Date	21 Jul 2015	Service Note #	2500x-2061	Updated	01 Jun 2016
Product	Model 2500		Created By	J. Yangco	
Description	Field Retrofit for 2500 RTD Shafts				

Release	☒	Internal	☒	Distributors	☐	Customers

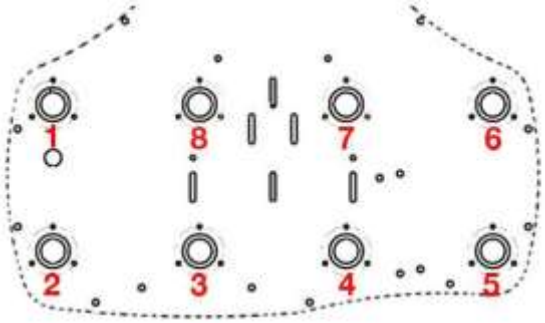
Parts/Tools Required	Serial Numbers Affected
6 Position Kit (2800-0314-6) or 7 Position Kit (2800-0314-7) or 8 Position Kit (2800-0314-8) 0.05 inch Hex Key 1/16th inch Hex Key 3/16th inch Hex Key Flat Blade Screwdriver Philips Screwdrivers Wire Cutter	2501184-present 2501183 and older will need new spindle assembly (2800-0240)

Field Retrofit for 2500 RTD Shafts

Reason: As a valued option, a standard Model 2500 can be fitted with RTD shafts of up to 8 vessel position. This will allow temperature monitoring on each vessel when running a test.

Pre-requisite: Service Engineer or person performing this service must have proper training in servicing the instrument.

For this procedure, follow the spindle position numbering as shown:



Top View-Spindle Drive

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Kit contents:

1. RTD Shaft assembly, includes battery (2800-0312)
2. Wire harness (2700-0214)
3. Communication board (2400-5178)
4. Sensor board (3250-0133)
5. Sensor board support (3250-0133)
6. Flash drive with current firmware (6690-0004)
7. IR Disk (3250-0134)
8. Ribbon cable (2700-0215)
9. Miscellaneous hardware (set screws, standoffs, screws, nylon spacers, tie wraps and tie mounts)
10. Drive cover (3350-0016) not shown

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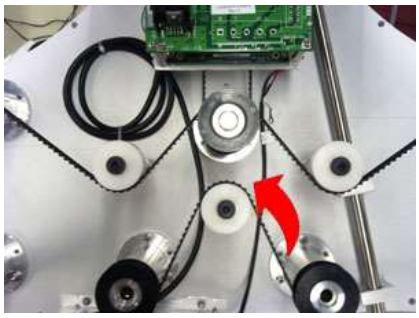
Solution / Action

Before proceeding, discharge any static electricity from your body by touching a bare screw from the instrument. Turn off the instrument and disconnect the AC power cord.

Step 1	Remove the existing shafts from the instrument.
Step 2	Using a Phillips Head Screw Driver, remove the nine screws from underneath the drive plate and one screw located on the top rear side of the cover.  **Remove bottom screws (x9)**  **Remove top screw** Remove the drive plate cover by grabbing both sides and raising the cover up as shown.  **Step 2**
Step 3	Remove the spindle drive belt by pulling it from the idler wheel as shown.  **Step 3**

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Step 4	Locate and loosen the two set screws on the pulley as shown. This will allow the pulley to come off the spindle assembly.  **Step 4**
Step 5	Using a flat blade screwdriver, carefully pry up the pulley together with the white bearing cap to remove them from the spindle sleeve as shown.  **Step 5** **To prevent damaging the bearings, DO NOT use the spindle bearing as a leverage when using the screwdriver to pry out the pulleys and bearing cap.**

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Step 6	With the pulley and bearing cap off, use a permanent marker to mark the location of the two flats of the spindle sleeve top end as shown.  **Step 6**
Step 7	Using the spacer tool provided, position the tool around the spindle housing. One half of the tool has two vertical lines, these should be facing toward the front of the instrument and the other half, towards the rear. The left vertical guide should line up with the set screw on the spindle.  **Step 7**

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Step 8

Insert the gray PVC sensor bracket onto the spindle. Follow the position of the bracket from below pictures:

6 VESSEL UNIT: Positions 2, 3, 4 and 5
Make sure that the set screw of the bracket is lined up with the vertical marking of the spacer as shown.

