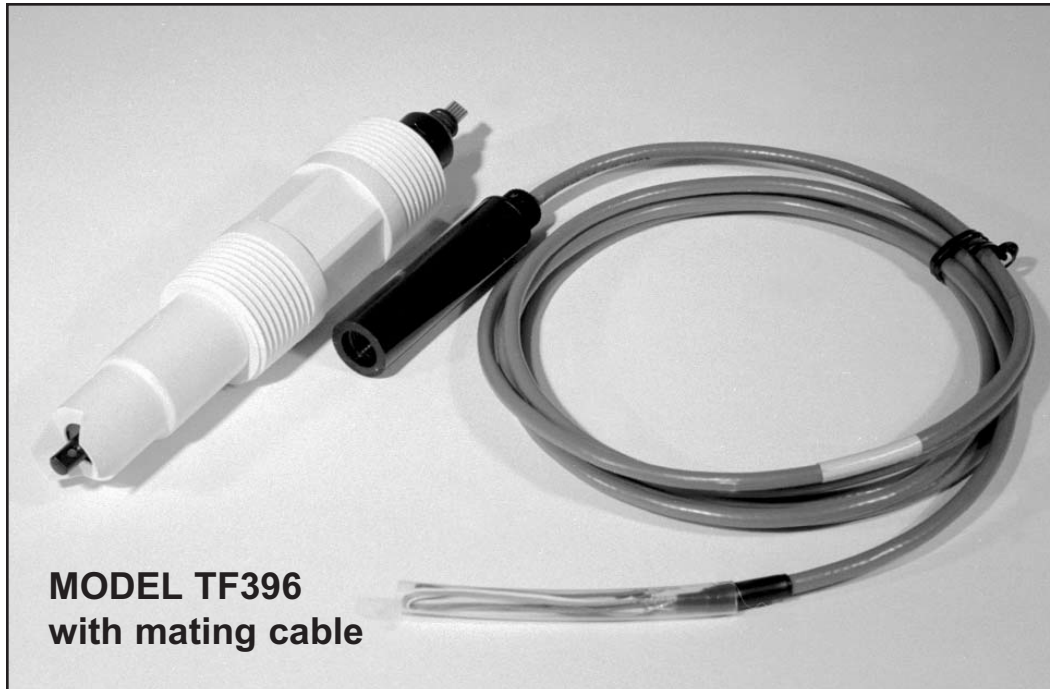


TU_pH_FET™ COMBINATION pH SENSOR



ESSENTIAL INSTRUCTIONS

READ THIS PAGE BEFORE PROCEEDING!

Rosemount Analytical designs, manufactures, and tests its products to meet many national and international standards. Because these instruments are sophisticated technical products, you must properly install, use, and maintain them to ensure they continue to operate within their normal specifications. The following instructions must be adhered to and integrated into your safety program when installing, using, and maintaining Rosemount Analytical products. Failure to follow the proper instructions may cause any one of the following situations to occur: Loss of life; personal injury; property damage; damage to this instrument; and warranty invalidation.

- Read all instructions prior to installing, operating, and servicing the product. If this Instruction Manual is not the correct manual, telephone 1-800-654-7768 and the requested manual will be provided. Save this Instruction Manual for future reference.
- If you do not understand any of the instructions, contact your Rosemount representative for clarification.
- Follow all warnings, cautions, and instructions marked on and supplied with the product.
- Inform and educate your personnel in the proper installation, operation, and maintenance of the product.
- Install your equipment as specified in the Installation Instructions of the appropriate Instruction Manual and per applicable local and national codes. Connect all products to the proper electrical and pressure sources.
- To ensure proper performance, use qualified personnel to install, operate, update, program, and maintain the product.
- When replacement parts are required, ensure that qualified people use replacement parts specified by Rosemount. Unauthorized parts and procedures can affect the product's performance and place the safe operation of your process at risk. Look alike substitutions may result in fire, electrical hazards, or improper operation.

DANGER HAZARDOUS AREA INSTALLATION

This sensor is not Intrinsically Safe. or Explosion Proof. Installations near flammable liquids or in hazardous area locations must be carefully evaluated by qualified on site safety personnel.

To secure and maintain an intrinsically safe installation, an appropriate transmitter/ safety barrier/sensor combination must be used. The installation system must be in accordance with the governing approval agency (FM, CSA or BASEEFA/CENELEC) hazardous area classification requirements. Consult your analyzer/transmitter instruction manual for details.

Proper installation, operation and servicing of this sensor in a Hazardous Area Installation is entirely the responsibility of the user.

CAUTION SENSOR/PROCESS APPLICATION COMPATIBILITY

The wetted sensor materials may not be compatible with process composition and operating conditions. Application compatibility is entirely the responsibility of the user.

About This Document

This manual contains instructions for installation and operation of the Model TF396 TUpHFET Combination pH Sensor. The following list provides notes concerning all revisions of this document.

<u>Rev. Level</u>	<u>Date</u>	<u>Notes</u>
A	6/02	This is the initial release of the product manual. The manual has been reformatted to reflect the Emerson documentation style and updated to reflect any changes in the product offering.
B	4/03	Revised figure 2-3 on page 5.
C	10/05	PN 9330022 has been deleted, changed to PN 9320057 on the drawing of 4TF39603, page 6.
D	2/06	Deleted cable lengths of 8 and 12 ft, changed PN on Figure 2-1, page 4.
E	2/08	Updates of page 1, Description and Specifications and page 2, ordering information.
F	9/09	Updates on 16, DNV logo for 2008.

Emerson Process Management

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EMERSON
Process Management

MODEL TF396 COMBINATION pH SENSOR

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SECTION 1.0

DESCRIPTION AND SPECIFICATIONS

1.1 FEATURES AND APPLICATIONS

The ion-selective field effect transistor (ISFET) pH electrode provides a stable pH measurement. Its rate of response can be ten times faster than glass electrodes, enabling better process control. Its short response time and increased stability at low temperatures make it suitable for use in cold processes like brine or water for cooling. Aging effects caused by temperature fluctuations or large changes of process pH are greatly reduced, providing longer intervals between calibration and maintenance of the sensor.

Because there is no glass bulb, it can be used in many applications that restrict or prohibit pH glass electrodes due to the risk of broken glass getting into the process. It may also provide longer sensor life in processes that will break or crack pH glass bulbs. By allowing direct installation into the process, costs for laboratory analysis of sample lines are greatly reduced.

The TUpH Reference technology includes a large area reference junction for minimum maintenance requirements. The reference junction provides an electrical connection between the reference electrode and the sample, and helps maintain a stable reference potential, regardless of the change in sample pH. The TUpH reference electrode junction (the entire plastic tip surrounding the ISFET electrode) maintains a steady reference signal, even in dirty applications, by resisting plugging (a common cause of pH signal drift). This large reference junction area (400 times

greater than typical teflon or ceramic junctions) is made of micron-sized reference pathways allowing for ionic exchange but preventing plugging by larger particles and will continue to send a steady pH signal, even in the dirtiest of applications. The field-proven TUpH reference junction technology results in greatly reduced maintenance requirements.

The TUpH helical reference pathway resists reference poisoning. Ions diffuse through the reference pathways and a charge is passed to the reference element. The reference element must be protected from contamination by poisoning ions such as sulfide, mercury, cyanide, and ammonia that will cause reference drift and offsets. The TUpH sensor's long internal reference pathway hinders the contaminants' migration to the reference element thereby providing an increased sensor life.

All TUpH sensor models have been specifically designed for improved performance in harsh, dirty, or abrasive applications where large quantities of suspended solids are present.

The Model TF396 offers a watertight sensor-to-cable connector that prevents cable twisting and eliminates the need for rewiring when replacing the sensor. The sensor cable includes an integral preamplifier cap with mating connector and is compatible with most Rosemount Analytical analyzers and transmitters.

