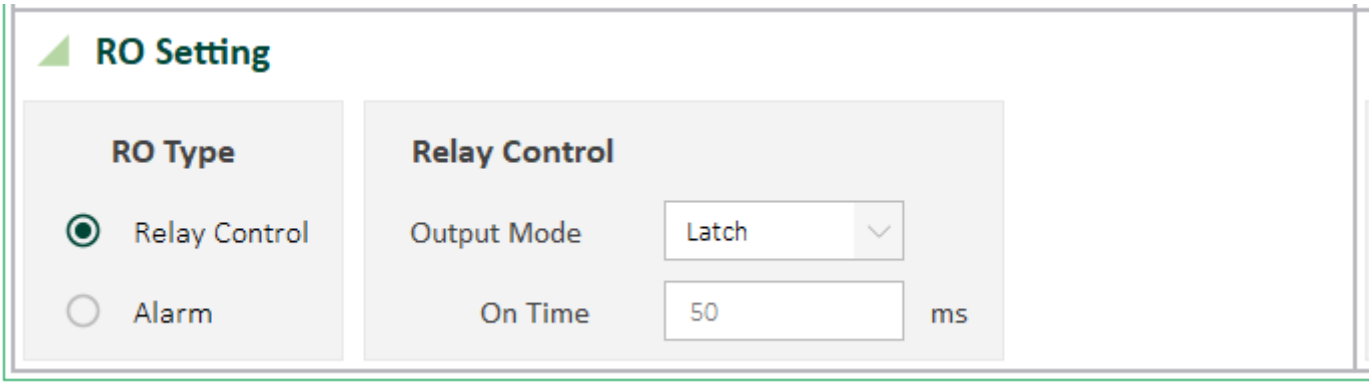
How to configure and see the relay outputs with the utility software

To configure the relay output settings, go to the Settings tab and select the relevant I/O module from the I/O Module tab.



You can configure two types of relay outputs:

1. Control Relay: Used to switch the relay ON or OFF manually. Two control modes are available:
   - Latch: The relay stays in its current state until it is manually changed.
   - Momentary: The relay switches ON for a set time between 50 ms and 3000 ms, then switches OFF automatically.
2. Alarm Relay: Triggered by a configured alarm condition. The relay switches ON or OFF based on whether the measured value is above or below the configured threshold. Two control modes are available:
   - Latch: The relay stays in its state until the alarm condition changes.
   - Manual: The relay stays ON until it is manually switched OFF.



The relay output status is available in the Reading tab of the utility software. The correct tab—I/O Module 1 or I/O Module 2—depends on the connected module. The status is shown as:

- ON: when the relay switch is closed
- OFF: when the relay switch is open

For a control relay, push the Control  button to switch the relay ON and OFF.

Relay output Modbus addresses

- 10a0H determines the work mode. If the address is 0, the relay outputs are in control mode. If the address is 1, the outputs are in alarm mode.
- 10a1H determines the output mode. If the address is 0, the outputs are in latch mode, and if the address is 1, the outputs are in momentary mode.
- 10a2H determines the time for which the relay is on when the output is in monetary mode. For example, if the address is 100, the outputs are on for 100 ms after you have switched the relay on.