

**7758 Pipe-Line
Electrode Mounting Assembly
Operation and Maintenance Manual**

70-82-25-39

Rev. 0

2/97

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Revision 0 – 2/28/97

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About This Document

Abstract

This manual is published solely for the purpose of supporting the 7758 Pipe-Line Electrode Mounting Assembly.

Revision Notes

The following list provides notes concerning all revisions of this document.

Rev. ID	Date	Notes
0	2/97	This is the initial release of the Honeywell version of L&N manual 177793, Rev. G. This manual has been formatted to reflect the Honeywell document format and updated to reflect changes in the product offering.

References

Honeywell Documents

The following list identifies all Honeywell documents that may be sources of reference for the material discussed in this publication.

Document Title	ID #	Binder Title	Binder ID #
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Non-Honeywell Documents

The following list identifies select non-Honeywell documents that may be sources of reference for the material discussed in this publication.

Title	Author	Publisher	ID/ISDN #
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Contacts

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1. Introduction

1.1 Performance Specifications

1.1.1 7758 Pipe Line Electrode Mounting

Pressure and Temperature Limits

Stainless Steel	Polypropylene
150 psig at 212°F (10.5 kg/cm ² at 100°C)	100 psig at 95°F (7.0 kg/cm ² at 35°C)
50 psig at 266°F (3.5 kg/cm ² at 130°C)	50 psig at 167°F (3.5 kg/cm ² at 75°C)

Operating temperature is limited by the electrodes selected. If operating temperature of the electrode is higher, refer to the electrode mounting limits for maximum temperature and pressure.

Materials of Construction

316 stainless steel
Viton A or EPM (O-ring)
Polypropylene (washer)
Neoprene (cable boot)
Delrin (compression nut)

Electrode Size

Designed for 12 mm (0.5") diameter electrode having minimum length of 127 mm (5")

Thread Size

3/4" NPT male bushing
1/8 NPTF Flow Chamber (7758-□-08 only)

Dimensions

1-1/4" (32 mm) diameter
4-1/4" (108 mm) long
6-1/2" (165 mm) long Durafet Electrode Option
9" (229 mm) long, Flow Chamber option (7758-□-08)

Mounting Weight, not including preamplifier

1 pound (0.454 kg) per housing

1.1.2 31079288 Durafet® Preamplifier Module

Temperature: -5 to + 70°C (23°F to + 158°F)

Materials of Construction: Glass-filled polypropylene housing, nickel-plated steel mounting bracket.

Housing rated NEMA 4X and IP65.

Dimensions: 9" (229 mm) L X 3-1/2" (89 mm) diameter overall. See Fig. 2-8.

1.1.3 31079290 Durafet® Adapter Module

Refer to Manual 70-82-25-13 for specifications

1.1.4 Conventional Electrode Preamplifier

Refer to Manual 70-82-25-36 for specifications.

1.2 Model Selection Guide

KEY NUMBER	Selection	Availability
Description		
7758 Electrode Mounting	07758	

TABLE I

Instrument, Preamp			
Instrument	Preamp		
Honeywell (L&N) Analog Instruments Except 7079 Transmitter	316529 preamp module for glass electrodes	01	c
7082-3_, -71 Analyzer or 7079-22, -33 Transmitter and all direct connection analog instruments	31352106 high impedance junction box for glass/ORP electrodes greater than 10' from instrument	02	c
7082-3_, -71 Analyzer or 7079-22, -33 Transmitter (used with glass electrodes only) and all direct connection analog instruments	None-housings only, glass/ORP electrode less than 10' from instrument	03	c
7079-11 Transmitter	31026395 glass/ORP electrode preamp module	04	c
All Honeywell (L&N) Microprocessor Based Instruments	31028698 glass/ORP electrode preamp module	05	c
7082-4_, -76 Analyzer (used with Durafet electrodes only)	None-housings only, Durafet electrode less than 50' from instrument	00	d
All Honeywell (L&N) Instruments	31079288 Durafet preamp module	06	d

Non-Honeywell (L&N) Instruments used with Durafet Electrodes	31079290 Durafet Interface Module - 120 VAC Power	07	d
	31084755 Interface Module - 240 VAC Power	08	d
	31075773 Interface Module - Battery Powered	09	d

TABLE II

Selection

Housing Material, Electrode Type, Quantity				
Housing Material	Electrode Type	Quantity		
316 Stainless Steel	Combination glass pH/ORP Note 1	Two	01	e
	Separate glass pH measuring, reference and ATC	Three	02	g
	Combination glass pH or ORP	One	03	p
	Combination Durafet pH Electrode	One	09	h
	Combination Durafet pH Electrode w/ATC or separate Durafet measuring and reference electrodes	Two	11	q
	Glass pH electrode in low volume flow chamber for high purity water	One	08	f
Polypropylene	Combination glass pH/ORP Note 1	Two	04	e
	Separate glass pH measuring, reference and ATC	Three	05	g
	Combination glass pH or ORP electrode	One	06	p
	Combination Durafet pH Electrode	One	10	h
	Combination Durafet pH Electrode w/ATC or separate Durafet pH measuring and reference electrodes	Two	12	q

TABLE III

Electrode Options (Combination Electrodes)				
Electrode Type	Leads	Temp. Range	Part Number	
None				00
	12' Separate Quick Disconnect (31079227)	-10 to 110°C	31079220	10
	20' Separate Quick Disconnect (31079228)	-10 to 110°C	31079220	20
Durafet	30' Separate Quick Disconnect (31086236)	-10 to 110°C	31079220	53
	40' Separate Quick Disconnect (31086237)	-10 to 110°C	31079220	54

