ABB MEASUREMENT & ANALYTICS | TECHNICAL BULLETIN

Replacement procedures for modules with incorrect firmware TFIO Analog Input (AI) modules with part number 2100418-009

NOVEMBER 20, 2023 | 2108612TB-TB228

Contents

Contents 1

1 Description 2

2 Impacted products 2
- 2.1 Identify affected AI modules by part number 2
- 2.2 Determine AI module firmware version from PCCU 3
- 2.3 Determine AI module firmware version from registers 4

3 Resolution 4
- 3.1 Module replacement on powered-off system 5
  - 3.1.1 Replace TFIO AI module(s) 5
  - 3.1.2 Verify new AI module(s) detection and firmware 5
- 3.2 Module replacement on a system under power 6
  - 3.2.1 Save the controller's configuration 6
  - 3.2.2 Replace hot pluggable module(s) 6
  - 3.2.3 Restart the I/O Interface 10
  - 3.2.4 Verify new AI module(s) detection and firmware 10

1 Description

Analog Input (AI) TFIO Modules with part number 2100418-009 with firmware version 2107630-001AA present the following issues after power reset:

- AI module(s) lose calibration.
- All values on AI module show negative values.

2 Impacted products

XSeries, RMC-100, and XIO devices which have AI modules with the incorrect firmware may be impacted.

DANGER – Serious damage to health / risk to life. Explosion Hazard: Follow warnings and precautions for the related products when installed in Classified Hazardous Locations before disconnecting or removing the TFIO module from the product for inspection.

IMPORTANT NOTE: ABB TFIO Analog input (AI) modules with green housing and AI modules with part number 2100418-007 ARE NOT AFFECTED. These modules DO NOT need to be replaced.

Use the table below to guide you in locating any AI modules with incorrect firmware in your inventory and field installations.

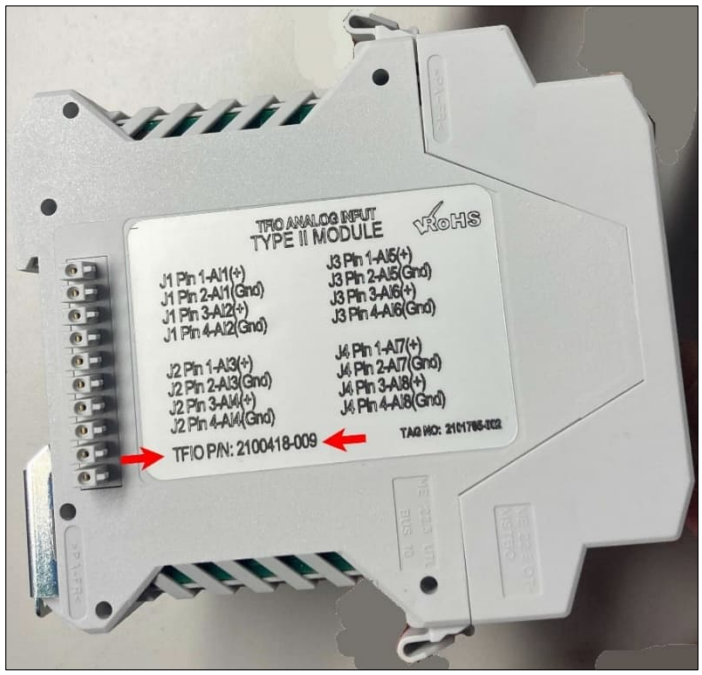
Module location	Action to detect
Not installed	Inspect the part number on the exterior of the module or the module circuit board: — If the module housing has part number 2100418-009 the module may be configured with incorrect firmware. Confirm by checking the firmware version as described in section 2.2. — If the module circuit board has part number 2100418-008, the module may be configured with incorrect firmware. Confirm by checking the firmware version as described in section 2.2.
Installed (in-service)	Check the firmware version from PCCU (see section 2.2) or read registers from management system (see section 2.3). If the modules have firmware version 2107630-001AA, they have the incorrect firmware.

If you find AI modules with incorrect firmware in systems that are already in operation, carefully review and follow the appropriate procedure to replace them (see section 3 Resolution).