1.2 SPECIFICATIONS

Measurement Range: 2-12 pH

Measuring element: ISFET

Repeatability: ± 0.05 pH

Response time to pH change: 99% in 30 seconds step change

Wetted Materials: *Code -01:* Polypropylene, EPDM, Ryton, Silicon.
Code -02: 316SST, Titanium, Polypropylene, EPDM, Ryton, Silicon

Process Connections: *Code -01:* 1 in. MNPT front and rear facing threads
Code -02: 2 in. Tri-Clamp connection

Temperature Range: 0 to 100°C (32 to 212°F) @ 50 psig

Pressure Range: -10 to 100 psig (32 to 790 kPa [abs]) at 50°C

Minimum Process Conductivity: 75 $\mu\text{S}/\text{cm}$; nominal: 100 $\mu\text{S}/\text{cm}$

Cable Lengths: 20 ft, 50 ft (6 m, 18 m)

Weight/Shipping Weight: 0.45 kg/0.9 kg (1 lb/2 lb)

1.3 ORDERING INFORMATION

The Model TF396 TuPHFET Non-glass ISFET pH Sensor is housed in a molded reinforced polypropylene body with 1 in. MNPT threads suitable for insertion, submersion or flow through installation, or housed in a 316SST body for use with a 2.0 inch Tri-Clamp fitting. The sensor includes an ion-selective field effect transistor, a patented reference junction, a solution ground, and a recessed protective tip. The Model TF396 includes automatic temperature compensation (Pt 100 RTD) and connector for use with a cable assembly that includes an integral cap with mating connector and a choice of 20 or 50 ft of cable.

MODEL TF396 NON-GLASS ISFET pH SENSOR	
CODE	PREAMPLIFIER/CABLE (Required Selection)
01	Threaded body for insertion/submersion service
02	316 SST Body for use with Tri-clamp (PN 23513-00, ordered separately)
CODE	CABLE AND INTEGRAL CAP WITH PREAMPLIFIER
C08	20 ft cable
C50	50 ft cable
TF396	-01 -C08 EXAMPLE

Notes:

- ¹ For first-time installation, cable and integral cap with preamplifier (Codes C20 or C50) must be included.
- ² For installations with distances (between the sensor and instrument) of more than 50 ft; a cable extension junction box should be used.
- ³ The Model TF396 is compatible with Models 54e, 1055, 81, 3081, 4081, 1056, XMT and 5081 .

ACCESSORIES: FIRST TIME INSTALLATION GUIDE

CODE	MOUNTING ASSEMBLIES
915240-03	Tee, Flow-through, 2 in. PVC, 3/4 in. NPT
915240-04	Tee, Flow-through, 2 in. PVC, 1 in. NPT
915240-05	Tee, Flow-through, 2 in. PVC, 1-1/2 in. NPT
11275-01	Handrail Mounting Assembly
2002011	Flow Cell, CPVC, 1 in. FNPT
24091-00	Cell, Low Flow
SQP10098-LQD	2.0 inch Tri-Clamp adapter (SQ11109; formerly PN 23513-00)
CODE	REMOTE JUNCTION BOXES
23550-00	Cable extension junction box
CODE	EXTENSION CABLES (requires a remote junction box)
9200273	Cable, Extension, 11 Conductor, Shielded, Unprepped
23646-01	Cable, Extension, 11 Conductor, Shielded, Prepped, per ft
CODE	OTHER
2001492	Tag, Stainless Steel, Specify Marking
12707-00	Jet Spray Cleaner
23242-02	Mounting Adapter, 1-1/2 in. Insertion, 1 in. x 3/4 in.
7901631	Shroud, PVC
9210012	Buffer Solution, 4.01pH, 16 oz.
9210013	Buffer Solution, 6.86pH, 16 oz.
9210014	Buffer Solution, 9.18pH, 16 oz.
9322014	Union, KYNAR
9330022	Union, CPVC

SECTION 2.0 INSTALLATION

2.1 UNPACKING AND INSPECTION.

Inspect the outside of the carton for any damage. If damage is detected, contact the carrier immediately. Inspect the hardware. Make sure all the items in the packing list are present and in good condition. Notify the factory if any part is missing. If the sensor appears to be in satisfactory condition, proceed to Section 2.2, Mounting.

NOTE

Save the original packing cartons and materials as most carriers require proof of damage due to mishandling, etc. Also, if it is necessary to return the sensor to the factory, you must pack the sensor in the same manner as it was received. Refer to Section 6.0 for return instructions. If the sensor is to be stored, the vinyl boot should be filled with pH buffer solution and replaced on sensor tip until ready to use.



CAUTION

Buffer solution, in the vinyl boot, may cause skin or eye irritation.

WARNING

Electrode tip must be wetted at all times (in storage and in line) to maximize sensor life.



CAUTION

Cable connection at back of sensor body is fragile. Do not overtighten.

2.2 MOUNTING.

The sensor has been designed to be located in industrial process environments. Temperature and pressure limitations must not be exceeded at any time. A caution label regarding this matter is attached to the sensor. Please do not remove the label. See Figure 2-1.



CAUTION

Internal electrolyte fill solution may cause skin or eye irritation.



CAUTION

Cable connection at back of sensor body is fragile. Do not overtighten.

In most cases, the pH sensor can simply be installed as shipped and readings with an accuracy of ± 0.6 pH may be obtained. To obtain greater accuracy or to verify proper operation, the sensor must be calibrated as a loop with its compatible analyzer or transmitter.

2.2.1 Flow Through and Insertion Mounting.

The Model TF396 Sensor has a 1-inch MNPT process connection at the front of the sensor for mounting into a 1-1/2 inch tee or the process pipes. See Figure 2-1 through Figure 2-7 for installation configurations.

