Calibrate Red Lion Model CUB5P Process Meter

Tank Farm Maintenance Procedure

USQ # Routine Maintenance

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This is a new revision. The First Time Use process as defined in TFC-OPS-OPER-C-13 can be used during the initial performance of this revision.

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1.0 PURPOSE AND SCOPE

1.1 Purpose
This procedure provides instructions to calibrate Red Lion CUB5B 5-digit process meter.

1.2 Scope
This procedure involves calibration of Red Lion CUB5B 5-digit process meter.

2.0 INFORMATION
NONE

3.0 PRECAUTIONS AND LIMITATIONS

3.1 Personnel Safety

3.1.1 All safety related hazards and their controls will be identified on a General Hazard Analysis (Site Form A-6005-827) and/or a site specific Job Hazard Analysis (Site Form A-6004-101) based on site specific hazards.

3.1.2 Failure to use protective equipment when working on or near energized systems could result in serious injury. Job specific protective equipment requirements should be addressed during the pre-job brief and be in accordance with TFC-ESHQ-S_IS-C-02.

3.1.3 Compliance with DOE–0359, Hanford Site Electrical Safety Program is required when working with this procedure.

3.1.4 If a lock and tag is required during the performance of this procedure, comply with the DOE-0336, Hanford Site Lockout/Tagout Procedure.

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.

3.3 Environmental Protection
The Central Shift Office must be notified in the event of a leak or a spill in accordance with TFC-ESHQ-ENV_FS-C-01, Environmental Notification.
4.0 PREREQUISITES

4.1 Special Tools, Equipment, and Supplies

The following supplies may be needed to perform this procedure:
- Calibrated DC current source (accuracy of 0.01% or greater)
- Calibrated Digital Multimeter
- Other tools, equipment and supplies as identified by Shift Manager/OE/FWS/User.

4.2 Performance Documents

The following documents may be needed to perform this procedure:
- DOE-0336, Hanford Site Lockout/Tagout Procedure
- DOE–0359, Hanford Site Electrical Safety Program
- Red Lion CUB5P manual, CUB5P-G.

4.3 Field Preparation

4.3.1 REQUEST Operations to configure system to allow performance of this procedure.

4.3.2 IF removing instrument to shop, ENSURE lockout/tagout and overlocking requirements have been satisfied per DOE-0336, Hanford Site Lockout/Tagout Procedure.
5.0 **PROCEDURE**

5.1 **Obtain As-Found Values for Red Lion CUB5P**

NOTE - Figure 1, Figure 2, and Figure 3 are referenced as visual aids.

5.1.1 **DISCONNECT** input leads per Data Sheet(s).

5.1.2 **CONNECT** calibrated test equipment to input of indicator per Data Sheet.

5.1.3 **ALLOW** a warm-up period prior to taking readings and/or calibrating instrument.

5.1.4 **APPLY** input values per Data Sheet AND **RECORD** the following As-Found readings on Data Sheet.

- Output values per Data Sheet
- If listed, alarm/interlock/setpoint(s) per Data Sheet.

5.1.5 **IF** As-Found values are not within specified tolerance per Data Sheet, **GO TO** Step 5.2.1

**OR**

**IF** As-Found values are within specified tolerance, but deemed marginal, and optimization is desired, **GO TO** Step 5.2.1, **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 Calibrate Red Lion CUB5P

5.2.1 CONNECT the negative lead of a precision DC source (with an accuracy of 0.01% or better) to the COMM.

5.2.1.1 LEAVE the positive lead of the DC source unconnected.

5.2.2 WITH the display at CodE 111, PRESS AND HOLD the “SEL” button for 2 seconds and the display will read CAL NO.

5.2.3 PRESS the “RST” button to select the range to be calibrated.

5.2.4 PRESS the “SEL” button and the display will read “0.0A”.

5.2.5 APPLY zero (0) signal as follows:

5.2.5.1 IF using Current, LEAVE the positive lead of the DC source unconnected.

5.2.5.2 IF using Voltage, APPLY a short to the input

OR

CONNECT the positive lead of the DC source to “INP+” AND SET the source to zero (0).

5.2.5.3 PRESS “SEL” and the display reads CALC for approximately 8 seconds.

5.2.6 WHEN the display reads the selected range, (10V, 20mA or 50mA) CONNECT the positive lead of the DC current source “INP+” AND APPLY the full-scale input signal for the range.