2.1 Identify affected AI modules by part number

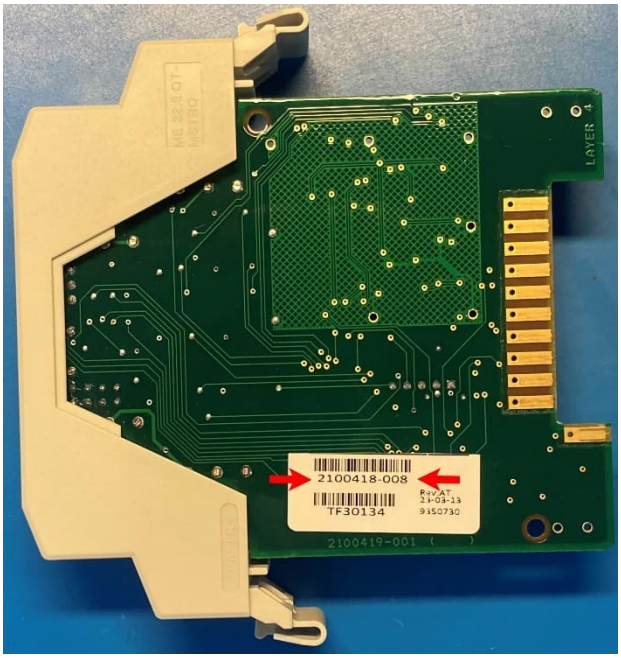
Figure 2-1 and Figure 2-2 show the location of the part numbers on the housing and on the circuit board. Modules and boards with these part numbers may be configured with the incorrect firmware and must be verified (see section 2.2).

Figure 2-1: Part number on housing: 2100418-009



NOTICE – Circuit board damage. When removing or handling module's circuit boards, be sure to be properly grounded to protect the module's circuit board (PCBA) from electrostatic discharge (ESD) damage.

Figure 2-2: Part number on circuit board



2.2 Determine AI module firmware version from PCCU

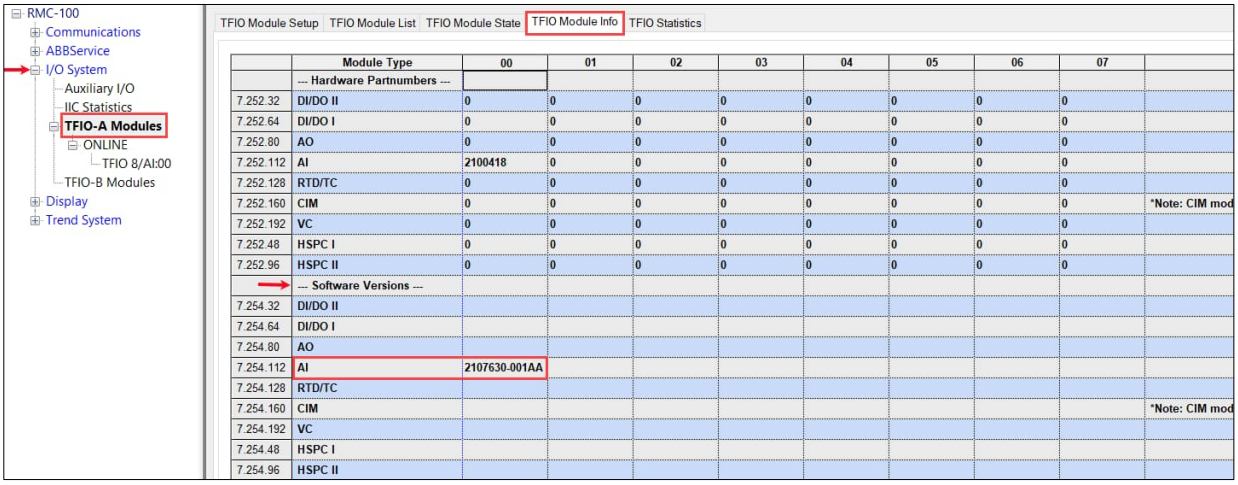
This procedure uses PCCU to determine the firmware version of AI modules. It assumes that the AI module(s) are installed and connected to a flow computer or controller and that the I/O Interface application has detected the module(s).