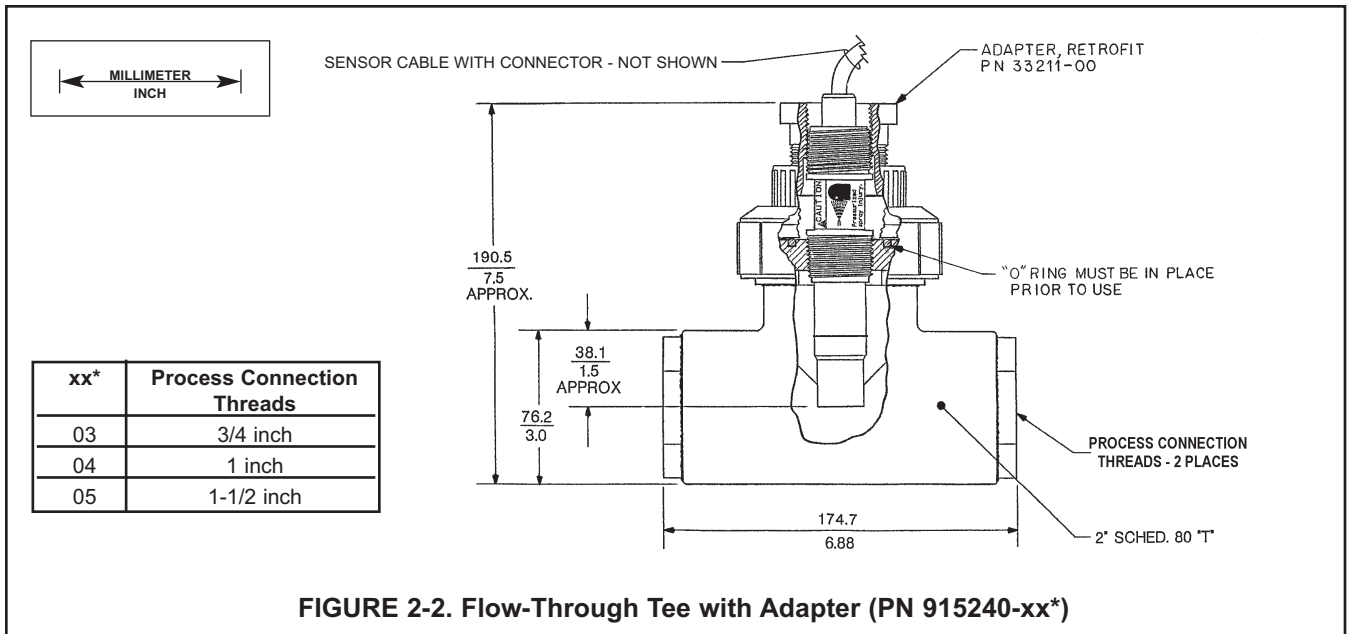
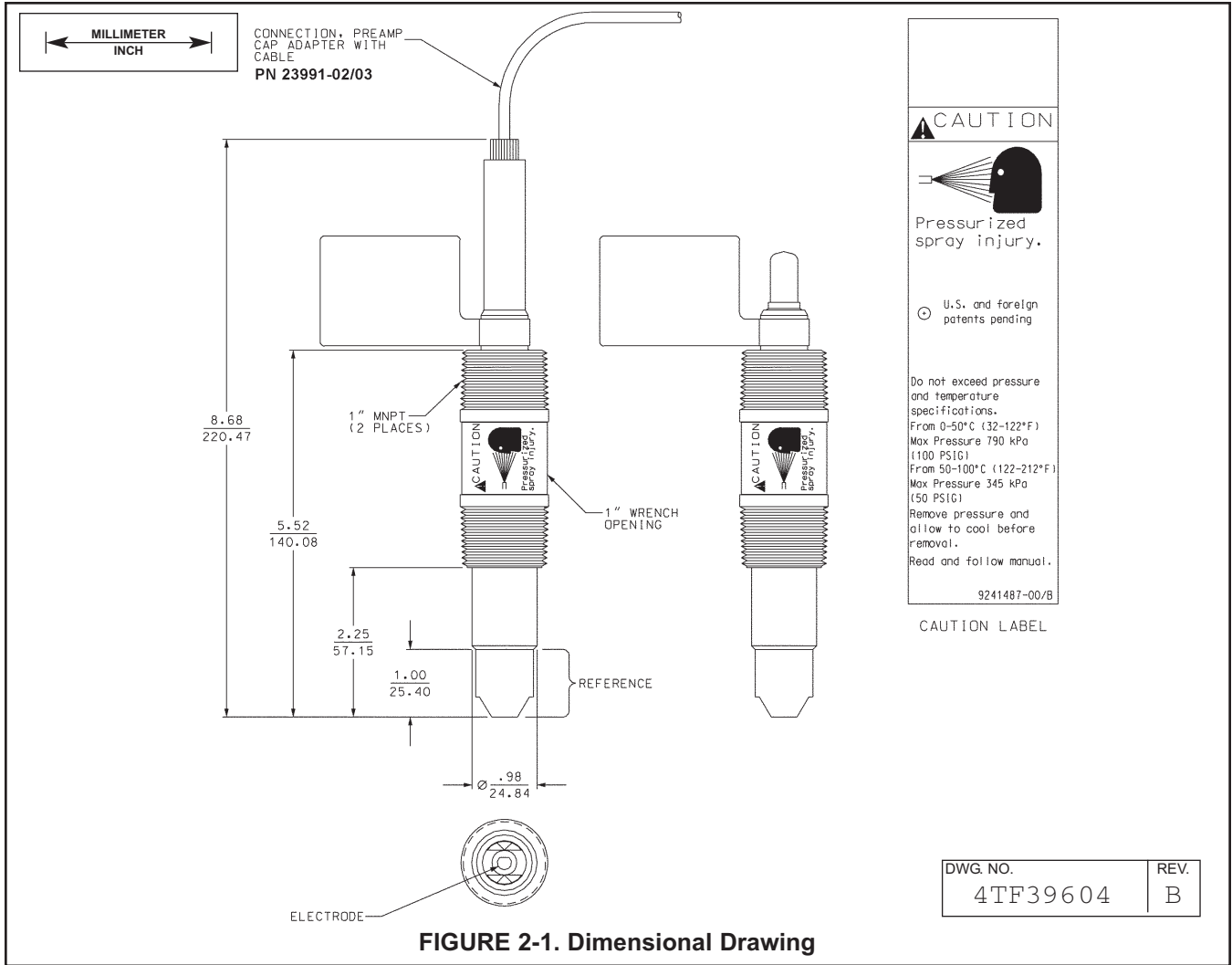
NOTE

LARGE PIPE WRENCHES MUST NOT BE USED TO TIGHTEN THE SENSOR INTO A FLANGE OR OTHER TYPE OF MOUNTING.

2.2.2 Submersion Mounting.

The Model TF396 Sensor also has a 1 inch MNPT process connection at the back of the sensor. Utilizing a standard 1 inch union, the sensor may be mounted to a 1 inch SCH 80 CPVC or PVDF standpipe (see Figure 2-5). Tapered pipe threads in plastic tend to loosen after installation. It is therefore recommended that Teflon¹ tape be used on the threads and that the tightness of the connection be checked frequently to assure that no loosening has occurred. To prevent rain water or condensation from running into the sensor, a weatherproof junction box is recommended (see Figure 2-5). The sensor cable must be run through a protective conduit for isolation from electrical interference or physical abuse from the process. The sensor should be installed within 80° of vertical, with the electrode facing down. The sensor's cable should not be run with power or control wiring.

¹ Teflon is a registered trademark of E.I. du Pont de Nemours & Co.