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	50' Separate Quick Disconnect (31086238)	-10 to 110°C	31079220	55	
Meridian - pH	Screw cap, w/6" spade lug Note 3	10 to 100°C	31117486	40	
Meridian - pH Sterilizable	Screw cap, w/6" spade lug Note 3	20 to 130°C	31117494	50	
Meridian - ORP (gold)	12' Tinned	-5 to 100°C	31020749	60	
Meridian - ORP (platinum)	12' Tinned	-5 to 130°C	31020751	70	
Meridian - pH	12' Coax	40 to 110°C	31050383	80	
Meridian - pH (with ATC)	12' Tinned, coax plus conductors	10 to 80°C	31050381	30	
Meridian - pH (with ATC)	12' Tinned, coax plus conductors	10 to 80°C	31055546	90	
Electrode Options (Separate Measing/Reference)					
Measuring Electrode					
Reference Electrode	Electrode Type	Leads	Temp. Range	Part Number	
Gel Filled/	Meridian-pH	Screw Cap Note 2	-5 to 40°C	31117389	21
		Screw Cap Note 2	10 to 80°C	31117390	22
		Screw Cap Note 2	40 to 110°C	31117391	23
Ryton Body (P/N 31117482)	Durafet	12' separate quick disconnect (31079227)	-10 to 110°C	31079250	24
		20' separate quick disconnect (31079228)	-10 to 110°C	31079250	25
		30' separate quick disconnect (31086236)	-10 to 110°C	31079250	26
		40' separate quick disconnect (31086237)	-10 to 110°C	31079250	27
		50' separate quick disconnect (31086238)	-10 to 110°C	31079250	28
Gel Filled/	Meridian-pH	Screw Cap Note 2	-5 to 40°C	31117389	41
		Screw Cap Note 2	10 to 80°C	31117390	42
		Screw Cap Note 2	40 to 110°C	31117391	43
Double Junction (P/N 31035833)	Durafet	12' separate quick disconnect (31079227)	-10 to 110°C	31079250	44
		20' separate quick disconnect (31079228)	-10 to 110°C	31079250	45
		30' separate quick disconnect (31086236)	-10 to 110°C	31079250	46
		40' separate quick	-10 to 110°C	31079250	47

		disconnect (31086237) 50' separate quick disconnect (31086238)	-10 to 110°C	31079250	48	
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TABLE
IV

Automatic Temperature Compensators			
Material	Part Number		
None		0	j
Ryton Body	311 521 70	1	k
Glass Body	31152077	4	l
Glass Body	31152179	5	k
Ryton	31022290	6	m
Glass	31022292	7	m
Stainless Steel	31079199	8	n

TABLE V - OPTIONS

		Selection	
Tagging	None	0	
	Linen Customer I.D. Tag, limit to 3 lines, 22 spaces per line.	L	
	Stainless Steel Customer I.D. Tag, limit to 3 lines, 22 spaces per line.	S	

Note 1: Must order ORP electrode separately (either 31117418 or 31117419)

Note 2: Includes 31040849 cable.

Note 3: Includes 31198160 cable.

RESTRICTIONS

Restriction Letter c d e f g h j k l m n p q	Available Only With		Not Available With	
	Table	Selection	Table	Selection
	II	01, 02, 03, 04, 05, 08		
	II	09, 10, 11, 12		
	III	30, 40, 50, 60, 70, 80, 90		
		(See Note 1)		
	III	40		
	III	21, 22, 23, 41, 42, 43		
	III	10, 20, 53, 54, 55		
	III	10, 20, 24, 25, 26, 27 28, 44, 45, 46, 47, 48 53, 54, 55		
			III	60, 70
	I	01, 02, 03, 04 (Analog instruments only)		
	I	01, 02		
	I	02, 03, 05, 00, 06 (Microprocessor Instruments only)		
	II	08		

2. Meredian® Glass and ORP Electrodes

2.1 Introduction

These individual electrode mountings, supplied in sets (see Section 1.2), are each designed to support one measuring electrode, reference electrode or automatic temperature compensator for continuous "in-line" measurements of pH, ORP or specific ion. The mounting has a male 3/4" NPT thread and, as shown in Figure 2-1, requires a pipe tee for pipe lines up to 2-1/2 inches. If used in a 3" or larger pipe line, it requires a 3/4" NPT tap in the wall of the pipe. The mounting can also be welded into the pipe line if so desired. For limits of pressure and temperature, refer to the performance specifications. Although designed for Honeywell industrial electrodes, the mountings will accept many 12 mm diameter electrodes or temperature compensators.

The mountings are designed to be easily disassembled without the use of tools.

The 7758 Assembly may include, in addition to the electrode mountings, an electronic preamplifier module or a special-terminal junction box for use with a low-loss shielded cable run to a direct measuring pH or ORP instrument.

If the electrodes are supplied with the assembly, it will be indicated by Table III of the MSG. The automatic temperature compensator, if supplied, is identified by Table IV. See Section 1.2, Model Selection Guide.