Verify the firmware version of AI module(s):

1. Launch PCCU.
2. Connect to the flow computer or remote controller with attached AI modules.

3. Expand I/O Interface (or I/O System) on the PCCU navigation tree.
4. Select TFIO Modules on the navigation tree.
5. Select the TFIO Module Info tab.
6. Locate the detected AI module(s) under the Software Versions section.
7. Take note of the firmware version listed. Modules with version 2107630-001AA firmware should be replaced. Figure 2-3 shows an RMC-100 with a single AI module detected (on address 00). The module shows the module with the incorrect firmware version.

Figure 2-3: Incorrect AI module firmware version



	Module Type	00	01	02	03	04	05	06	07	
	--- Hardware Partnumbers ---									
7.252.32	DI/DO II	0	0	0	0	0	0	0	0	
7.252.64	DI/DO I	0	0	0	0	0	0	0	0	
7.252.80	AO	0	0	0	0	0	0	0	0	
7.252.112	AI	2100418	0	0	0	0	0	0	0	
7.252.128	RTD/TC	0	0	0	0	0	0	0	0	
7.252.160	CIM	0	0	0	0	0	0	0	0	*Note: CIM mod
7.252.192	VC	0	0	0	0	0	0	0	0	
7.252.48	HSPC I	0	0	0	0	0	0	0	0	
7.252.96	HSPC II	0	0	0	0	0	0	0	0	
	--- Software Versions ---									
7.254.32	DI/DO II									
7.254.64	DI/DO I									
7.254.80	AO									
7.254.112	AI	2107630-001AA								
7.254.128	RTD/TC									
7.254.160	CIM									*Note: CIM mod
7.254.192	VC									
7.254.48	HSPC I									
7.254.96	HSPC II									

2.3 Determine AI module firmware version from registers

You can use your own management system (SCADA) to remotely read the registers storing the firmware version. The data type for these registers is String.

As shown in Table 2-1, the register address containing an AI module's firmware version depends on the AI module's hardware switch position.

The app in the register address is the application slot of the I/O Interface (or I/O System) application on the flow computer or controller:

- Slot 7 (app=7) is the default application slot for RMC TFIO-A, XSeries, and XIO devices.
- Slot 71 (app=71) is the default application slot for RMC TFIO-B.

If the I/O Interface has not been instantiated in the default slot, use your assigned app value to read the registers.

Table 2-1: Registers addresses storing the AI Module firmware version

Hardware Switch position	Position shown in TFIO Module Info tab	Register address
0	00	app.254.112
1	01	app.254.114
2	02	app.254.116
3	03	app.254.118
4	04	app.254.120
5	05	app.254.122
6	06	app.254.124
7	07	app.254.126

3 Resolution

If your system has AI modules with the incorrect firmware version, the modules need to be replaced.

This document describes two methods for module replacement. Select the method appropriate for your company policies and field conditions:

- Module replacement on a powered-off system (all power to system and modules must be removed)
- Module replacement on a system under power

IMPORTANT NOTE: Replacement AI Modules received from ABB should have the correct firmware. Modules with firmware that has already been updated at the factory will be marked with an orange dot sticker. Checking the firmware once the new module is installed is still recommended.

3.1 Module replacement on powered-off system

This replacement procedure requires powering off the controller and all modules. This is a simpler procedure but requires shutting down the flow computer or controller at a scheduled maintenance period.

NOTICE – Equipment Damage. Secure motors and valves before proceeding.

3.1.1 Replace TFIO AI module(s)

Module replacement on a powered off system consists of the disconnection and removal of an old AI module and the installation of a new module. The entire module is replaced. Please note that AI modules may be installed as a part of a module stack and have adjacent modules.

To replace the module(s):

1. Remove power from the flow computer or controller.

DANGER – Serious damage to health / risk to life. Explosion Hazard: Do not connect or disconnect TFIO modules, connectors or their terminations while energized unless the area is known to be non-hazardous.

