APPENDIX E-8

CMS/CEMS Calibration and Maintenance Procedures

TABLE 2
Trane 1 and Trane 2 Incinerators Maintenance Program
API Industries, Inc.
Guayama, Puerto Rico

System	Maintenance Description	Program	Frequency
SYSTEM MAINTENANCE	Check and clean all strainers and filters in the piping system.	5	
	Inspect all piping, flange connections, and flexible connections for leaks and tighten or replace gaskets if necessary.	1	3
	Check all quench water piping for erosion or plugging and clean if required.	4	6 Months
	Inspect the vent stack for solids build-up and erosion. Flush if required.	4	6 Months
	Inspect structural, piping and pipe supports for any deterioration due to corrosion.	4	6 Months
	Inspect, check and calibrate all instrumentation to ensure proper function and control. This includes checking proper valve operation of safety and control valves.	2	4 Months
VENTURI MAINTENANCE	Check the spray nozzle for solids build-up and proper flow.	4	6 Months
	Check for leaks at the venturi throat seal.	1	3 Months
	Check for proper operation of adjustable venturi throat.		
COMBUSTION AIR BLOWER	Check the blower motor and bearings for unusual vibration noise or heat.	1	4 Months
	Inspect the blower impeller and blades for erosion solids build-up or corrosion. Check for condensate build-up and the drain plug.	4	6 Months
	Inspect the filter for clogging, debris and blockage.	4	6 Months
	Check the operation of the silencer.	4	6 Months
VENTURY RECIRCULATION WATER PUMPS	Check pump and motor bearings for unusual noise or heat.	1	4 Months
	Inspect gasketing at suction and discharge for leaks.	1	4 Months
	Check shaft alignment and levelness of the base plate.	1	4 Months
	Check for water flush to the mechanical seal and adjust if necessary.	1	4 Months
QUENCH RECIRCULATION WATER PUMPS	Check the bearing lubrication to ensure the proper amount of oil is present.	1	4 Months
	Check pump and motor bearings for unusual noise or heat.	1	4 Months
	Inspect gasketing at suction and discharge for leaks.	1	4 Months
	Check shaft alignment and levelness of the base plate.	1	4 Months
	Check for water flush to the mechanical seal and adjust if necessary.	1	4 Months
KEROSENE PUMPS	Check the motor bearings for unusual noise or heat.	1	4 Months
	Check shaft alignment and levelness of the base plate.	1	4 Months
	Check the mechanical seal for proper flushing.	1	4 Months
QUENCH TANK, IMMERSION TUBE AND EXPANSION JOINT	Check all flanged connections for leaks.	4	6 Months
	Check expansion joint for cracks and wear.	4	6 Months
	Inspect immersion tube for solids build-up and pieces of refractory. Check the gas discharge holes and the quench water inlet weir for erosion or blockage.	4	6 Months
	Inspect quench tank and immersion tube internals for corrosion.	4	6 Months
INCINERATOR AND REFRACTORY	Check all flanged connections for leaks.	4	6 Months
	Check for hot spots on incinerator	4	6 Months
	Inspect refractory for erosion and wear and make proper repairs.	4	6 Months
	Check proper location and condition of temperature probes.	4	6 Months

TABLE 2
Trane 1 and Trane 2 Incinerators Maintenance Program
API Industries, Inc.
Guayama, Puerto Rico

System	Maintenance Description	Program	Frequency
BURNER	Check proper burner flame pattern.	5	
	Check proper connections and condition of electrodes.	1	4 Months
	Replace flame scanner cells.	5	
	Clean and recalibrate all gauges and metering devices.	1	4 Months
NOZZLES AND VANE GUIDE	Check connections to nozzle holder for leaks.	3	Daily
	Inspect nozzle condition (i.e. erosion) and nozzle orientation.	4	6 Months
	Check vane guide for erosion and corrosion.	4	6 Months
WESP	Upper Frame Wash (Using spray headers in top of WESP). The T/R set and controller should be deenergized before washing.	1	Monthly
	Visual inspection of support insulators. Check for corrosion, cracking, moisture.	4	6 Months
	Visual inspection of spray headers. Check for corrosion, nozzle plugging	1	Monthly
	Visual inspection of collector tubes. Check for pollutant buildup, corrosion, electrode alignment, foreing matter.	1	6 Months
	No load electrical testing (i.e. Air test with no process load). Check readings against initial startup air test and log electrical readings.	1	Monthly
	Check dielectric of insulating Oil in T/R set	4	6 Months
	Check level of insulating Oil in T/R set	1	Monthly
WESP PURGE AIR BLOWER	Check the blower motor and bearings for unusual vibration noise or heat.	1	Monthly
	Inspect the blower impellor and blades for erosion solids build-up or corrosion. Check for condensate build-up and the drain plug.	4	6 Months
	Inspect the filter for clogging, debris and blockage.	4	6 Months
WESP RECIRCULATION WATER PUMP	Check the bearing lubrication to ensure the proper amount of oil is present.	4	6 Months
	Check pump and motor bearings for unusual noise or heat.	4	6 Months
	Inspect gasketing at suction and discharge for leaks.	3	Daily
	Check shaft alignment and levelness of the base plate.	1	4 Months
	Check for water flush to the mechanical seal and adjust if necessary.	1	4 Months

PROGRAMS

1 Critical equipment maintenance program
2 Control monitoring systems and valves maintenance program
3 Daily inspections
4 Semi-annual shut downs
5 Corrective Maintenance

ChemSource

Procedimiento Normalizado de Trabajo

Page 1 of 6	FU-003-02	Pressure Devices Verification/Calibration

Distribución	Area de Trabajo	Código	Localización (Manual SOPs por Area)	Total de Copias
[ ]	Almacén	WH		
[ ]	Ambiental	EE		
[x]	Asuntos Regulatorios	RA	SM – 01	1
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[ ]	Control de Calidad	QC		
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[ ]	Garantía de Calidad	QA		
[x]	Guayama 1	G1	SM – 01	1
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[ ]	Sistemas de Información	IS		
[ ]	Validaciones	VA		

Supersedes: FU-003-01	Prepared by : [signature] Date : 12-17-02
Effective Date: 01-07-03	Reviewed by : Pedro David Date : 12/18/02

Approval: Diane Vega

e@ F:\SOPs\FU-003-2

Date: 12-19-02

ChemSource

Procedimiento Normalizado de Trabajo

1. OBJECTIVE

1.1 To describe the procedure to be followed in order to verify or calibrate pressure devices at ChemSource Corporation facilities in Guayama, PR.

2. SCOPE

2.1 The succesful execution of this procedure will certify that the devices are within certified tolerances and meet ChemSource quality standards.

3. RESPONSABILITIES

3.1 The facilities personnel is responsible to follow this procedure when the execution of the verification and/or calibration of the device will be performed.

3.2 The facilities Supervisor is responsible for preparing and revising this procedure.

4. DEFINITIONS

4.1 Calibration Work Order (CWO): It is a form that will be automatically generated in specific frecuency for any instrument or equipment for verification/ calibration (See form FU-001F1, current revision).

5. REFERENCES

5.1 Instruments Manufacturer's Manuals

6. PROCEDURE

6.1 Pressure to Current Transmitter (P/I)

6.1.1 After notifying operator and switching instrument to manual control, disconnet signal input from other parts of the loop and connect instead the certified signal simulator which is required.

6.1.2 Apply signal equivalent to low end of range or 0%; this will usually be 3 psig for pneumatic instruments and 4 mA for electronic instruments. Record the data in the CWO.

6.1.3 Apply signal equivalent to high end of range or 100%; this will usually be 15 psig for pneumatic instruments and 20 mA for electronic instruments. Record the data in the CWO.

6.1.4 Apply signal near to mid of range or 50%; this will usually be 9 psig for pneumatic instruments and 12 mA for electronic instruments. Record the data in the CWO.

6.1.5 Verify if the tolerance are within the specified tolerance in the CWO.

6.1.6 If adjusment is necessary repeat the step 6.1.2 for the zero adjustment of the device.

6.1.7 Repeat the step 6.1.3 for the span adjustment of the device.

6.1.8 Repeat steps 6.1.4.

6.1.9 Repeat steps 6.1.6 through 6.1.7 until proper indications.

6.1.10 Complete the CWO with all the necessary information.

6.1.11 Fill the appropiate label and attach to the instrument.

6.1.12 Reconnect all process signal and notify operator on completion of work.

6.2 Vacuum Pressure Devices

6.2.1 Disconnect instruments from process source.

6.2.2 Read the zero of the instrument without applying any pressure or vaccum. Record the data in the CWO.

NOTE: For best result read the device before connect with the certified standard equipment.

6.2.3 Connect the device in parallel with a certified vacuum standard equipment. Provide bleed valve for control.

NOTE: Provide instrument with operating energy, such as 24 VDC for electronic devices and 20 psi for neumatic devices.

6.2.4 Activate the vacuum and adjust bleed valve to obtain 50% of process value, according to instrument range. Record the data in the CWO.

6.2.5 Activate the vacuum and adjust bleed valve to obtain 100% of process value, according to instrument range. Record the data in the CWO.

6.2.6 Verify if the tolerance are within the specified tolerance in the CWO.

6.2.7 If adjusment is necessary repeat the step 6.2.5 for the span adjustment of the device.

6.2.8 Repeat step 6.2.2 for the zero adjusment of the device.

6.2.9 Repeat the step 6.2.4

6.2.10 Repeat steps 6.2.6 through 6.2.9 until all readings match precisely.

6.2.11 Complete the CWO with all the necessary information.

6.2.12 Fill the appropiate label and attach to the instrument.

6.2.13 Reconnect all process signal and notify operator on completion of work.

6.3 Pressure Indicators/Recorders

6.3.1 Apply the pressure equivalent to process 0%, 50% and 100% values. Record the data in the CWO.

6.3.2 Verify if the tolerance are within the specified tolerance in the CWO.

6.3.3 If adjusment is necessary repeat the step 6.3.1 for the 0% value and adjust the device as necessary.

6.3.4 Repeat the step 6.3.1 for the 100% value and adjust the device as necessary.

6.3.5 Repeat the step 6.3.1 for the 50% value and adjust the device as necessary.

6.3.6 Repeat steps 6.3.2 through 6.3.5 until all readings match precisely.

6.3.7 Complete the CWO with all the necessary information.

6.3.8 Fill the appropriate label and attach to the instrument.

6.3.9 Reconnect all process signal and notify operator on completion of work.

6.4 Pressure Transmitters Devices

6.4.1 Disconnect, after blocking off from process, lead line to instrument.

6.4.2 Connect to output of instrument, the output readout instrument, pneumatic or electronic.

6.4.3 Apply the pressure equivalent to process 0%, 50% and 100%. Record the data in the CWO.

6.4.4 Verify if the tolerance are within the specified tolerance in the CWO.

6.4.5 If adjusment is necessary repeat the step 6.4.3 for the 0% value and adjust the device as necessary.

6.4.6 Repeat step 6.4.3 for the 100% value and adjust the device as necessary.

6.4.7 Repeat step 6.4.3 for the 50% value and adjust the device as necessary.

6.4.8 Repeat steps 6.4.4 through 6.4.7 until all readings match precisely.

6.4.9 Complete the CWO with all the necessary information.

6.4.10 Fill the appropriate label and attach to the instrument.

6.4.11 Reconnect all process signal and notify operator on completion of work.

6.5 Pressure Differencial Transmitters

6.5.1 Disconnect, after blocking off from process, lead lines to instrument, and remove integral orifice from instrument body, and plug one side of "high" section.

