AY-AZ Cooling Tower Fischer Porter R1

Tank Farm Maintenance Procedure

MAINTENANCE

USQ # GCX-2

CHANGE HISTORY (≤ LAST 5 REV-MODS)

<table>
<thead>
<tr>
<th>Rev-Mod</th>
<th>Release Date</th>
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<td>B-2</td>
<td>05/18/2017</td>
<td>Periodic Review / Inconsequential Change</td>
<td>Remove “As Required” from Step 4.1.</td>
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<tr>
<td>B-1</td>
<td>11/10/2014</td>
<td>Operation Request</td>
<td>CHAMPS Removal</td>
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<td>B-0</td>
<td>05/12/2014</td>
<td>Periodic Review</td>
<td>Add “EEWP” to Step 3.1.1. Add “Special Instructions” prior to Step 5.1. Add Steps 5.3.4 – 5.3.4.2. Reword Steps 4.3.1, 5.1.2, 5.3.3 and Note prior to Step5.1.2. Struck Steps 4.3.2 – 4.3.2.2 and 1st Note at page 6.</td>
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<td>A-0</td>
<td>04/07/2011</td>
<td>Required for 702 AZ</td>
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1.0 PURPOSE AND SCOPE

1.1 Purpose

The purpose of this procedure is to provide calibration instructions for the Fischer & Porter series 10LV3000 Vortex Flowmeter and 50LV3000 Signal Conditioner.

1.2 Scope

This procedure provides instructions for loop and bench calibration of the AY/AZ Ventilation and Cooling System Fischer & Porter Vortex Flowmeter and Signal Conditioner using a remote signal generator.

2.0 INFORMATION

2.1 General Information

NOTE - Calibration may be performed in the field or in the shop.

- Figure 1 provides a block diagram of the test instruments and Signal Conditioner connections for calibration with Remote Signal Generator
- Figure 2 provides a general layout of the Signal Conditioner's test points and switch locations
- Bench Calibration – Calibrate the flowmeter current output by connecting a Milliammeter in series with a 24 VDC Power Supply (See Figure 1)
- Field (Loop) Calibration – Calibrate the flowmeter current output by connecting a Milliammeter in series with the circuit output
- The peak to peak amplitude of the test signal applied to input terminal A PRIMARY IN should be 20 mV. The internal multiplier and output frequency ranges for various meters must be used to obtain the correct test signal.
3.0 PRECAUTIONS AND LIMITATIONS

3.1 Personnel Safety

3.1.1 An Energized Electrical Work Permit (EEWP) is not required when working energized parts that operate at less than 50 volts potential per DOE–0359, Hanford Site Electrical Safety Program.

The maximum voltage encountered when connecting and disconnecting from terminal strips is less than 50 VDC.

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:

- Milliammeter or Digital Multimeter
- Regulated 24 V dc Power Supply
- Calibrated Precision Frequency Generator
- Two (2) 3 μF film capacitors
- Oscilloscope (optional).

4.2 Performance Documents

- Fischer & Porter Instruction Bulletin, VORTEX FLOWMETERS 10LV3000-01 Rev.3.
4.3 **Field Preparations**

**Special Instructions**

If the AY/AZ Ventilation and Cooling system is not shut down and the unit's coolant pumps are operating then the respective interlock override switch should be used to prevent switching or shut down of the pumps. Table 1 lists the pumps.

**Table 1 – Coolant Pumps**

<table>
<thead>
<tr>
<th>COOLANT PUMP</th>
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</thead>
<tbody>
<tr>
<td>AY101-EW-P-1A</td>
</tr>
<tr>
<td>AY101-EW-P-1B</td>
</tr>
<tr>
<td>AY102-EW-P-1A</td>
</tr>
<tr>
<td>AY102-EW-P-1B</td>
</tr>
<tr>
<td>AZ101-EW-P-1A</td>
</tr>
<tr>
<td>AZ101-EW-P-1B</td>
</tr>
<tr>
<td>AZ102-EW-P-1A</td>
</tr>
<tr>
<td>AZ102-EW-P-1B</td>
</tr>
</tbody>
</table>

