AW Model IFI-420 Flow Transmitter Verification and Calibration

Tank Farm Maintenance Procedure 242-A Evaporator

USQ # N/A-4

<table>
<thead>
<tr>
<th>Change History (≤ Last 5 Rev-Mods)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rev-Mod</strong></td>
</tr>
<tr>
<td>D-1</td>
</tr>
<tr>
<td>D-0</td>
</tr>
<tr>
<td>C-2</td>
</tr>
<tr>
<td>C-1</td>
</tr>
<tr>
<td>C-0</td>
</tr>
</tbody>
</table>

Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>PURPOSE AND SCOPE</td>
</tr>
<tr>
<td>1.1</td>
<td>Purpose</td>
</tr>
<tr>
<td>1.2</td>
<td>Scope</td>
</tr>
<tr>
<td>2.0</td>
<td>INFORMATION</td>
</tr>
<tr>
<td>3.0</td>
<td>PRECAUTIONS AND LIMITATIONS</td>
</tr>
<tr>
<td>3.1</td>
<td>Personnel Safety</td>
</tr>
<tr>
<td>3.2</td>
<td>Radiation and Contamination Control</td>
</tr>
<tr>
<td>4.0</td>
<td>PREREQUISITES</td>
</tr>
<tr>
<td>4.1</td>
<td>Special Tools, Equipment, and Supplies</td>
</tr>
<tr>
<td>4.2</td>
<td>Field Preparations</td>
</tr>
<tr>
<td>5.0</td>
<td>PROCEDURE</td>
</tr>
<tr>
<td>5.1</td>
<td>Calibration Verification</td>
</tr>
<tr>
<td>5.2</td>
<td>Restoration</td>
</tr>
<tr>
<td>5.3</td>
<td>Acceptance Criteria</td>
</tr>
<tr>
<td>5.4</td>
<td>Review</td>
</tr>
<tr>
<td>5.5</td>
<td>Records</td>
</tr>
</tbody>
</table>

Figure 1 – IFI 420 Wiring Diagram and Scaling Switches | 10
1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure provides instructions to calibrate AW Company Flow Transmitter/Converter Model IFI-420/A2.

1.2 Scope

This procedure applies to AW Company Flow Transmitter/Converter Model IFI-420/A2.

2.0 INFORMATION

None

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 injury.

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:

- Digital Multimeter (DMM)
- Frequency Generator with Counter
- Other tools, equipment and supplies as identified by Shift Manager/OE/FWS/User.

NOTE - Measuring and Test Equipment (M&TE) used to collect acceptance criteria data during performance of this procedure shall meet the following requirements:

- Be within its current calibration cycle as evidenced by an affixed calibration label
- Be capable of desired range
- Have an accuracy:
  - Equal to or greater than M&TE tolerance specified on recall data sheet
  - OR
  - If device being calibrated is not recall associated, at least 4 times greater than specified device tolerance.

4.2 Field Preparations

The following conditions must be met before this procedure may commence:

4.2.1 NOTIFY Shift Supervisor of intent to remove instrument from service.

4.2.2 IF performing this procedure within a Tank Farm Boundary CONTACT IH for the approved IH sampling plan.
5.0 PROCEDURE

Special Instructions

If performance of any steps in this procedure is not required for procedure completion, steps not performed are to be marked, "N/A" in appropriate Data Sheet signoff space, and explained in comments/remarks section of Data Sheet.

5.1 Calibration Verification

5.1.1 REQUEST operations to remove system from service.

5.1.2 REMOVE front panel by inserting flat tip screwdriver in the slot between the connector and front panel AND GENTLY TWIST the panel off.

5.1.3 RECORD As-Found scaling switch positions on Data Sheet AND CONFIRM settings are per Data Sheet (see Figure 1).

5.1.3.1 IF settings are not in accordance with Data Sheet, RECORD findings on Comments section of Data Sheet AND NOTIFY Engineering for resolution.

5.1.4 DISCONNECT flow element (transducer) from terminals 1, 2 and 3 (ref. Figure 1) AND IDENTIFY leads for reconnection.