6.5.2 Vent low side of instrument and connect to high side the pressure source to be used as certified standard.

6.5.3 Connect to output of instrument the output readout instrument, pneumatic or electronic.

6.5.4 Apply to high side of the device the pressure equivalent to process 0%, 50% and 100% values. Record in the CWO.

6.5.5 Verify if the tolerance are within the specified tolerance in the CWO.

6.5.6 If adjusment is necessary repeat the step 6.5.4 for the 0% value and adjust the device as necessary.

6.5.7 Repeat the step 6.5.4 for the 100% value and adjust the device as necessary.

6.5.8 Repeat the step 6.5.4 for the 50% value and adjust the device as necessary.

6.5.9 Repeat steps 6.5.5 through 6.5.8 until all readings match precisely.

6.5.10 Complete the CWO with all the necessary information.

6.5.11 Fill the appropriate label and attach to the instrument.

6.5.12 Reinstall integral orifice and reassemble the device.

6.5.13 Reconnect all process signal and notify operator on completion of work.

7. HISTORY CHANGE

Date	*Revision*	*Description*
1/12/98	00	New
12/14/00	01	This procedure was revised due to its two-year expiration date.
01-07-03	02	This procedure was revised due to its two-year expiration date.

Approval: Diane Vega

Date: 12-19-02

FT: 50DP4: Fischer & Porter

Differential and High Differential Pressure Transmitter.

The following are the basic configuration entries for the FISCHER & PORTE 50 DP4. Refer to the manufacturer manual in the *"Operation and Maintenance Manual: Continuous Monitoring Systems"* for more configuration entries, additional instructions, maintenance tests, and troubleshooting.

1. Zero and Span Adjustment

The following steps apply when the zero adjustment corresponds to zero pressure input.

1. Adjust zero. With zero input applied to the transmitter, turn the zero adjustment screw until the transmitter reads 4 mA.

2. Adjust span. Apply maximum pressure to the transmitter high side connection. Turn the span adjustment screw until the transmitter output reads approximately 20 mA.

3. Release the input pressure and readjust the zero output to read 4 mA ± 0.032 mA.

4. Reapply maximum pressure to the transmitter. If the output reading is greater than 20 mA, multiply the difference by 0.25 and subtract the result from 20 mA. Adjust the 100% output to this value. If the output reading is less than 20 mA, multiply the difference by 0.25 and add the result to 20 mA. Adjust the 100% output to this value.

   Example: The full-scale transmitter output is 20.100 mA. Multiplying 0.100 by 0.25 gives the product 0.025. Subtracting the product 0.025 from 20.00 mA gives the difference 19.975 mA. Adjust the 100% output to this value.

5. Release input pressure and readjust the zero.

6. Apply 100% input and repeat Steps 1 through 5 if full-scale output is not 20 +/- 0.032 mA.

The following steps apply when the zero adjustment corresponds to non-zero pressure input.

1. Calibrate the transmitter to zero to maximum pressure as described in the zero and span adjustment information described above.

2. Apply the minimum pressure to the high side process connection and adjust the zero until transmitter output reads 4 mA. **Do not use the span adjustment.**

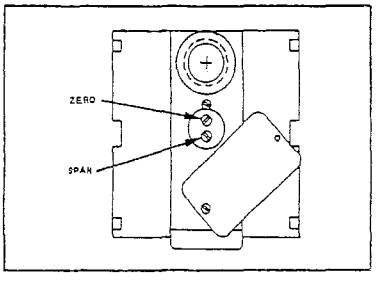

Figure 1. Zero and Span Adjustment Screws.

NOTE:
Under operating conditions that subject the transmitter to temperature extremes or significant vibration, mechanical backlash may occur in the zero and span adjustment screws. To improve the stability of zero and span settings in these circumstances, back off the adjustment screws slightly after final adjustment to break contact between the potentiometer blades and the adjustment screw slot surfaces.

Magnetic Flow Converter

The following are the basic configuration entries for the YOKOGAWA YMA 11 magnetic flow converter. Refer to the manufacturer manual in the *"Operation and Maintenance Manual: Continuous Monitoring Systems"* for more configuration entries, additional instructions, maintenance tests, and troubleshooting.

1. Initial Configuration

The following are the basic data configuration for the YMA11. Refer to the manufacturer manual for more configuration entries or additional instructions.

Flow Units

1. Use auxiliary data item No. 3 to specify the flow units. Enter the following values for GPM:

0	N	P	Q	R	S

N : 4 for gallons
P : 1 for minutes
Q : 2 Output pulse factor 1 pulse/gallon
R : 2 Totalizer factor 1 pulse/gallon
S : 5 Output pulse duration 50 ms

For other entries refer to the manual pages 5-9 to 5-10.

Transducer Settings

From the Magnetic flow transducer dataplate take the transducer nominal size, meter factor, and exciting current.

1. Go to auxiliary data item No. 11 to set the transducer nominal size. Enter 15 mm for YM 115.

2. Go to auxiliary data item No. 12 to set the transducer meter factor.

3. Go to auxiliary data item No. 13 to set the transducer exciting current.

2. Zero and Span Adjustment

Span Setting

1. Use auxiliary data item No. 4 to set the span. This corresponds to forward flow span. Enter a value in gal/min.

Zero Adjustment

After setting the main and auxiliary data of the converter, pass a liquid through the flowmeter tube. The converter will output the flow signal. Since a magnetic flowmeter requires zero adjustment without exception after installation, carry out the zero adjustment in the following procedure.

1. After confirming that the flowmeter tube is completely filled with a liquid, make the liquid standstill.

2. Adjust zero by means of the automatic zero-adjusting function of the converter. Use auxiliary item No. 01 and follow the instruction depicted below.

Switch operation :	Display	Description
Carry out operation for releasing data setting inhibition.		
MAIN / AUX.		Select Aux. with MAIN/AUX. data selector switch.
ENABLE / INHIBIT		Select ENABLE of the data setting enable/inhibit selector switch.
▲ ▼	AUX. ITEM NO. 01	Select Aux. data item No. 1.
	00010	The initially set data is displayed.
SHIFT▶	00010	The 5th digit (from the left) flashes
5 times		Operation for making RESET switch enabled.
INCR▲	00000	The 5th digit flashes indicating "0".
		indicating "1".
SET	00000	The whole set data flashes.
SET	00000	Data setting is completed.
MAIN / AUX.		Select MAIN of the main/Aux. data selector switch.
▲ ▼	● RATE %	Select the flow rate indication. (The display in engineering unit may be selected.)
	0.4	A data near 0% is displayed.
RESET	ZEro	"ZERO" is displayed (for about 15 seconds).
	0.0	Zero adjustment is completed.

FT: YF100: Yokogawa

Vortex Flowmeter.

The following are the basic configuration entries for the YOKOGAWA YF100 Vortex Flowmeter. Refer to the manufacturer manual in the *"Operation and Maintenance Manual: Continuous Monitoring Systems"* for more configuration entries, additional instructions, maintenance tests, and troubleshooting.

1. Initial Configuration

The vortex flowmeter has been calibrated at the factory before shipment, and recalibration is not required. When changing the flow range, calculate the new range using the method described in page 5-1 of the instruction manual and execute span and zero adjustment procedure.

2. Span and Zero Adjustment

Zero Adjustment

Zero adjustment is not required.

Span Adjustment

1. Connect instruments as shown in Figure 1. Warm up the instruments for at least five minutes.

2. Set the sine wave generator to 2 to 5 V (rectangular wave may be used) and set the frequency obtained from the following equation.

$$F = Kt * Q_1$$

Where

F: Frequency at maximum flow rate (Hz)

Q_1: Maximum flow rate (GPM)

Kt: Constant at flowing temperature (Hz/GPM)

$$Kt = N * 0.01667 * [1 - 2.963 * 10^{-5} * (t - 59)]$$

$$Kt = N * 0.01667 * [1 - 1.470 * 10^{-5} * (t - 59)] \quad \text{for carbon steel body}$$

Where

N: Instrument K-factor (pulse/gal) entered on instrument data plate.

t : Flowing temperature (oF)

Example:

Nominal Size: *2 inch*

Fluid : *Liquid*

Maximum flow rate: *180 GPM*

Flowing temperature: *212 F*

K-factor: *33.83 pulse/gal* *read on the instrument plate*

$$K_{212} = 33.83 * 0.01667 * [1 - 2.963 * 10^{-5} * (212 - 59)]$$

$$K_{212} = 101.0$$

Hence, frequencies between 0 and 101.0 Hz are generated for flows in the range 0 to 180 GPM

3. Adjust span until the digital multimeter indicates 5 V.

4. Using the Sine Wave Generator apply a frequency corresponding to 50% of the range and confirm that the output is within the specified value.