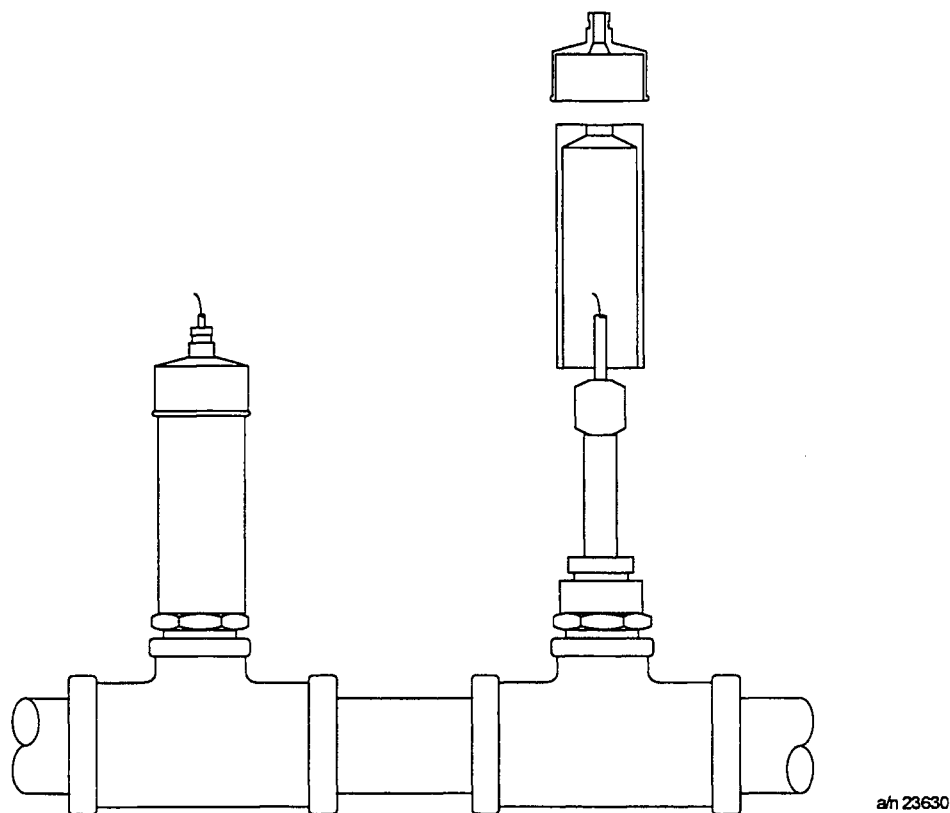


Figure 2-1. 7758 Pipe-Line Electrode Mounting Installed in a 3/4" Tee (not supplied)

2.2 Description

As shown in Figure 2-2, each electrode mounting consists of six or seven parts. The electrode is supported in the pipe or tee by a 316 stainless steel or polypropylene housing consisting of a special 3/4" NPT bushing and threaded cover. It is sealed by means of the plastic knurled compression nut, tubular spacer, O-ring washer, and dual O-ring. The rubber boot serves to seal the electrode's leadwire. A second plastic spacer is furnished with each mounting to permit greater electrode extension, required when the pipe line is 2" or larger. A spare dual O-ring and O-ring washer are supplied with each mounting.

If specified by the assembly catalog number suffix, the measuring and reference electrodes may be supplied with the assembly. The pH measuring electrode, if supplied, is a connector-cap type and a 12-foot long shielded cable with an integral low-loss connector is supplied with the assembly.

If specified by the assembly catalog number, a preamplifier module may be supplied. This potted electronic circuit is housed in a weatherproof corrosion resistant fiberglass case. Its output is a high-level low-impedance signal, easily carried long distances over ordinary cable. It requires no line-voltage supply: the dc operating voltage is supplied from the Honeywell measuring instrument. A separate manual, 70-82-25-36, is supplied with the preamplifier module.

2.3 Installation

2.3.1 Electrode Mounting

Location

The installation requires a pipe-line tee with a 3/4 NPT center opening for each of the electrode mountings used. The relative locations of the electrodes is not of great importance. The distance between multiple mountings is usually kept to a minimum.

Mounting

Dimensions of the 7758 Electrode mounting are given in Figure 2-3. Mount and tighten the bushing in the 3/4 NPT of the pipe tee using a suitable pipe compound. Good results have been obtained using Loctite high performance pipe sealant with Teflon. For pipe lines of 3" and larger diameter, drill and tap the pipe wall for 3/4 NPT.

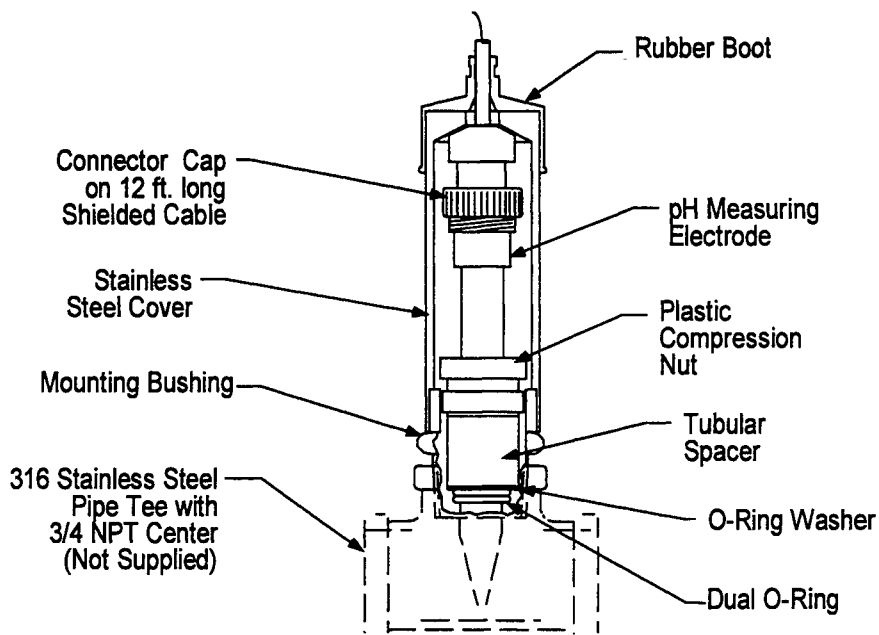
The user may weld the stainless steel bushing into the wall of the pipe if desired.

