Sponsler Model AN40-MA Rate Indicator With Analog Output

Tank Farm Maintenance Procedure

Effluent Treatment Facility

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

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1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure provides a safe, uniform method for calibration of Sponsler Model AN40-MA rate indicator with analog output.

1.2 Scope

This procedure applies to calibrating the Sponsler Model AN40-MA rate indicator with analog output.

2.0 INFORMATION

2.1 Terms and Definitions

- GPM – Gallons Per Minute.

2.2 General Information

2.2.1 The SP712-2 is a remote-mounted indicating transmitter, which converts frequency signals from a turbine flow meter to flow proportional 4 to 20 mA output, and provides local indication using a 3-1/2 or 4-1/2 digit LCD display. Full-scale frequency range of 75 Hz to 10 KHz is selected via jumpers JU1, JU2, and JU3. Sensitivity adjustment sets input cut-off threshold for processing as a valid signal so instrument can discriminate between “noise” and signal. Zero adjusts for 4 mA out with no frequency input. Span adjustment establishes frequency at which 20 mA output is achieved. Offset zeroes the display at 4 mA. Display sets the displayed rate equivalent to analog output.

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-ESH-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 Materials

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:
- Two CMDs.

4.2 Performance Documents

The following documents may be needed to perform this procedure:
5.0 PROCEDURE

Special Instructions:

Figure 1 and Figure 2 are to be referenced to perform procedure.

Steps referring to frequency generator imply connection of external monitoring equipment (i.e., frequency generator).

5.1 Initial Setup and Calibration Check

5.1.1 CONNECT CMD 1 (mADC) in series with terminal J1-7 (-).

5.1.2 CONNECT frequency generator to terminals J1-1 (+) and J1-2 (-).

5.1.3 SET frequency generator controls as follows:

5.1.3.1 SET output signal to “Sinewave.”

5.1.3.2 SET amplitude to “Zero.”

Special Instructions

JU1 should only require changing on initial installation.

5.1.4 IF initial installation, CONFIRM JU1 set for proper frequency range per PM/S data sheet (Figure 2).

5.1.5 DETERMINE as-found sensitivity adjustment as follows:

5.1.5.1 SET frequency to mid-point (50%) input per PM/S data sheet.

5.1.5.2 SET frequency generator amplitude to “Zero.”

NOTE - Display at this time may be out-of-tolerance, depending on calibration status of AN40. The purpose is to determine point where unit is “seeing” input signal versus “noise.” Display should be steady and close to mid-point.

5.1.5.3 SLOWLY INCREASE frequency generator amplitude until AN40 just displays proper output.

5.1.5.4 RECORD as-found sensitivity (generator output amplitude) on PM/S data sheet.

5.1.6 INCREASE frequency generator amplitude until instrument is stable.
5.1 Initial Setup and Calibration Check (Cont.)

5.1.7 VARY (frequency) input per PM/S data sheet AND

RECORD the following:

- As-found current output (CMD 1)
- Display values
- Control Room readings.

5.1.8 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 tolerance per PM/S data sheet and need no adjustments, RECORD as-found values in as-left column AND

GO TO Section 5.4.
5.2 Calibration

5.2.1  CONNECT CMD 2 (VDC) to terminals J1-3 (+) and J1-5 (-).

5.2.2  ADJUST SENS full CW.

5.2.3  SET frequency to high (100%) input per PM/S data sheet.

5.2.4  SET frequency generator amplitude to “Zero.”

5.2.5  ADJUST AN40 ZERO for minimum output (CMD 1) per PM/S data sheet.

5.2.6  CONFIRM CMD 2 indicates 5.00 (4.80 to 5.20) VDC.

5.2.7  DISCONNECT CMD 2 (+) lead from J1-3 AND RE-CONNECT to J1-6.

5.2.8  ADJUST R5 (display) fully CW.

5.2.9  CONFIRM CMD 2 indicates approximately 0.508 VDC.

5.2.10 SET frequency generator amplitude to 20 mV.

5.2.11 ADJUST AN40 SPAN for maximum output (CMD 1) per PM/S data sheet.

5.2.12 CONFIRM CMD 2 indicates approximately 2.540 VDC.

5.2.13 REPEAT Steps 5.2.4 through 5.2.12 until both values are within tolerance per PM/S data sheet.

5.2.14 SET frequency generator amplitude to “Zero.”

5.2.15 ADJUST OFFSET (R-18) for display indication of 000.

5.2.16 SET frequency generator amplitude to 20 mV.

5.2.17 ADJUST DISPLAY for desired maximum indication per PM/S data sheet.

5.2.18 REPEAT Steps 5.2.14 through 5.2.17 until both values are within tolerance per PM/S data sheet.

5.2.19 VARY (frequency) input per PM/S data sheet AND RECORD as-left current output (CMD 1) and display values (gpm).
5.3  Sensitivity Adjustment

5.3.1  ADJUST SENS full CCW.

5.3.2  SET frequency to mid-point (50%) input per PM/S data sheet.

5.3.3  SET frequency generator amplitude to PM/S data sheet value if specified, OTHERWISE

SET amplitude to as-found value from Step 5.1.5.4.

5.3.4  SLOWLY ADJUST SENS CW until CMD 1 indicates proper output.

5.3.5  RECORD as-left sensitivity (generator output amplitude) on PM/S data sheet.
5.4 Restoration

5.4.1 RESTORE to as-found conditions.

5.4.2 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.
Figure 1 - Front Panel
Figure 2 - Panel Adjustments

- JU-1 1675-10,000 Hz
- JU-2 300-1726 Hz
- JU-3 75-325 Hz

POTS MOUNTED ON TRACHT SIDE OF CIRCUIT BOARD

1 2 3 4 5 6 7 8 9 10
SIGNAL SIGNAL DISPLAY 5V DISPLAY DISPLAY VOLTS ANALOG OUT ANALOG OUT 110VAC HOT (DC+) 110VAC NEUT (DC-)

Type: REFERENCE
Document No.: ETF-EL18081
Rev/Mod: A-2
Release Date: 10/09/2018
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