## CHANGE HISTORY (LAST 5 REV-MODS)

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<td>09/02/2015</td>
<td>Periodic Review</td>
<td>Updated to current standards, removed vague phrases and changed note to special instructions.</td>
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<td>CHAMPS Removal</td>
<td>CHAMPS removal, new records statement.</td>
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<td>Replaced references to document TFC-ESHQ-S-STD-03, Electrical Safety with DOE–0359, Hanford Site Electrical Safety Program.</td>
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<td>Add CHAMPS to Section 2.2, Reworded Steps 4.2.1, 5.4.11, 5.5.15, 5.6.2, thru 5.6.4, and Record Section 5.9, Struck Step 5.6.5.</td>
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**Type**: CONTINUOUS  
**Document No.**: 6-TCD-740  
**Rev/Mod**: C-0  
**Release Date**: 09/02/2015  
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Calibrate Action Instrument TransPak T287 Temperature Transmitter

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1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure provides instructions for the configuration/calibration of Action Instrument, TransPak® T287 Temperature Transmitter.

1.2 Scope

This procedure applies to Action Instrument, TransPak® T287 Temperature Transmitter.

2.0 INFORMATION

2.1 General Information

2.1.1 Return to Factory Calibration Settings by the following:
- When a specific parameter is selected inside the calibration menu, you can return to original factory settings by pressing “default” button
- To restore all the original factory calibration parameters, the calibration menu must be started anew and “none” of the parameters should be selected. Pressing the “default” button will restore all the factory settings for all of the calibrations references.

2.1.2 The T287 transmitter features PC programmable configuration technology. The communications adapter cable provides a fully isolated serial interface and power source, allowing the transmitter to be “Configured” with just a PC; no external power supply, calibrator or meter is required.

2.2 Terms and Definitions
- RTD - Resistance Temperature Detector
3.0 PRECAUTIONS AND LIMITATIONS

3.1 Personnel Safety

3.1.1 If working around live circuits, extreme caution should be used. Failure to follow electrical safety practices as outlined in DOE–0359, Hanford Site Electrical Safety Program could result in serious injury or death.

3.1.2 If a lock and tag is required during the performance of this procedure, perform in accordance with DOE-0336, Hanford Site Lockout/Tagout Procedure.

3.2 Radiation and Contamination Control

Work in radiological areas will be performed using a Radiological Work Permit following review by Radiological Control per the ALARA Work Planning procedure TFC-ESHQ-RP_RWP-C-03.

4.0 PREREQUISITES

4.1 Special Tools Equipment and Supplies

The following supplies may be needed to perform this procedure:

- Laptop Computer
- TransPak T287 Configuration and Calibration software (C600-0001)
- Communications Adapter Cable (Laptop to Transmitter)
- RTD Temperature Simulator/Calibrator
- DMM (for output milliamps reading)
- Resistance Decade Box (Optional)
- Other tools, equipment and supplies as identified by Shift Manager/OE/FWS/User.

4.2 Field Preparation

4.2.1 REQUEST Operations to configured system allowing performance of this procedure.

4.2.2 IF lock and tag is required during the performance of this procedure, PERFORM in accordance with DOE-0336, Hanford Site Lockout/Tagout Procedure.
5.0 PROCEDURE

Special Instructions

After the initial configuration and set-up, subsections 5.1, 5.2, and 5.3 may be skipped with concurrence of the FWS and explained in comments section of Data Sheet.

5.1 Perform Initial Software Download to PC

5.1.1 IF not already installed, INSERT the Configuration and Calibration software disc (C680-0001) into laptop computer.

5.1.1.1 RUN file “TConf50.exe” on the CD-ROM (this will create a program group labeled XXXX).

5.1.1.2 FROM the program menu of your start tab, SELECT XXXX AND RUN the program YYY.

5.1.2 CONNECT the communications adapter to the computer and transmitter.

5.1.3 IDENTIFY the serial port to which the adapter is connected AND SELECT “Options” from the menu bar.

5.1.4 CLICK “Communications” AND SELECT the correct COMM port from the pull-down menu.

5.2 Confirm Transmitter Configuration

NOTE - Refer to Figure 4 for Transmitter Configurator Screen.