Assembling Electrode Mounting

1. After the mounting bushing is installed in the pipe line, insert one of the dual O-rings in the seat in the bushing and place one of the polypropylene washers and the tubular spacer over it. Mount the knurled plastic compression nut but do not tighten it and do not compress the O-ring. Refer to Figures 2-2 or 2-4, which illustrate the assembled mounting for measuring and reference electrodes, respectively. The internal parts of the mounting, arranged in order of assembly, are shown in Figure 2-5.
2. Lubricate the lower half of the electrode with silicone grease.

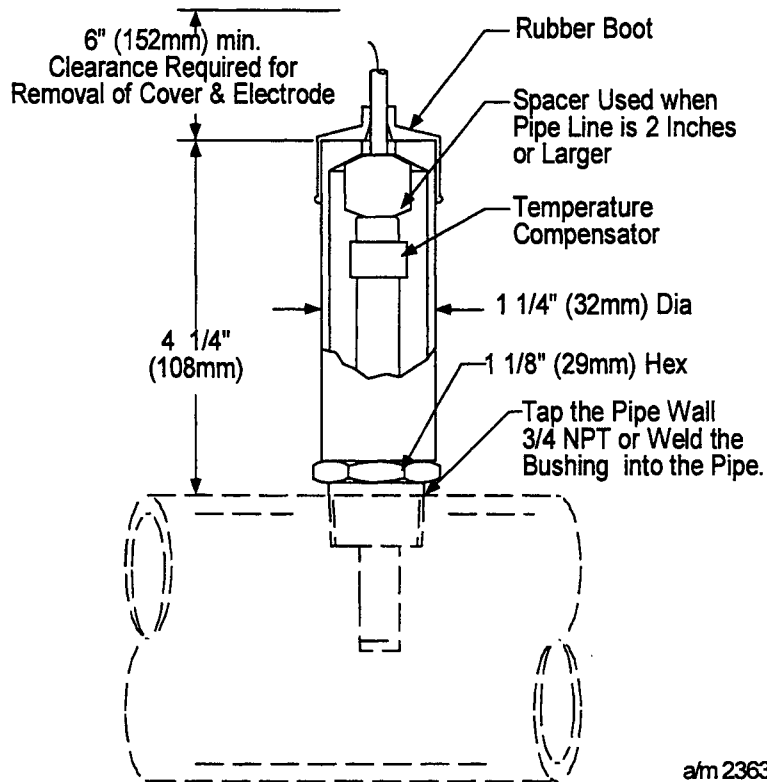
CAUTION

On measuring electrodes, avoid smearing any grease on the glass membrane or metal tip since this may adversely affect the sensitivity of the electrode.



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Figure 2-2. Cutaway View of Assembled Mounting using Connector-Cap Type Measuring Electrode (3/4" Pipe Tee not Included in Assembly)



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Figure 2-3. Dimensions of 7758 Electrode Mounting, Shown Threaded into Large Pipe (Spacer is not used for pipe lines under 2 inches)

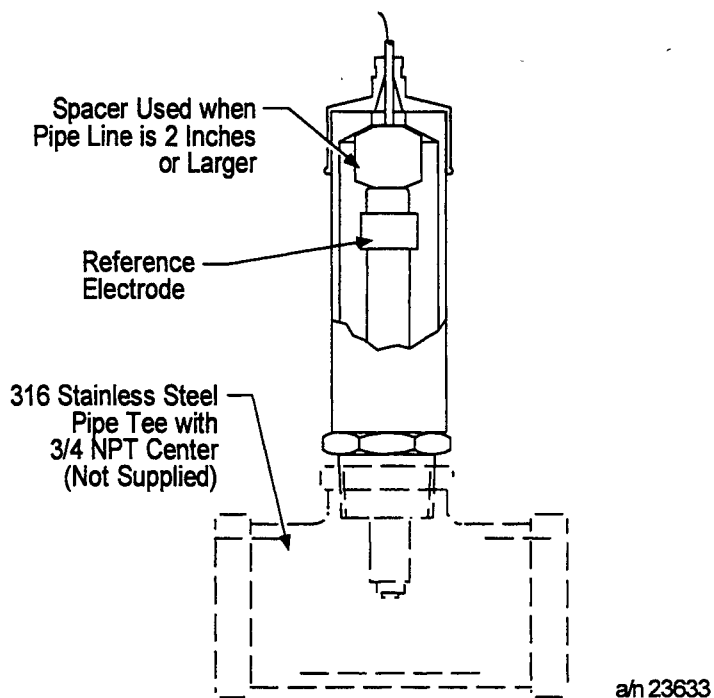


Figure 2-4. Assembled Mounting Using a Reference Electrode (For larger pipes, the spacer above the electrode provides greater depth of insertion)

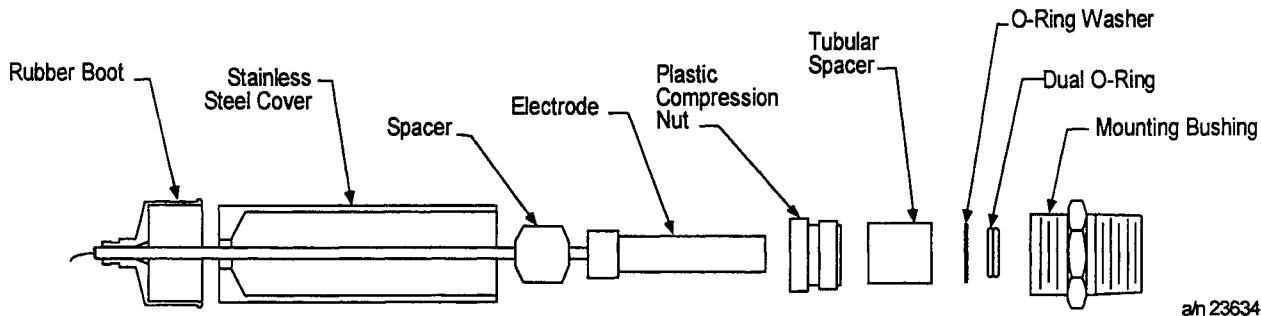


Figure 2-5. 7758 Electrode Mounting Internal Parts, Arranged in Order of Assembly

