Brooks® Model 200 Electronic Signal Converter

Tank Farm Maintenance Procedure

EFFLUENT TREATMENT FACILITY

USQ Not Required – ETF is a <Hazard Category 3 Radiological Facility

<table>
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<tr>
<th>Rev-Mod</th>
<th>Release Date</th>
<th>Justification</th>
<th>Summary of Changes</th>
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<td>A-2</td>
<td>08/01/2017</td>
<td>Periodic Review</td>
<td>Inconsequential Change to Update Record Section.</td>
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<td>A-1</td>
<td>07/25/2016</td>
<td>Correct Use Type</td>
<td>Change from continuous use to reference use per document owner’s direction.</td>
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<td>A-0</td>
<td>09/03/2015</td>
<td>Converting to WRPS Format</td>
<td>New Procedure; Supersedes ETF-PRO-MN-51430 (EL18067)</td>
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1.0  PURPOSE AND SCOPE

1.1  Purpose

This procedure provides a safe, uniform method for calibration of Brooks® Model 200 Electronic Frequency-to-Current Signal Converter.

1.2  Scope

This procedure provides instructions for calibrating Brooks® Model 200 Electronic F/I Converter.

2.0  INFORMATION

2.1  Terms and Definitions

- F/I - Frequency-to-Current Signal.

2.2  General Information

2.2.1  Figure 1 depicts F/I converter electrical connections.

2.2.2  Figure 2 depicts F/I converter adjustment locations.

3.0  PRECAUTIONS AND LIMITATIONS

3.1  Radiation and Contamination Control

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

3.2  Environmental Compliance

3.2.1  In the event of a spill/leak/release, notify the SOM/FWS and respond per ETF-ERP-85B-003, Emergency Spill or Release at ETF.
4.0 PREREQUISITES

4.1 Special Tools, Equipment, and Supplies

NOTE - Measuring and Test Equipment 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
- Accuracy is equal to or greater than M&TE tolerance specified on PM/S data sheet or is at least four times greater than specified device tolerance.

The following supplies may be needed to perform this procedure:

- CMD
- Pulse/square wave generator.

4.2 Performance Documents

The following documents may be needed to perform this procedure:

- Manual is VI-1373-008-002, Rev. 0, Vendor Catalog X-200, Issue 2, Brooks® Instrument Instructions, Model 200, Electronic Signal Converter.
5.0 PROCEDURE

5.1 M&TE Setup

5.1.1 IF adjustments are needed, ACCESS instrument as follows:

5.1.1.1 REMOVE top plate of instrument.

5.1.1.2 LEVER levering top plate out with small screwdriver.

5.1.2 DISCONNECT 4 to 20 mA +lead terminal 29 of F/I converter.

5.1.3 CONNECT DCM in series with +lead and terminal 29.

5.1.4 DISCONNECT input signal leads from terminals 13 and 15.

5.1.5 CONNECT square wave generator output to input terminals 13+ and 15-.

5.2 F/I Converter As-Found

5.2.1 APPLY input values per data sheet AND

RECORD output values in as-found section of data sheet.

5.2.2 IF as-found values are within tolerance per data sheet and no adjustments are needed, RECORD as-found values in as-left column of data sheet AND

GO TO Section 5.6, Restoration.

5.2.3 IF as-found outputs are NOT within tolerance or adjustments are needed,

GO TO Section 5.3, F/I Converter Analog Zero and Span Output Adjustments,

OR

GO TO Section 5.4, Zero and Span Adjustments of F/I Converter with Digital Display.
5.3 F/I Converter Analog Zero and Span Output Adjustments

5.3.1 APPLY test input values equal to zero specified on data sheet.

5.3.2 ADJUST ZERO pot for 4 mA output.

5.3.3 APPLY test input values equal to maximum output specified on data sheet.

5.3.4 ADJUST SPAN pot for 20 mA output.

5.3.5 REPEAT Steps 5.3.1 through 5.3.4 until values are within tolerance per data sheet.

5.4 Zero and Span Adjustments of F/I Converter with Digital Display

5.4.1 APPLY minimum input per data sheet.

5.4.2 ADJUST display VR2 ZERO pot for a display equal to minimum value per data sheet.

5.4.3 APPLY maximum input per data sheet.

5.4.4 ADJUST display VR3 SPAN pot for a display equal to maximum value per data sheet.

5.4.5 REPEAT Steps 5.4.1 through 5.4.4 until as-left values are within tolerance per data sheet.

5.5 Final As-Left Output

5.5.1 APPLY input per data sheet AND RECORD output values in as-left section of data sheet.

5.5.2 RECORD control room readout on data sheet.
5.6 Restoration

5.6.1 DISCONNECT M&TE.

5.6.2 RECONNECT 4 to 20 mA (+) lead disconnected from frequency-to-current converter terminal 29, per Step 5.1.2.

5.6.3 RECONNECT input signal leads disconnected from terminals 13 and 15, per Step 5.1.4.

5.6.4 RESTORE to as-found conditions.

5.6.5 INFORM SOM test is complete and instrument/equipment/system may be returned to service.

5.7 Acceptance Criteria

Acceptance criteria has been met when steps in this procedure have been satisfactorily performed and results are recorded on the data sheet(s).

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.

5.9 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 - F/I Converter Electrical Connections
Figure 2 - F/I Converter Adjustment Locations

<table>
<thead>
<tr>
<th>S6</th>
<th>S5</th>
<th>S4</th>
<th>S3</th>
<th>S2</th>
<th>S1</th>
<th>RANGE (Hz)</th>
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<td>•</td>
<td>•</td>
<td>•</td>
<td>x</td>
<td>12.5 – 25</td>
</tr>
<tr>
<td>x</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>25 – 50</td>
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<tr>
<td>x</td>
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<td>•</td>
<td>•</td>
<td>•</td>
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<tr>
<td>x</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
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<table>
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<th>S5</th>
<th>S4</th>
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<td>x</td>
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SPAN | ZERO | INPUT | LOCAL INDICATOR

X UP = ON
O DOWN = OFF