2. Remove external power from the affected TFIO AI modules.
3. Unplug the field terminals from the old AI module(s).
4. On the XSeries flow computers or RMC-100s, disconnect the old AI modules from the IO bus as follows:
   a. If an AI module is the first module on a stack, remove the TFIO cable from the controller and module, then remove module.
   b. If the AI module is in the middle of a stack, slide the adjacent modules on the DIN rail and then remove the AI module.
5. On the XIOs, disconnect the old AI modules as follows:
   a. If an AI module is the first module in the stack, pull the module off from the XIO I/O bus connector.
   b. If the AI module is in the middle of a stack, slide the adjacent modules on the DIN rail and then remove the AI module.
6. Set the rotary switch on the new AI module(s) to match the old module(s).
7. Insert the new AI module(s) on the DIN rail.
8. Connect the new AI module to the IO bus.
9. Plug the field terminals into the new AI module.
10. Restore external power to the AI modules.
11. Restore power to the flow computer or controller.

3.1.2 Verify new AI module(s) detection and firmware

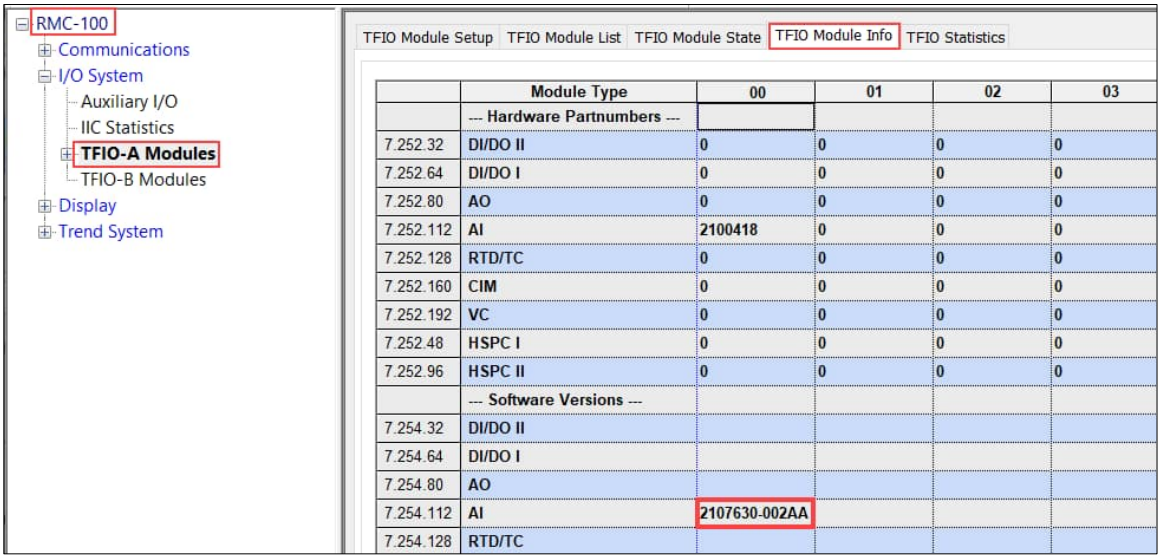
IMPORTANT NOTE: ABB recommends that all newly installed replacement AI modules be checked to verify that the firmware is correct. This includes those modules with the orange dot sticker.

To verify detection of the AI module(s) and their firmware:

1. Reconnect to the flow computer or controller on PCCU Entry mode.
2. Expand I/O Interface (or I/O System) on the PCCU navigation tree.
3. Select TFIO Modules on the navigation tree.
4. Select the TFIO Module Info tab.
5. Locate the detected AI modules under the Software Versions section.

6. Take note of the firmware version listed. Verify that the version is 2107630-002AA or later (Figure 3-1).

Figure 3-1: Correct AI Module firmware version



3.2 Module replacement on a system under power

This replacement procedure is performed while the flow computer or controller is operating under power. There is no need to reset or shutdown the entire flow computer or controller. Only the I/O app on the controller is momentarily interrupted.

