

Totalflow product line

# Technical bulletin 195

## RTD measurement performance specification deviation

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### Totalflow products

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File name: **2104787TBAA-TB195.docx**

Distribution: **External public**

Date: **2/25/2013**

Revision: **Rev. AA**

Page: **1/17**

Status  
of document: **Released**

Doc name: **Technical bulletin 195**

Document Title: **RTD measurement performance specification deviation**

Issued by  
department: **Totalflow customer service**

Language: **En**

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Proprietary information

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# 1. Introduction

It has been discovered that not all of the released  $\mu$ FLO<sup>G4</sup> and XFC<sup>G4</sup>6200/6201EX units meet the published temperature accuracy specifications over the full operating temperature range. Approximately one fourth of shipped  $\mu$ FLO<sup>G4</sup> units and one half of XFC<sup>G4</sup>6200/6201EX units will register flowing temperature within our published specification:  $\pm 0.35^{\circ}\text{F}$  over a normal operating range of  $-40^{\circ}\text{F}$  to  $+140^{\circ}\text{F}$ , (with field bias applied) excluding the uncertainty of the RTD element itself.

# 2. Description

The  $\mu$ FLO<sup>G4</sup> and XFC<sup>G4</sup>6200/6201EX units are designed to utilize a small electronic board (about the size of a stamp) that acts as an interface between the main electronics board and the internal pressure sensors and RTD input. Extensive testing has confirmed that there are two issues that adversely affect the RTD (temperature) measurement.

First, as shipped from the factory, a nominal  $\sim 2$  degrees F bias may be needed on existing  $\mu$ FLO<sup>G4</sup> units and  $\sim 0.5$  degrees F on XFC<sup>G4</sup>6200/6201EX units when first commissioning the units. We recommend that, upon installation, the temperature reading be verified against a reference temperature and the RTD bias be adjusted to agree with the reference temperature.

Second, performance outside our published specification of:  $\pm 0.35^{\circ}\text{F}$  over a full operating range of  $-40^{\circ}\text{F}$  to  $+140^{\circ}\text{F}$  may be observed on some units and conditions.

Both of these issues are being corrected for new factory units. Please refer to Section 5 Supplemental Information beginning on page 15 for additional Information.

# 3. Is your product impacted?

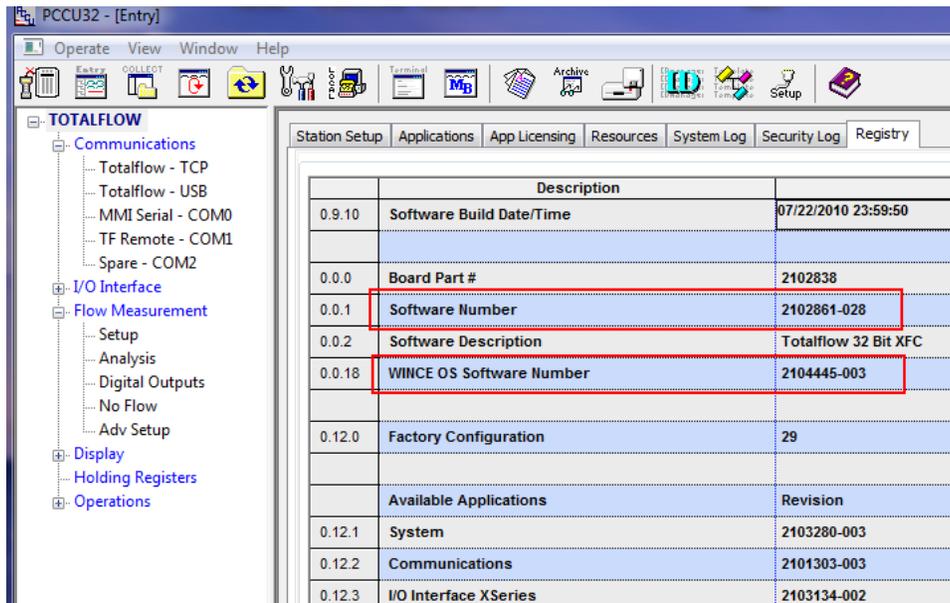
Units with software versions older than those listed in the following table will require updating.

**Table 3-1. Impacted products**

Product Model	Software:	Versions to upgrade:
$\mu$ FLO <sup>G4</sup>	Operating System	2104464-006 or older
	FLASH (US)	2104497-012 or older
	FLASH (Selectable Units)	2104498-012 or older
XFC <sup>G4</sup> 6200/6201EX	Operating System (16 MB)	2104154-012 or older
	Operating System (32 MB)	2104447-005 or older
	FLASH (US)	2104159-026 or older
	FLASH (Selectable Units)	2104158-026 or older

## 3.1. Verifying software

1. Identify the WINCE Software Number and Flash, by connecting to the meter with PCCU. Go to the Entry Mode and choose the Registry tab. The example below shows where the Operating System and Flash part numbers are located.



### 3.2. Background on software

When the operating system is upgraded, a system cold start could result due to differences between the new OS and the previous OS. Using the procedure in this document will allow the customer to upload the tfData and restore it to the device after the OS has been replaced.

**Note:** It is highly recommended to collect all data and save the configuration before the following procedures.

## 4. Resolution

A retrofit kit is available that will correct these issues for any existing  $\mu$ FLO<sup>G4</sup> or XFC<sup>G4</sup> 6200/6201EX units. Three steps are required to properly implement the retrofit:

1. Update the OS (see table 4.1 for new versions)
2. Update the flash (see table 4.1 for new versions)
3. Insert the new cable with the resistor (Part number 2104738-001) using the following instructions depending upon the product model.



**Note:** ALL 3 STEPS MUST BE TAKEN in order to correct the issue. It's especially important to note that installing the new cable without updating the flash and the OS will cause the temperature readings to be more skewed, so do not do this.