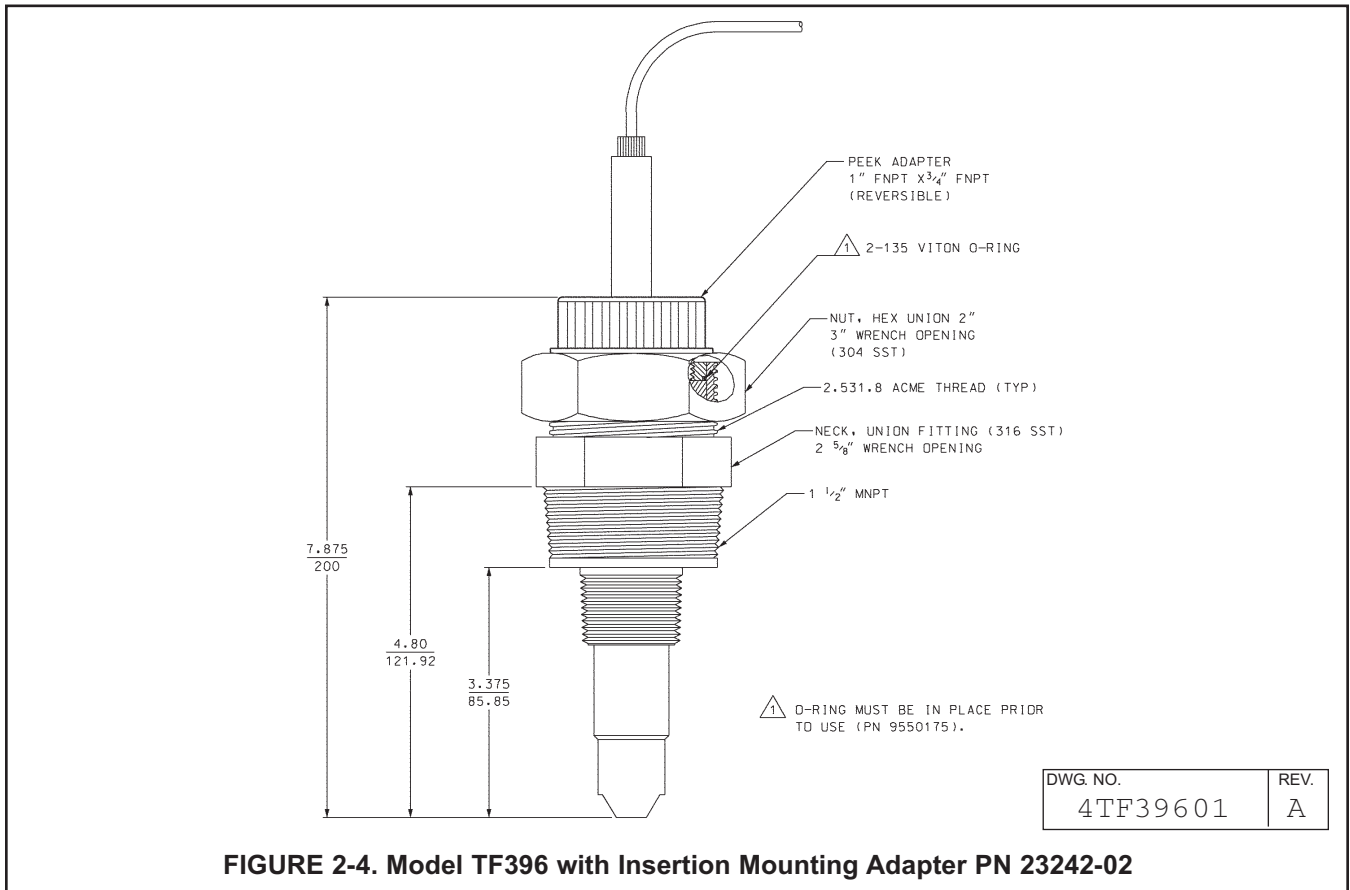
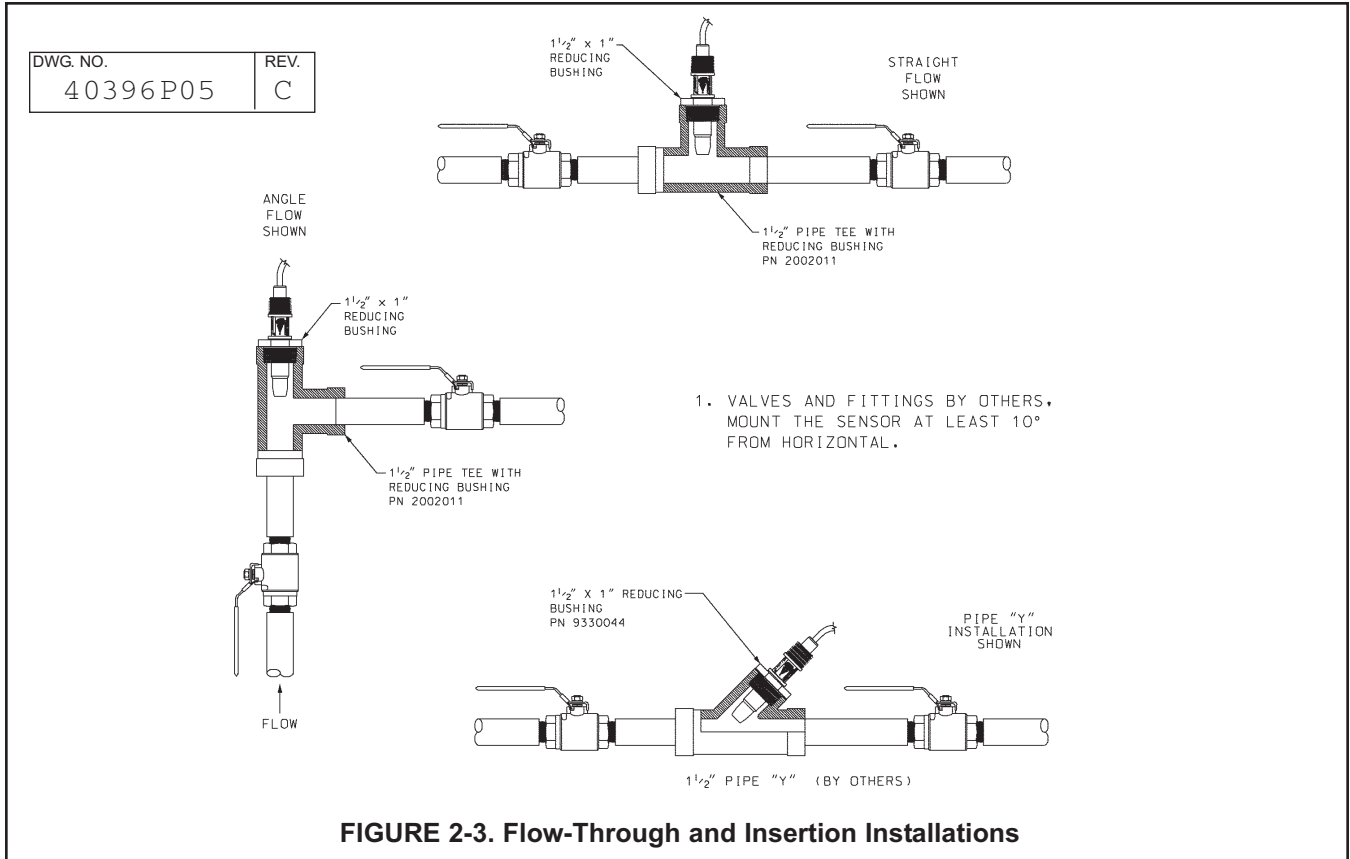
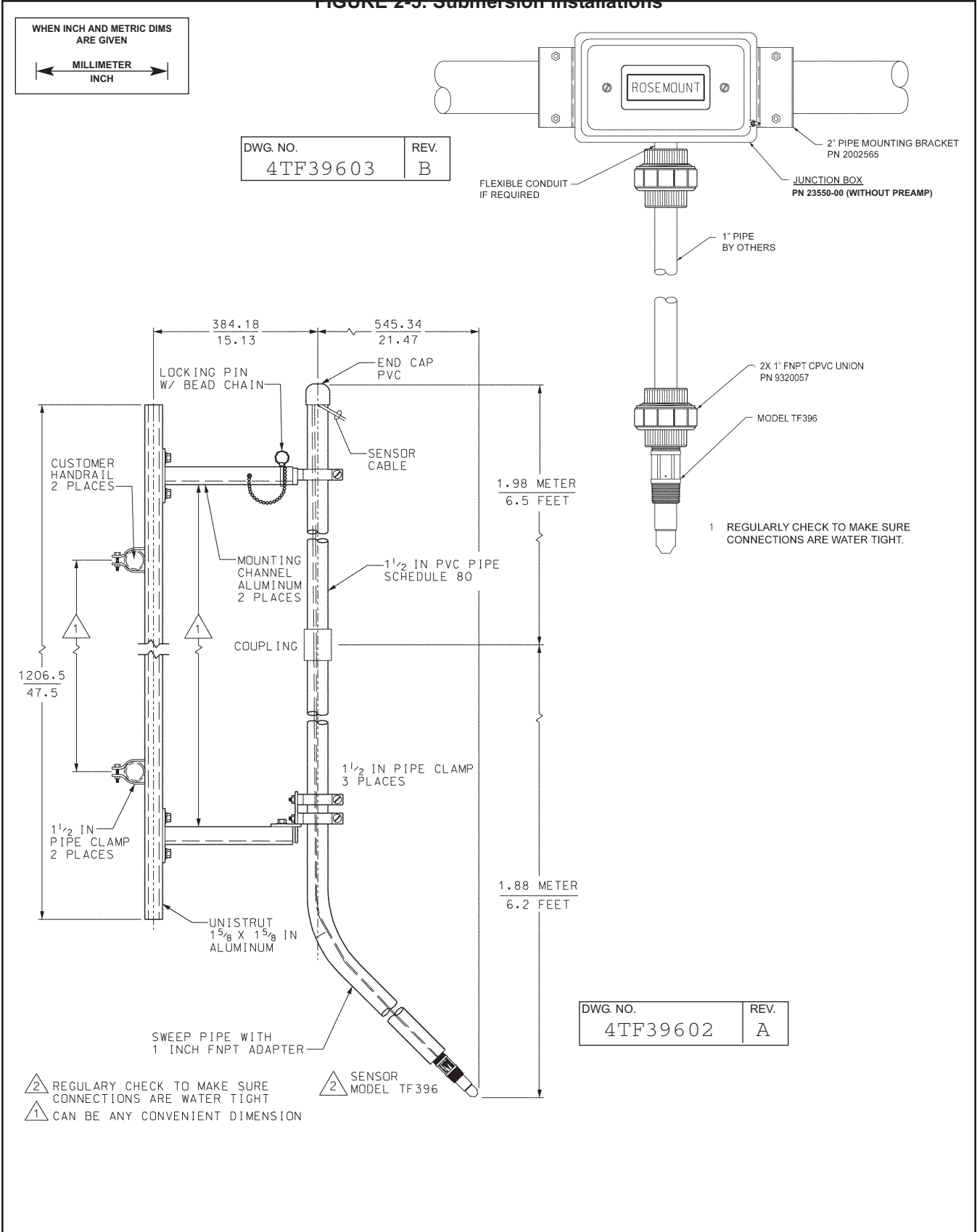