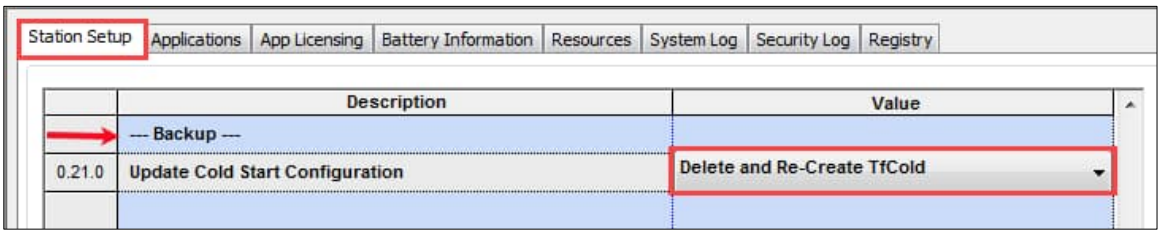
IMPORTANT NOTE: This procedure requires a backup of the configuration of the flow computer or controller before module replacement. Please complete the procedure in section 3.2.1.

3.2.1 Save the controller's configuration

Before module replacement, back up or save the flow computer or controller's current configuration to the Cold Start configuration:

1. Connect to the flow computer or controller on PCCU Entry mode.
2. Select the top node on the PCCU navigation tree.
3. On the Station Setup tab, locate the Backup section.
4. Expand the value Update Cold Start Configuration field.
5. Select Delete and Re-Create TfCold (Figure 3-2).

Figure 3-2: Update Cold Start Configuration



3.2.2 Replace hot pluggable module(s)

Hot pluggable modules support module replacement while systems are powered on. This replacement method consists of the removal of an old module's internal circuit board from its housing and the insertion of a new circuit board back into the housing without powering off the controller. During this replacement, the module's housing remains attached to the DIN rail and other modules in the stack do not need to be disconnected.

DANGER – Serious damage to health / risk to life. Explosion Hazard: Do not connect or disconnect TFIO modules, connectors or their terminations while energized unless the area is known to be non-hazardous.

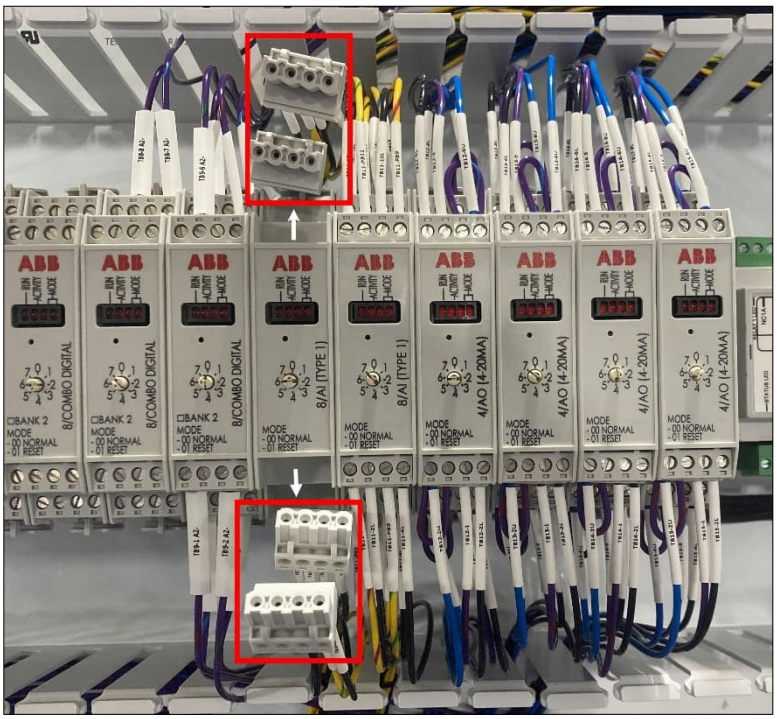
DANGER – Serious damage to health / risk to life. Place control loops (PID, Valve Control) in manual and place Shutdowns in bypass. Secure motors and valves before proceeding.

NOTICE – Circuit board damage. When removing or handling module's circuit boards, be sure to be properly grounded to protect the module's circuit board (PCBA) from electrostatic discharge (ESD) damage.