4.3.1 **IF** the AY/AZ Ventilation and Cooling system is not shut down and the unit's coolant pumps are operating, **PERFORM** the following to override at the MCS to prevent switching or shutdown of the pumps:

4.3.1.1 **CLICK** on the running pump **AND**

**EXPAND** the faceplate (three dot button).

4.3.1.2 **CHECK** the Inhibit Priority Cmd and Interlock Checkbox **AND**

**PRESS** ENTER button on faceplate.

4.3.1.3 **CONFIRM** the Interlock Symbol (covered with a yellow X) appears.
5.0 **PROCEDURE**

**Special Instructions**

If any step is not required for procedure completion, record “N/A” in the applicable space(s) on the Data Sheet and document the justification in the Data Sheet’s Comments/Remarks section.

5.1 **Obtain As-Found Data**

5.1.1 DE-ENERGIZE Signal Conditioner power source AND

DISCONNECT “A PRIMARY IN” and “B PRIMARY IN” input signal lines, as required.

**NOTE** - The Oscilloscope may be used to verify signal generator output accuracy.

5.1.2 CONNECT test equipment as detailed on Figure 1.

5.1.3 APPLY input signals specified on Data Sheet AND

RECORD As-Found values on Data Sheet.

5.1.4 IF As-Found values are NOT within specified tolerance per Data Sheet, **GO TO** Calibration Section 5.2,

**OR**

IF As-Found values are within specified tolerance, but deemed marginal, and optimization is desired, **GO TO** Calibration 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 5.3.
5.2 Calibration with Remote Signal Generator

5.2.1 APPLY minimum scale hertz input as specified on Data Sheet to Signal Conditioner AND

ADJUST Signal Conditioner null potentiometer (R51) for minimum scale output as specified on Data Sheet (see Figure 2).

5.2.2 APPLY full scale hertz signal as specified on Data Sheet to Signal Conditioner AND

ADJUST Signal Conditioner SPAN potentiometer (R47) until Milliammeter reads full scale output as specified on Data Sheet.

5.2.3 APPLY inputs per Data Sheet AND

CHECK output values for tolerance.

5.2.4 IF values are within tolerance per Data Sheet, RECORD As-Left values on Data Sheet AND

GO TO Restoration, Section 5.3.

5.2.5 IF values are not within tolerance per Data Sheet, REPEAT Steps 5.2.1 through 5.2.4 until values are within tolerance,

OR

IF unable to bring values into tolerance NOTIFY FWS/OE for resolution.
5.3 Restoration

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

5.3.2 DISCONNECT test equipment AND

RESTORE system wiring to as found condition.

5.3.3 RETURN Signal Conditioner to on stream configuration.

5.3.4 IF Step 4.3.1 was performed to inhibit the AY/AZ Ventilation and Cooling system PERFORM the following:

5.3.4.1 UNCHECK the Inhibit Priority Cmd and Interlock Checkbox AND

PRESS ENTER.

5.3.4.2 CONFIRM the Interlock Symbol with the “X” disappears.

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

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

5.4 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.

5.5 Review

5.5.1 INFORM FWS test is complete.

5.5.2 FWS REVIEW AND ENSURE the following:

- System Engineer is informed of test results if completed Data Sheet shows calculated value is outside of upper or lower limits
- 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.
5.6 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.
Figure 1 — Signal Conditioner Remote Signal Generator Calibration Configuration

**SERIES 50LV3000**

(4 - 20 mA CURRENT OUTPUT, dc POWER)

**NOTE**

USE POWER SUPPLY ONLY AS NECESSARY

**REGULATED**

24 V dc

POWER SUPPLY

**MILLIAMMETER**

**CHASSIS**

**PRECISION FREQUENCY GENERATOR (ISOLATED)**

* 3 of FILM TYPE
  (POLYCARBONATE OR MYLAR)
  2 REQUIRED

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Figure 2 — Signal Conditioner Test Point and Switch Location