FIGURE 2-5. Submersion Installations



LOW FLOW CELL PN 24091-00

Inlet and outlet connections are stainless steel and take 1/4-inch OD tubing. Flow cell is polycarbonate with 1/4-inch FNPT fittings.

WETTED MATERIALS:

- BODY - ACRYLIC
- NUT - CPVC
- FITTINGS - 316 SST
- SEALS - BUNA N

FLOW CELL RATINGS

- TEMPERATURE: 32-122F (50C)
- MAX. PRESSURE: 65 PSIG (549 kPa [abs])
- FLOW RATE: 2-5 GPH (7.6-18.9 LPH)



The see-through acrylic Low Flow Cell

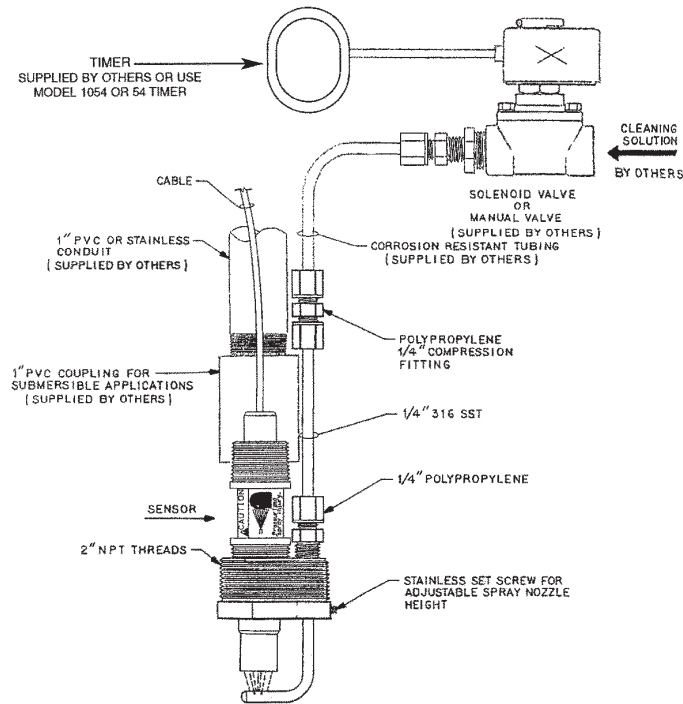
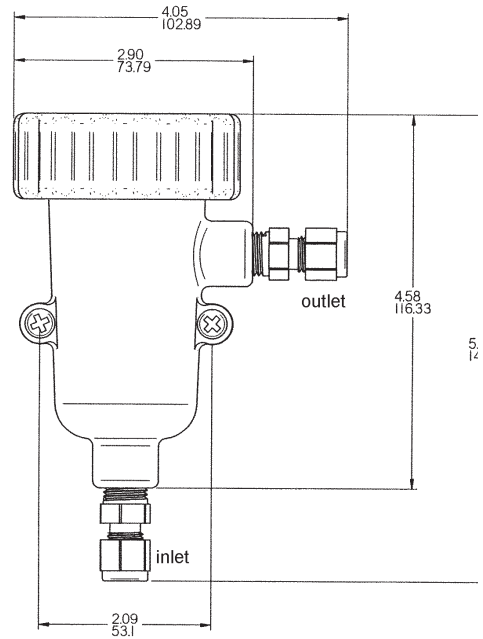


FIGURE 2-7. Jet Cleaner PN 12707-00

SECTION 3.0

WIRING — MODEL TF396

Figures in this section provide the guidelines for wiring the TF396 sensor to various analyzers/transmitters.

To determine which wiring guideline to use, locate the model number of the analyzer/transmitter to be installed.

1. If the cable needs to be extended (maximum distance from sensor to analyzer is 250 ft), use a high quality eleven conductor double shielded instrument cable available from Rosemount Analytical.

NOTE

If the cable is too long, loop up the excess cable. If the cable has to be shortened, cut and terminate each conductor neatly and **make sure that the overall (outermost) drain wire is not shorted out with either of the two inner drain wires (shields).**

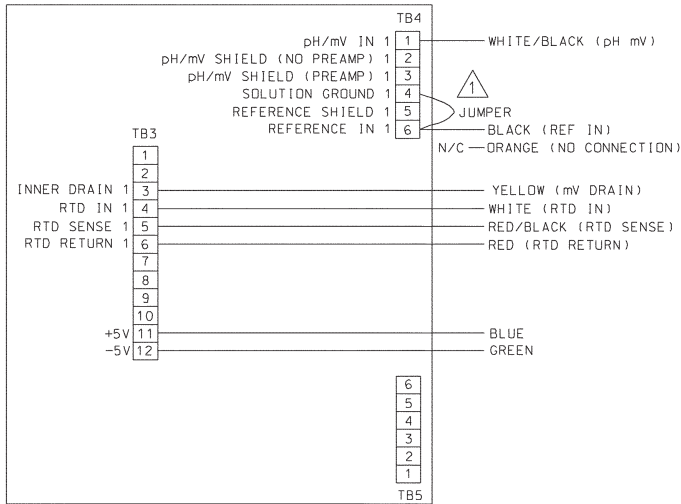
2. Signal cable should be run in a dedicated conduit (preferably an earth grounded metallic conduit) and should be kept away from AC power lines. For your convenience, a wire nut kit is furnished (in a plastic bag wrapped around the cable).

NOTE

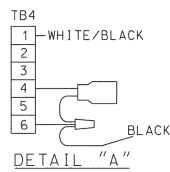
For maximum EMI/RFI protection when wiring from the sensor to the junction box, the outer braid of the sensor should be connected to the outer braided shield of the extension cable. The outer braid of the extension cable to the instrument must be terminated at earth ground or by using an appropriate metal cable gland fitting that provides a secure connection to the instrument cable.

Wiring. The Model TF396 has a mating cable with built-in preamplifier and is offered with a shielded cable. The cable should be handled carefully and kept dry and free of corrosive chemicals at all times. Extreme care should be used to prevent it from being twisted, damaged or scraped by rough, sharp edges or surfaces. Please refer to Figures 3-1 through 3-3 for wiring Model TF396.

DANGER
DO NOT CONNECT SENSOR CABLE TO
POWER LINES. SERIOUS INJURY MAY
RESULT.

