Calibration Testing and Re-Calibration Sequence for Moore Industries TRX Temperature Transmitters

Tank Farm Maintenance Procedure

MAINTENANCE

USQ # ROUTINE MAINTENANCE

<p>| CHANGE HISTORY (≤ LAST 5 REV-MODS) |
|-------------------------------|------------------|-----------------------------|</p>
<table>
<thead>
<tr>
<th>Rev-Mod</th>
<th>Release Date</th>
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<tr>
<td>E-0</td>
<td>03/19/2015</td>
<td>Incorporate comments from Periodic Review</td>
<td>Updated to current standards, changed notes to Special Instructions.</td>
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<td>D-1</td>
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<td>CHAMPS Removal and new records statement.</td>
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<td>01/22/2013</td>
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<td>Removed unnecessary information, reformatted steps, added clarification and modified RadCon section.</td>
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<td>Deleted Section 3.1. Added new bullet to Section 4.1. Changed title of Section 5.1. Modified wording in Step 5.1.7. Added new Step 5.1.8. Deleted old Steps 5.1.9 and 5.1.10.</td>
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Calibration Testing and Re-Calibration Sequence for Moore Industries TRX Temperature Transmitters

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1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure provides instructions for equipment set-up, checking calibration via testing sequence, and re-calibration of Moore Industries TRX Temperature Transmitters as needed.

1.2 Scope

This procedure involves any Tank Farm system utilizing a Moore Industries TRX/PRG/4220MA/8-42DC (TRX) Temperature Transmitter.

2.0 INFORMATION

2.1 Terms and Definitions

TRX  Two wire (loop powered) temperature transmitter.

3.0 PRECAUTIONS AND LIMITATIONS

3.1 Radiation and Contamination Control

Work in radiological areas will be performed using a Radiation Work Permit following review by Radiological Control per ALARA 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:

- DC Power Source
- IBM Compatible Laptop Computer (For Calibration Only)
- Non-Isolated Communications Cable #803-040-26
- Computer Program (Floppy Disk Or Hard Drive) Number TRX/TRY/SIY/TDY/CONFIGURATION TR_SETUP.EXE
- Current Meter (Calibrated With Expiration Dates)
- Decade Box (Calibrated With Expiration Dates)
- Other tools, equipment and supplies as identified by Shift Manager/OE/FWS/User.

4.2 Field Preparation

4.2.1 If during performance of this procedure, any of the following conditions are found, immediately stop work, place equipment in a safe condition, notify Supervision, and proceed as directed:

- Any equipment malfunction which could prevent fulfillment of its functional requirements
- Personnel error or procedural inadequacy which could prevent fulfillment of procedural requirements.
5.0 PROCEDURE

Special Instructions

If during the performance of this procedure, any step, group of steps or data entry that is not applicable must be identified as such by entering "N/A" in appropriate Data Sheet sign off space and explained in COMMENTS/REMARKS section of Data Sheet.

5.1 Obtain As-Found Data

5.1.1 ATTACH Current Meter positive terminal to TRX Temperature Transmitter negative terminal PS with connection wire. (See Figure 2.)

5.1.2 ATTACH Current Meter negative terminal to Power Source negative terminal with connection wire. (See Figure 2.)

5.1.3 ATTACH Power Source positive terminal to TRX Temperature Transmitter positive terminal PS with connection wire. (See Figure 2.)

5.1.4 ATTACH Decade Box to TRX Temperature Transmitter as shown on Figure 2.

5.1.5 SET power supply at 24 Volts.

5.1.6 Performs Calibration Test on TRX Temperature Transmitter based on input values listed on Data Sheet.

5.1.7 RECORD As-Found Calibration Test results on Data Sheet.

5.1.8 IF As-Found values are not within specified tolerance per Data Sheet, GO TO Section 5.2,

    OR

    IF As-Found values are within specified tolerance, but deemed marginal, and optimization is desired, GO TO Section 5.2,

    OR

    IF As-Found values are within specified tolerance, RECORD As-Found values in As-Left column of Data Sheet AND

    GO TO Restoration, Section 5.6.
Calibration Testing and Re-Calibration Sequence for Moore Industries TRX Temperature Transmitters

5.2 Laptop Computer Setup

5.2.1 CONNECT Non-Isolated Computer Connection Cable to Laptop Computer Serial "COM" Port and TRX Temperature Transmitter "COM" Port.

5.2.2 INSERT computer program floppy disk

OR

USE previously installed program listed in Section 4.1.

5.2.3 START program "TRX_TRY_SIY Setup.exe".

NOTE - If the Temperature Transmitter is connected properly, the program will automatically choose the correct type of configuration to open and after a brief display of "splash screen" the main configuration display will appear. (See Figure 1.)

5.2.4 IF the connected TRX Temperature Transmitter is correctly identified by the configuration program, PROCEED to Section 5.4.