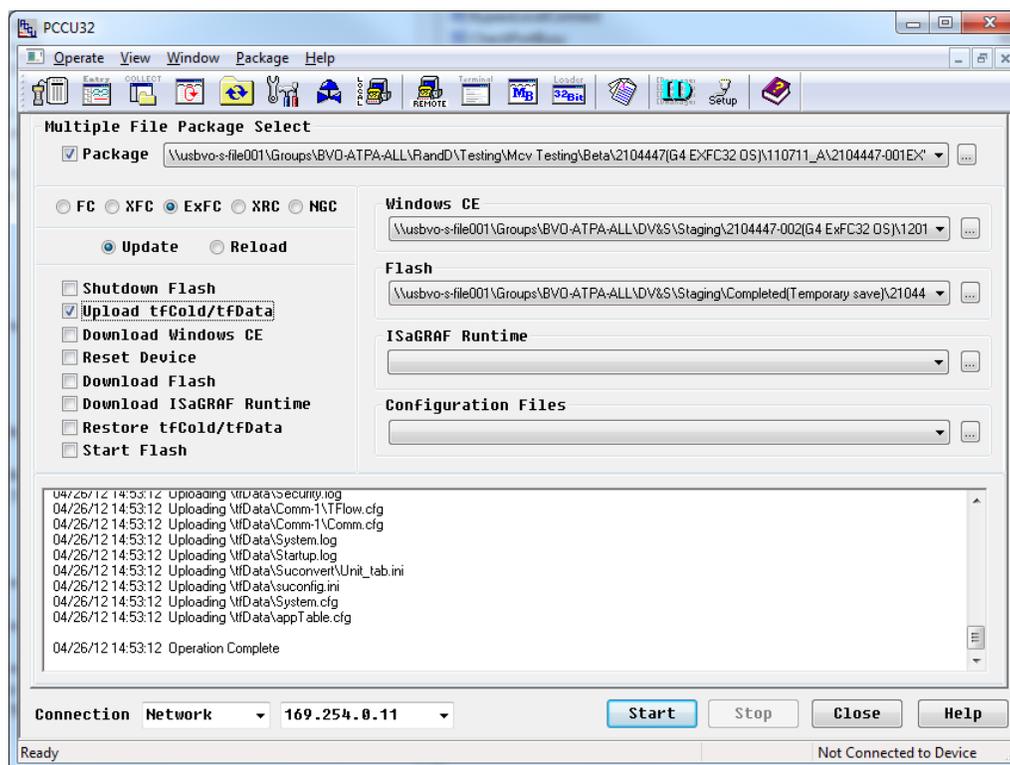
**Table 4-1. Upgrade versions**

Product Model	Instructions	Software:	Versions to upgrade to:
μFLO <sup>G4</sup>	4.4	Operating System	2104464-007 or newer
		FLASH (US)	2104497-013 or newer
		FLASH (Selectable Units)	2104498-013 or newer
XFC <sup>G4</sup> 6200/6201EX	4.5	Operating System (16 MB)	2104154-013 or newer
		Operating System (32 MB)	2104447-006 or newer
		FLASH (US)	2104159-027 or newer
		FLASH (Selectable Units)	2104158-027 or newer

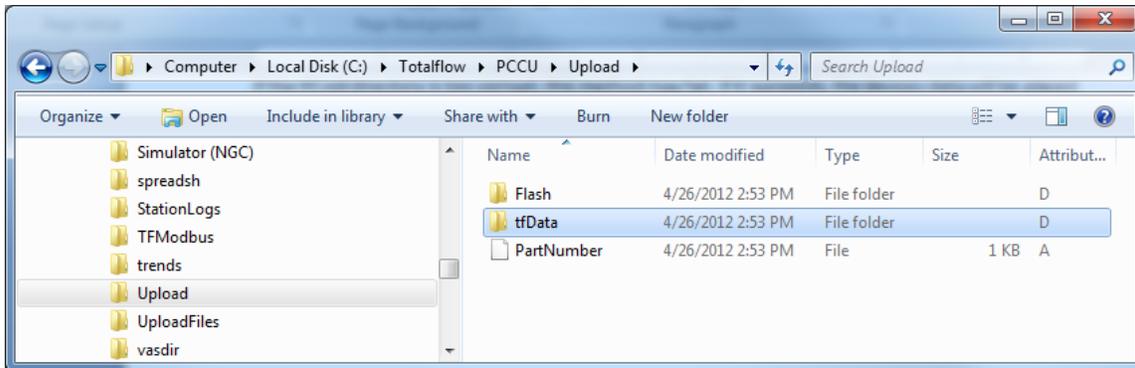
#### 4.1. Uploading tfData using 32Bit Loader

**NOTE:** It is highly recommended to collect all data and save the configuration before the following procedure.

1. Select your Device Type (FC for uFLO<sup>G4</sup> or ExFC for EX6200/6201<sup>G4</sup>), Update mode, and select “Upload tfCold/tfData” and click “Start”. Follow the instructions on the screen, and the loader will save your data. When the Loader finishes, it will show “Operation Complete”. If this method fails, a cold start may be necessary. (This may be due to excessive corruption in the unit).



- The device's data will be placed into a subdirectory of PCCU named 'Upload':

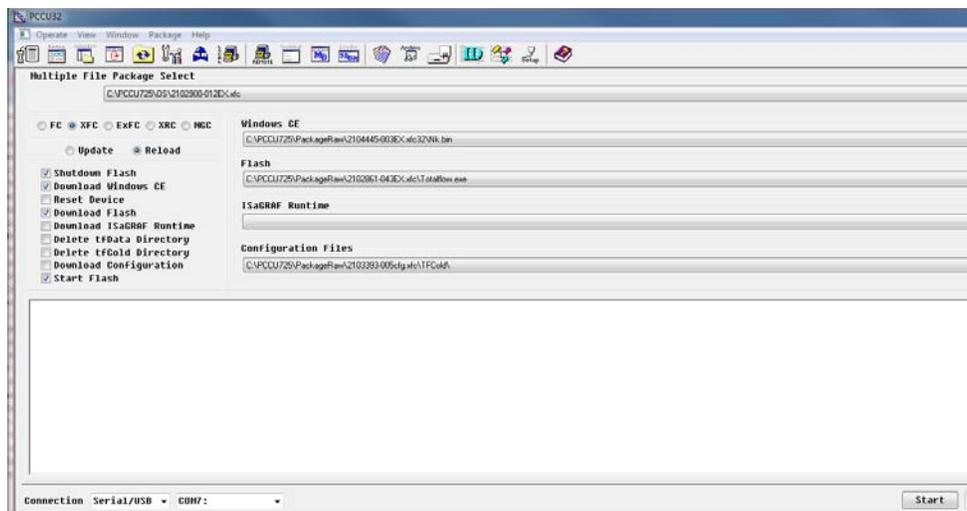


- Please note the current Network configuration and IP address of the device. If you have a different IP than the default 169.254.0.11, it will need to be re-entered, after the OS is replaced.