Obtain As-Found Values

5.1.5 CONNECT a digital multimeter to the current output of the converter at Terminals 14(+) and 15(-).

5.1.6 CONNECT Frequency Generator with counter to terminal 3 and ground (ref. Figure 1).

NOTE - The IFI-420 handles signals with amplitudes ranging from 4.5Vp-p to 40Vp-p.

5.1.7 ADJUST the Frequency Generator signal(s) and amplitude in accordance with Data Sheet.
5.1 Calibration Verification (Cont.)

**NOTE** - When converter sees a frequency input, the yellow LED on front will flash.

5.1.8 **APPLY** test input values per Data Sheet **AND**
**RECORD** output values in As-Found section of Data Sheet.

5.1.9 **IF** As-Found values are within tolerance per Data Sheet and no further adjustment is desired, **RECORD** output data and scaling switch positions in As-Left section of the Data Sheet **AND**

**GO TO** Restoration Section 5.2, otherwise continue.

### 4mA Offset Adjustment/Verification

**NOTE** - It is not necessary to power down the unit to change the scaling switch setting and can be done with or without incoming signal.

- The Offset value is taken with no frequency input applied.

5.1.10 **APPLY** minimum input frequency per Data Sheet **AND**
**CHECK** mA output.

5.1.11 **IF** the Offset value (4mA) is correct, **GO TO** Step 5.1.12.

**OR**

**IF** the Offset value (4mA) is incorrect, **PERFORM** the following:
(reference Figure 2)

5.1.11.1 **ENTER** the Offset adjustment mode by turning switch S1 to number 8 **AND**
**CONFIRM** the yellow LED is blinking rapidly.

**NOTE** - Unit enters the adjustment mode when yellow LED turns off.

5.1.11.2 **PRESS** PB1 once **AND**
**CONFIRM** the yellow LED turns off.
5.1 Calibration Verification (Cont.)

5.1.11.3 IF the Offset value is to be increased, LEAVE S1 at number 8 AND
PRESS PB1 until desired mA value (4mA) is reached,

OR

IF the Offset value is to be decreased, TURN S1 to number 7 AND
PRESS PB1 until desired mA value (4mA) is reached.

5.1.11.4 IF unable to adjust Offset to proper value, NOTIFY engineering for resolution.

5.1.11.5 WHEN the Offset has been set to the desired value (4.0mA),
TURN S1 to the number 5 position AND
CONFIRM the yellow LED turns back on.

NOTE - The Offset value is now stored in eprom chip and will be retained if unit is powered down.

5.1.11.6 RETURN S1 to its original scaling position.

20mA Adjustment/Verification

NOTE - As an example, for a maximum input frequency of 442 Hertz, the switches would be set to 0, 4, 4, 2, starting left to right.

5.1.12 IF input frequency is not correct, ADJUST scaling switches to match the input frequency per Data Sheet, (starting from left to right in order of decreasing value as shown in Figure 1).

5.1.13 APPLY maximum input frequency value to transmitter per Data Sheet.

5.1.14 IF 20mA output is in tolerance, APPLY input values per Data Sheet AND CHECK output values for tolerance.

5.1.15 IF output values are within tolerance per Data Sheet, RECORD As-Left values and scaling switch positions on Data Sheet AND

GO TO Restoration, Section 5.2.
5.1 Calibration Verification (Cont.)

5.1.16 IF values are not within tolerance per Data Sheet, **REPEAT** Steps 5.1.10 through 5.1.15 until values are within tolerance,

OR

IF values cannot be brought into tolerance, **NOTIFY** FWS for resolution AND

**STOP WORK** until further directed.
5.2 Restoration

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

5.2.2 DISCONNECT AND REMOVE Test Equipment as necessary.

5.2.3 RECORD the Test Equipment information and calibration status on Data Sheet as applicable.

5.2.4 ENSURE flow element (transducer) is reconnected (ref. Step 5.1.4 and Figure 1).

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

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

5.3 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.

5.4 Review

5.4.1 INFORM FWS test is complete.

5.4.2 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.
5.5 Records

This procedure is performed within a work package, as such, the procedure in its entirety will be maintained as a record per the Work Control process.

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.
Figure 1 – IFI 420 Wiring Diagram and Scaling Switches

Rotary Scaling Switches
Figure 2 - Offset Adjustment