6 VESSEL UNIT: Positions 1 and 6
Line up the post of the sensor bracket with the vertical marking of the spacer as shown.

7 or 8 VESSEL UNIT: Positions 3 and 4:
Line up the post of the sensor bracket with the vertical marking of the spacer as shown.

7 or 8 VESSEL UNIT: Position 8
Line up the post of the sensor bracket with the vertical marking of the spacer as shown.

Step 8

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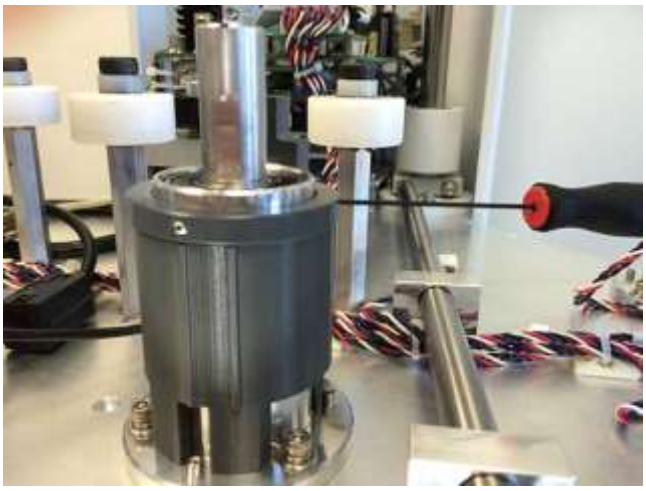
Step 9

Start tightening the two set screws located closer to the post of the bracket as shown. **DO NOT OVERTIGHTEN.** Lastly tightened the remaining set screw.
Remove the spacer tool.

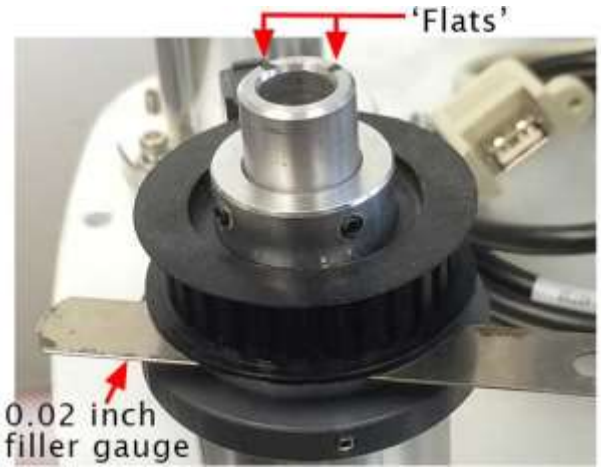


Step 9

DO NOT OVERTIGHTEN sensor bracket set screws. Overtightening the set screws will distort the PVC sensor bracket and will cause the bracket be uneven.

Step 10

Replace the drive pulley set screws with the provided set screws.
Install the drive pulley with the hub on the top side with the set screws opposite the flats from Step 6. Use a filler gauge set to 0.010 inch (0.254mm) to set the drive pulley height as shown.
Tighten the set crews to lock drive pulley in place.



Step 10

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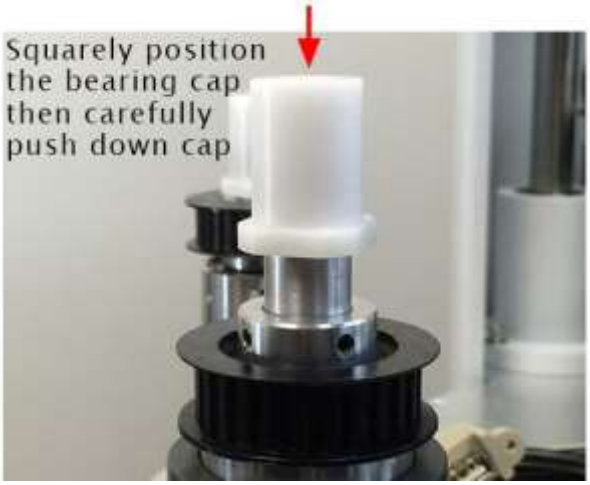
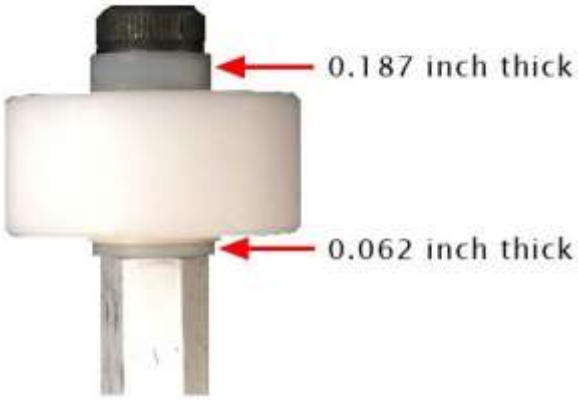
Step 11	Install the white bearing cap on the spindle sleeve by first partially inserting it squarely and then pushing it downwards until it bottoms in.  **Step 11**
Step 12	The nylon spacer on each idler wheel needs to be replace. Using an adjustable wrench and a 3/16th hex key, remove the idler then remove the existing nylon spacers. **The idler wheel standoffs does not need to be taken out. This allows the drive belt tension to be maintained.**
Step 13	Reinstall the idler wheel with the provided spacers as shown.  **Step 13**