5. If the output is outside the limit, repeat steps (3) and (4).

Item	Instruments YEW Recommends	Remarks
Power Supply	–	Analog output: 24V DC±10% Pulse output: 10 to 30V DC
Load Resistance	Model 2792 standard resistor: (250 Ω ±0.005% for 4 to 20 mA DC signal)	4 to 20 mA DC version only
Voltmeter	Model 2502 digital multimeter (accuracy: ±0.05%)	4 to 20 mA DC version only
Sine Wave Generator	HP Model 204C	
Counter	HP Model 5302A	5 to 10kHz, 4 or more digits.
Oscilloscope	–	

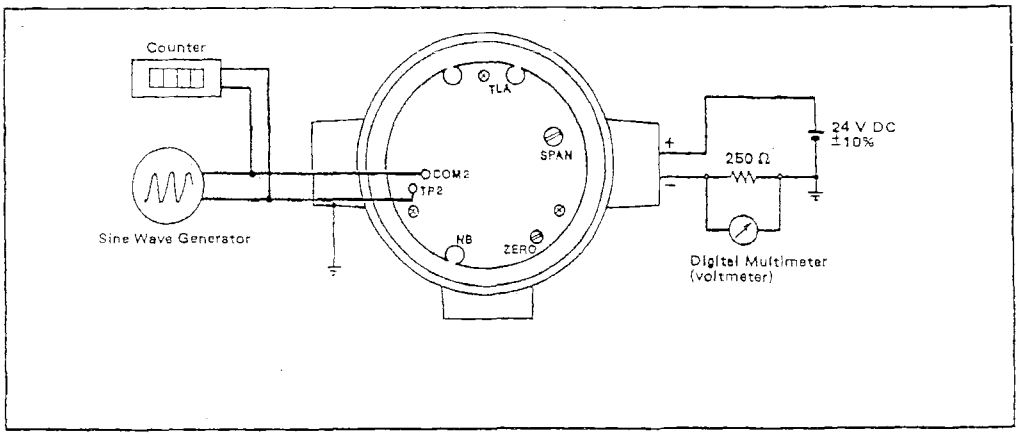

Figure 1. Diagram for span adjustment setup (analog output)

FT: AM 205A: Yokogawa

Integral Type Magnetic Flowmeter.

The following are the basic configuration entries and calibration procedure for the AM 205A. Refer to the manufacturer manual in the *"Operation and Maintenance Manual: Continuous Monitoring Systems"* for more configuration entries, additional instructions, maintenance tests, and troubleshooting.

1. Initial Configuration

Flowmeter Size Setting

1. Using SHIFT and INC keys select B20 SIZE UNIT. Set units to inch.
2. Using INC key select B21 NOMINAL SIZE. For an AM205A flowmeter set size in inches to 2.00
3. Press SET key twice to input to memory.

Volume Units Selection

1. Using SHIFT and INC keys select B22 FLOW UNIT. Set units to "gal".
2. Press SET key twice to input to memory.

Time Units Selection

1. Using SHIFT and INC keys select B23 TIME UNIT. Set units to "m" (minutes).
2. Press SET key twice to input to memory.

Meter Factor Setup

There are two meter factors: LOW (low-frequency) and HIGH (high-frequency). Both values are read from the detector used and should be set.

1. Using SHIFT and INC keys select B30 LOW MF. Enter the value read in the detector plate name.
2. Press SET key twice to input to memory.
3. Using SHIFT and INC keys select B31 HIGH MF. Enter the value read in the detector plate

name

4. Press SET key twice to input to memory.

2. Span and Zero Adjustment

Span Value Setting

1. Using SHIFT and INC keys display B24 FLOW SPAN. Enter value in gal/m.

2. Press SET key twice to input to memory.

Zero Value Setting

After confirming that the flowmeter is filled with water and the water is still, adjust the zero point.

1. Using SHIFT and INC keys select L10 ZERO TUNING. Set ENABLE.

2. Using SHIFT and INC key select L11 MAGFLOW ZERO. Press SET key twice. At this point the automatic zero adjustment starts, the display becomes "AUTO ZERO....". During this time the key operation is inhibited. Wait until the corrected zero value is displayed.

3. Using SHIFT and INC keys select L10 ZERO TUNING. Set INHIBIT.

LT: 1151DP: Rosemount

Alphaline. Differential and High Differential Pressure Transmitter.

The following are the basic configuration entries for the ROSEMOUNT 1151DP. Refer to the manufacturer manual in the *"Operation and Maintenance Manual: Continuous Monitoring Systems"* for more configuration entries, additional instructions, maintenance tests, and troubleshooting

1. Zero and Span Adjustment

The following steps apply when the zero adjustment corresponds to zero pressure input.

1. Adjust zero. With zero input applied to the transmitter, turn the zero adjustment screw until the transmitter reads 4 mA.

2. Adjust span. Apply maximum pressure to the transmitter high side connection. Turn the span adjustment screw until the transmitter output reads approximately 20 mA.

3. Release the input pressure and readjust the zero output to read 4 mA ± 0.032 mA.

4. Reapply maximum pressure to the transmitter. If the output reading is greater than 20 mA, multiply the difference by 0.25 and subtract the result from 20 mA. Adjust the 100% output to this value. If the output reading is less than 20 mA, multiply the difference by 0.25 and add the result to 20 mA. Adjust the 100% output to this value.

   Example: The full-scale transmitter output is 20.100 mA. Multiplying 0.100 by 0.25 gives the product 0.025. Subtracting the product 0.025 from 20.00 mA gives the difference 19.975 mA. Adjust the 100% output to this value.

5. Release input pressure and readjust the zero.

6. Apply 100% input and repeat Steps 1 through 5 if full-scale output is not 20 +/- 0.032 mA.

The following steps apply when the zero adjustment corresponds to non-zero pressure input.

1. Calibrate the transmitter to zero to maximum pressure as described in the zero and span adjustment information described above.

2. Apply the minimum pressure to the high side process connection and adjust the zero until transmitter output reads 4 mA. **Do not use the span adjustment.**

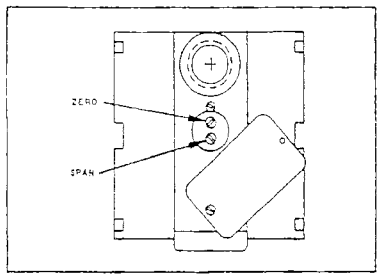

Figure 1. Zero and Span Adjustment Screws.

NOTE:
Under operating conditions that subject the transmitter to temperature extremes or significant vibration, mechanical backlash may occur in the zero and span adjustment screws. To improve the stability of zero and span settings in these circumstances, back off the adjustment screws slightly after final adjustment to break contact between the potentiometer blades and the adjustment screw slot surfaces.

FT: D12: Micro Motion

Model D Sensor.

The following are the basic configuration entries for the Rosemount D12 Model D Sensor. Refer to the manufacturer manual in the *"Operation and Maintenance Manual: Continuous Monitoring Systems"* for more configuration entries, additional instructions, maintenance tests, and troubleshooting.

1. Transmitter Considerations

1. Remote Flow Transmitter

When the D sensor is connected to a Remote Flow Transmitter, you can replace the sensor and transmitter separately, because each sensor is factory calibrated and marked with its own density and mass flow calibration factors. No other calibration or equipment is needed.

2. Flow Calibration Factor

The flow calibration factor enables calibration of the Remote Flow Transmitter for flow measurement. Testing conducted in the Micro Motion Flow Calibration Lab determines the precise value of the flow calibration factor for each individual sensor. Every Micro Motion flow sensor has label displaying the sensor's flow calibration factor, which consist of 10 characters, including 2 decimals points.

3. Density Calibration Factor

The density calibration factor enables the calibration of the Remote Flow Transmitter for density measurement. The density calibration factor consist of 14 characters, including 2 decimal points.

4. Meter Zeroing

Zero flow calibration (ie, sensor offset adjustment) is accomplished with an externally wired set zero switch, with the communications protocol auto zero command, or with the set zero flow switch in the terminal compartment. During zero flow adjustment, the LED in the terminal compartment remains on indicating that a zero flow calibration is in process. The Remote Flow Transmitter will not allow an excessive sensor offset, during meter zeroing, protecting against zeroing while excessive fluid flow exists. .

2. Transmitter Auto Zeroing Procedure

5. Let the material to be measure run through the sensor for about 15 minutes or until the sensor achieves process temperature.

6. Close the shutoff valve downstream from the sensor. The sensor should be completely filled with the process fluid and should not contain trapped air or gas. Also the process fluid must not be "flashing" or boiling inside the sensor tube.

7. Fluid flow through the sensor must be completely stopped or the zero flow setting will be incorrect. Problems setting zero flow occasionally occur because of leakage through valves.

8. The Remote Flow Transmitter can be zeroed in three ways:

    i. With the internal set zero switch

    ii. With a remote set zero switch (wired across terminals 14, 15, 3)

    iii. Or with an auto zero command from the Model 268

9. The LED in the terminal compartment turns on after 2 seconds of zero switch closure and remains on continuously during calibration of zero flow.

10. Zeroing normally takes about 30 seconds. After the zeroing procedure has been completed, the terminal compartment LED will again flash on at a rate of 1 Hz.

11. If auto zeroing fails, the terminal compartment LED will flash at a rate of 4 Hz to indicate an error condition.

12. An auto zero error condition could signify that

    i. Excessive fluid is still flowing,

    ii. That the sensor tubes are not completely full, or

    iii. That the sensor is improperly mounted.

13. To clear an auto zero error, perform another auto zero after correcting the problem or turn power off, then on again.

14. After the sensor and transmitter have been properly mounted and the zero setting adjusted, the flowmetering system is ready for operation. After setting the zero, DO Not readjust it between batches.

FT: 823DPI: Foxboro

The following are the basic configuration procedure the FOXBORO 823 DPI. Refer to the manufacturer manual in the *"Operation and Maintenance Manual: Continuous Monitoring Systems"* for more configuration entries, additional instructions, maintenance tests, and troubleshooting.

1. Zero and Span Adjustment

Field Calibration Procedure

The setup for the field calibration does not require the removal of either the transmitter, piping or the external wiring. Calibrating signals between the range limits produce proportional 0.1000 to 0.5000 V output readings on the voltmeter.

The maximum inherent error due to the built-in resistor across the output-test terminals is ±0.1% of span.

Do the connections indicated in Figure 1 (a) and follow the next steps.

1. Open bypass valve and close both pressure connection valves.
2. Open vent screw on low-pressure side of transmitter.
3. Remove vent screw assembly on high-pressure side of transmitter, and connect calibrating air supply. With liquid service, drain both sides of transmitter.
4. Close bypass valve.
5. Set calibrating pressure equal to lower range value. Output should be 1.000 V. If necessary adjust zero screw to get correct output. See Figure 1 (b).
6. Set calibrating pressure equal to upper range value. Output should be 5.000 V. If necessary, adjust span potentiometer to get correct output. See Figure 1 (b).
7. Repeat Steps 5 and 6 until both outputs are correct without adjustment.
8. Set calibrating pressure equal to midrange value. Output should be 3.000. ±0.008 V.

If output is satisfactory, calibration is complete. If output is not satisfactory refer to manufacturer manual available in *"Operation and Maintenance Manuals: Continuous Monitoring Systems"* for troubleshooting procedures.

