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1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure provides instructions for calibrating the Foxboro E69 Series Current-to-Pneumatic Converter and Positioner.

1.2 Scope

This procedure involves calibrating the Foxboro E69 Series Current-to-Pneumatic Converter and Positioner, allowing for both cleaning and replacement.

2.0 INFORMATION

2.1 Terms and Definitions

- RIDS - Records Inventory and Disposition Schedule.

2.2 General Information-

2.2.1 This procedure may be performed either in the shop or in the field.

2.2.2 Convert psi to kPa as follows: 1.0 psi = 6.9 kPa

3.0 PRECAUTIONS AND LIMITATIONS

3.1 Personnel Safety

3.1.1 All identified hazards will be addressed in the pre-job safety meeting.

3.2 Radiation and Contamination Control

3.2.1 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 tools and equipment may be needed to perform this procedure:
- Transmation Flexi Tester 1080 or equivalent 0-20 mA current source and milliammeter or digital multimeter
- Druck Digital Pressure Indicator 0-30 psi or equivalent output pressure tester with 0-15 psi/0-100 kPa
- Adjustment screwdriver (common)
- Wrenches: \( \frac{5}{32}, \frac{3}{16}, \frac{1}{2}, \text{ and } \frac{4}{6} \)"
- Frog Hair Wires (cleaning wire)
- Water trap device (Figure 4)
- Other tools, equipment and supplies as identified by Shift Manager/OE/FWS/User.

4.2 Performance Documents

The following documents may be required during the performance of this procedure.
- Radiological survey plan
- Waste sampling checklist
- Pressure M&TE vendor manual.

4.3 Field Preparation

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

4.3.1 NOTIFY Shift Manager of the intent to perform this procedure.
4.3.2 ENSURE Operations has configured system to allow calibration.
4.3.3 WHERE potential for radiological contamination exists, PERFORM equipment survey prior to beginning maintenance or removal of any equipment or component from its installed location.
5.0 PROCEDURE

5.1 Perform Calibration

5.1.1 IF performing this procedure on a system that has the potential for free liquids or moisture to enter the Pressure M&TE, USE a water trap device.

5.1.1.1 ENSURE the Water Trap is installed in a vertical position to operate correctly. (Figure 4)

5.1.1.2 IF liquids or moisture gets into the Water Trap or Pressure M&TE REFER to Attachment 1.

5.1.2 IF performing this procedure on a system that is potentially contaminated, FOLLOW Calibration Instructions. (Attachment 2)

5.1.3 CONNECT test equipment (example shown Figure 1).

5.1.4 APPLY test inputs specified by the Data Sheet.

5.1.5 RECORD output values in As-Found section of the Data Sheet.

5.1.6 IF As-Found values are not within specified tolerance per Data Sheet, GO TO Step 5.1.7,

OR

IF As-Found values are within specified tolerance, but deemed marginal, and optimization is desired, GO TO Step 5.1.7,

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 5.2.

5.1.7 ENSURE air supply to unit is at least 20 psi.

5.1.8 IF in need of cleaning, CLEAN the following:

- Orifice
- Relay
- Flapper nozzle.
5.1 Perform Calibration (Cont.)

NOTE - For Steps 5.1.9 through 5.1.18, adjustments should be made as near as reasonably achievable to the specified output value listed on the Data Sheet.

5.1.9 APPLY 50% input signal per Data Sheet AND ADJUST ZERO screw (Figure 2) to bring flapper to horizontal position (at 90° to edge of top plate, as shown in Figure 3).

5.1.10 LOOSEN nuts (1/16) for Span and Nozzle (3/32) adjustments.

5.1.11 TURN 3/16 inch span-adjustment nuts to position nozzle to center of flapper arm (as shown in Figure 3).
5.1 Perform Calibration (Cont.)

5.1.12 MOVE ½ inch nozzle-adjustment nuts to obtain 50% output per Data Sheet.

5.1.13 SECURELY LOCK span-adjustment and nozzle-adjustment nuts.

NOTE - Nozzle should now be at 90° to flapper.

5.1.14 IF nozzle is not at 90° to flapper, TRIM slightly with ZERO screw AND

REPEAT Steps 5.1.10 thru 5.1.13 until nozzle is at 90° to flapper.

5.1.14.1 IF unable to set nozzle at 90° to flapper, NOTIFY FWS for resolution.

5.1.15 SET input to 0% per Data Sheet AND

ADJUST ZERO screw for 0% output per Data Sheet.

5.1.16 MOMENTARILY TURN power OFF AND

TURN power back ON.

NOTE - When power is returned, output should respond crisply.

5.1.17 IF output does NOT respond crisply, PERFORM the following:

5.1.17.1 APPLY 50% input signal per Data Sheet AND

ADJUST ZERO screw to bring flapper to horizontal position (at 90° to edge of top plate, as shown in Figure 3).

5.1.17.2 SET input to 0% per Data Sheet AND

ADJUST ZERO screw for 0% output per Data Sheet.

5.1.17.3 MOMENTARILY TURN power OFF AND

TURN power back ON.