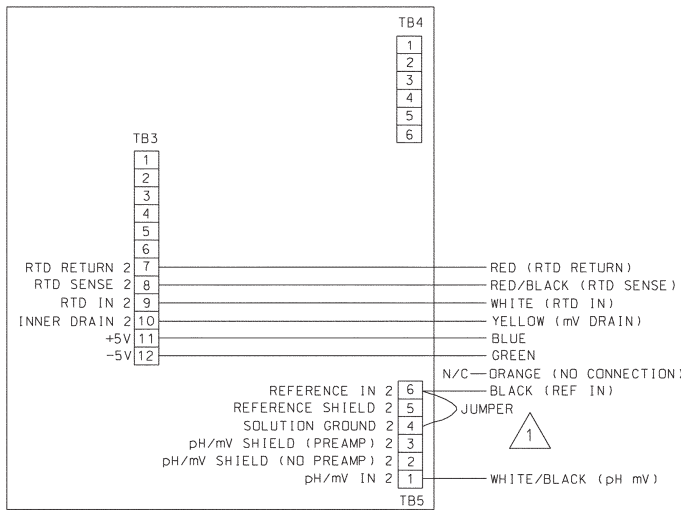


MODEL 1055-XX-XX-22-30
-22-32 (REFER TO DWG 41055103 FOR TB3 & TB5 CONNECTIONS)
-20-32
-25-32

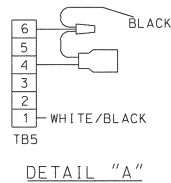


RC JUMPERS REQUIRED FOR DUAL MEASUREMENT ONLY. SEE DETAIL.

DWG. NO.	REV.
41055102	B



MODEL 1055-XX-XX-22
-22-31
-22-32 (REFER TO DWG 41055102 FOR TB3 & TB4 CONNECTIONS)
-22-33
-21-32
-23-32
-24-32
-26-32



RC JUMPERS REQUIRED FOR DUAL MEASUREMENT ONLY. SEE DETAIL.

DWG. NO.	REV.
14055103	B

FIGURE 3-1. Wiring to Model 1055.

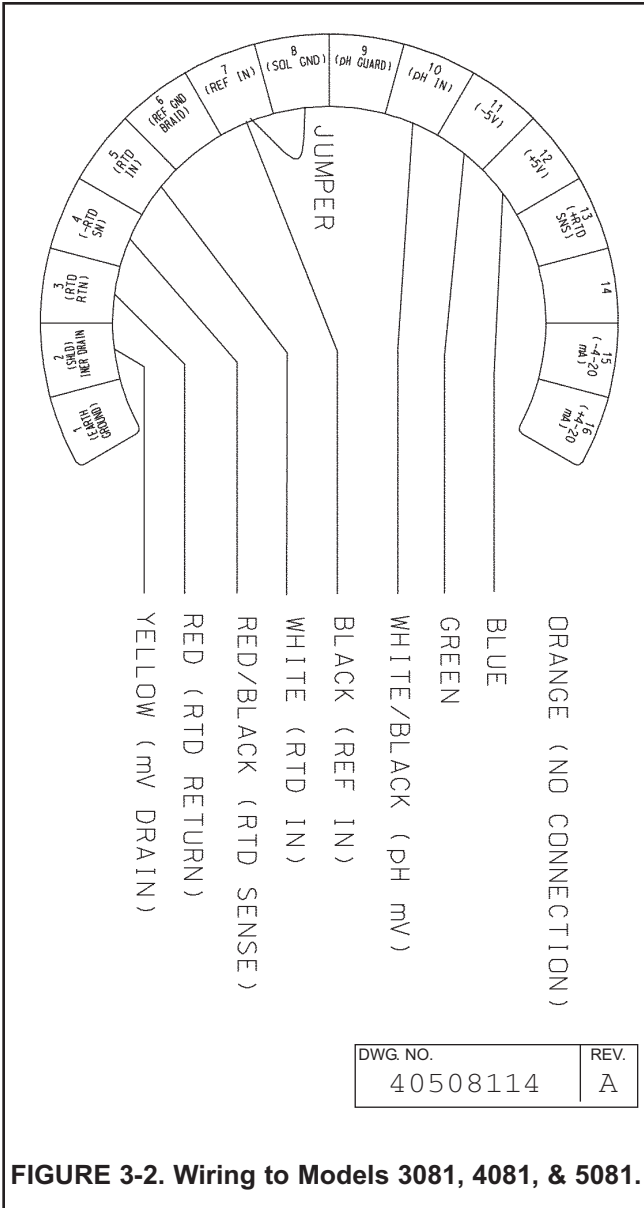


FIGURE 3-2. Wiring to Models 3081, 4081, & 5081.

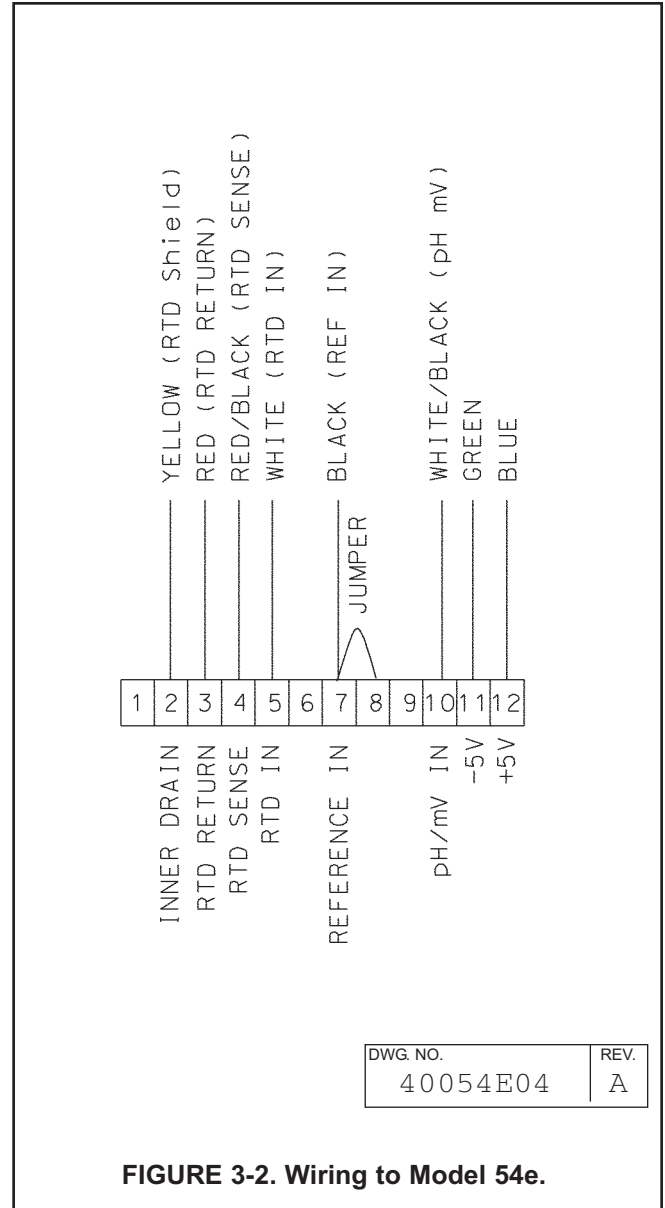


FIGURE 3-2. Wiring to Model 54e.

SECTION 4.0

START UP AND CALIBRATION

4.1 SENSOR PREPARATION.

In most cases, the pH sensor can simply be installed as shipped and readings with an accuracy of ± 0.6 pH may be obtained. To obtain greater accuracy or to verify proper operation, the sensor must be calibrated as a loop with its compatible analyzer or transmitter.

4.2 pH CALIBRATION.

After a temporary connection is established between the sensor and the instrument, a buffer calibration may be performed. Consult appropriate pH analyzer or transmitter instruction manual for specific calibration and standardization procedures, or see below for recommended two-point buffer calibration procedure.

Recommended two-point buffer calibration procedure:

Select two stable buffer solutions, preferably pH 4.0 and 10.0 (pH buffers other than pH 4.0 and pH 10.0 can be used as long as the pH values are at least two pH units apart).

NOTE

A pH 7.0 buffer solution reads a mV value of approximately zero, and pH buffers read approximately 59.1 mV for each pH unit above or below pH 7.0. Check the pH buffer manufacturer specifications for millivolt values at various temperatures since it may affect the actual value of the buffer solution mV/pH value.