To replace the AI module's circuit board:

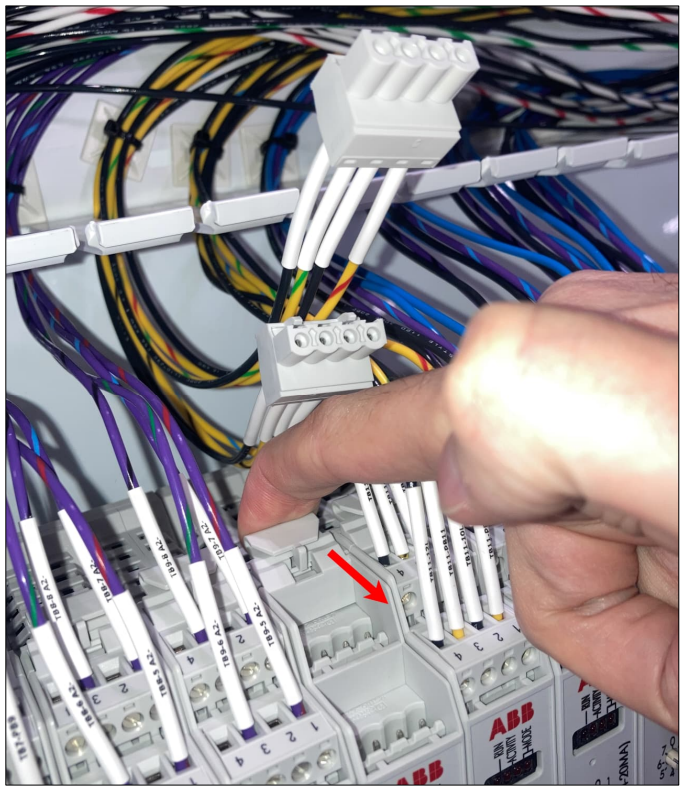
1. Remove external power from the affected TFIO AI module(s).
2. Disconnect the field terminals from the affected AI module(s).

Figure 3-3: Field terminal removal



3. With the module's housing still connected to the DIN rail, remove the module's circuit board from the housing. Circuit board removal is assisted by pulling on the top and bottom securing module latches.
   a. Locate the top (shown in Figure 3-4) and bottom secure latches on the module.

Figure 3-4: Top TFIO module latch

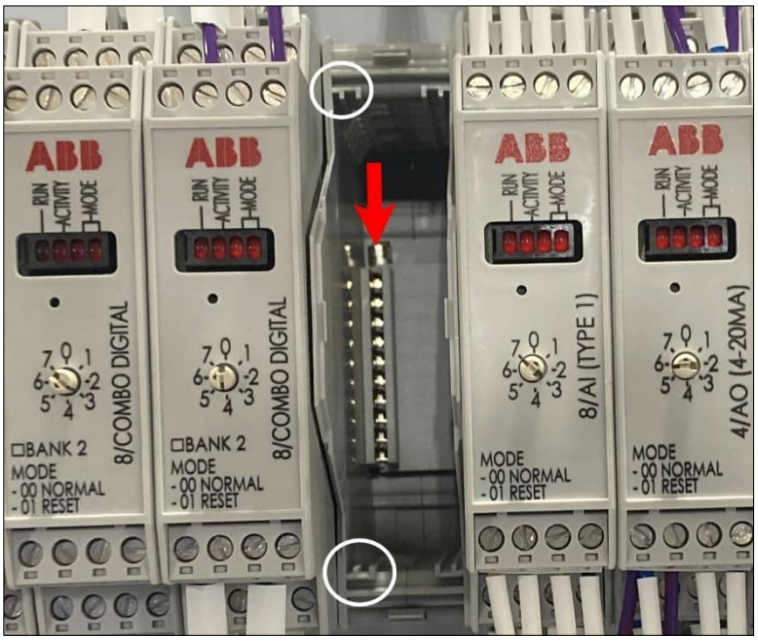


b. Gently pull the top and bottom module latches forward simultaneously and slide the circuit board out slowly.