5.2.6.1 PRESS “SEL” and the display reads CALC for approximately 8 seconds.

5.2.7 WHEN the display reads “CAL NO”, PRESS the “SEL” button to exit calibration.
5.2 Calibrate Red Lion CUB5P (Cont.)

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

GO TO Restoration, Section 5.3.

OR

IF As-Found values are within specified tolerance and additional Red lion CUB5P units need to be calibrated, RE-PERFORM Section 5.1 to obtain As-Found values for the next Red lion CUB5P unit.

OR

IF values are not within tolerance per Data Sheet, REPEAT Steps 5.2.1 through 5.2.7,

OR

IF unable to bring values into tolerance NOTIFY FWS for resolution.

5.3 Restoration

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

5.3.2 IF not already removed; DISCONNECT AND REMOVE Test Equipment.

5.3.3 RE-LAND lifted leads AND

RESTORE equipment to original configuration.

5.3.4 IF lock and tag was installed, REMOVE per DOE-0336, Hanford Site Lockout/Tagout Procedure.

5.3.5 RECORD the Test Equipment information and calibration status on Data Sheet.

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

5.3.7 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 Operations management and FWS the test is complete.

5.5.2 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.

5.6 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.
Calibrate Red Lion Model CUB5P Process Meter

Figure 1 – Red Lion Model CUB5P Display Image

Red Lion CUB5P Process Meter
4.3 INPUT WIRING

**CAUTION:** Power input common is NOT isolated from user and input commons. In order to preserve the safety of the meter application, the power input common must be suitably isolated from hazardous live earth referenced voltage, or input common must be at protective earth ground potential. If not, hazardous voltage may be present at the signal or user inputs and input common terminals. Appropriate considerations must then be given to the potential of the user and input commons with respect to earth ground, and the common of the plug-in cards with respect to input common.

Before connecting signal wires, the Input Range Jumper should be verified for proper position.

**Input Signal (self powered)**

- **JUMPER POSITION**
  - 10 VDC
  - 20/50 mA DC
  - 30 VDC
  - 150 mA

**Series Loop (must use separate supply for sensor power and each CUB5)**

**2 Wire With External Power**

- **EXTERNAL POWER**
  - +VDC

**2 Wire With MLPS Power**

- **EXTERNAL POWER**
  - +VDC

**2 Wire With Separate Sensor And CUB5 Power**

- **EXTERNAL POWER**
  - +VDC
Figure 3 — CUB5P Programming Quick Overview Menu

Press and hold SEL button to enter Programming Mode.

- Menu:
  - I-IMP: Input Range
  - dECFl: Display Decimal Point
  - dFSET: Display Offset Value
  - FIltr: Filter Setting
  - Filt: Filter Band
  - SLYLE: Scaling Style
  - IMP 1: Input Value for Scaling Point 1
  - dSP 1: Display Value for Scaling Point 1
  - IMP 2: Input Value for Scaling Point 2
  - dSP 2: Display Value for Scaling Point 2
  - USr In: User Input Function
  - USr A: User Input Assignment

- Menu:
  - 2-SEL: Max Display Enable
  - HI: Max Capture Delay Time
  - LO: Min Display Enable
  - LD: Min Capture Delay Time
  - FCS: Factory Service Operations
  - CodE: Code

- Menu:
  - 3-dSP: Display Update Time
  - SEL: Front Panel Display Select Enable
  - rSt: Front Panel Reset Enable
  - 2En: Zero Display with Display Reset
  - Scrl: Display Scroll Enable
  - UNITS: Units Indicator Salutation
  - dCOLe: Display Color
  - d-LEV: Display Intensity Level

- Menu:
  - 4-SP: Setpoint Select
  - Pt: Setpoint Action
  - SPE: Satpoint Value
  - Hysteresis Value
  - On Time Delay
  - Off Time Delay
  - Output Reset Action
  - Output Reset with Display Reset
  - Standby Operation
  - Change Display Color with Output State

- Menu:
  - 5-SE: Baud Rate
  - Add: Data Bit
  - Par: Parity Bit
  - Addr: Meter Address
  - Abbr: Abbreviated Printing
  - OPl: Print Options

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