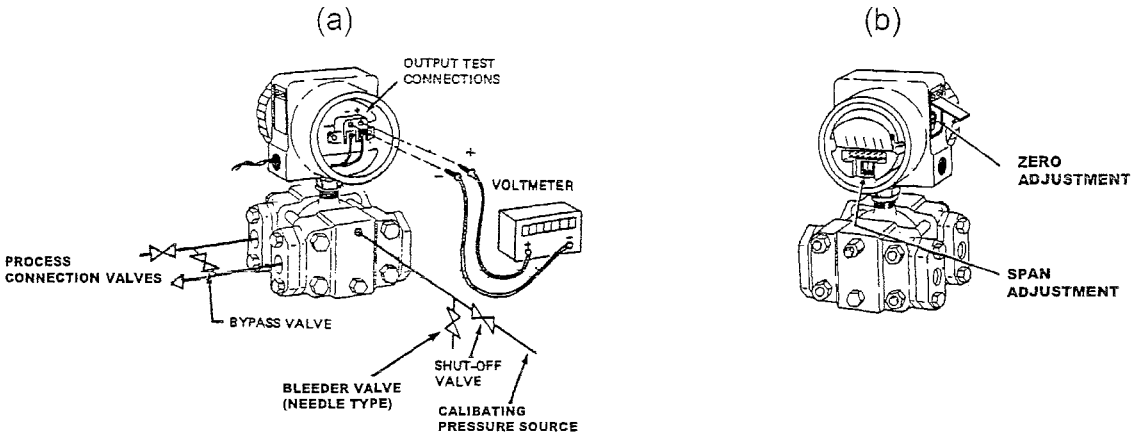

Figure 1.

NOTE

To convert differential pressure expressed in meters of water to kPa, multiply by 9.789. To convert differential pressure expressed in inches of water to psi, multiply by 0.03609.

PT: 821GM: Foxboro

(Taken from 823DP Cell Transmitter)

The following are the basic configuration procedure the FOXBORO 821GM. Refer to the manufacturer manual in the *"Operation and Maintenance Manual: Continuous Monitoring Systems"* for more configuration entries, additional instructions, maintenance tests, and troubleshooting.

1. Zero and Span Adjustment

Field Calibration Procedure

The setup for the field calibration does not require the removal of either the transmitter, piping or the external wiring. Calibrating signals between the range limits produce proportional 0.1000 to 0.5000 V output readings on the voltmeter.

The maximum inherent error due to the built-in resistor across the output-test terminals is ±0.1% of span.

Do the connections indicated in Figure 1 (a) and follow the next steps.

1. Open bypass valve and close both pressure connection valves.
2. Open vent screw on low-pressure side of transmitter.
3. Remove vent screw assembly on high-pressure side of transmitter, and connect calibrating air supply. With liquid service, drain both sides of transmitter.
4. Close bypass valve.
5. Set calibrating pressure equal to lower range value. Output should be 1.000 V. If necessary adjust zero screw to get correct output. See Figure 1 (b).
6. Set calibrating pressure equal to upper range value. Output should be 5.000 V. If necessary, adjust span potentiometer to get correct output. See Figure 1 (b).
7. Repeat Steps 5 and 6 until both outputs are correct without adjustment.
8. Set calibrating pressure equal to midrange value. Output should be 3.000. ±0.008 V.

If output is satisfactory, calibration is complete. If output is not satisfactory refer to manufacturer manual available in *"Operation and Maintenance Manuals: Continuous Monitoring Systems"* for troubleshooting procedures.

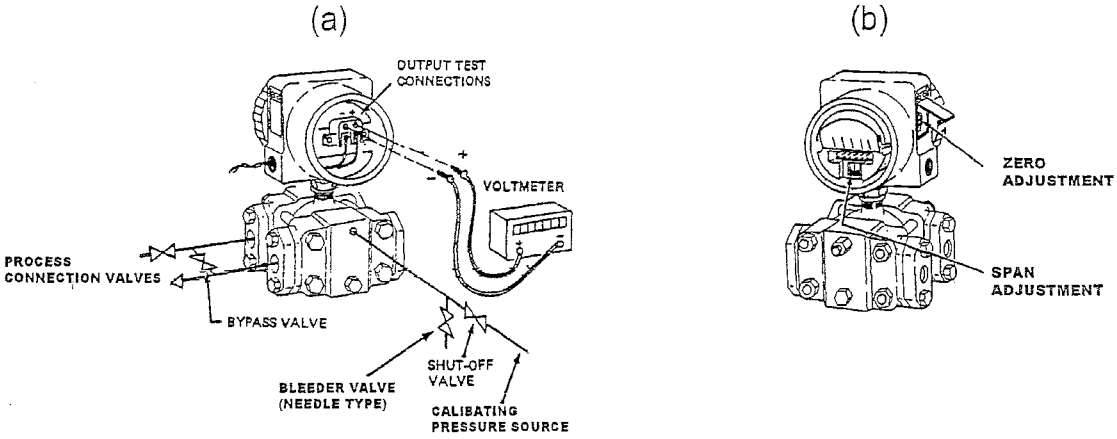

Figure 1.

NOTE

To convert differential pressure expressed in meters of water to kPa, multiply by 9.789. To convert differential pressure expressed in inches of water to psi, multiply by 0.03609.

AE: PH 200: Yokogawa

PH Transmitter

The following is the basic calibration procedure for the YOKOGAWA PH200. Refer to the manufacturer manual in the *"Operation and Maintenance Manual: Continuous Monitoring Systems"* for more configuration entries, additional instructions, maintenance tests, and troubleshooting.

1. Standard Automatic Calibration Procedure

1. Select AUT.CAL routine using MODE and YES keys (enter pass code if necessary). Select buffer 7 using YES key.

2. Insert the rinsed sensors from the process into a solution of pH 7.00 at 25°C.

3. CAL.END display on stable reading. Press YES to end or NO to go on to next buffer.

4. Clean the sensor with water and insert into buffer solution of pH 4.00 at 25°C.

5. CAL.END display on stable reading. Press YES to end.

The whole process will not take more than 15 minutes and should, be repeated at least every 2 months or whenever the EXA PH200 signals a malfunction with an ERROR-message.

FT: CFT 10: Foxboro

Mass Flowmeter

The following are the basic configuration entries for the FOXBORO CFT 10. Refer to the manufacturer manual in the *"Operation and Maintenance Manual: Continuous Monitoring Systems"* for more configuration entries, additional instructions, maintenance tests, and troubleshooting

1. Initial Configuration

Flow Units

Procedure to define the flow units.

1. Display is in SYSTEM menu (Level 3). Select FLOW option.

   3 SYSTEM

   F L O W

2. Go to flow components submenu and select Comp A

   FL COMP

   C o m p A

3. Go to flow measurement units submenu and enter lb/min

   FLOW

   lb/min

4. Enter the factor by which the mass flow , in kg/s, would have to be multiplied, to achieve mass flow in the units selected in step 3. Go to FL SLOPE submenu.

   FL SLOPE

   132.158590

5. The previous entry is accepted by repeatedly pressing →.

6. Press ← to return to SYSTEM menu (Level 3).

Density Units

Procedure to define units of the flow density.

1. Display is in SYSTEM menu (Level 3). Select DENSITYoption.

   3 SYSTEM

D E N S I T Y

2. Go to flow measurement units submenu and enter lb/min

   D E N S I T Y

   lb/ft3

3. Enter the factor by which the density, in kg/m3, would have to be multiplied, to achieve density in the units selected in step 2. Go to DS SLOPE submenu.

   DS SLOPE

   0.062371

4. The previous entry is accepted by repeatedly pressing → .

5. Press ← to return to SYSTEM menu (Level 3).

Current Trim

The Current Trim selection in the Calib Level 3 menu is used to adjust the current output lower range value (0 or 4 mA) and the upper range value (20 mA). Note, however, that if the current output has been set to Preset value or Off using the OUTPUTS menu (Level 3) selection, then Current Trim does not apply and the message "Invalid Config!" is encountered.
Proceed as follows.

2 SETUP

CALIB

1. Press → to select (accept) CALIB.

2. Press ↑ or ↓ to view the CALIB Level 3 menu selections (FLOW ZERO, CURRENT TRIM, CLEAR CUR TRIM, TX INFORMATION, TUBE PARAMETERS, and FLUID PARAM). Use ↑ or ↓ to place CURRENT TRIM on display.

3. Press → to select CURRENT TRIM. The following display is provided for adjustment of lower range value. Also provided is the present adjustment step size (0.2 mA in this example). Refer to Figure 3-22 in the Manual.

   LVR TRIM

   S t e p s i z e = 0 . 2 m A

4. Press ↑ to increase the current output by the displayed step size. Press ↓ to decrease the current output by the displayed step size. Press 0 to change the displayed step size. The available step sizes are 0.002 mA, 0.02 mA, and 0.2 mA.

5. When required current lower range value is reached, press →. The following display is provided for adjustment of the upper range value. Also provided is the present adjustment step size (0.2 mA in this example).

   URV TRIM

   S t e p s i z e = 0 . 2 m A

6. Press ↑ to increase the current output by the displayed step size. Press 0 to change the displayed step size.

7. When required current upper range value is reached, press →. The display returns to the Calib Level 3 menu. Press ← to return to previous menus.

Tube Parameters

The Transmitter must be programmed with certain numerical values (parameters), which reflect physical characteristics specific to the flowtube to which the transmitter is to be connected. The flowtube parameters may be read directly from the flowtube data label. When transferring information from flowtube to transmitter, the information is keyed in using the notation shown on the flowtube. After entering the information, the transmitter display reads the actual number represented by the notation. Refer to the following example.

As Keyed in from flowtube: -09210363E+02
Notation meaning: -0910363×10^{2}
As displayed on transmitter: -92.10363

Proceed as Follows.

Display is in SETUP menu (Level 2) as shown below.

2 SETUP

C A L I B

1. Press → to select (accept) CALIB.

2. Press ↑ or ↓ to view the CALIB sub-menu selections (FLOW ZERO, CURRENT TRIM, CLEAR CUR TRIM, TX INFORMATION, TUBE PARAMETERS, and FLUID PARAM). Use↑ or ↓ to place TUBE PARAMETERS on display.

3. Press → to select TUBE PARAMETERS. Refer to Figure 3-25.

4. Use ↑ or ↓ to view the Tube Parameters sub-menu selections (Sens. ID, Dens C1, Dens C2, Dens C3, Dens C4, Dens C5, Dens C6, Flow C1, Flow C2, Flow C3, Flow C4, Nom Cap, TP COR S, TP COR O). Use ↑ or ↓ to set display to Sens. ID.