3. Carefully insert the electrode or compensator into the mounting (not too far) and tighten the compression nut just enough to provide some resistance to electrode motion.
4. If the pipeline is 2" or more in diameter, slip the plastic spacer provided onto the cable. This effectively extends the electrode or compensator deeper into the pipe-line to provide the proper immersion. See Figure 2-3.
5. Run the cable for each electrode through the stainless steel cover. For the connector-cap type measuring electrode, carefully secure the high-impedance connector at the end of the cable to the electrode. See Directions 70-82-25-35. Lower the cover over the electrode gently pushing the electrode down into the mounting. Screw the cover down, then remove it again. The electrode should now be in the proper position. Tighten the knurled compression nut by hand.
6. If the 31117494 or 31117486 Meredian combination electrode is used, connect the spade lug on the electrode's short reference lead to the screw on the high-impedance connector.
7. Run the reference electrode cable through the rubber boot. For the measuring electrode cables, it is necessary to cut 1/8 to 1/4 inch off the tip of the boot, as shown in Figure 2-2. For the temperature

compensator, it may be necessary to cut 1/2 inch off. Do not cut off too much because the boot should make a tight seal around the cable. Slide the boot along the cable and pull it over the top of the steel cover. Silicone grease on the leadwire cable will help to make a better seal. The electrode assembly is now complete and installed.

8. Make certain during both installation and removal of the electrode that the rubber boot is rolled or pushed up off the steel cover when the cover is being rotated. This will avoid excessive twisting of the cable.

2.3.2 Preampifier or Junction Box Mounting

Except when the Table I = 3, a weatherproof junction box, housing preampifier or special terminal block, is to be mounted. Figures 2-6 and 2-7 give all necessary dimensions for these housings. Although 12 feet of cable is supplied with each electrode, it is recommended that the preampifier or junction box be located as close as possible to the electrode mounting in order to reduce the length of loose high-impedance cable used. Position the junction box with the unthreaded wire-entrance hole down or the preampifier module with the 1-1/8" wire-entrance hole down to reduce the possibility of water or dust entry.

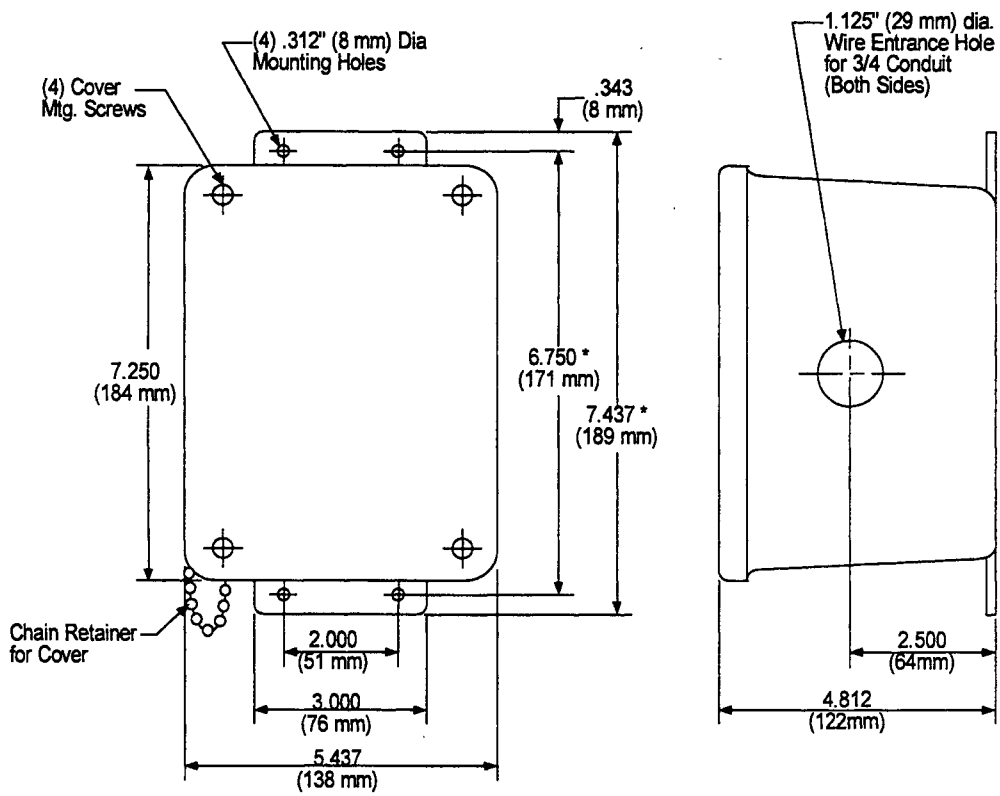
If the 7758-03 Electrode Mounting is used (no junction box), locate the measuring instrument within ten feet of the electrode mounting. The electrode and compensator cables are 12 feet long.