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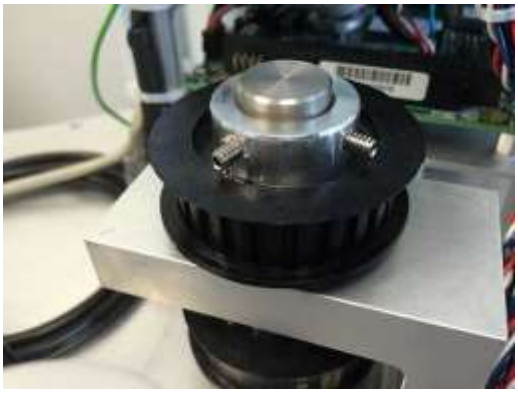
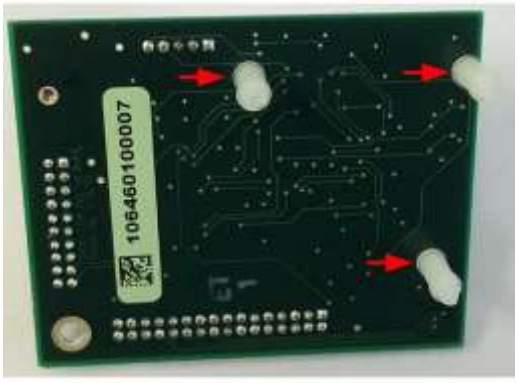
Step 14	Remove the top pulley on the drive pulley assembly and invert the pulley position as shown. Secure the pulley with the set screws.  **Step 14**
Step 15	Locate the bridge board. Remove the screw located on the right hand side of the board as shown. Save the screw.  **Step 15**
Step 16	Prepare the communication board. Install the three nylon standoffs as shown.  **Step 16**

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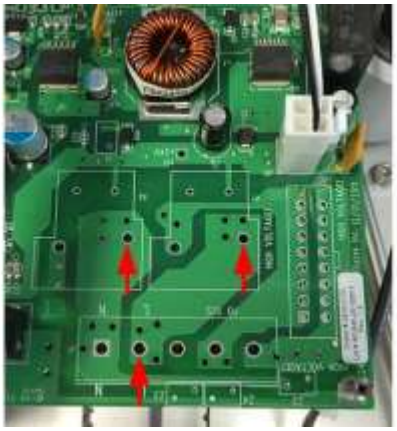
Step 17

Mount the communication board on the bridge board as shown. Follow steps below:

Install the standoff with lock-washer provided where the screw was removed (from Step 15) as shown.



Start securing the communication board using the 3 plastic standoffs, lining them up with the three available holes on the bridge board as shown.

Finally, secure the communication board using the screw taken out from Step 15.