#### 4.2. Upgrade the OS and Flash

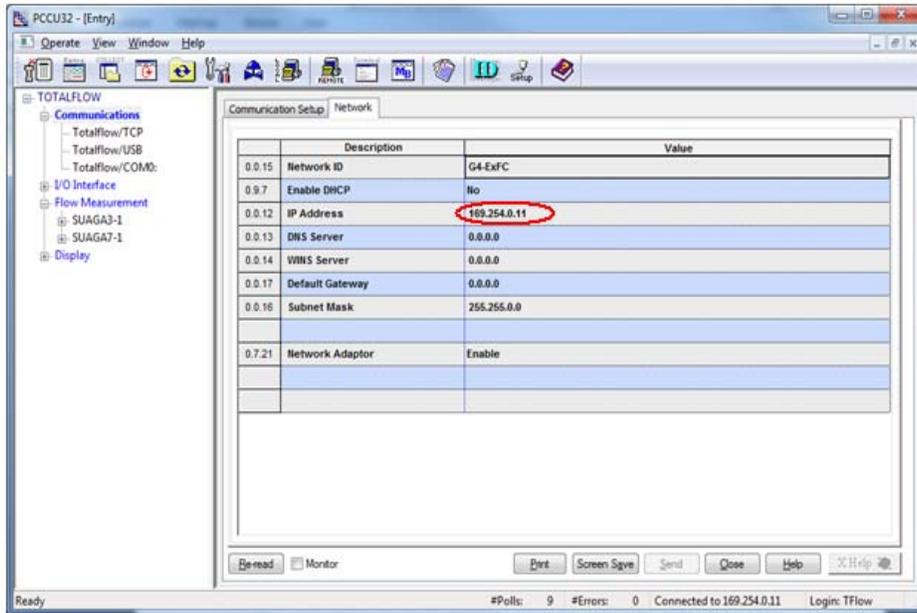
When the operating system is upgraded, a system cold start could result due to differences between the new OS and the previous OS. Using this procedure will allow the customer to upload the tfData and restore it to the device after the OS has been replaced.

- Using the 32 Bit Loader, verify correct device type is selected, select Reload and enter the new OS file in the Windows CE line and the updated Flash in the Flash line, and choose Start. (Follow the instructions on the screen). The Download will start and show a progress bar across the bottom of the screen.

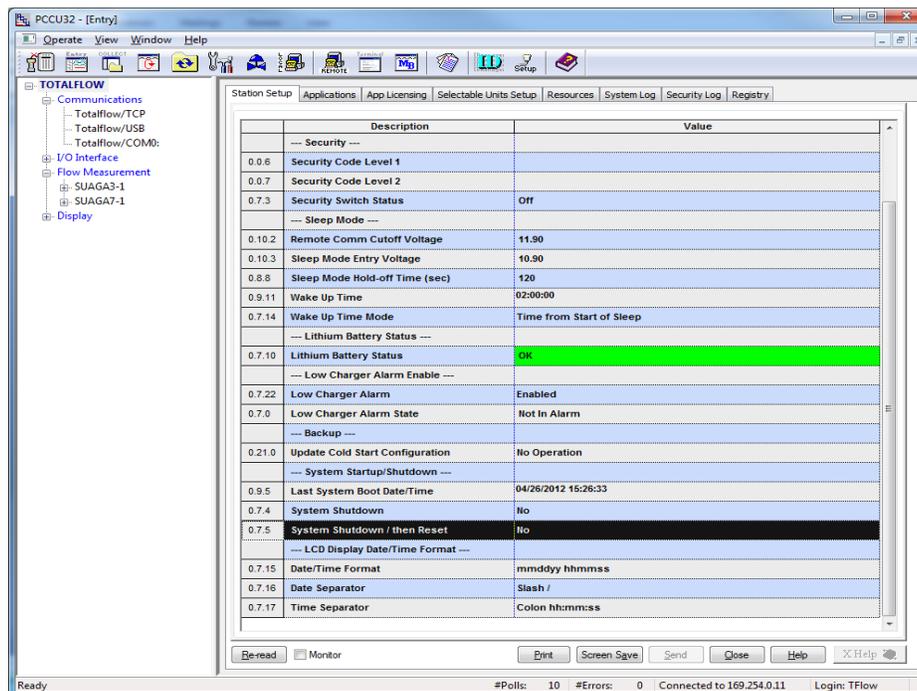


- If you are not utilizing IP connectivity for PCCU, skip to **Step 6**.