Figure 3-5: Remove module circuit board

4. Set the rotary switch on the new module(s) to match the old module(s).
5. Insert the new module(s) circuit board(s) into the old housing(s).
   a. Note the location of the back connector and the guiding rails inside the housing.

Figure 3-6: Housing back connector and guiding rails



b. Position the circuit board to align with the top and bottom guiding rails. Figure 3-7 shows the board inserted through the top guiding rail. Make sure the board is also inserted through the bottom rail.

Figure 3-7: Board inserted through the housing guiding rail (top view)

c. Slide the circuit board gently towards the back connector.
d. Ensure the circuit board is all the way in. The top and bottom latches snap into the housing, securing the circuit board.

6. Plug the field terminals into the new module(s).
7. Restore external power to the AI module(s).

8. Press the reset button on the new module(s).

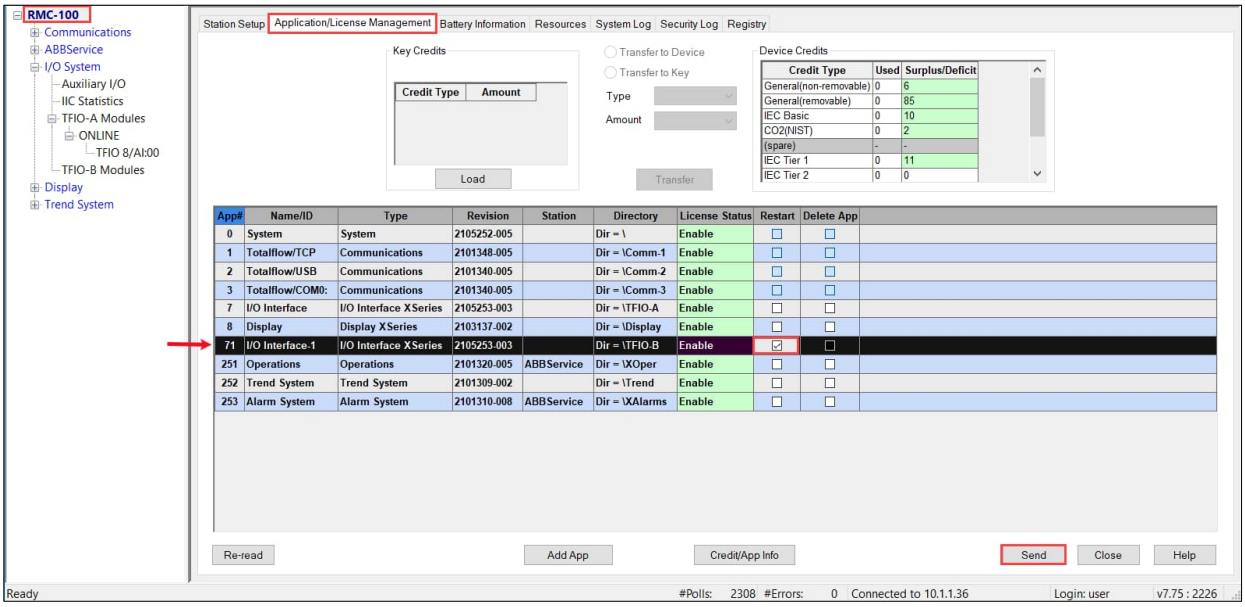
3.2.3 Restart the I/O Interface

I/O Interface restart is required to ensure that the firmware part numbers displayed on PCCU reflect the firmware on the new module(s). Without this restart, PCCU may display the previous firmware which is no longer correct after the replacement.

To restart:

1. Connect to the controller on PCCU Entry mode.
2. Select the top node on the PCCU navigation tree.
3. Select the Application/License Management tab.
4. Locate the I/O Interface (I/O System) application on the application table.
5. Select the Restart check box for the I/O Interface (Figure 3-8).

