# Automax Model 4000 Electro-Pneumatic Valve Positioner

**Tank Farm Maintenance Procedure**

**Effluent Treatment Facility**

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

## Change History (≤ Last 5 Rev-Mods)

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<td>A-4</td>
<td>08/06/2018</td>
<td>Radcon Requirement</td>
<td>Added Radiation and Contamination Control, Added new Figure(s), Added Attachment.</td>
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<td>A-3</td>
<td>04/25/2018</td>
<td>Periodic Review</td>
<td>Added “HPT” to Attachment 1 and corrected references to figures.</td>
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<td>A-2</td>
<td>08/14/2017</td>
<td>WRPS-PER-2016-2301.1</td>
<td>Added Water Trap Device to special tools, updated performance documents, added steps for potential free liquids, added Attachment 1 and Figure 2.</td>
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<td>07/21/2016</td>
<td>Correct Use Type</td>
<td>Change from continuous use to reference use per document owner’s direction.</td>
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<tr>
<td>A-0</td>
<td>10/20/2015</td>
<td>Converting to WRPS Format</td>
<td>New procedure – Supersedes ETF-PRO-MN-51424 (EL18059)</td>
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1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure provides a safe, uniform method for calibration of Automax Model 4000 Electro-Pneumatic Valve Positioner.

1.2 Scope

This procedure provides instructions for calibrating the Automax Model 4000 Electro-Pneumatic Valve Positioner.

2.0 INFORMATION

2.1 Terms and Definitions

- I/P - Current to Pressure.

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.

3.1.2 The opening of any system or component within a Radiological Area requires presence of a Health Physics Technician to verify contamination control.

3.1.3 When disconnecting, breaching, or opening systems or system components that are currently or previously connected to waste tanks or waste transfer systems:

- Follow the RWP for radiological control requirements
- Pre-job and post-job surveys are required
- Follow Calibration Instructions (Attachment 2)

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:

- Calibrated pressure sources capable of producing 60 psi (bench calibration only)
- Calibrated current source capable of producing 0 to 30 mAdc
- Water trap device (Figure 2).

4.2 Performance Documents

The following documents may be needed during the performance of this procedure:

- Manufacturer’s information sheet B-00014a2 GU ACCORD Model 1000 Pneumatic Positioner, vendor information number V-135A-007-223 Rev 1, Incorporated with Section III Centerline Series 33000 - 38000 Data.
- Manufacturers information sheet B-00017, AUTOMAX Model H-4000 I/P Converter
- Radiological survey plan
- Waste planning checklist
- Pressure M&TE vendor manual.
5.0 PROCEDURE

5.1 Setup and Calibration Check

NOTE - Figure 1 provides a schematic to assist in 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 2).

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

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

5.1.2 REMOVE cover from I/P converter.

NOTE - Signal input connection can be made at either the circuit board terminals or at any point on the input line from the local control unit to the positioner.

5.1.3 CONNECT 4 to 20 mAdc source to signal input.

5.1.4 IF performing bench calibration, CONNECT 60 psi supply to “SUPPLY” connection.

5.1.5 VARY input per PM/S data sheet AND RECORD as-found values on data sheet.

5.1.6 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 Section 5.4.
5.2 Calibration

5.2.1 APPLY 4 mA dc input signal.

5.2.2 ADJUST thumbscrew until valve goes into position specified on PM/S data sheet.

5.2.3 SLOWLY INCREASE input signal to 20 mA dc.

NOTE - Adjuster cup should be loose upon completion of the following step.

5.2.4 LOOSEN top screw of spring clamp.

5.2.5 ENSURE bottom screw of spring clamp is secure.

5.2.6 ADJUST spring until valve positions per PM/S data sheet.

5.2.7 REPEAT steps 5.2.1 through 5.2.6 until no further adjustments are required.

5.2.8 IF positioner will not adjust into tolerance, CONTACT FWS AND IF directed by FWS, PERFORM Section 5.3, I/P Converter Calibration.

5.2.9 TIGHTEN top screw of spring clamp.

5.2.10 VARY signal input per PM/S data sheet AND RECORD as-left values on data sheet.
5.3 I/P Converter Calibration

NOTE - I/P converter calibration will normally not be needed. Performance of Section 5.3 is optional and should only be performed when directed by FWS.

5.3.1 APPLY 0.0 mAdc signal input.

5.3.2 IF I/P output gauge reads 2.7 to 3 psi, GO TO Step 5.3.4.

NOTE - Clockwise increases signal and counter clockwise decreases signal.

5.3.3 SLOWLY ADJUST bias adjustment until 2.7 to 3.0 psi is indicated on I/P output gauge.

5.3.4 APPLY 4 mAdc input signal.

5.3.5 ADJUST zero potentiometer for 3 psi output.

5.3.6 SLOWLY INCREASE input signal to 20 mAdc.

5.3.7 ADJUST span potentiometer for 15 psi output.

5.3.8 REPEAT Steps 5.3.4 through 5.3.7 until no further adjustments are required.

5.3.9 INCREASE input signal to 25 mAdc.

5.3.10 IF I/P output gauge reads 17 to 20 psi, GO TO Section 5.2, Calibration.

5.3.11 ADJUST regulator to 20 psi.

5.3.12 RETURN TO Section 5.2 AND PERFORM the entire section.

5.4 Restoration

5.4.1 RESTORE to as-found conditions.

5.4.2 ENSURE alarms are reset or cleared.

5.4.3 INFORM SOM test is complete and instrument/equipment/system may be returned to service.
5.5 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).

5.6 Review

5.6.1 INFORM FWS test is complete.

5.6.2 (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.

5.7 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 and HPT.
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 and HPT.
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.
Positive pressure calibrations:

Note: Vent Valve assembly is required on all positive pressure calibrations to ensure M&TE is not contaminated by venting potential process air back through M&TE.
Install vent valve assembly Per Figure 4
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 M&TE is not contaminated by pulling process air into M&TE while drawing Vacuum.
Negative calibrations should be performed as follows.
Ensure surrogate filter holder has media installed.
Connect filter in-line per Figure 3.
Ensure IV is open.
Pull a representative vacuum into M&TE 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.
Figure 1 - Adjustment Locations

Model H-4000 I/P Converter

Model 1000 Positioner
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 3 – Negative Pressure Connection
Figure 4 – Positive Pressure Connection