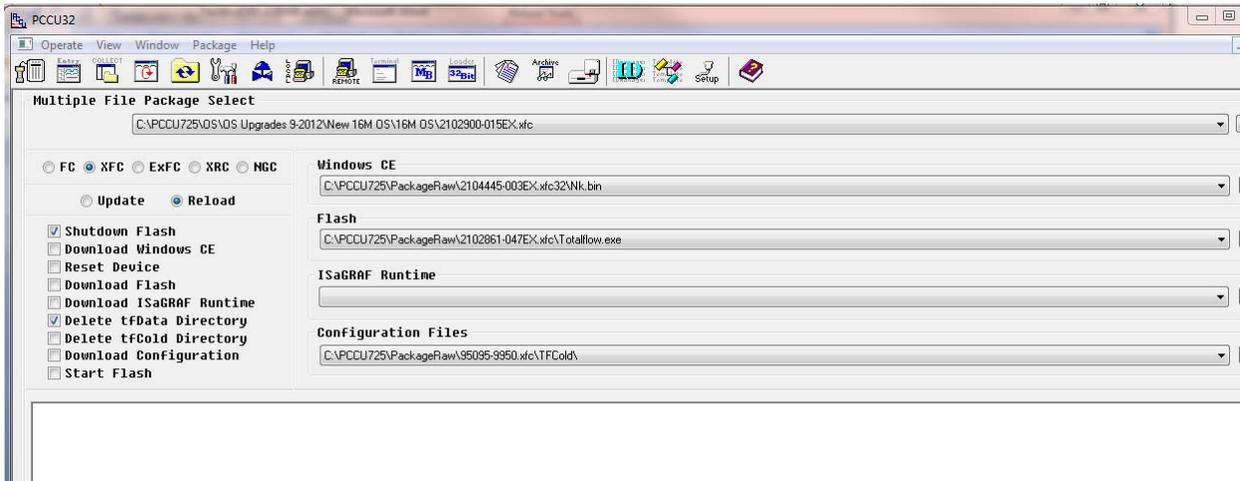
- If you are utilizing IP connectivity for PCCU, in order to restore the IP address (after the OS and Flash are upgraded), connect to the device serially via the USB or MMI port and check or set the Network configuration.



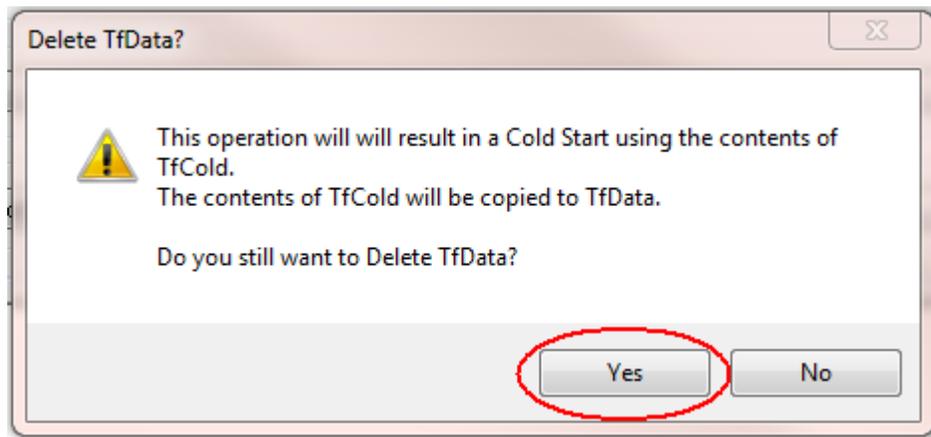
- The device must be reset again before the IP address will take effect. You can do this from the top level Station Setup screen by selecting System Shutdown/then Reset, choose "yes" and send:



5. Once the device has reset and network connectivity is established, close the screen.
6. Using the 32Bit Loader, select the Device Type and Reload Mode. Check the boxes for Shutdown Flash and Delete tfData Directory as shown below:



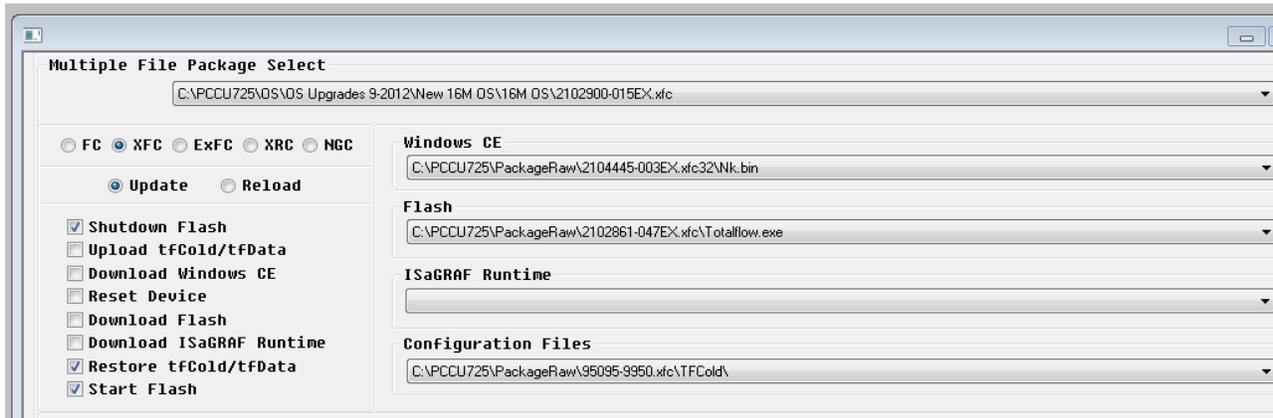
7. After selecting the above boxes, the following screen will appear:



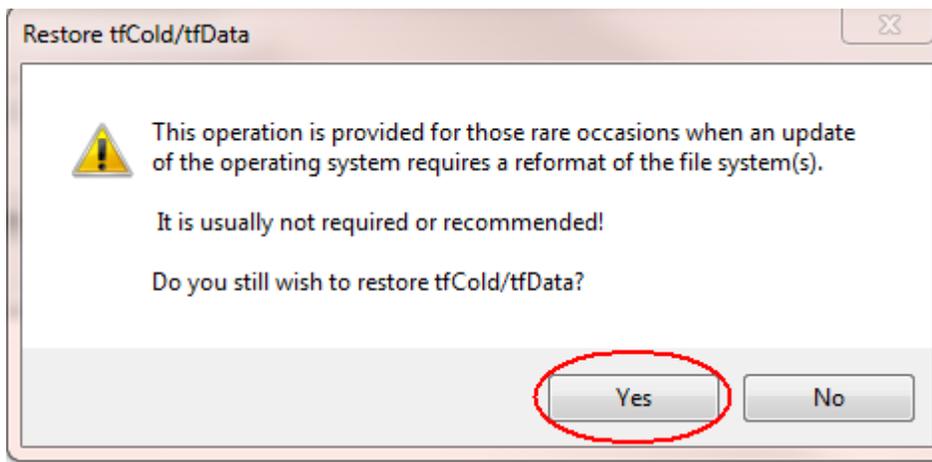
8. Choose yes, then choose Start. (Follow the instructions on the screen).
9. When the data is deleted, the comment "Operation Complete" will appear.