Step 17

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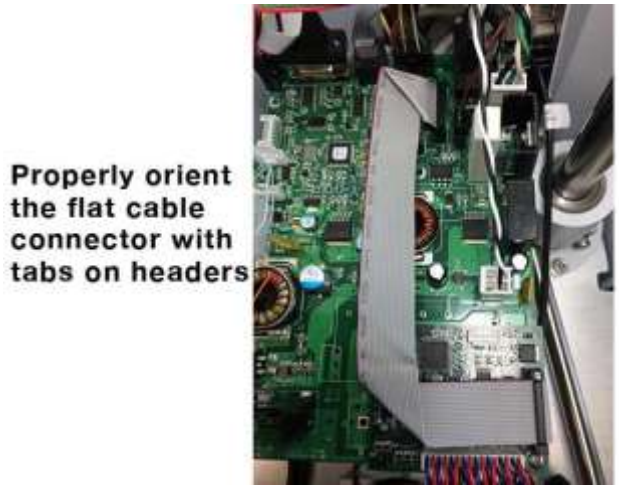
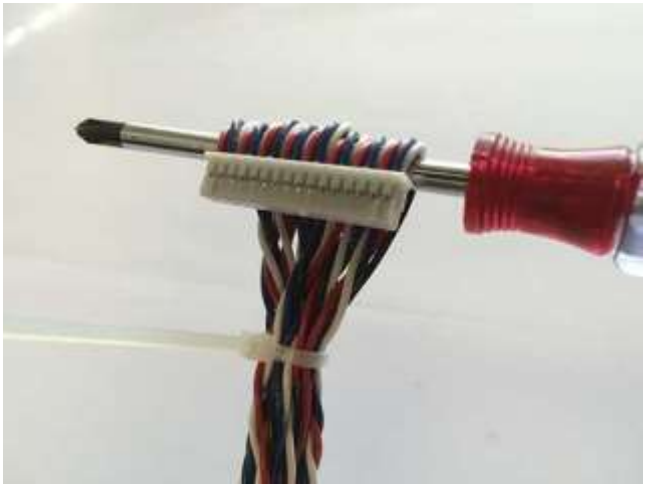
Step 18	Install the flat cable provided as shown. Starting on the bridge board, connect one end of the flat cable and the other end on the communication board.  **Step 18** **Properly orient the flat cable connectors with the headers on the bridge board and communication board.**
Step 19	Prepare the wireless cable assembly. Create a semi-loop closer to the connector using a screwdriver then bundle the cable using a tie wrap as shown.  **Step 19**

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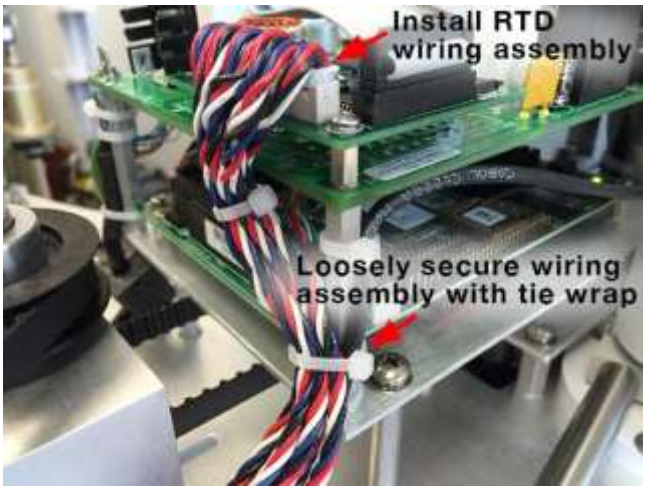
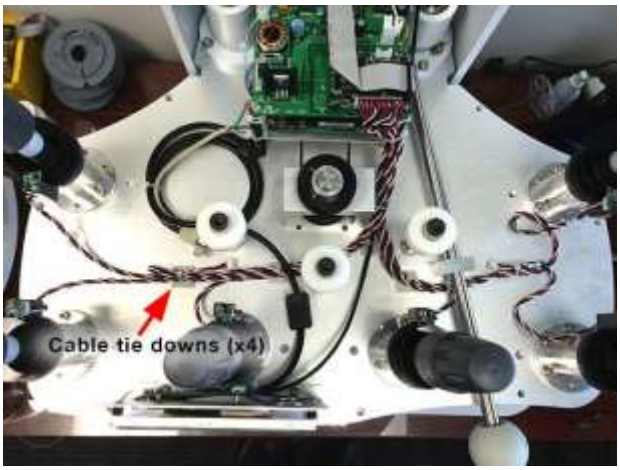
Step 20	Connect the cable assembly onto the communication board header J2 the loosely secure the cable assembly using a tie wrap with the bridge board standoff as shown..  **Step 20** **Keep in mind to properly orient the connector with the headers on the communication board.**
Step 21	Split the RTD wiring assembly in to two, by grouping 1, 2, 3, and 8 and 4, 5, 6 and 7. Group 1, 2, 3 and 8 will be routed towards the left side of the drive plate. Group 4, 5, 6 and 7 will be routed towards the right side of the drive plate. **FOR 6 VESSEL POSITION:** Follow the wiring routing as shown.  **6 Position Bath**