Figure 3-8: I/O Interface restart



6. Click Send to restart. Note that this will cause all I/O values to freeze momentarily.

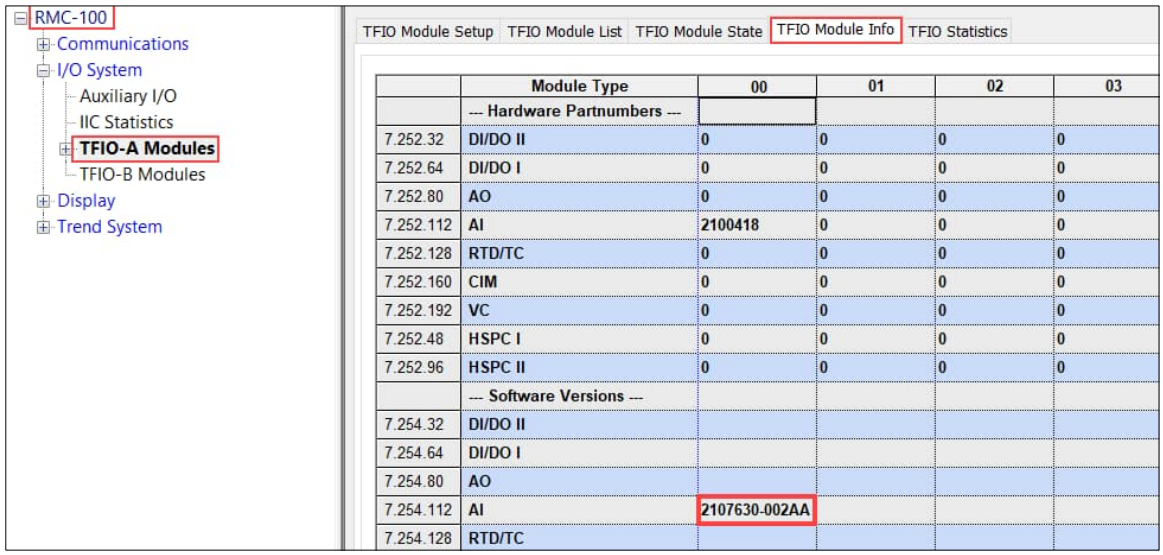
3.2.4 Verify new AI module(s) detection and firmware

IMPORTANT NOTE: ABB recommends that all newly installed replacement AI modules be checked to verify that the firmware is correct. This includes those modules with the orange dot sticker.

To verify detection of the new AI module and its firmware:

1. Expand I/O Interface (or I/O System) on the PCCU navigation tree.
2. Select TFIO Modules on the navigation tree.
3. Select the TFIO Module Info tab.
4. Locate the detected AI modules under the Software Versions section.
5. Take note of the firmware version listed. Verify that the version is 2107630-002AA or later (Figure 3-9).

Figure 3-9: Correct AI Module firmware version



	Module Type	00	01	02	03
	--- Hardware Partnumbers ---				
7.252.32	DI/DO II	0	0	0	0
7.252.64	DI/DO I	0	0	0	0
7.252.80	AO	0	0	0	0
7.252.112	AI	2100418	0	0	0
7.252.128	RTD/TC	0	0	0	0
7.252.160	CIM	0	0	0	0
7.252.192	VC	0	0	0	0
7.252.48	HSPC I	0	0	0	0
7.252.96	HSPC II	0	0	0	0
	--- Software Versions ---				
7.254.32	DI/DO II				
7.254.64	DI/DO I				
7.254.80	AO				
7.254.112	AI	2107630-002AA			
7.254.128	RTD/TC				

6. Calibration may be needed. Verify calibration and re-calibrate only if necessary. Refer to PCCU help files for calibration instructions.
7. Return any temporary bypassed alarms and shutdowns to their normal operating state.
8. Return any temporary manual or bypassed control loops to their normal operating state.

ABB Inc.
Measurement & Analytics
Quotes: US-IAMA.inquiry@us.abb.com
Orders: US-IAMA.order@us.abb.com
Training: US-IAMA.training@us.abb.com
Support: upstream.support@us.abb.com
+1 800 442 3097 (opt. 2)

Additional free publications are available for download at:
www.abb.com/upstream

Main Office - Bartlesville
7051 Industrial Blvd
Bartlesville, OK 74006
Ph: +1 918 338 4888

Texas Office - Houston
3700 W. Sam Houston
Parkway S., Suite 600
Houston, TX 77042
Ph: +1 713 587 8000