### 4.3. Restoring tfData using 32Bit Loader

1. Verify that the proper device type is selected. Restore tfData on the device by selecting 'Update' mode. Check the boxes for Shutdown Flash, Restore tfCold/tfData, and Start Flash.



2. The following screen will appear: Choose Yes, then choose Start.



3. Once tfData is restored, close the 32Bit Loader and press the reset button on the board to start the unit.
4. Connect to the device using PCCU.

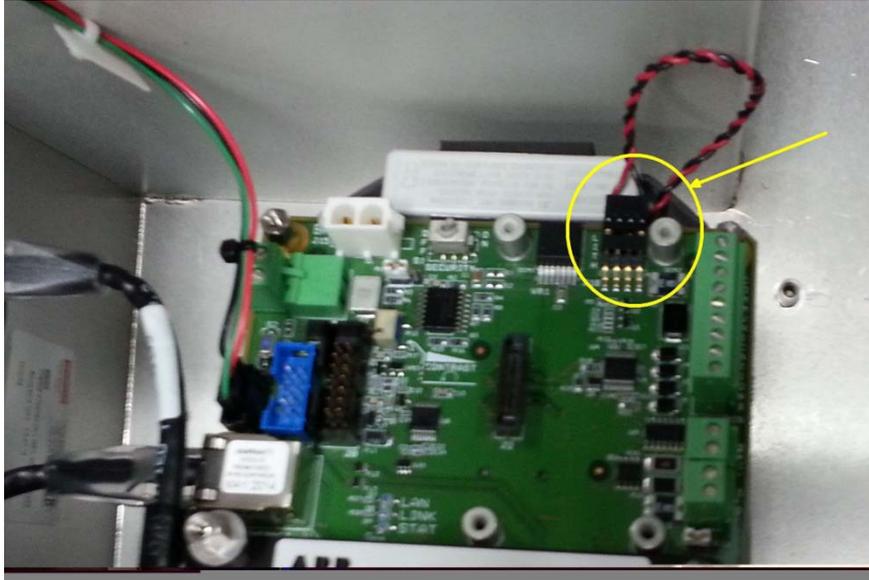
- Choose 'Update Cold Start Configuration' from the top level 'Station Setup' Screen. Select 'Delete and Re-Crete tfCold' option from the drop down box and Send.

The screenshot shows the 'Station Setup' configuration interface. The left sidebar contains a tree view for the 'TOTALFLOW' device, with categories including Communications, I/O Interface, Flow Measurement, and Display. The main window displays a table of configuration parameters. The 'Update Cold Start Configuration' row is highlighted, and its dropdown menu is open, showing the option 'Delete and Re-Crete TfCold' circled in red.

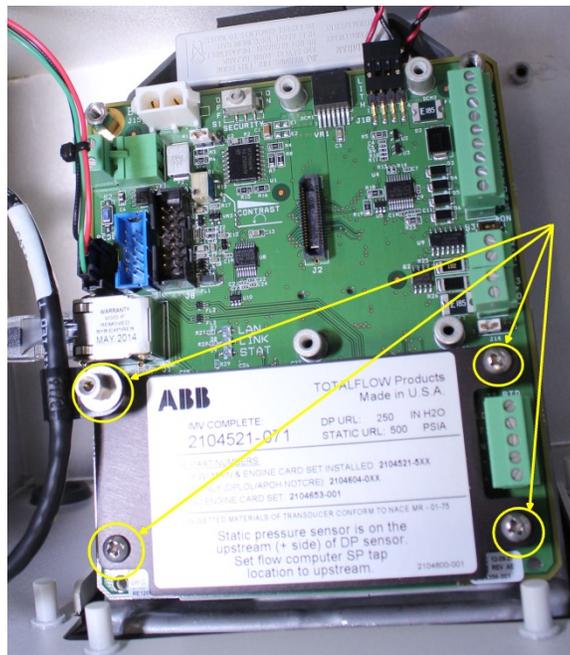
	Description	
0.0.4	Station ID	TOTALFLOW
0.0.5	Location	2104492-002
0.9.0	Date/Time	08/30/2012 12:26:00
0.9.0	Set Device with PCCU Date/Time	No
--- Security ---		
0.0.6	Security Code Level 1	
0.0.7	Security Code Level 2	
0.7.3	Security Switch Status	Off
--- Sleep Mode ---		
0.10.2	Remote Comm Cutoff Voltage	11.90
0.10.3	Sleep Mode Entry Voltage	10.90
0.8.8	Sleep Mode Hold-off Time (sec)	120
0.9.11	Wake Up Time	02:00:00
0.7.14	Wake Up Time Mode	Time from Start of Sleep
--- Lithium Battery Status ---		
0.7.10	Lithium Battery Status	OK
--- Low Charger Alarm Enable ---		
0.7.22	Low Charger Alarm	Enabled
0.7.0	Low Charger Alarm State	In Alarm
--- Backup ---		
0.21.0	Update Cold Start Configuration	Delete and Re-Crete TfCold
--- System Startup/Shutdown ---		
0.9.5	Last System Boot Date/Time	11/25/1934 08:05:04
0.7.4	System Shutdown	No
0.7.5	System Shutdown / then Reset	No
--- LCD Display Date/Time Format ---		
0.7.15	Date/Time Format	mmddy hhmss
0.7.16	Date Separator	Slash /
0.7.17	Time Separator	Colon hh:mm:ss