1. Immerse sensor in the first buffer solution. Allow sensor to adjust to the buffer temperature (to avoid errors due to temperature differences between the buffer solution and sensor temperature) and wait for reading to stabilize. Value of buffer can now be acknowledged by analyzer/transmitter.
2. Once the first buffer has been acknowledged by the analyzer/transmitter, rinse the buffer solution off of the sensor with distilled or deionized water.
3. Repeat steps 1 and 2 using the second buffer solution.
4. Once the analyzer/transmitter has acknowledged both buffer solutions, a sensor slope (mV/pH) is established (the slope value can be found within the analyzer/transmitter).

Recommended pH Sensor Standardization:

For maximum accuracy, the sensor can be standardized online or with a process grab sample after a buffer calibration has been performed and the sensor has been conditioned to the process. Standardization accounts for the sensor junction potential and other interferences. Standardization will not change the sensor's slope but will simply adjust the analyzer's reading to match that of the known process pH.

1. While obtaining a process solution sample (it is recommended that the sample is taken close to the sensor), record the pH value that is shown on the analyzer/transmitter display.
2. Measure and record the pH of the process solution sample with another temperature compensated, calibrated pH instrument. For best results, standardization should be performed at the process temperature.
3. Adjust the analyzer/transmitter value to the standardized value.

4.3 INSTRUMENT CONFIGURATION FOR USE WITH MODEL TF396

INSTRUMENT CONFIGURATION REQUIREMENTS: For proper operation, instruments capable of advanced sensor diagnostics must have this feature turned off (please refer to the appropriate instrument's instruction manual for complete instructions).


MODEL 54epH/ORP: From the **Program** menu, select **Configure**, then **Diagnostics**. Edit **diagnostics** and select **off**.

SOLU COMP II MODEL 1055: From the **Program** menu, select **Measurement**, then **Sensor1** or **Sensor2** as appropriate, then **pH**. At the screen prompt **Glass Fault Enable?**, select **No**.

MODELS 81, 3081, 4081 OR 5081: From the **Program** menu, select **DIAG** and toggle to **OFF**.

SECTION 5.0 MAINTENANCE

The Model TF396 Sensors require minimum maintenance. The sensor should be kept clean and free of debris and sediment at all times. The frequency of cleaning by wiping or brushing with a soft cloth or brush is determined by the nature of the solution being measured. The sensor should be removed from the process periodically and checked in buffer solutions.

WARNING	
<p>BEFORE REMOVING THE SENSOR, be absolutely certain that the process pressure is reduced to 0 psig and the process temperature is lowered to a safe level!</p>	

If the sensor will not calibrate, refer to your analyzer/transmitter instruction manual for proper test procedures. If it is determined that the sensor has failed, it should be discarded and replaced.

5.1 AUTOMATIC TEMPERATURE COMPENSATOR.

The temperature compensator element is temperature sensitive and can be checked with an ohmmeter. Resistance increases with temperature.

The Pt100 will read 110 ohms at 25°C. Resistance varies with temperature for a Pt100 element and can be determined according to Table 5-2 or the following formula:

$$R_T = R_0 [1 + R_1 (T - 20)]$$

Where R_T = Resistance

T = Temperature in °C

Refer to Table 5-1 for R_0 and R_1 values.

5.2 ELECTRODE CLEANING

If the electrode is coated or dirty, clean as follows:

1. Remove the sensor from process.
2. Wipe the ISFET silicon surface with a soft, clean, lint free cloth or tissue. If this does not remove the dirt or coating, go to Step 3. (Detergents clean oil and grease; acids remove scale.)
3. Wash the sensor tip in a mild detergent solution and rinse it in clean water. If this does not clean the ISFET, go to Step 4.

CAUTION	
<p>The solution used during the following check is an acid and should be handled with care. Follow the directions of the acid manufacturer. Wear the proper protective equipment. Do not let the solution come in contact with skin or clothing. If contact with skin is made, immediately rinse with clean water.</p>	

4. Wash the sensor tip in a dilute 5% hydrochloric acid solution and rinse with clean water. Soaking the sensor overnight in the acid solution can improve cleaning action.

NOTE

Erroneous pH results may result immediately after acid soak, due to reference junction potential build-up.

Replace the sensor if cleaning does not restore sensor operation.

TABLE 5-1. R_0 and R_1 Values for Temperature Compensation Elements

Temperature Compensation Element	R_0	R_1
Pt100	107.7	.00385

TABLE 5-2. Temperature vs. Resistance of Auto T.C. Elements

Temperature °C	Resistance (Ohms) ±1% Pt100
0	100.0
10	103.8
20	107.7
25	109.6
30	111.5
40	115.4
50	119.2
60	123.1
70	126.9
80	130.8
90	134.6
100	138.5

SECTION 6.0 RETURN OF MATERIAL

6.1 GENERAL.

To expedite the repair and return of instruments, proper communication between the customer and the factory is important. Before returning a product for repair, call 1-949-757-8500 for a Return Materials Authorization (RMA) number.

6.2 WARRANTY REPAIR.

The following is the procedure for returning instruments still under warranty:

1. Call Rosemount Analytical for authorization.
2. To verify warranty, supply the factory sales order number or the original purchase order number. In the case of individual parts or sub-assemblies, the serial number on the unit must be supplied.
3. Carefully package the materials and enclose your "Letter of Transmittal" (see Warranty). If possible, pack the materials in the same manner as they were received.
4. Send the package prepaid to:

Rosemount Analytical Inc., Uniloc Division
Uniloc Division
2400 Barranca Parkway
Irvine, CA 92606

Attn: Factory Repair

RMA No. _____

Mark the package: Returned for Repair

Model No. _____

6.3 NON-WARRANTY REPAIR.

The following is the procedure for returning for repair instruments that are no longer under warranty:

1. Call Rosemount Analytical for authorization.
2. Supply the purchase order number, and make sure to provide the name and telephone number of the individual to be contacted should additional information be needed.
3. Do Steps 3 and 4 of Section 6.2.

NOTE

Consult the factory for additional information regarding service or repair.

RETURN OF MATERIALS REQUEST

•IMPORTANT!

This form must be completed to ensure expedient factory service.