2.3.3 Wiring Connections

Electrode Mounting to Preampifier Module

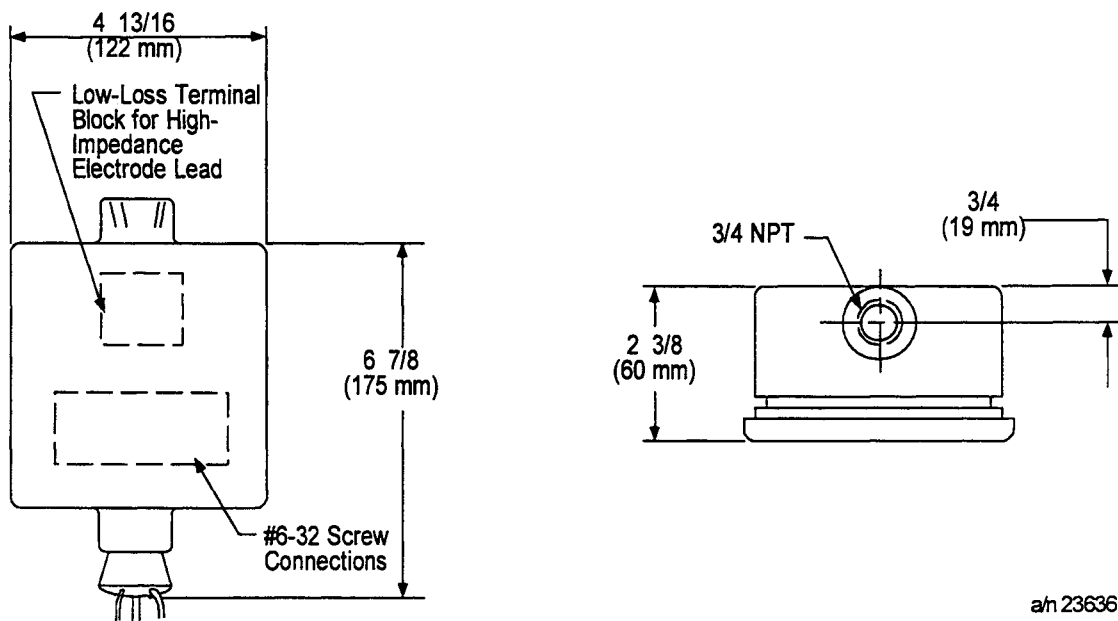
Cut the leads of the electrodes and the compensator to the desired length. Allow enough slack at the electrode mounting for each electrode to be removed for servicing or standardizing. Guard against a condition which will result in continuous or frequent flexing of the shielded cable, as this motion will build up a charge and cause erratic measurements at the instrument. Do not subject this cable to temperatures above 225° F. A rubber grommet is supplied with the junction box or preampifier module. Run the temperature-compensator cable, the measuring-electrode shielded cable and the reference electrode lead (if used) through the appropriate holes in the rubber grommet and mount the grommet in the unthreaded wire entrance opening of the junction box.

Cut the shielded cable to the required length. Remove about two inches of the outer insulation, unravel the metallic shield and remove the exposed thin black conductive plastic shield. Remove one-half inch of the inner insulation. Do NOT touch this inner-insulation material.



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Figure 2-6. 316529 Pre-amplifier Module Mounting Dimensions (Rubber wire entrance grommet supplied with electrode mounting parts)



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Figure 2-7. 313252106 Junction Box Mounting Dimensions

Twist the length of unraveled shield and connect it to the R terminal screw on the preamplifier terminal board; be very careful that the cable shield is not in contact with the metal cover or any other part of the terminal-board compartment. Connect the inner conductor of the shielded cable to the lower screw on the metal terminal strip E on the special terminal block. Use care to avoid touching the plastic block with bare fingers. Replace the metal cover on this block.

CAUTION

Even the film left by fingerprints on the plastic can form a leakage path which will affect the required high resistance from this terminal to ground. If the block or the cable is soiled, clean it with isopropyl alcohol (not denatured or wood alcohol).

Connect the unshielded reference electrode lead to terminal R on the preamplifier terminal board, the same terminal used for the measuring electrode shield connection. Note that for some ORP applications (e.g., chrome-reduction reactions), it will be necessary to connect the reference lead and measuring electrode lead to R in order to obtain the correct meter response.

ATTENTION

For automatic temperature compensation, the Automatic Temperature Compensator must be used with a preamplifier module. Connect the two compensator leads from the electrode mounting across appropriate preamplifier terminals. For fixed temperature compensation, select a resistor having a value suitable for the electrode system and the solution temperature.

For microprocessor based instruments, the proper resistor value is listed in the Operator's Manual. To calculate the resistor value for analog instruments, use the formula:

Resistance in Ohms = $651.8 + (2.78 T)$, where

T is the fixed temperature selected in degrees C.

Junction Box to Measuring Instrument

For the wiring connection between the junction box and the measuring instrument, a special low-loss coaxial cable is required for the measuring electrode connection. See Accessory List in table 2-2. If automatic temperature compensation is used, a two-conductor cable is used. All cables are listed under Accessories.

Under ideal conditions, the wiring from junction box to measuring instrument can be run in open trays or by other means which will guard against flexing of the measuring electrode coaxial lead. However, these leads must not be run with ac power lines. Use water-tight rigid conduit. One side of the junction box is threaded for 3/4 inch pipe.

The insulating material between shield and conductor of the special low-loss cable is a thermoplastic which must not be subjected to temperatures above 225° F. Locate the cable and/or conduit accordingly. Unroll and carefully straighten the measuring electrode cable before pulling it through the conduit. Do not take it or pull it over sharp corners. Use pull boxes on each side of every bend. The tensile strength of the shielded cable is 70 lbs on a straight pull; do not exceed this value.

The junction box to measuring instrument cable connections are shown in Figure 2-8. Note that the reference electrode is connected to the shield of the measuring electrode cable, and to the shield on the interconnecting cable.