#### 4.4. Installing the Cable in a $\mu$ FLO<sup>G4</sup>

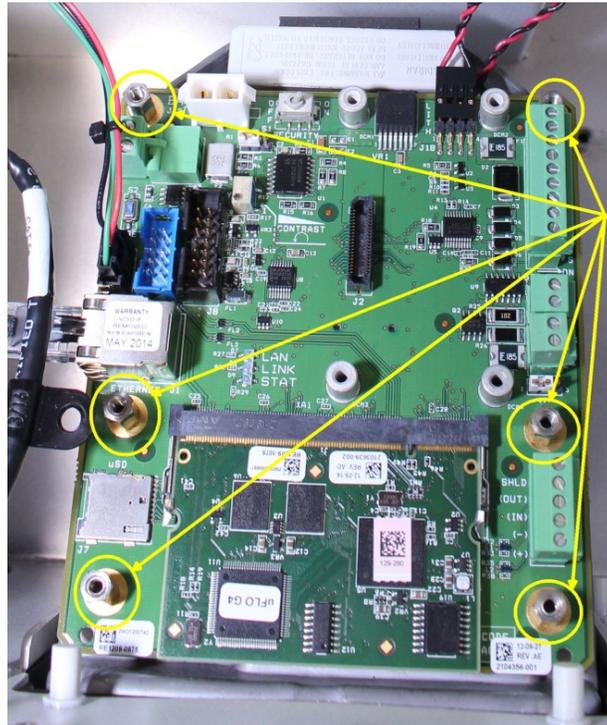
1. Unplug all of the cables from the board except for the lithium battery (shown below). Keep the lithium battery plugged in throughout this process.



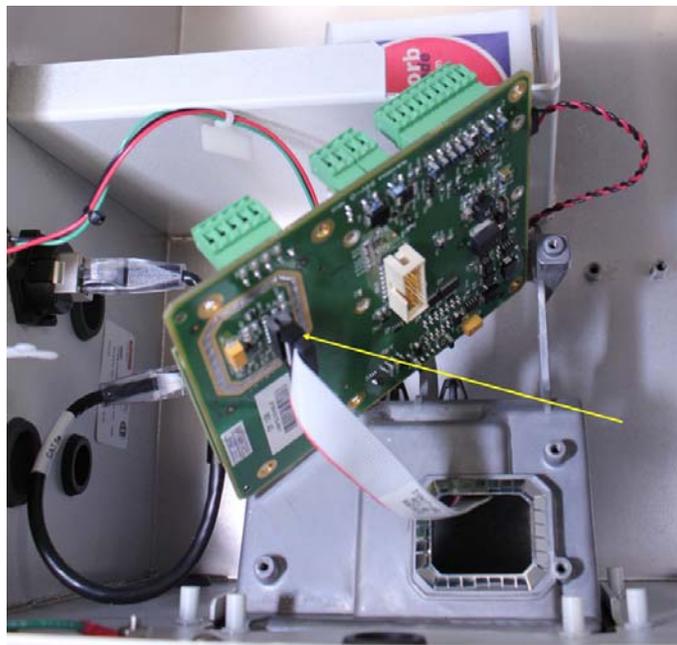
2. Remove the 3 screws and 1 hex nut shown below.



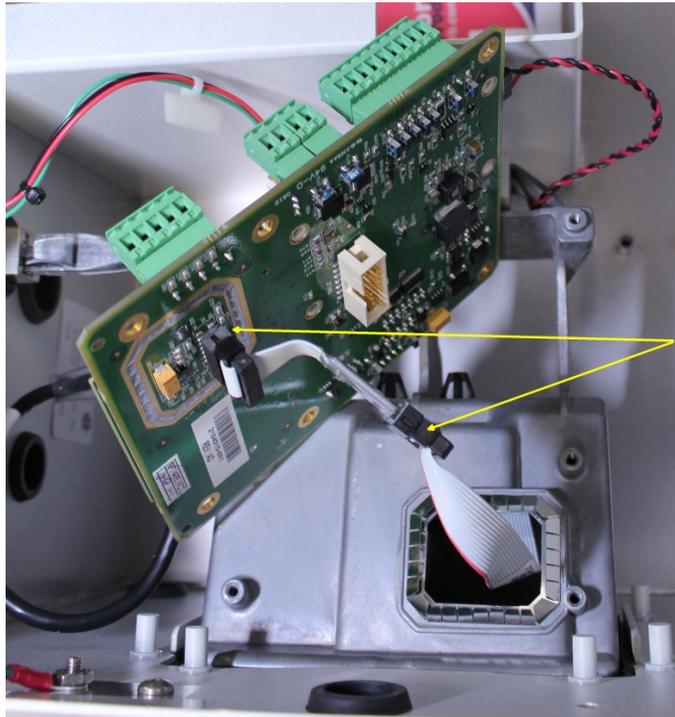
3. Remove the 6 hex nuts.



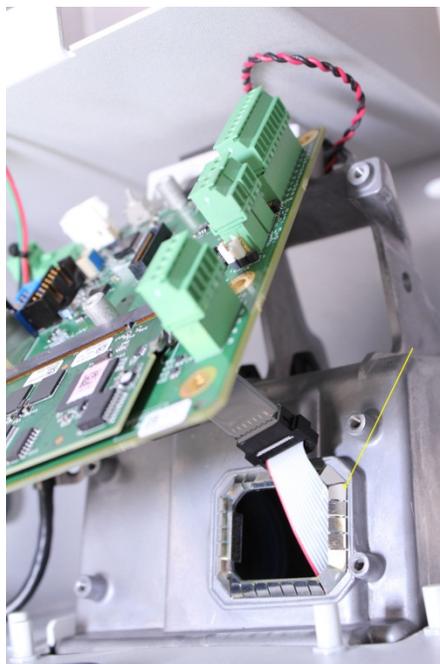
4. Detach the Sensor cable from the board.