5. Press → to enter change mode. Successful entry is confirmed by the appearance of cursor under leftmost digit.

6. Use ↑ or ↓ to set digit in accordance with first digit of Sensor ID on flowtube data label.

7. Press → to move cursor to the right and continue until all characters of flowtube Sensor ID have been placed on display.

8. After setting rightmost digit, press → to execute (accept) serial number. Acceptance is confirmed by the removal of cursor from display.

9. Press ↑ or ↓ to display Dens C1, and repeat procedure to enter number from flowtube data label. Continue until all flowtube parameters have been entered. Note that Dens C5 and Dens C6 are only required to be entered if provided on flowtube data label.

10. After acceptance of TP COR 0, press ← twice to return to SETUP menu (Level 2).

Fluid Parameters

If % Solids is to be measure, both the density and the reference temperature at which the density applies must be provided. In addition, the coefficient of expansion for both components as the temperature varies from the reference temperature must be provided.

Display is in SETUP menu (Level 2) as shown below.

2 SETUP

C A L I B

1. Press → to select (accept) CALIB.

2. Press ↑ or ↓ to view the CALIB sub-menu selections (FLOW ZERO, CURRENT TRIM, CLER CUR TRIM, TX INFORMATION, TUBE PARAMETERS, and FLUID PARAM). Use ↑ or ↓ to place FLUID PARAM on display.

3. Press → to select FLUID PARAM. Refer to Figure 3-26 in the Manual.

4. Use ↑ or ↓ to view the CALIB sub-menu (DENSITY OF COMP A, COEFFICIENT OF EXPANSION FOR COMP A, THE NAME ASSIGNED TO COMP A, DENSITY OF COMP B, COEFFICIENT OF EXPANSION FOR COMP B, THE NAME ASSIGNED TO COMP B, and REFERENCE TEMPERATURE). Use ↑ or ↓ to place DENSITY OF COMP A on display.

5. Press → to enter the change mode. Entry into the change mode is confirmed by the appearance of cursor under leftmost character.

6. Use ↑ or ↓ to set character as required.

7. Press → to move cursor to the right and continue until all characters have been set as required.

8. After setting rightmost character, press → to execute (accept0 density. Acceptance is confirmed by removal of cursor from display.

9. Press ↑ or ↓ to display the coefficient of expansion for Component A, and repeat procedure to set characters as required. Continue until all fluid parameters have been entered.

10. After acceptance of reference temperature, press ← twice to return to SETUP menu (Level 2).

2. Calibration Procedure

Zero and Span Settings

This menu is used to set zero and span values to the output current values (4-20 mA).

1. Display is in OUTPUTS menu (Level 3) as shown below.

   3 OUTPUTS

   C U R R E N T

2. Select current mode

   CT MODE

   F l o w (4 – 20 mA)

3. Press → to select (accept). Enter current upper range value assigned to 20 mA

   CT URV

   xx.xxxxxxx lb/min

4. After all characters have been set, the entire displayed number is accepted by pressing → repeatedly. Enter current upper range value assigned to 20 mA

   CT LRV

   xx.xxxxxxx lb/min

5. After all characters have been set, the entire displayed number is accepted by pressing → repeatedly. Acceptance is confirmed by departure from change mode. The present current mode is displayed.

   CT MODE

   F l o w (4 – 20 mA)

6. Press ← to return to OUTPUTS menu (Level 3).

Flow Zero

Initially After being put into operation, the transmitter must be set to read zero output under a zero flow condition. In addition, the transmitter may be re-zeroed at any time after shutting flow down to zero. After confirming that the flowmeter tube is completely filled with a liquid, make the liquid standstill. Proceed as follows.

Flow has been shut to down to zero and display is in SETUP menu (level 2) as shown below.

2 SETUP

CA L I B

1. Press → to select (accept) CALIB. The following is displayed.

   3 CALIB

   F L O W Z E R O

2. Press → to select (accept) Flow Zero. The Following is displayed.

   PUSH "0"

   T O C A L I B R A T E

3. If user decides not to zero, press ← To abort. After a temporary abort acknowledgement message, the display returns to Level 3.

   If zeroing is to be performed, press 0. While the level of offset (change) required to zero the transmitter is being calculated, the following is displayed.

   Flow Zero

   C a l i b r a t i n g

   When the offset has been determined, the following is displayed.

   Set to ?

   ######## XX / X

4. Press → to accept offset. Acceptance is confirmed by the following momentary display.

   Flow Zero

   Calib. Complete

   This is followed by the return of the display to Level 3.

   3 CALIB

   F L O W Z E R O

5. Press ← to return to SETUP menu.

AT: ZA8C: Yokogawa

Zirconia Oxygen Analyzer

The following are the basic configuration entries for the YOKOGAWA ZA8C zirconia oxygen analyzer. Refer to the manufacturer manual in the *"Operation and Maintenance Manual: Continuous Monitoring Systems"* for more configuration entries, additional instructions, maintenance tests, and troubleshooting.

1. Calibration Gas

a. Zero Gas

A gas with a known oxygen concentration is used for calibration.Normal calibration is performed using 2 different gases: a zero gas and a span gas with oxygen concentration. The zero gas typically, 1 vol. % oxygen balanced in Nitrogen is used, however, an oxygen mixture between 0.4% and 8% is acceptable. A compressed gas cylinder containing certified gas mixture fitted with a dual stage regulator should be used. The maximum working pressure of the calibration box is 35 PSI. (See Figure)

b. Span Gas Gas

A clean dry air source is recommended, such as instrument air. Install an in-line filter before the calibration unit to remove any moisture or dirt. A regulator must be attached to the instrument air source to provide the appropriate working pressure for the calibration unit. The maximum pressure is 35 psi.

c. Reference Gas

Reference air is from the same source as the span gas, which is clean, dry instrument air. The reference air flows to the back side of the zirconia cell, and is used at all times. The calibration unit is plumbed to provide a continuous flow rate of the reference air, as well as , calibration gas flow during calibration. .

2. Initial Flow Rate Setup (AC1)

Ensure that the cal gas and reference air are properly plumbed to the left side of the AC1 auto cal unit. The zero gas and instrument air should be set approximately 20+2 PSIG. Power is not needed to set the flow rates. .

a. Setting the Reference Air Flow Rate

Locate the reference air flowmeters. Adjust the flow adjustment knob on the REFERENCE AIR FLOWMETER to 0.8 LPM or 800 ml/min.

b. Balancing Pressure drops in the cal lines

For accurate calibrations, the auto cal system must provide a fixed flow of Zero gas and Span gas (0.6 LPM or 600 ml/min). To balance the pressure drops, perform the following steps:

These adjustment can be made with a flat tip screwdriver:

1. Locate the BLOCK and SPAN GAS SOLENOID. Using screwdriver, turn the override screw to the manual position.

2. Use the flow regulator knob on the CAL GAS FLOWMETER to adjust the flow to 1.0 LPM.

3. Switch the override screw of the SPAN GAS solenoid to AUTO. Turn the override screw for the ZERO GAS solenoid to Manual.

4. Adjust the pressure regulator on the zero gas cylinder for a flow of 1.0 LPM on the Calibration Gas flowmeter.

IMPORTANT: DO NOT USE THE flow regulator knob of the flowmeter to achieve this flow rate.

5. Adjust the flow regulator knob on the Calibration Gas Flowmeter until flowmeter reads 0.6 LPM.

6. Verify that all manual overrides are set back to AUTO.

Standard operation

3. MC1 Flow Rate Setup

For accurate calibrations, the manual cal system must provide a fixed flow of zero gas and span gas (0.6 LPM or 600 cc/min) during calibration. There are two flowmeters and one hand valve adjuster for the MC1. the hand valve is used only during calibration flow either span gas or zero gas to the probe, using the Cal Gas flowmeter to indicate the flowrate. The Reference Air flowmeter is used to flow the reference air for the probe, and remains flowing at all times with a flowrate of 0.8 LPM. The display will prompt the User to perform the following steps, when programmed for One Touch (TCH) calibration as follows.

1. Position the valve knob to Span Gas On. This will start the flow of Span Gas (or Air) to the probe.

2. Adjust the Cal Gas flowmeter to show 0.6 LPM as the flowrate. Also, if necessary, adjust the reference flowmeter to show 0.8 LPM.

3. To stop the flow of Span gas, position the valve knob to the OFF position.

4. To start the flow of zero gas, to the probe, position the valve knob to Zero Gas On.

5. Adjust the Cal Gas flowmeter to show 0.6 LPM as a flowrate. Also, if necessary, adjust the reference flowmeter to show 0.8 LPM.

6. To stop the flow of Zero gas, position the valve knob to the OFF position.

Warning: If reference air is used during calibration, the reference air must be left on after the calibration..

Checking for Leaks

1. .Position the valve to Span.

2. Apply a leak detection spray on all compression fittings and bends of the cal line tubing for the probe, the cal unit inlet, cal unit outlet, probe inlet for Cal Gas and reference air. Spray both the reference air and Cal Gas line.

3. Inspect the full length of the cal line to determine if there is a leak. Repair any leaks.

4. After repairing the leaks, if any, return the valve to the Off position. Ste reference air flowmeter to 0.8 LPM.

4. Procedure to enter calibration gas values.

Begin entering the calibration gas and reference air values.

1. Press ENTER. The LCD will display "Maintenance Mode/ Entry Model <Y/N> "Note the green light to the left of the LCD.

2. Press Yes. The LCD will display "Password?"

3. Use arrow (↑,→) keys to Enter your 2 digit password number which is on the inside door on the ZA8C. Your number is probably 16.

4. Press Enter. This will Enter your password number. If your password is correct, the dispay will show the C0. If the Password is not accepted, the unit will Return to Step 1 above..

5. The flashing cursor must highlight the character you wish to change. To change press up arrow key (↑) until the display shows C0, Span Value menu.

6. Enter the Span value using the arrow keys (↑,→) until the correct value is entered (which is between 19% to 21%). Press the ENTER key.

7. Use arrow keys to enter your vol% O2 value for your zero gas cylinder. Press the ENTER key.

5. Procedure to perform a manual calibration and record diagnostic parameters.

1. Exit the Manitenance mode by pressing the DiSP (display) key. This returns the unit to the measurement mode.

2. Te begin a calibration press the CAL key. The display will ask if you want to begin a span calibration,"SPAN CAL Y/N?"

3. Press the YES key.

4. If you are using a manual calibration system, begin the flow of span gas.

5. Wait until the O2 reading has stabilized.

6. Press the YES key.

Note: At this point the unit read the span gas and then prompt the manual calibration user to close the span valve. To complete the calibration, you must do a zero cal.

7. .The unit will ask you if you want to do a Zero Cal, "ZERO CAL Y/N?"