C U S T O M E R	FROM: _____ _____ _____	RETURN _____ _____ _____	BILL TO: _____ _____ _____												
N O T I C E T O S E N D E R	<p>CUSTOMER/USER MUST SUBMIT MATERIAL SAFETY SHEET (MSDS) OR COMPLETE STREAM COMPOSITION, AND/OR LETTER CERTIFYING THE MATERIALS HAVE BEEN DISINFECTED AND/OR DETOXIFIED WHEN RETURNING ANY PRODUCT, SAMPLE OR MATERIAL THAT HAVE BEEN EXPOSED TO OR USED IN AN ENVIRONMENT OR PROCESS THAT CONTAINS A HAZARDOUS MATERIAL ANY OF THE ABOVE THAT IS SUBMITTED TO ROSEMOUNT ANALYTICAL WITHOUT THE MSDS WILL BE RETURNED TO SENDER C.O.D. FOR THE SAFETY AND HEALTH OF OUR EMPLOYEES. WE THANK YOU IN ADVANCE FOR COMPLIANCE TO THIS SUBJECT.</p>														
<p>SENSOR OR CIRCUIT BOARD ONLY: (Please reference where from in MODEL / SER. NO. Column)</p> <table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:33%;">1. PART NO. _____</td> <td style="width:33%;">1. MODEL _____</td> <td style="width:33%;">1. SER. NO. _____</td> </tr> <tr> <td>2. PART NO. _____</td> <td>2. MODEL _____</td> <td>2. SER. NO. _____</td> </tr> <tr> <td>3. PART NO. _____</td> <td>3. MODEL _____</td> <td>3. SER. NO. _____</td> </tr> <tr> <td>4. PART NO. _____</td> <td>4. MODEL _____</td> <td>4. SER. NO. _____</td> </tr> </table>				1. PART NO. _____	1. MODEL _____	1. SER. NO. _____	2. PART NO. _____	2. MODEL _____	2. SER. NO. _____	3. PART NO. _____	3. MODEL _____	3. SER. NO. _____	4. PART NO. _____	4. MODEL _____	4. SER. NO. _____
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R E A S O N F O R R E T U R N	<p>PLEASE CHECK ONE:</p> <table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:50%;"><input type="checkbox"/> REPAIR AND CALIBRATE</td> <td style="width:50%;"><input type="checkbox"/> DEMO EQUIPMENT NO. _____</td> </tr> <tr> <td><input type="checkbox"/> EVALUATION</td> <td><input type="checkbox"/> OTHER (EXPLAIN) _____</td> </tr> <tr> <td colspan="2"><input type="checkbox"/> REPLACEMENT REQUIRED? <input type="checkbox"/> YES <input type="checkbox"/> NO</td> </tr> </table> <p>DESCRIPTION OF MALFUNCTION: _____ _____ _____</p>			<input type="checkbox"/> REPAIR AND CALIBRATE	<input type="checkbox"/> DEMO EQUIPMENT NO. _____	<input type="checkbox"/> EVALUATION	<input type="checkbox"/> OTHER (EXPLAIN) _____	<input type="checkbox"/> REPLACEMENT REQUIRED? <input type="checkbox"/> YES <input type="checkbox"/> NO							
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R E P A I R S T A T U S	<p>WARRANTY REPAIR REQUESTED:</p> <table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:50%;"><input type="checkbox"/> YES-REFERENCE ORIGINAL ROSEMOUNT ANALYTICAL ORDER NO. _____</td> <td style="width:50%;">CUSTOMER PURCHASE ORDER NO. _____</td> </tr> <tr> <td colspan="2"><input type="checkbox"/> NO-PROCEED WITH REPAIRS-INVOICE AGAINST P.O. NO. _____</td> </tr> <tr> <td colspan="2"><input type="checkbox"/> NO-CONTACT WITH ESTIMATE OF REPAIR CHARGES: LETTER <input type="checkbox"/> _____</td> </tr> <tr> <td colspan="2">PHONE <input type="checkbox"/> _____</td> </tr> </table>			<input type="checkbox"/> YES-REFERENCE ORIGINAL ROSEMOUNT ANALYTICAL ORDER NO. _____	CUSTOMER PURCHASE ORDER NO. _____	<input type="checkbox"/> NO-PROCEED WITH REPAIRS-INVOICE AGAINST P.O. NO. _____		<input type="checkbox"/> NO-CONTACT WITH ESTIMATE OF REPAIR CHARGES: LETTER <input type="checkbox"/> _____		PHONE <input type="checkbox"/> _____					
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<p>NAME _____ PHONE _____</p> <p>ADDRESS _____</p> <p>_____ ZIP _____</p>															
<p>RETURN AUTHORITY FOR CREDIT ADJUSTMENT [Please check appropriate box(s)]</p> <table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:50%;"><input type="checkbox"/> WRONG PART RECEIVED</td> <td style="width:50%;"><input type="checkbox"/> REPLACEMENT RECEIVED</td> </tr> <tr> <td><input type="checkbox"/> DUPLICATE SHIPMENT</td> <td>REFERENCE ROSEMOUNT ANALYTICAL SALES ORDER NO. _____</td> </tr> <tr> <td><input type="checkbox"/> RETURN FOR CREDIT</td> <td>RETURN AUTHORIZED BY: _____</td> </tr> <tr> <td colspan="2">WARRANTY DEFECT _____</td> </tr> </table>				<input type="checkbox"/> WRONG PART RECEIVED	<input type="checkbox"/> REPLACEMENT RECEIVED	<input type="checkbox"/> DUPLICATE SHIPMENT	REFERENCE ROSEMOUNT ANALYTICAL SALES ORDER NO. _____	<input type="checkbox"/> RETURN FOR CREDIT	RETURN AUTHORIZED BY: _____	WARRANTY DEFECT _____					
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24-6047

Emerson Process Management

Rosemount Analytical Inc.

2400 Barranca Parkway

Irvine, CA 92606 USA

Tel: (949) 757-8500

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<http://www.raihome.com>

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WARRANTY

Seller warrants that the firmware will execute the programming instructions provided by Seller, and that the Goods manufactured or Services provided by Seller will be free from defects in materials or workmanship under normal use and care until the expiration of the applicable warranty period. Goods are warranted for twelve (12) months from the date of initial installation or eighteen (18) months from the date of shipment by Seller, whichever period expires first. **Consumables, such as glass electrodes, membranes, liquid junctions, electrolyte, o-rings, catalytic beads, etc., and Services are warranted for a period of 90 days from the date of shipment or provision.**

Products purchased by Seller from a third party for resale to Buyer ("Resale Products") shall carry only the warranty extended by the original manufacturer. Buyer agrees that Seller has no liability for Resale Products beyond making a reasonable commercial effort to arrange for procurement and shipping of the Resale Products.

If Buyer discovers any warranty defects and notifies Seller thereof in writing during the applicable warranty period, Seller shall, at its option, promptly correct any errors that are found by Seller in the firmware or Services, or repair or replace F.O.B. point of manufacture that portion of the Goods or firmware found by Seller to be defective, or refund the purchase price of the defective portion of the Goods/Services.

All replacements or repairs necessitated by inadequate maintenance, normal wear and usage, unsuitable power sources, unsuitable environmental conditions, accident, misuse, improper installation, modification, repair, storage or handling, or any other cause not the fault of Seller are not covered by this limited warranty, and shall be at Buyer's expense. Seller shall not be obligated to pay any costs or charges incurred by Buyer or any other party except as may be agreed upon in writing in advance by an authorized Seller representative. All costs of dismantling, reinstallation and freight and the time and expenses of Seller's personnel for site travel and diagnosis under this warranty clause shall be borne by Buyer unless accepted in writing by Seller.

Goods repaired and parts replaced during the warranty period shall be in warranty for the remainder of the original warranty period or ninety (90) days, whichever is longer. This limited warranty is the only warranty made by Seller and can be amended only in a writing signed by an authorized representative of Seller. Except as otherwise expressly provided in the Agreement, THERE ARE NO REPRESENTATIONS OR WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, AS TO MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE, OR ANY OTHER MATTER WITH RESPECT TO ANY OF THE GOODS OR SERVICES.

RETURN OF MATERIAL

Material returned for repair, whether in or out of warranty, should be shipped prepaid to:

**Emerson Process Management
Liquid Division
2400 Barranca Parkway
Irvine, CA 92606**

The shipping container should be marked:

Return for Repair

Model _____

The returned material should be accompanied by a letter of transmittal which should include the following information (make a copy of the "Return of Materials Request" found on the last page of the Manual and provide the following thereon):

1. Location type of service, and length of time of service of the device.
2. Description of the faulty operation of the device and the circumstances of the failure.
3. Name and telephone number of the person to contact if there are questions about the returned material.
4. Statement as to whether warranty or non-warranty service is requested.
5. Complete shipping instructions for return of the material.

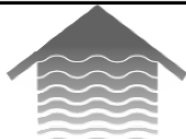
Adherence to these procedures will expedite handling of the returned material and will prevent unnecessary additional charges for inspection and testing to determine the problem with the device.

If the material is returned for out-of-warranty repairs, a purchase order for repairs should be enclosed.



*The right people,
the right answers,
right now.*

**ROSEMOUNT ANALYTICAL
CUSTOMER SUPPORT CENTER
1-800-854-8257**



Emerson Process Management

2400 Barranca Parkway
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Tel: (949) 757-8500
Fax: (949) 474-7250

<http://www.rosemountanalytical.com>

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ON-LINE ORDERING NOW AVAILABLE ON OUR WEB SITE
<http://www.rosemountanalytical.com>

Specifications subject to change without notice.



Credit Cards for U.S. Purchases Only.