5. Attach the new cable between the existing sensor cable and the electronics board.



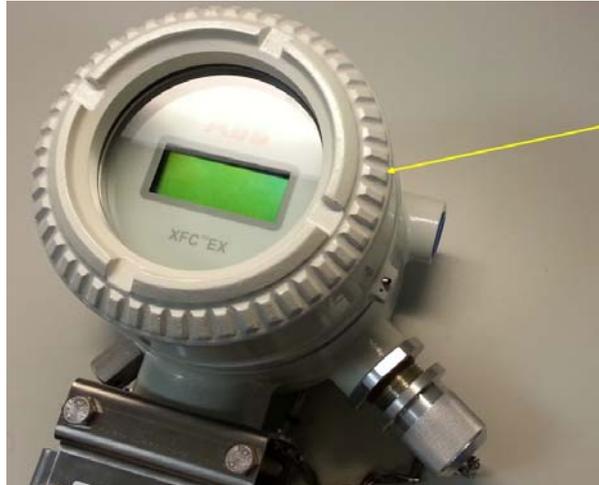
6. Tuck the cable into the hole. Make sure the EMI gasket is back in place within the ridges around the hole.



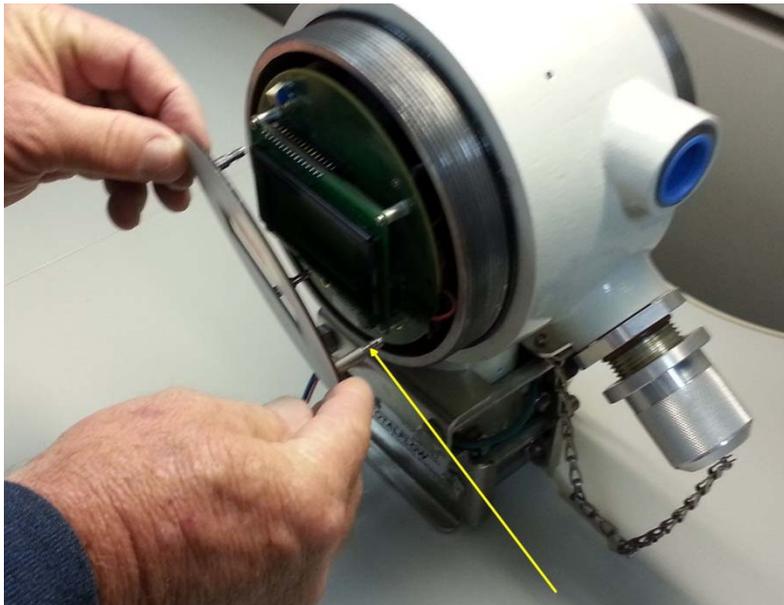
7. Reassemble.

#### 4.5. Installing the Cable in a 6200/6201EX<sup>G4</sup>

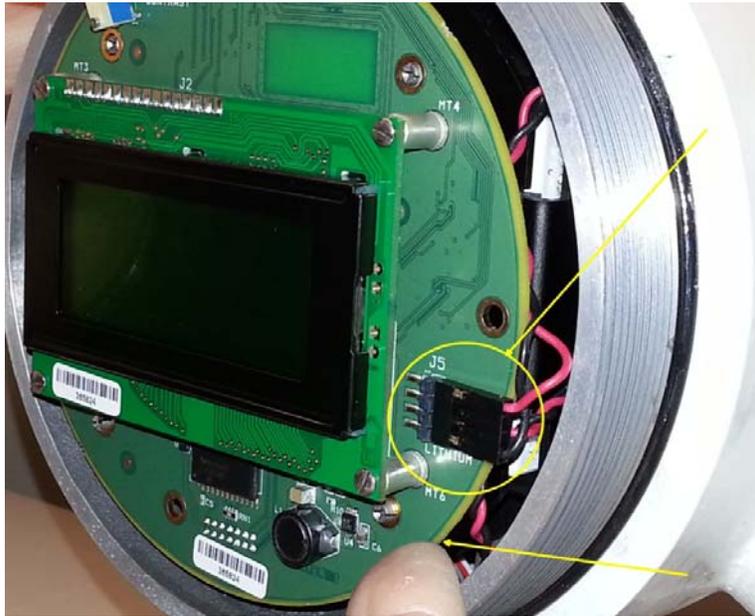
1. Unscrew the enclosure front cover.



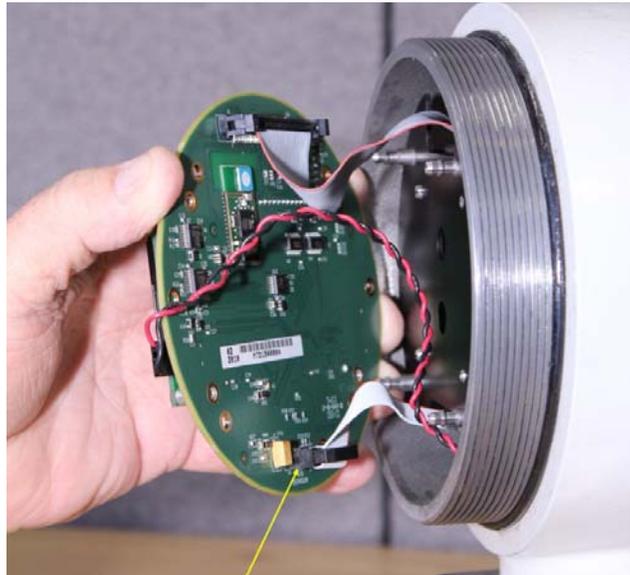
2. Gently pull the face plate off the board.



3. Gently pull the board forward, taking care not to disconnect the lithium battery (circled below).



4. Disconnect the sensor cable from the electronics board



5. Insert the new cable between the existing sensor cable and the electronics board.



6. Reassemble the unit.

## 5. Supplemental Information

### **μFLO<sup>G4</sup> and XFC<sup>G4</sup> 6200/6201EX RTD Input Issue Notification**

At ABB Totalflow, we continually strive to provide the best products at competitive prices. The new μFLO<sup>G4</sup> and XFC<sup>G4</sup> 6200/6201EX are examples. As we continue to implement new features and applications, we introduce and perform additional testing of our products. Ongoing testing has revealed that not all μFLO<sup>G4</sup> and XFC<sup>G4</sup> 6200/6201EX units will meet the published temperature accuracy specifications over the full temperature operating range. This notification is to inform you, our valuable customers, of this situation and provide a solution as needed.