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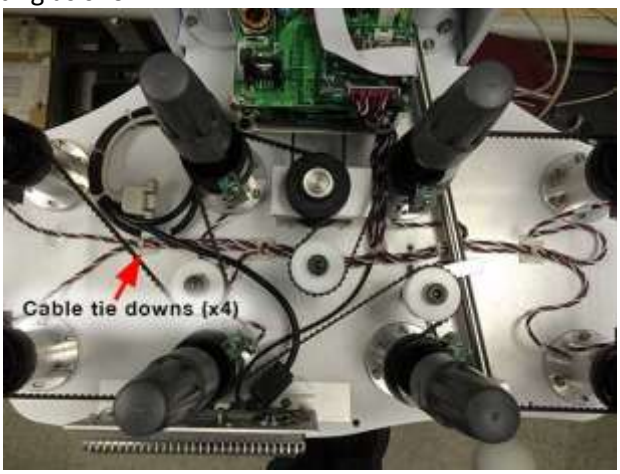
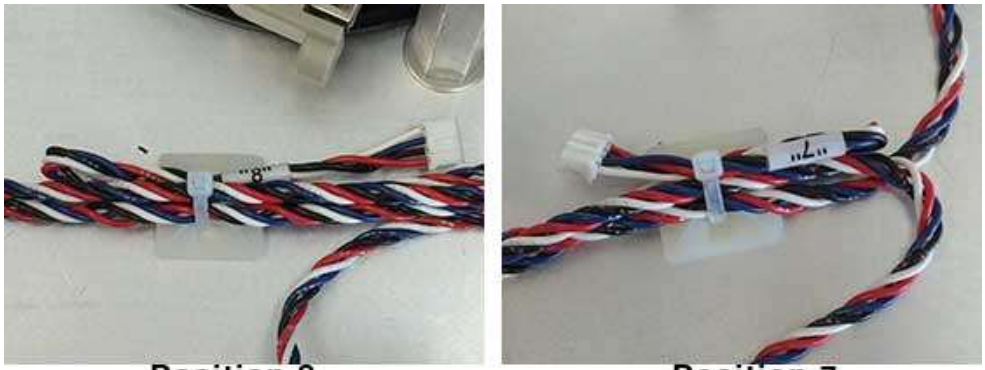
FOR 7 or 8 VESSEL POSITION:
Follow the wiring routing as shown.



7 or 8 Position Bath

Clean the surface with alcohol where the cable tie downs will be mounted.

Appropriately secure RTD wiring positions 7 and 8 with the cable tie downs as shown.



Step 21

The cable assembly is designed for up to 8 positions. Unused positions must be tied neatly with the cable tie downs.

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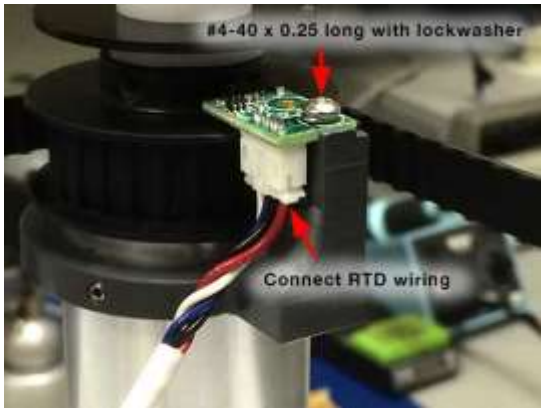
Step 22

Mount the IR receiver board with the provided 4-40 x ¼ Inch long screw with lock washer. Check that the IR receiver board has enough clearance that it does not contact with the pulley. Connect the individual connectors onto the IR receiver boards as shown.

Check IR receiver board clearance



Connecting the RTD wiring

Step 22

Properly orient the connector with the headers on the IR receiver board.

Step 23

Reinstall the drive belt.

Step 24

Install the IR disk as shown. The disk sits on the bearing cap snugly.