5.2.1 WITH the communications adapter cable, CONNECT the transmitter to the laptop computer (ref. Figure 1).

5.2.1.1 IF the current transmitter configuration did not automatically upload, PRESS the Icon on dropdown menu.

5.2.2 CHECK that Transmitter Configurator Screen is per Data Sheet [Item 1].

5.2.3 IF Transmitter Configurator Screen is per Data Sheet, GO TO Section 5.4

OR

IF Transmitter Configurator Screen is not per Data Sheet, GO TO Section 5.3.
5.3 Configure the Transmitter

NOTE - Refer to Figure 4 for Transmitter Configurator Screen.

5.3.1 IF not already connected, CONNECT the transmitter to the laptop computer via the communications adapter cable (ref. Figure 1).

5.3.2 ALLOW a minimum warm-up time of 15 minutes.

5.3.3 IF the current transmitter configuration did not automatically upload, PRESS the Icon on dropdown menu.

5.3.4 IF the current Sensor Type does not match the application, CLICK on the “Select Sensor” box AND SELECT appropriate tab at the top of the “Input Sensor Selection” screen.

5.3.4.1 SELECT “Single Input” from the menu, THEN SELECT the type of input.

5.3.4.2 SET the Mode/Transfer Function to “Standard”.

5.3.4.3 CLICK the “OK” button to return to Configuration Screen.

5.3.5 SELECT the Engineering Units (Fahrenheit) from the pull down menu.

NOTE - Burnout mode determines if the Transmitter will go above full scale or below zero scale upon failure.

5.3.6 ENTER the following values from Data Sheet:
• “Zero Scale” value
• “Full Scale” value
• “Burnout” mode (Upscale)
• “Line Frequency”.

5.3.7 CLICK the “Set to Optimal” button to optimize the transmitter’s filtering.

5.3.8 PRESS the Icon on dropdown menu to download the new configuration to the transmitter.
5.4 Obtain As-Found Values

NOTE - As-Found output values may be determined by using an RTD Simulator, this page, or by using a Decade Resistance Box on the following page.

5.4.1 IF connected, DISCONNECT RTD from transmitter input terminals.

Obtain Output Values Using RTD Simulator

5.4.2 CONNECT RTD Simulator to Temperature Transmitter (ref. Figure 3).

NOTE - Connecting ≥ 24VDC power source is only necessary if bench testing (existing power is used in the field).

5.4.3 CONNECT DMM (and DC power source if bench testing) in accordance with Figure 3.

5.4.4 APPLY power to the test set-up AND

ALLOW a minimum of 15 minutes warm-up time.

5.4.5 REFER to Attachment 1 for RTD temperature versus resistance table.

5.4.6 ADJUST RTD Simulator for temperature values per Data Sheet AND

RECORD the following observed As-Found values on Data Sheet [Item #2],
- As-Found loop current (4-20 mA)
- HMI Temperature Indication.

5.4.7 IF As-Found values are NOT within specified tolerance per Data Sheet, GO TO Calibration Section 5.5,

OR

IF As-Found values are within specified tolerance, but deemed marginal, and optimization is desired, GO TO Calibration Section 5.5,

OR

IF As-Found values are within specified tolerance, RECORD As-Found values in As-Left column of Data Sheet [Item #3] AND

GO TO Restoration, Section 5.6.
5.4 Obtain As-Found Values (Cont.)

Obtain Output Values Using Decade Resistance Box

5.4.8 IF connected, DISCONNECT RTD input from transmitter input terminals.

5.4.9 CONNECT Decade Resistance Box to transmitter input terminals in accordance with Figure 3.

NOTE - Connecting ± 24VDC power source is only necessary if bench testing (existing power is used in the field).

5.4.10 CONNECT DMM (and DC power source if bench testing) in accordance with Figure 3.

5.4.11 APPLY power to the test set-up AND ALLOW a minimum of 15 minutes warm-up time.

5.4.12 REFER to Attachment 1 for RTD temperature versus resistance table.

5.4.13 ADJUST Decade Box for resistance values per Data Sheet AND RECORD the following observed As-Found values on Data Sheet [Item #2].

- As-Found loop current (4-20 mA)
- HMI Temperature Indication.

5.4.14 IF As-Found values are NOT within specified tolerance per Data Sheet, GO TO Calibration Section 5.5,

OR

IF As-Found values are within specified tolerance, but deemed marginal, and optimization is desired, GO TO Calibration Section 5.5,

OR

IF As-Found values are within specified tolerance, RECORD As-Found values in As-Left column of Data Sheet [Item #3] AND

GO TO Restoration, Section 5.6.
5.5 Calibration

Zero and Span Adjustment

NOTE - If at any time, “Return to Factor Settings” is required, Step 2.1.1 may be referenced for instructions.