8. If you are using a manual calibration system, begin the flow of zero gas.

9. Wait until the O2 reading has stabilized.

10. Press the YES key.

Note: At this point the unit will read the zero gas and then prompt the manual calibration user to close the zero value. When the display ask you if you want to do a span cal, press the NO key until the bar graph is displayed.

ChemSource

Procedimiento Normalizado de Trabajo

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Supersedes: FU-006-01	Prepared by : [signature] Date : 12-17-02
Effective Date: 01-07-03	Reviewed by : [signature] Date : 12/17/02

Approval: [signature]

Date: 12-19-02

1. OBJECTIVE

1.1 To describe the procedure to be followed in order to verify or calibrate level transmitter devices at ChemSource Corporation facilities in Guayama, PR.

2. SCOPE AND APPLICATION

2.1 The succesful execution of this procedure will be certified that the devices are within certified tolerances and meet ChemSource quality standards.

3. RESPONSABILITIES

3.1 The facilities personnel is responsible to follow this procedure when the execution of the verification and/or calibration of the device will be performed.

3.2 The facilities Supervisor is responsible for preparing and revising this procedure.

4. DEFINITIONS

4.1 Calibration Work Order (CWO): A form that will be automatically generated in specific frecuency for any instrument or equipment for verification/ calibration (See form FU-001f1, current revision).

5. REFERENCES

5.1 Instruments Manufacturer's Manuals

5.2 CFR Tittle 21 Part 211.68(a)

6. PROCEDURE

6.1 Calibration will be performed in place, using process liquid whenever possible. If not, simulate process signal at lab.

6.1.1 Head Type Transmitters

6.1.1.1 Determine tank height and have process liquid specific gravity available.

6.1.1.2 Calculate pressure to be used in psi for verification/calibration purpose using the following formula:

Pressure (psi) = Head (in inches) x S.G. x .03606

6.1.1.3 Apply the equivalent signal for a 100% indication and for a 0% indication. Record all data and calibrate if it is necessary.

6.1.1.4 Complete the CWO with all the necessary information.

6.1.1.5 Fill the appropiate label and attach to the instrument.

6.1.2 Float, Capacitance or Ultrasonic Type Transmitter

6.1.2.1 Filling up vessel with required quantity of liquid to get 100% and 0% readings and record the data.

6.1.2.2 If calibration necessary, adjust the equipment and repeat step 6.1.2.1 until necessary.

6.1.2.3 Complete the CWO with all the necessary information.

6.1.2.4 Fill the appropriate label and attach to the instrument.

7. HISTORY CHANGES

Date	*Revision*	*Description*
2/4/98	00	New
12/14/00	01	This procedure was revised due to its two-year expiration date.
01-07-03	02	This procedure was revised due to its two-year expiration date.

Approval: Diane Vega

Date: 12-19-02

ChemSource

Procedimiento Normalizado de Trabajo

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[ ]	Finanzas	FI		
[x]	Garantía de Calidad	QA	SM – 01	1
[x]	Guayama 1	G1	SM – 01	1
[x]	Guayama 2	G2	SM – 01	1
[x]	Guayama 3	G3	SM – 01	1
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[ ]	Validaciones	VA		

Supersedes: FU-008-01	Prepared by :
	Date :
Effective Date:	Revised by :
	Date :

Approval:_____

Date:_____

1. OBJECTIVE

1.1 To describe the procedure to be followed in order to verify or calibrate temperature devices at ChemSource Corporation facilities in Guayama, PR.

2. SCOPE

2.1 The succesful execution of this procedure will be certified that the devices are within certified tolerances and meet ChemSource quality standards.

3. RESPONSABILITIES

3.1 The facilities personnel is responsible to follow this procedure when the execution of the verification and/or calibration of the device will be performed.

3.2 The facilities Supervisor is responsible for preparing and revising this procedure.

4. DEFINITIONS

4.1 Calibration Work Order (CWO): A form that will be automatically generated in specific frecuency for any instrument or equipment for verification/ calibration (See form FU-001f1, current revision).

5. REFERENCES

5.1 Instruments Manufacturer's Manuals

6. PROCEDURE

6.1 Digital Thermometer

6.1.1 Calibration at 0^0C

6.1.1.1 Inmerse the certified thermometer and the Digital Thermometer device in the bucket of Methanol solution or use a certified temperature bath in substitution of the methanol solution. The temperature of the Methanol solution or the certified temperature bath should be about 0^0C.

NOTE: If you use the certified thermometer, consider that the two (2) devices should be immersed as close to each other as possible and at the same depth.

6.1.1.2 Compare readings on the certified standard device and the Digital Thermometer device. Record the instrument readings and the standard device reading in the CWO.

NOTE: The deviation shall not exceed the tolerance specified in the CWO.

6.1.1.3 Make adjustment in the Digital Thermometer to correspond the reading with the Standard Device only if it necessary.

6.1.1.4 Record the readings of both temperature devices in the CWO.

6.1.1.5 Complete the CWO with all the necessary information.

6.1.2 Calibration at any specify temperature parameter

6.1.2.1 Set the certified bath to the calibration parameter temperature specified in the CWO.

6.1.2.2 Repeat from step 6.1.1.1 to 6.1.1.5 for the specified temperature parameter.

Note: The complete verification/ calibration steps will have to be repeated and recorded, if any adjustments are made to the Digital device. The Digital device will have to go through the complete procedure with no adjustments, in order for the calibration to be valid.

6.1.3 Fill apropiate label and attach to the instrument.

6.2 Temperature Transmitter (TT) with RTD

6.2.1 Disconnect the RTD sensor and connect a certified decade box.

6.2.2 Disconnect the signal output and connect a certified digital current meter.

6.2.3 Determine the resistance in ohms for low, middle and full scale temperature.

6.2.4 Simulate a signal equivalent to low scale and check the output; it should be 4.00 mA and adjust the zero pot, if necessary. Record the data in the CWO.

6.2.5 Simulate a signal equivalent to full scale and check the output; it should be 20.00 mA and adjust the span pot, if necessary. Record the data in the CWO.

6.2.6 Simulate a signal equivalent to middle scale and check the output; it should be 12.00 ma and adjust the linearity pot, if necessary. . Record the data in the CWO.

6.2.7 Repeat steps 6.2.4 to 6.2.6 until proper reading.

6.2.8 Reconnect the RTD sensor and the output leads.

6.2.9 Complete the CWO with all the necessary information.

6.2.10 Fill apropiate label and attach to the instrument.

6.3 Temperature Indicators

6.3.1 Remove the temperature element from the thermowell.

6.3.2 Introduce the temperature element on the certified temperature bath, for cooling or heating as required.

6.3.3 Simulate the zero temperature valve and adjust to zero, if necessary. Record the data in the CWO.

6.3.4 Simulate the span temperature valve and adjust to span, if necessary. Record the data in the CWO.

6.3.5 Simulate the mid-range temperature valve for instrument alignment and adjust, if necessary. Record the data in the CWO.

6.3.6 Repeat steps 6.3.3 and 6.3.5 until proper readings.

6.3.7 Reconnect the temperature element.

6.3.8 Complete the CWO with all the necessary information.

6.3.9 Fill apropiate label and attach to the instrument.

6.4 Thermocouple and RTD's Converter

6.4.1 Remove instrument from service, after notifying operator and placing controller, if any, in manual.

6.4.2 Apply to input terminal of instument the signal equivalent to 0% of instrument range. Account for ambient temperature compensation if needed.

6.4.3 Verify output of instrument. It should equal 0% of output. Adjust to proper value if it is not so. Record the data in the CWO.

6.4.4 Apply to output terminal of instument the signal equivalent to 100% of range. Observe output and adjust to proper value if it is not 100% of output. Record the data in the CWO.

6.4.5 Repeat operations 6.4.2 to 6.4.4 until correct response is obtained at 0% and 100% of instrument range.

6.4.6 Reconnect the instrument.

6.4.7 Complete the CWO with all the necessary information.

6.4.8 Fill apropiate label and attach to the instrument.

6.5 Temperature Detector RTD Verification

6.5.1 Field Test

6.5.1.1 Disconnect the leads of the RTD element from the temperature transmitter.

6.5.1.2 Check continuity to ground of the three (3) leads of the RTD with the certified Ohms meter. Resistance value should be infinite. If a resistance value is measured, replace the RTD and complete the CWO.

6.5.1.3 Measure resistance between the RTD leads. Between two (2) leads and a third common lead, the resistance value should be the same corresponding to the temperature sensed by the element. The resistance between two (2) of the three (3) leads should be zero. If these results are not obtained, the RTD element may be damaged and should be replaced. Complete the CWO.

6.5.2 Shop Accuracy Test

6.5.2.1 Remove the RTD element from the thermowell and locate it at the Instrument Shop.

6.5.2.2 Determine the actual range in which the RTD element is used to measure temperatures. Define the zero, mid-range and full span values.

6.5.2.3 Introduce the RTD element on the certified temperature bath, for cooling of heating the element as required.

6.5.2.4 Simulate the zero, mid-range and full span temperature values and read them on certified temperature bath. On each value simulated, read and record the RTD element resistnace using the Ohms meter. Use the RTD temperature vs. resistance table to calculate the temperature measured by the RTD.

6.6.5 Keep the calibration chart and attach to the CWO.

6.6.6 Replace the process chart and identify the period when the work was done (if necessary).

6.6.7 Reconnect the instrument.

6.6.8 Complete the CWO with all the necessary information.

6.6.9 Fill apropiate label and attach to the instrument.

6.7 Temperature Controller Model Moore Mycro 352[

6.7.1 Using updated copy of Mycro 352 configuration booklet, verify the existing configuration and tuning parameters saved in the controller's memory. If differences are found, verify master copies of the booklet stored at the Metrology Lab, to confirm that the updated copy is the latest revision. Then ensure that configuration complies with the latest revision.

6.7.2 To perform the hardware calibration of the analog inputs and outputs, please refer to attached Calibration Procedure from Moore Products Company (Document SD352, section 4.0, dated 1/85).

6.7.3 Complete the CWO with all the necessary information.

6.7.4 Fill apropiate label and attach to the instrument.

7. HISTORY CHANGE

Date	*Revision*	*Description*
12/08/97	00	New
12/14/00	01	This procedure was revised due to its two-year expiration date.
	02	The section 6.5.2.6 was edited.