5.2.5 IF the connected TRX Temperature Transmitter is misidentified by the configuration program, PROCEED to Section 5.3.

5.3 Identifying the Correct Transmitter Type

5.3.1 EXIT program.

5.3.2 DISCONNECT Non-Isolated Computer Connection Cable from TRX Com Port.

5.3.3 START program "TRX_TRY_SIY_Setup.exe" again.

5.3.4 ENSURE “TRX/TRY” menu selection is made on selection screen.

NOTE - When connection is made, in Step 5.3.5 the computer program will automatically establish communications displaying operating parameters for connected TRX Temperature Transmitter and default configuration file.

5.3.5 CONNECT Non-Isolated Computer Connection Cable to TRX Com Port.
5.4 Temperature Transmitter Input Calibration

5.4.1 **WITNESS** Temperature Transmitter is communicating with Configuration Program by checking the following:
- Flashing Communication indicator (See Figure 1, Center Screen.)
- Configuration Program listed under flashing indicator.

5.4.2 **INITIATE** Get Setup Button.

5.4.3 **ENSURE** the "Input Zero" and "Input Full" Range and Units are consistent with the Data Sheet.

**NOTE** - The Start and Stop buttons (as well as other function keys) are located on the same Key button and are activated in rotating order as the user selects or "clicks" the desired functions.

5.4.4 **INITIATE** Start button.

5.4.5 **INITIATE** SensTrim button.

5.4.6 **BEGIN** trimming by initiating Sensor Trim ON button.

5.4.7 **ADJUST** input signal to low limit as specified on Data Sheet.

5.4.8 **ALLOW** input signal to stabilize.

**NOTE** - After a brief pause the captured input trim value is shown in the Zero Captured box.

5.4.9 **INITIATE** Zero Trim button.

5.4.10 **ADJUST** input signal to upper limit as specified on Data Sheet.

5.4.11 **ALLOW** input signal to stabilize.

**NOTE** - After a brief pause the captured input trim value is shown in Full Captured box.

5.4.12 **INITIATE** Full Trim button.

5.4.13 **INITIATE** QuiSeTrim button.

5.4.14 **WHEN** Sensor Trim Change screen appears, **INITIATE** OK button.

5.4.15 **INITIATE** Stop button.

5.4.16 **INITIATE** Prog button.

5.4.17 **AFTER** a distinct audible "BEEP", **INITIATE** Start button.
5.5 Temperature Transmitter Output Calibration

5.5.1 WITNESS Temperature Transmitter is communicating with Configuration Program by checking the following:
- Flashing Communication indicator (See Figure 1, Center Screen.)
- Configuration Program listed under flashing indicator.

5.5.2 INITIATE Get Setup button.

5.5.3 ENSURE the following Range and Units are consistent with the Data Sheet:
- Input Zero
- Input Full.

NOTE - The Start and Stop buttons (as well as other function keys) are located on the same Key button and are activated in rotating order as the user selects or "clicks" the desired functions.

5.5.4 INITIATE Stop button.

5.5.5 INITIATE Trim button.

5.5.6 MONITOR Temperature Transmitter output via Current Meter.

5.5.7 SELECT AND ENTER desired value for "Output Zero" output trim inside "Output" Box in the lower right hand portion of configuration screen.

NOTE - Arrow cursor on slide bar with left mouse click will activate output adjustment up or down.

5.5.8 ADJUST "Output Zero" until Temperature Transmitter output is at zero percent of scale based on observed output of Current Meter and is within desired tolerance listed on Data Sheet.

5.5.9 REPEAT Step 5.5.8 for "Output Full" trim located below "Output Zero" trim. (See Figure 1.)

NOTE - Field name for whichever output value is being adjusted changes color when selected.

5.5.10 INITIATE Quit Trim button when desired output is obtained.
5.5 Temperature Transmitter Output Calibration (Cont.)

NOTE - The lower right area of configuration screen will return to normal.

5.5.11 INITIATE Prog button to download output trim settings into TRX Temperature Transmitter memory.

5.5.12 INITIATE Start button to Highlight Exit Button.

5.5.13 INITIATE Exit button.

5.5.14 DISCONNECT Non Isolated Communication Cable from COM Port of TRX Temperature Transmitter.

5.5.15 FOLLOW Steps 5.1.6 through 5.1.8.

5.6 Restoration

5.6.1 ENSURE Test Equipment has been disconnected and removed.

5.6.2 ENSURE Test Equipment is recorded on Data Sheet.

5.7 Review

RECORD Work Request Number(s) in comments section for any work documents generated as a result of this procedure.

5.8 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.

If generated, the Computer Calibration printouts are to be enclosed with the work package.

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.
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Figure 1 TRX Configuration Program Main Computer Screen
Figure 2 TRX Temperature Transmitter Setup Configuration