5.5.1 CONNECT the Temperature Transmitter to the Laptop computer, power source and the current output monitor (DMM) per Figure 2.

5.5.2 ALLOW a minimum of 15 minutes warm-up time.

5.5.3 FROM the “Device” drop-down menu, SELECT “Calibration”.

5.5.3.1 WHEN the prompt for password appears, ENTER password (the default for password is the “device serial number”).

5.5.4 AFTER entering password, the “Device Calibration” screen will appear.

5.5.5 FROM the “calibration references” list, SELECT “Output 4mA”.

5.5.6 USE the output scroll bar AND ADJUST the reading of the current monitor to 4.00mA.

5.5.7 PRESS the “Send to Device” button to download new reference to the unit.

5.5.8 FROM the “calibration references” list, SELECT “Output 20mA”.

5.5.9 USE the output scroll bar AND ADJUST the reading of the current monitor to 20.00mA.

5.5.10 PRESS the “Send to Device” button to download new reference to the unit.

5.5.11 DISCONNECT Laptop from transmitter.

5.5.12 CONNECT Decade Resistance Box or Temperature Simulator in accordance to Figure 3.

5.5.13 APPLY input values per Data Sheet AND CHECK output values for tolerance.
5.5 Calibration (Cont.)

5.5.14 IF values are within tolerance per Data Sheet, RECORD the following As-Left values on Data Sheet [Item #3]:
- As-Left loop current (4-20 mA) from DMM
- As-Left HMI Temperature display.

GO TO Restoration, Section 5.6.

5.5.15 IF values are not within tolerance per Data Sheet, REPEAT Steps 5.5.3 through 5.5.14 until values are within tolerance,

OR

IF values cannot be brought into tolerance, STOP WORK AND NOTIFY FWS for resolution.
5.6 Restoration

5.6.1 IF any problems were encountered with calibration, INFORM FWS.

5.6.2 DISCONNECT AND REMOVE Test Equipment.

5.6.3 CONNECT RTD to temperature transmitter and tighten snug tight.

5.6.4 RECORD the Test Equipment information and calibration status on Data Sheet.

5.6.5 CHECK equipment restoration by observing indications are consistent with expected conditions.

5.6.6 NOTIFY Operations that testing is complete and system may be returned to desired configuration.

5.7 Acceptance Criteria

Acceptance Criteria has been met when Steps in this procedure have been satisfactorily performed and As-Left values meet the specifications and tolerance(s) per the Data Sheet.

5.8 Review

5.8.1 INFORM FWS test is complete.

5.8.2 FWS REVIEW AND ENSURE the following:

- Completed Data Sheets meet the acceptance criteria
- Comments sections are filled out appropriately
- Work requests needed as a result of this procedure are identified and generated
- Work request number(s) of any work documents generated as a result of this procedure, are recorded in the Comments/Remarks section of the Data Sheet, as applicable.
5.9 Records

The performance of this procedure generates no records. However, PM Data Sheets associated with the procedure, are records and are maintained in the work package as record material.

The record custodian identified in the Company Level, Records Inventory and Disposition Schedule (RIDS) is responsible for record retention in accordance with TFC-BSM-IRM_DC-C-02
Calibrate Action Instrument TransPak T287 Temperature Transmitter

Figure 1 - Configure Transmitter Using Laptop and RTD Software
Calibrate Action Instrument TransPak T287 Temperature Transmitter

Figure 2 - Setting Zero and Span Using Computer Software

Laptop with TransPak T287 RTD software
Calibrate Action Instrument TransPak T287 Temperature Transmitter

Figure 3 - Transmitter Calibration Verification Using RTD Temperature Simulator or Decade Box
Figure 4 - Transmitter Configurator Screen
### Calibrate Action Instrument TransPak T287 Temperature Transmitter

#### Attachment 1 - RTD Temperature versus Resistance Chart

**PLATINUM: PD TCR = 3.85e-3, R0 = 100**

\[
A = 0.0039083 \quad B = -5.775E-07 \quad C = -4.183E-12 \quad \text{(Values are in Ohms)}
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