Approval:_____

Date:_____

Standard Operating Procedure

Page 1 de 5	FU-005-02	Flow Meter Devices Verification/Calibration

Distribution	Work Area	Code	Location (SOPs Manual by Area)	Total of Copies
[ ]	Warehouse	WH		
[ ]	Environmental	EE		
[x]	Regulatory Affairs	RA	SM – 01	1
[ ]	Purchasing	PU		
[ ]	Quality Control	QC		
[ ]	Finance	FI		
[ ]	Quality Assurance	QA		
[ ]	Guayama 1	G1		
[ ]	Guayama 2	G2		
[ ]	Guayama 3	G3		
[ ]	Guayama 4	G4		
[ ]	Technical Information	TI		
[x]	Engineering	EN	SM – 01	1
[x]	Instalation & Utilities	FU	SM – 01,02,03	3
[ ]	Research & Development	RD		
[ ]	Kilo Lab.	KL		
[ ]	Manufacturing	CM		
[ ]	Planning	PL		
[ ]	Human Resources	HR		
[ ]	Health & Security	SS		
[x]	Quality System	QS	SM – 01	1
[ ]	Information System	IS		
[ ]	Validation	VA		

Replaces: FU-005-01	Prepared by: Pedro Davila Date: 10/10/03
	Revised by: Date:: 10/10/03
Date of Effectiveness: 10/20/03	Dept. Manager: Date: 10/10/03
	QA Manager: Diane Stegall Date:: 10/10/03
	Quality Director: Date:: 10/10/03
	Other (if applicable): N/A Date:: 10/10/03

Standard Operating Procedure

1. OBJECTIVE

1.1 To describe the procedure to be followed in order to verify or calibrate flow meter devices at API Industries facility in Guayama, PR.

2. SCOPE AND APPLICATION

2.1 The successful execution of this procedure will certify that the devices are within certified tolerances and meet API Industries quality standards.

3. RESPONSABILITIES

3.1 The instrumentation personnel is responsible to follow this procedure when the execution of the verification and/or calibration of the device will be performed.

3.2 The Maintenance Supervisor is responsible for preparing and revising this procedure.

4. DEFINITIONS

4.1 Calibration Work Order (CWO): It is a form that will be automatically generated in specific frecuency for any instrument or equipment for verification/ calibration (See form FU-001F1, current revision).

5. REFERENCES

5.1 Instruments Manufacturer's Manuals

5.2 CFR Tittle 21 Part 211.68(a)

6. PROCEDURE

6.1 Flow Meter – Bucket Type

6.1.1 Block off normal flow through line (downstream of meter) after attaching a rubber hose or similar device to tee off location, right after meter.

6.1.2 Establish flow through hose, to a suitable value, directing liquid into empty 55 gallon drum. Flow should be observed in local readout.

6.1.3 When flow is stable, switch hose into 5 or 1 gallon calibrated container, starting chronometer simultaneously with a certified chronometer. Stop chronometer when container is full, switching hose into 55 gallon drum again. Stop flow through hose.

6.1.4 Determine flow rate and see if it matches values established. Record the readings in a CWO.

6.1.5 Repeat steps 6.1.2 to 6.1.4 three times to obtain an average flow rate.

6.1.6 Compare results and verify if it is not out of the specified tolerance in the CWO. A formal calibration should be repeated if a discrepancy was found.

6.1.7 Adjust the unit if necessary

6.1.8 Return all valves to the original normal flow.

6.1.9 Complete the CWO with all necessary information.

6.1.10 Fill the appropriate label and attach to the instrument.

6.2 Flow Meter – Body Section

6.2.1 In Field instrument verification/calibration

6.2.1.1 Block-off all valves leading to and from instrument.

6.2.1.2 Connect hose to downstream side of flowmeter. Put end of hose into a pre-weighed tank or drum. Run a pre-determined quantity through meter.

6.2.1.3 Weigh tank and calculate quantity of liquid. Record all data and formula in the CWO.

6.2.1.4 Compare and verify if it is not out of the specified tolerance in the CWO.

6.2.1.5 Adjust meter, if it is necessary. Repeat run until reading matches the calibration meter..

6.2.1.6 Return all valve to the original normal flow

6.2.1.7 Complete the CWO with all necessary information.

6.2.1.8 Fill the appropriate label and attach to the instrument.

6.2.2 In Metrology Lab Instrument Verification/ Calibration (if applicable)

6.2.2.1 Block-off all valves leading to and from instrument.

6.2.2.2 Remove meter from its location.

6.2.2.3 Install meter in the metrology lab, in series with a certified flow meter.

Note: An alternate method is to connect the certified meter in series with the meter on site.

6.2.2.4 Run a pre-determined quantity of water through both meters. Compare and record the data in the CWO.

6.2.2.5 Compare and verify if it is not out of specified tolerance in the CWO.

6.2.2.6 Adjust meter, if it is necessary. Repeat run until reading matches the calibration.

6.2.2.7 Complete the CWO with all necessary information.

6.2.2.8 Fill the appropriate label and attach to the instrument.

6.2.2.9 Return the instrument to the original place and return all valves to the original flow.

Standard Operating Procedure

7. HISTORY CHANGE

Date	*Revision*	*Description*
02/04/98	00	New
08/28/01	01	**Modified:** Steps 3.1, 3.2, 6.1.5, 6.2.1.5, 6.2.2.6
10|20|03	02	Modified: Steps 6.2.2.3 Change name and corporate logo.

ChemSource

Procedimiento Normalizado de Trabajo

Page 1 of 3	FU-011-02	pH Meter Devices Verification/Calibration

Distribución	Area de Trabajo	Código	Localización (Manual SOPs por Area)	Total de Copias
[ ]	Almacén	WH		
[ ]	Ambiental	EE		
[x]	Asuntos Regulatorios	RA	SM – 01	1
[ ]	Compras	PU		
[ ]	Control de Calidad	QC		
[ ]	Finanzas	FI		
[ ]	Garantía de Calidad	QA		
[x]	Guayama 1	G1	SM – 01	1
[x]	Guayama 2	G2	SM – 01	1
[x]	Guayama 3	G3	SM – 01	1
[x]	Guayama 4	G4	SM – 01	1
[ ]	Información Técnica	TI		
[ ]	Ingeniería	EN		
[x]	Instalaciones / Utilidades	FU	SM – 01,02,03	3
[x]	Investigación y Desarrollo	RD	SM – 01,02	2
[x]	Kilo Laboratorio	KL	SM – 01	1
[x]	Manufactura	CM	SM – 01	1
[ ]	Planificación	PL		
[ ]	Recursos Humanos	HR		
[ ]	Salud y Seguridad	SS		
[x]	Sistema de Calidad	QS	SM – 01	1
[ ]	Sistemas de Información	IS		
[ ]	Validaciones	VA		

Supersedes: FU-011-01	Prepared by : [signature] Date : 12-17-02
Effective Date: 01-07-03	Reviewed by : [signature] Date : 12/18/02

Approval: [signature]

Date: 12-19-02

1. OBJECTIVE

1.1 To describe the procedure to be followed in order to verify or calibrate pH meter devices at ChemSource Corporation facilities in Guayama, PR.

2. SCOPE

2.1 The succesful execution of this procedure will be certified that the devices are within certified tolerances and meet ChemSource quality standards.

3. RESPONSABILITIES

3.1 The facilities personnel is responsible to follow this procedure when the execution of the verification and/or calibration of the device will be performed.

3.2 The facilities Supervisor is responsible for preparing and revising this procedure

4. DEFINITIONS

4.1 Calibration Work Order (CWO): A form that will be automatically generated in specific frecuency for any instrument or equipment for verification/ calibration (See form FU-001f1, current revision).

5. REFERENCES

5.1 Instruments Manufacturer's Manuals

6. PROCEDURE

6.1 Remove pH probe from stream or vessel where installed. Clean probe, following manufacturer's suggestions and refill referenced cavity.

6.2 Connect a certified milliamp meter in series with instrument output signal.

6.3 Rinse probe with distilled water; wipe dry and submerge it in standard solution (buffer) with pH value equivalent to low end value of scale or as closest to it as possible. Record the result in the CWO.

6.4 Repeat step 6.3; now with a two different pH buffer solutions.

6.5 Compare results and adjust if it is necessary.

6.6 Repeat step 6.3 and adjust zero potentiometer in to the certified milliamp meter.

6.7 Repeat the step 6.6 with the pH buffer value next to the top range of the instrument. Adjust span pot accordingly until necessary.

6.8 Repeat step 6.3 with the third pH buffer solution.

6.9 Record all necessary data.

6.10 Complete the CWO with all the necessary information.

6.11 Fill the appropiate label and attach to the instrument.

7. HISTORY CHANGE

Date	*Revision*	*Description*
12/08/97	00	New
12/14/00	01	This procedure was revised due to its two-year expiration date.
01-07-03	02	This procedure was revised due to its two-year expiration date.

Approval: Diane Vega

Date: 12-19-02

Trane1 CMS Component List

API Industries, Inc.
Guayama, Puerto Rico

ID	Localization	Type	Manufacturer	Model	Calibration Frequency	Range	Accuracy[1]
FT/FE-908-1	Organic waste flow rate	Mass flow transmitter	FOXBORO	CFT10	12 months	0 – 12 L/min	+/- 0.25%
FT/FE-923-1	Aqueous waste flow rate	Magnetic flow transmitter	YOKOWAGA	YMA11	12 months	0 – 27 L/min	+/- 0.15%
PT-975B-1	Aqueous waste atomization pressure	Pressure Transmitter	FOXBORO	821GM	12 months	0 – 75 psi	+/- 0.2%
PT-975A-1	Organic waste atomization pressure	Pressure transmitter	FOXBORO	821GM	12 months	0 – 75 psi	+/- 0.2%
FT-904-1	Kerosene flow rate	Mass Flow Transmitter	FOXBORO	CFT10	12 months	0 – 6 L/min	+/- 0.2%
TIC-905-1	Incinerator combustion chamber temperature	Temperature indicator	PYROMATION	K E230	12 months	0 – 1200 °C	+/- 0.2%
FT-907-1	Combustion air flow rate	Differential pressure transmitter	FOXBORO	821GM	12 months	0 – 9.6 in H2O	+/- 0.25%
FT-906-1	Secondary air flow rate	Differential pressure transmitter	FISCHER & PORTER	50DP4	12 months	0 – 6 in H2O	+/- 0.25%
FT-975C-1	Organic waste atomization air flow rate	Differential pressure transmitter	FOXBORO	823 DPI	12 months	0 – 100 in H2O	+/- 0.25%
FT-975D-1	Aqueous waste atomization air flow rate	Differential pressure transmitter	FOXBORO	823 DPI	12 months	0 – 100 in H2O	+/- 0.25%
AE-900-1	CO and O2 Analyzer CEMS	Gas Analyzer	SICK/MAIHAK	S700	Daily	0 – 2000 ppm 0 – 3000 ppm	+/- 0.1%
AT-900A-1	O2 Analyzer	Gas Analyzer	YOKOGAWA	ZA8C	6 months	TBD	TBD
AE-901-1	Quench tank blowdown pH	PH Transmitter	YOKOGAWA	PH200	3 months	0 – 14 PH	+/- 7.14%
FT-903-1	Quench tank blowdown flowrate	Magnetic flow transmitter	YOKOGAWA	AM205A	12 months	0 – 200 L/min	+/- 0.25%