Pre-amplifier Module to Measuring Instrument Connections

Figure 2-9 shows the terminal board connections in the 316529 preamplifier module. A 6-conductor cable is used for the wiring run between the preamplifier module and the measuring instrument. Refer to Manual 70-82-25-36 furnished with the preamplifier module for complete instructions for making the connections.

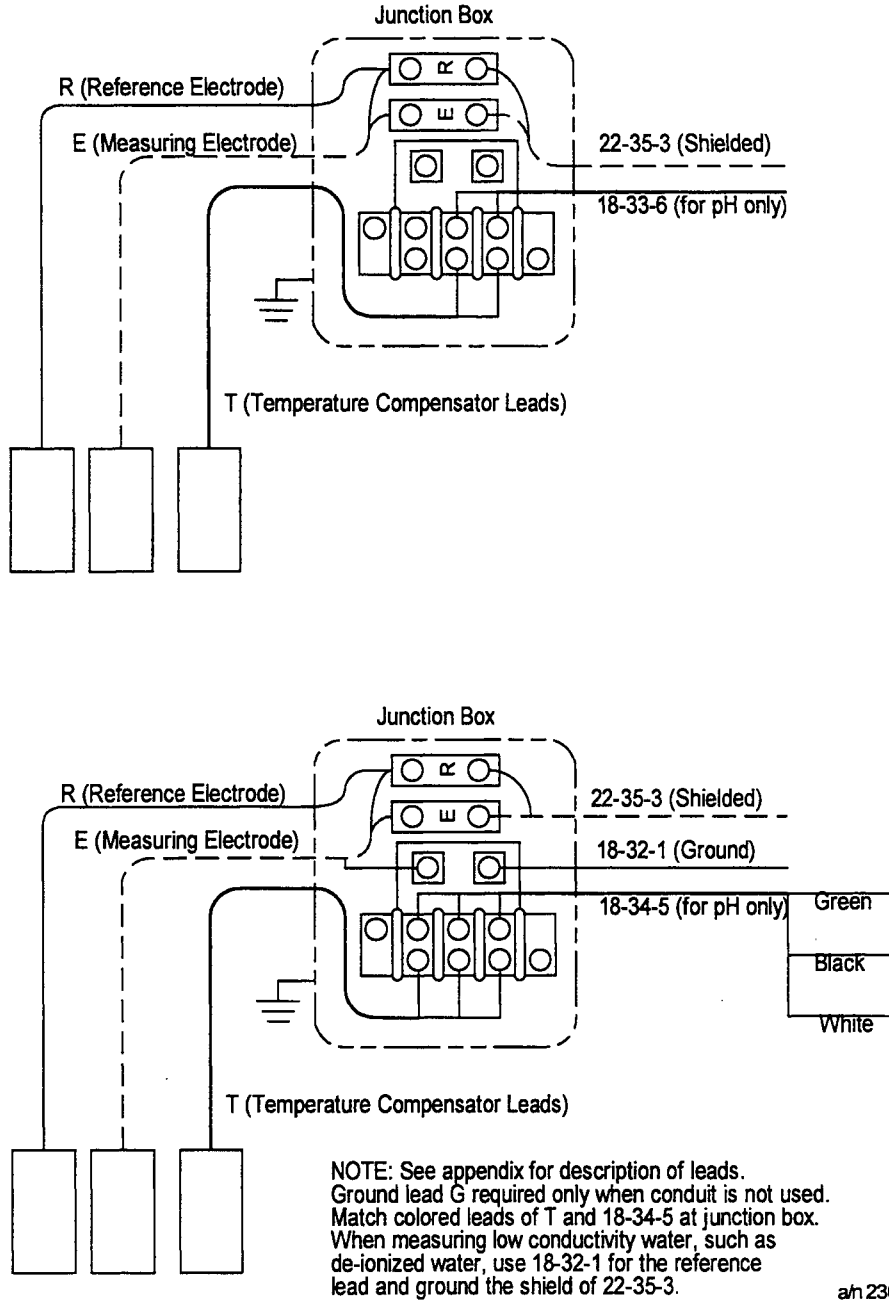


Figure 2-8. 7758-2 Electrode Mounting Wiring Connections

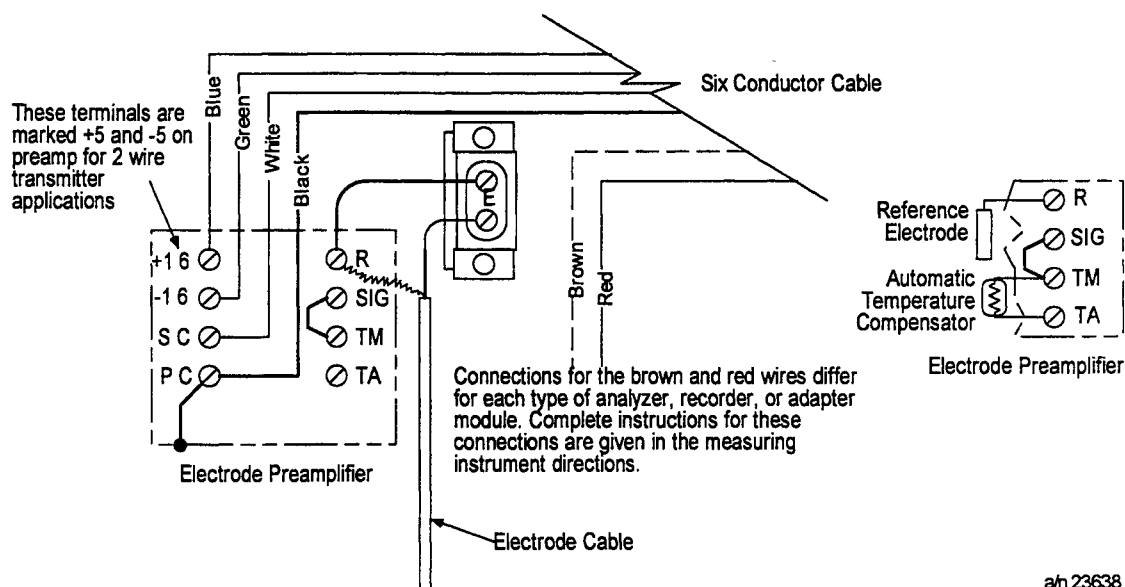


Figure 2-9. 7758-1 Electrode Mounting Wiring Connections

The cable between the preamplifier and the measuring instrument is moderately insensitive to pick-up of any kind; however, it is good practice to avoid running this cable in the same conduit with a power line over long distances. No special care is needed when handling this cable.

2.4 Maintenance

The only maintenance which may be required is periodic cleaning and calibration of the electrodes. If the assembly includes a preamplifier module or a junction box (7758-01, -02, -04, or -05), cleaning of the special terminal block, which is made from an extremely high-resistance material, may also be necessary. Oils or salts from perspiration form leakage paths which can cause erroneous pH readings. Always keep this terminal block clean and dry.

Cleaning the Electrode

CAUTION

Make certain that the pipeline is not under pressure. If necessary, bypass the sample flow or otherwise empty the pipeline.

Carefully slide the rubber boot back on the electrode or compensator lead and unscrew the cover while preventing the lead from twisting. Do not remove the electrode cap unless absolutely necessary. This will insure that the inside of the connector remains free of moisture and dirt.

Loosen the knurled plastic compression nut and carefully withdraw the electrode from the bushing. The measuring electrode then may be carefully wiped with a soft, wet cloth or tissue. Oil deposits may be removed with a detergent or solvent. It may be necessary to wash the membrane with dilute hydrochloric acid or other acid to remove solid deposits.

Thoroughly rinse the electrode with distilled water after any type of cleaning. Remove and examine the O-ring and the O-ring washer before re-assembling: Make certain that no salts or granular matter of any kind are present on the O-ring and the O-ring seal. Coat the surfaces with silicone grease before re-assembling.

Refer to the directions furnished with the measuring electrode. If it has been necessary to remove the connector cap, make certain that the inside of the connector has been protected from moisture and dirt. Do not touch the center contact of the connector with bare fingers as body oils and salts can cause contamination.

If necessary, clean the connector cap on the lead and the mating parts on the measuring electrode in accordance with the directions furnished.