Step 24

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Step 25	Loosely install the new drive cover (with larger holes).
Step 26	Prepare the RTD shaft. Reuse the shaft collars from the existing shafts and place them loosely on the RTD shafts. With the drive unit lowered, carefully insert the RTD shaft from the top of the spindle as shown.  **Step 26** **If RTD shafts seems harder to insert, apply a small amount of vacuum grease one inch above the tip of the shaft.**
Step 27	Remove the shaft adapter cover by pressing the two release button on each side as shown **at the same time** then lifting up the cover.  **Step 27**

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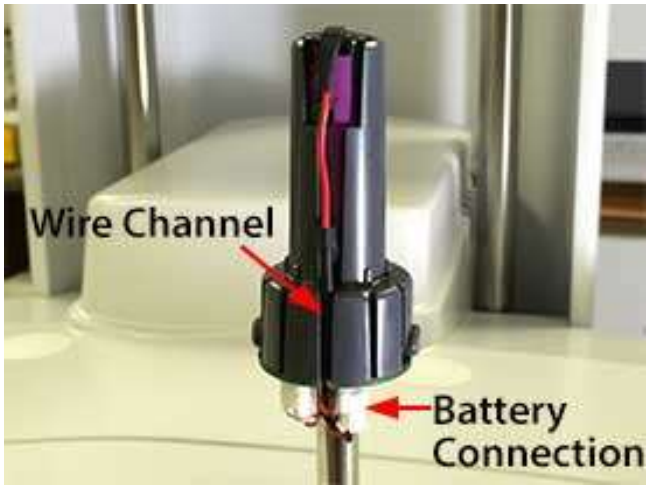
Step 28

If battery is not inside the shaft adapter, carefully insert the battery into the battery holder and route the battery wires inside the wire channel as shown.

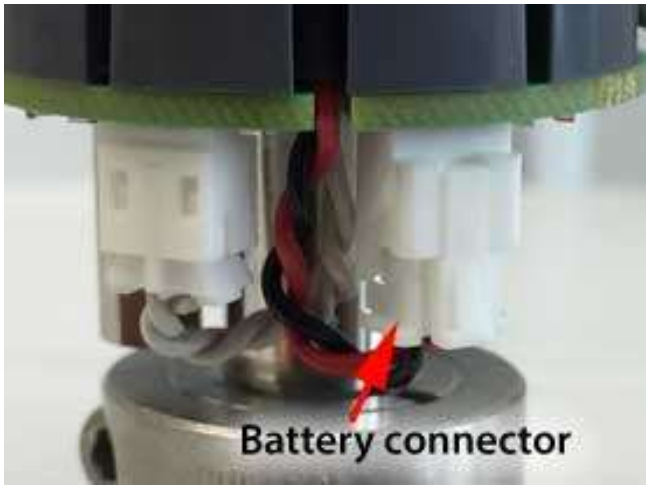


Step 28

If the provided documentation is missing, each battery needs to be pulled out and record on a piece of paper the stamped date from the battery manufacturer.

Step 29

Connect the battery connector onto the board connector as shown. Make sure that the connector is engaged and locked in place.



Step 29

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Step 30	Reinstall the shaft cover. Make sure that the cover is engaged and locked in place with the release buttons.
Step 31	Reconnect the AC power cable. Power up the instrument and log in as part of the manager group.
Step 32	Upgrading the user interface application. • Log in as part of the manager group. • Insert the USB flash drive that contains the file for upgrading the application. • Select *Settings* | *System Settings* | *Service* | *Upgrade Application* • Enter the appropriate password (*disfw*). Follow the prompts to complete the upgrade.
Step 33	Configuring the instrument as 2500RTD. • Log in as part of the manager group. • Select *Settings* | *System Settings* | *System Setup* | *Advanced* • Set the following parameters: ✓ Shafts Type = *RTD* ✓ Temp. Control = *Shafts Control Temp* ✓ Pre-Heat = *±0.2* • Select Save to accept the changes. Follow the prompts to complete the upgrade.
Step 34	 **Refer to the provided documentation regarding the necessary dates needed to be entered in the Battery Monitor menu.** Updating the Battery Monitor. • Log in as part of the manager group. • Select *Settings* | *System Settings* | *Battery Monitor* • Click on *Select All* to select all batteries (if batteries have the same dates) • Select the *Date Stamped* on the keypad and enter the appropriate month and year stamped on the battery (refer to provide documentation). • Select the *Replacement Date* on the keypad and enter the appropriate month, day and year (refer to provide documentation). • Select the '*Check*' key to accept the changes. • Exit the Battery Monitor screen by selecting *Done.*
Step 35	Calibrate the RTD shafts. Refer to the Operation Manual on section *Temperature Calibration*.

 **After the 2500RTD upgrade is completed, follow the company SOP regarding the validation of the instrument.**

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