[1] Percentages are applied to the range

Trane1 CMS Component List

API Industries, Inc.
Guayama, Puerto Rico

ID	Localization	Type	Manufacturer	Model	Calibration Frequency	Range	Accuracy[1]
LT-910-1	Quench tank water level	Differential pressure transmitter	ROSEMOUNT	1151DP	18 months	0 – 100 in H2O	+/- 0.2%
PDT-945-1	Venturi scrubber pressure drop	Differential pressure transmitter	FOXBORO	821GM	6 months	0 – 100 in H2O	+/- 0.2%
FT-901A-1	Venturi scrubber recycle water flow	Magnetic flow transmitter	YOKOGAWA	AM205A	12 months	0 – 492 L/min	+/- 0.2%
AE-902-1	Venturi scrubber recycle water pH	PH Transmitter	YOKOGAWA	PH200	3 months	0 – 14 PH	+/- 7.14%
FT-944-1	Venturi scrubber blowdown flow rate	Vortex flow transmitter	YOKOGAWA	YF100	12 months	0 – 12 gpm	+/- 0.1%
LT-907-1	Separator tank water level	Differential pressure transmitter	FOXBORO	823DP	18 months	0 – 63.7 in H2O	+/- 0.25%
SQ-300V/300A	WESP secondary power input	Automatic voltage control	EIL	YE-250-3	12 months	0 – 80 KVDC/ 0 – 2000 ma dc	+/- 1.0 KVDC +/- 1.0 ma dc

Trane2 CMS Component List

API Industries, Inc.
Guayama, Puerto Rico

ID	Localization	Type	Manufacturer	Model	Calibration Frequency	Range	Accuracy[1]
FT/FE-908-2	Organic waste flow rate	Mass flow transmitter	FOXBORO	CFT10	12 months	0 – 12 L/min	+/- 0.25%
FT/FE-923-2	Aqueous waste flow rate	Magnetic flow transmitter	YOKOWAGA	YMA11	12 months	0 – 27 L/min	+/- 0.15%
PT-975B-2	Aqueous waste atomization pressure	Magnetic flow transmitter	FOXBORO	821GM	12 months	0 – 75 psi	+/- 0.2%
PT-975A-2	Organic waste atomization pressure	Differential pressure transmitter	FOXBORO	821GM	12 months	0 – 75 psi	+/- 0.2%
FT-904-2	Kerosene flow rate	Magnetic flow transmitter	MICRO MOTION	D12	12 months	0 – 6 L/min	+/- 0.2%
TIC-905-2	Incinerator combustion chamber temperature	Thermocouple	PYROMATION	K E230	12 months	0 – 1200 °C	+/- 0.2%
FT-907-2	Combustion air flow rate	Differential pressure transmitter	FOXBORO	821GM	12 months	0 – 9.6 in H2O	+/- 0.25%
FT-906-2	Secondary air flow rate	Differential pressure transmitter	FISCHER & PORTER	50DP4	12 months	0 – 6 in H2O	+/- 0.25%
FT-975C-2	Organic waste atomization air flow rate	Differential pressure transmitter	FOXBORO	823 DPI3	12 months	0 – 100 in H2O	+/- 0.25%
FT-975D-2	Aqueous waste atomization air flow rate	Differential pressure transmitter	FOXBORO	823 DPI3	12 months	0 – 100 in H2O	+/- 0.25%
AE-900-1	CO and O2 Analyzer CEMS	Gas Analyzer	SICK/MAIHAK	S700	Daily	0 – 200 ppm 0 – 300 ppm	+/- 0.1%
AT-900A-2	O2 Analyzer	Gas Analyzer	YOKOGAWA	ZA8C	6 months	TBD	TBD
AE-901-2	Quench tank blowdown pH	PH Transmitter	YOKOGAWA	PH200	3 months	0 – 14 PH	+/- 7.14%
FT-903-2	Quench tank blowdown flowrate	Magnetic flow transmitter	YOKOGAWA	AM205A	12 months	0 – 200 L/min	+/- 0.25%

[1] Percentages are applied to the span range

Trane2 CMS Component List

API Industries, Inc.
Guayama, Puerto Rico

ID	Localization	Type	Manufacturer	Model	Calibration Frequency	Range	Accuracy[1]
LT-910-2	Quench tank water level	Differential pressure transmitter	ROSEMOUNT	1151DP	18 months	0 – 100 in H2O	+/- 0.2%
PDT-945-2	Venturi scrubber pressure drop	Differential pressure transmitter	FOXBORO	821GM	6 months	0 – 100 in H2O	+/- 0.2%
FT-901A-2	Venturi scrubber recycle water flow	Magnetic flow transmitter	YOKOGAWA	AM205A	12 months	0 – 492 L/min	+/- 0.2%
AE-902-2	Venturi scrubber recycle water pH	PH Transmitter	YOKOGAWA	PH200	3 months	0 – 14 PH	+/- 7.14%
FT-944-2	Venturi scrubber blowdown flow rate	Vortex flow transmitter	YOKOGAWA	YF100	12 months	0 – 12 gpm	+/- 0.1%
LT-907-2	Separator tank water level	Differential pressure transmitter	FOXBORO	823DP	18 months	0 – 63.7 in H2O	+/- 0.25%
SQ-300V/300A	WESP secondary power input	Automatic voltage control	EIL	YE-250-3	12 months	0 – 80 KVDC/ 0 – 2000 ma dc	+/- 1.0 KVDC +/- 1.0 ma dc

Trane 1 SOPs and Calibration Procedures

TAG	Description	SOP	Calibration Procedure
FT/FE-908-1	Hazardous Organic Waste Flow	FU-005	FT:CFT10:Foxboro
FT/FE-923-1	Hazardous Aqueous Waste Flow	FU-005	FT:YMA11:Yokogawa
FT-904-1	Kerosene Flow	FU-005	FT:CFT10:Foxboro
FT-907-1	Combustion Air Flow	FU-003	PT:821GM:Foxboro
FT-906-1	Secondary Air Flow	FU-003	FT:50DP4:Fischer&Port er
FT-975C-1	Organic waste Atomization Air Flow	FU-003	FT:823DPI:FOXBORO
FT-975D-1	Aqueous waste Atomization Air Flow	FU-003	FT:823DPI:FOXBORO
PT-975A-1	Organic Waste Atomization Pressure	FU-003	PT:821GM:Foxboro
PT-975B-1	Aqueous Waste Atomization Pressure	FU-003	PT:821GM:Foxboro
TIC-905-1	Incinerator Combustion Chamber Temperature	FU-008	FU-008
AE-901-1	Quench Tank Blowdown PH	FU-011	AE:PH200:Yokogawa
TI-911-1	Quench Tank Exit Temperature	FU-008	FU-008
LT-910-1	Quench Tank Water Level	FU-006	LT:1151DP:Rosemount
FT-903-1	Quench Tank Blowdown Flow	FU-005	FT:AM205A:Yokogawa
PDT-945-1	Venturi Scrubber Pressure Drop	FU-003	PT:821GM:Foxboro
FT-901A-1	Venturi Scrubber Recycle Water Flow	FU-005	FT:AM205A:Yokogawa
AE-902-1	Venturi Scrubber Recycle Water PH	FU-011	AE:PH200:Yokogawa
FT-944-1	Venturi Scrubber Blowdown Flow Rate	FU-005	FT:YF100:Yokogawa
LT-907-1	Separator Tank Water Level	FU-003	FT:823DPI:FOXBORO
SQ-300V/300A	WESP Secondary Power Input	VT:VJH7:Yokogawa	VT:VJH7:Yokogawa
AT-900A-1	O_2 Analyzer	AT:ZA8C:Yokogawa	AT:ZA8C:Yokogawa
AE-900-1	Carbon Monoxide Monitor	FU-043	FU-043

Trane 2 SOPs and Calibration Procedures

TAG	Description	SOP	Calibration Procedure
FT/FE-908-2	Hazardous Organic Waste Flow	FU-005	FT:CFT10:Foxboro
FT/FE-923-2	Hazardous Aqueous Waste Flow	FU-005	FT:YMA11:Yokogawa
FT-904-2	Kerosene Flow	FU-005	FT:D12:Micro Motion
FT-907-2	Combustion Air Flow	FU-003	PT:821GM:Foxboro
FT-906-2	Secondary Air Flow	FU-003	FT:50DP4:Fischer&Porter
FT-975C-2	Organic waste Atomization Air Flow	FU-003	FT:823DPI:FOXBORO
FT-975D-2	Aqueous waste Atomization Air Flow	FU-003	FT:823DPI:FOXBORO
PT-975A-2	Organic Waste Atomization Pressure	FU-003	PT:821GM:Foxboro
PT-975B-2	Aqueous Waste Atomization Pressure	FU-003	PT:821GM:Foxboro
TIC-905-2	Incinerator Combustion Chamber Temperature	FU-008	FU-008
AE-901-2	Quench Tank Blowdown PH	FU-011	AE:PH200:Yokogawa
TI-911-2	Quench Tank Exit Temperature	FU-008	FU-008
LT-910-2	Quench Tank Water Level	FU-006	LT:1151DP:Rosemount
FT-903-2	Quench Tank Blowdown Flow	FU-005	FT:AM205A:Yokogawa
PDT-945-2	Venturi Scrubber Pressure Drop	FU-003	PT:821GM:Foxboro
FT-901A-2	Venturi Scrubber Recycle Water Flow	FU-005	FT:AM205A:Yokogawa
AE-902-2	Venturi Scrubber Recycle Water PH	FU-011	AE:PH200:Yokogawa
FT-944-2	Venturi Scrubber Blowdown Flow Rate	FU-005	FT:YF100:Yokogawa
LT-907-2	Separator Tank Water Level	FU-003	FT:823DPI:FOXBORO
SQ-300V/300A	WESP Secondary Power Input	VT:VJH7:Yokogawa	VT:VJH7:Yokogawa
AT-900A-2	O_2 Analyzer	AT:ZA8C:Yokogawa	AT:ZA8C:Yokogawa
AE-900-1	Carbon Monoxide Monitor	FU-043	FU-043