Our testing indicates that a nominal ~2 degrees F bias may be needed on existing μFLO<sup>G4</sup> units and ~0.5 degrees F on XFC<sup>G4</sup> 6200/6201EX units when first commissioning the units. This is being corrected for all new production μFLO<sup>G4</sup> units. We recommend that, upon installation, the temperature reading be verified against a reference temperature and the RTD bias be adjusted to agree with the reference temperature.

Also, based on a random sampling and extensive laboratory controlled temperature testing of factory units, approximately one fourth of shipped μFLO<sup>G4</sup> units and one half of XFC<sup>G4</sup> EX6200/6201 units will register flowing temperature within our published specification: ±0.35°F over a normal operating range of -40°F to +140°F, (with field bias applied) excluding the uncertainty of the RTD element itself.

Our testing also indicates that both ambient temperature changes and process temperature changes affect the RTD input, and thus the flowing temperature derived by the flow computer. As the ambient temperature decreases from the ambient temperature at which the temperature bias verification was performed, the uncertainty increases. An increase in the ambient temperature will have minimal affects. Based on exhaustive testing of random sampling of factory units, the following tables have been developed that represent the units with the greatest RTD input uncertainty. These values reflect uncertainties comparable to current competitors.

## RTD Input Performance<sup>1</sup> for all shipped $\mu$ FLO<sup>G4</sup> units

Type: 4 wire, 100 ohm, Class B, platinum element with alpha of 0.00385

Sensing Range: -80°F to +750°F

Maximum RTD Input Uncertainty (°F) after Temperature Bias at Process Temperature <sup>1</sup> (including linearity, hysteresis, repeatability and ambient temperature effects)								
Operating Range	0°F to 140°F				-40°F to 140°F			
Ambient Temperature at time of bias verification	0°F	35°F	70°F	100°F	0°F	35°F	70°F	100°F
Process Range °F								
-80°F to -40°F	±0.54	±0.39	±0.53	±0.64	±0.54	±0.60	±0.75	±0.86
-40°F to 0°F	±0.62	±0.44	±0.54	±0.67	±0.62	±0.62	±0.78	±0.91
0°F to 40°F	±0.69	±0.49	±0.58	±0.72	±0.69	±0.67	±0.85	±0.99
40°F to 120°F	±0.75	±0.66	±0.86	±1.01	±0.76	±0.98	±1.17	±1.33
120°F to 185°F	±0.89	±0.64	±0.85	±1.03	±0.89	±0.97	±1.20	±1.39
Typical Process								
50°F to 80°F	±0.76	±0.54	±0.59	±0.75	±0.76	±0.69	±0.89	±1.04

<sup>1</sup> Performance does not include the uncertainty of the RTD element

## RTD Input Performance<sup>1</sup> for all shipped XFC<sup>G4</sup> EX6200/6201 units

Type: 4 wire, 100 ohm, Class B, platinum element with alpha of 0.00385

Sensing Range: -80°F to +750°F

Maximum RTD Input Uncertainty (°F) after Temperature Bias at Process Temperature <sup>1</sup> (including linearity, hysteresis, repeatability and ambient temperature effects)								
Operating Range	0°F to 140°F				-40°F to 140°F			
Ambient Temperature at time of bias verification	0°F	35°F	70°F	100°F	0°F	35°F	70°F	100°F
Process Range °F								
-80°F to -40°F	±0.55	±0.39	±0.36	±0.47	±0.55	±0.43	±0.58	±0.69
-40°F to 0°F	±0.62	±0.45	±0.39	±0.52	±0.62	±0.47	±0.63	±0.76
0°F to 40°F	±0.69	±0.50	±0.43	±0.57	±0.69	±0.52	±0.70	±0.84
40°F to 120°F	±0.77	±0.55	±0.53	±0.68	±0.77	±0.65	±0.85	±1.00
120°F to 185°F	±0.90	±0.65	±0.58	±0.77	±0.90	±0.71	±0.94	±1.12
Typical Process								
50°F to 80°F	±0.77	±0.54	±0.46	±0.62	±0.77	±0.56	±0.76	±0.91

<sup>1</sup> Performance does not include the uncertainty of the RTD element

## **μFLO<sup>G4</sup> and XFC<sup>G4</sup> EX6200/6201**

Design changes to correct the RTD input issue outlined above, will be implemented on all units shipped from the factory no later than February 1, 2013. A retrofit/upgrade solution will also be available by February 1, 2013 to all customers who may choose to upgrade existing units. The upgrade consists of a small adapter board/cable that connects between the existing cable from the sensor and the main electronics board as well as new software. This is a field installed solution and no data should be lost. Full instructions will accompany the upgrade components.

## **RTD Input Specification for all new μFLO<sup>G4</sup> and XFC<sup>G4</sup> EX6200/6201 units AND existing units that have had the upgrade installed**

**Type:** 4 wire, 100 ohm, Class B, platinum element with alpha of 0.00385

**Process Temperature Range:** -80°F (-62°C) to +750°F (399°C)

**Accuracy<sup>2</sup>** (including linearity, hysteresis, and repeatability): ±0.35°F (0.195°C) within ± 250°F (140°C) of the normal operating process temperature (not to exceed Process Temperature Range limits)

**Ambient Temperature Effects:** not to exceed ±0.20°F (±0.12°C) per 50°F (28°C) change in ambient temperature

<sup>2</sup> Accuracy specifications do not include the uncertainty of the RTD element

## **Conclusion**

We sincerely regret any inconvenience this may cause and will provide the upgrade parts for all existing units. Please contact your local sales person, customer service, or our order entry group to obtain the upgrade. Please provide the number of units needed, shipping address, name of company and specific contact name when contacting ABB Totalflow. Depending on the number of units requested, a shipping schedule may need to be arranged.

Preferred Contact Method: Order Entry at 800-442-3097 and press 1



Barry Balzer. Product Manager, Flow Computers

## **6. Additional Information**

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