5.1.18 CHANGE input to 100% per Data Sheet AND

CHECK for 100% output per Data Sheet.
5.1 Perform Calibration (Cont.)

5.1.19 IF not within tolerance per Data Sheet, **PERFORM** the following:

**NOTE** - If 100% output per Data Sheet cannot be obtained, the supply relay
needs to be adjusted or replaced.

5.1.19.1 **LOOSEN** ½ inch bottom nut which locks bellows in place
(see Figure 3).

5.1.19.2 **ROTATE** bellows, observing line running along length of
bellows.

5.1.19.3 **MOVE** line toward motor (left) to decrease span, or toward
feedback assembly frame (right) to increase span.

5.1.19.4 IF Span is not within tolerance specified on Data Sheet, **GO TO**
Step 5.1.9.

5.1.20 IF within tolerance per Data Sheet, **MOVE** the Span-adjustment nuts so
output is 100% per Data Sheet.

5.1.21 **APPLY** test inputs specified by the Data Sheet **AND**

**RECORD** output values in As-Left section of the Data Sheet.
5.2 Restoration

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

5.2.2 IF parts are needed for replacement, INFORM FWS AND OBTAIN new part(s).

5.2.3 ENSURE all test equipment has been disconnected and removed.

5.2.4 ENSURE Test Equipment information and calibration status are recorded on Data Sheet.

5.2.5 ENSURE equipment system restoration by observing that 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.
Attachment 1 – Water Trap/Pressure M&TE

**Water Trap with Potentially Contaminated Liquid**

1. If potentially contaminated liquid gets into Water Trap, Suspend the work.
2. Notify the FWS.
3. When provided approval from the FWS proceed as follows.
4. Remove Pressure M&TE from field.
5. Return to a RMA.
6. Disassemble the Water Trap.
7. Allow trap to dry overnight.
8. Survey disassembled trap components in accordance with Radcon survey plan.
9. If the Water Trap can be released, return it to tool crib.
10. If the Water Trap cannot be released, dispose of it per waste planning checklist.

**Water Trap with Clean Liquid (NOT Contaminated)**

1. If clean liquid gets into Water Trap, disassemble the Water Trap.
2. Allow Water Trap to dry overnight.
3. Re-assemble the Water Trap.
4. Return the Water Trap to the tool crib.
Attachment 1 – Water Trap/Pressure M&TE (Cont.)

**M&TE with Potentially Contaminated Liquid**

1. If potentially contaminated liquid gets past water trap and inside Pressure M&TE, Suspend the work.
2. Notify FWS.
3. Wait for further directions.

**M&TE with Clean Liquid (NOT Contaminated)**

1. If clean liquid gets past the water trap disassemble and dry out Pressure M&TE per manufactures direction.
2. Return the M&TE to the tool crib.
3. Request the M&TE to be returned to NIST calibration lab for recalibration.
Figure 1 - Equipment Setup

- DMM
- TEST INPUT
- CURRENT SOURCE
- 4 - 20 mAdc
- INPUT
- PRESSURE OUTPUT
- CONNECTION BOX
- TEST GAUGE (M&TE)
- 20 PSIG SUPPLY

FOXBORO E69 SERIES

- I/P
Figure 2 - Adjustment Locations

- Span Adjustment Nuts
- Nozzle Adjustment Nuts
- Flapper
- Nozzle
- Supply Relay
- Zero Screw
Figure 3 - Span Adjustment and Realignment

- **INCREASE**
- **DECREASE**

- SPAN NUT
- ARM BRACKET
- SPAN ADJUSTMENT NUT
- FLAPPER
- ARM
- NOZZLE
- SPAN BRACKET
- REFERENCE LINE

90°
1. Gas/Air enters through the top slot which goes into the chamber.
2. Dirt and Moisture particles are collected in the chamber, which is visible through the clear transparent glass window.
3. Then Gas/Dry Air goes into the centre slot where it enters the instrument.
Figure 5 – Negative Pressure Connection
Figure 6 – Positive Pressure Connection
Attachment 2 - Calibration Instruction

Positive pressure calibrations:

Note: Vent Valve assembly is required on all positive pressure calibrations to ensure MT&E is not contaminated by venting potential process air back through MT&E.
Install vent valve assembly Per Figure 6
Ensure IV is open and VV is closed
Proceed with calibration per work package
  ✓ Whenever venting is required during calibration steps, vent stored pressure as follows.

NOTE- Valve IV can remain open when reading is required via M&TE.

Ensure IV valve is closed
Ensure VV valve is opened
Repeat sequence as necessary to complete the calibration.
After all steps are completed for the calibration, perform RCT survey release plan XXX

Negative pressure calibrations:

Note: use of surrogate filter is required for negative pressure calibrations to ensure MT&E is not contaminated by pulling process air into MT&E while drawing Vacuum.
Negative calibrations should be performed as follows.
Ensure surrogate filter holder has media installed.
Connect filter in-line per Figure 5
Ensure IV is open
Pull a representative vacuum into MT&E through filter
Ensure IV is closed
Vent through VV
RCT to perform survey of the media.
IF no contamination found remove surrogate filter holder/manifold and proceed with calibration.