The reference electrode can also be cleaned. Wipe clean with a soft, wet cloth. Oily deposits may be removed with a detergent. If it is very difficult to remove other deposits, dilute bases or acids may be used. The presence of contaminants on and in the reference electrode can be tolerated if excessive zero adjustment has not been required at the measuring instrument.

However, erratic readings from an electrode system may result from a clogged reference electrode junction. This can be determined by means of a resistance check which is described in detail in the reference electrode directions. A clogged junction can be serviced by boiling the outer tube in a saturated potassium chloride solution.

If necessary, the porous plug can be unscrewed and a new plug screwed into place. The reference electrode directions give complete information on electrode disassembly, junction checks, internal electrode washing, and refilling the electrode. Refer to the list of Accessories for part numbers of refill solutions, replacement junctions, and other parts.

If the process sample solution contains material that coats the electrode, or if process precipitants adhere to the electrodes, establish a regular schedule for cleaning.

Cleaning the Special Terminal Block in the Preamplifier Module or Junction Box

The special terminal block is made from extremely high-resistance material. If any of this insulation material becomes contaminated by handling, spray it with TF Grade Freon, or wipe it clean with a lint-free cloth or lens tissue moistened in isopropyl or grain alcohol. A clean cotton swab or cotton ball can be used, but all lint and fibers must be rinsed off before placing the unit back in service. If this cleaning is not effective, remove the block and use water and detergent. Use distilled water if tap water has a high mineral content. Use clean forceps or clean rubber finger cots. Refer to preamplifier module Manual 70-82-25-36. For preamplifier tests and measuring system troubleshooting, refer to the directions supplied with the measuring instrument.

2.5 Replacement Parts

Table 2-1. Replacement Parts for Meredian Glass and ORP Electrodes

	Description	Part No.
PREAMPLIFIER	Preamplifier Module	316529
	Lead-Grommet	31018115
	Junction Box, Low Loss	31352106
	Preamplifier Module	31026395
	Preamplifier Module	31028698
ELECTRODE MOUNTING	Compression Nut (2)	31003495
	Dual O-ring, Viton A, Brown	31082124
	O-ring Washer	31301393
	Spacer (2)	31301576
	Mounting Bushing (2)	31367013*
	Electrode Cover (2)	31367014
	Rubber Boot (2)	31367033
ELECTRODES	Tubular Spacer (2)	31301721
	Ryton Reference Electrode (1)	31117425
	Gel-Filled Ryton Ref Elect. (1)	31117482
	Meredian combination Electrode with temperature compensator for microprocessor based instruments (1)	31050381
	Gel-Filled Glass Ref Electrode (1)	31117483
	Meredian combination Elect. (1)	31117486
	Adapter Cable	31198160
	Sterilizable Meredian combination Electrode (1)	31117494
	Gold Meredian combination ORP Electrode (1)	31020749
	Platinum Meredian combination ORP Electrode (1)	31020751
	High temperature Meredian combination Electrode (1)	31050383
	Meredian combination Electrode with temperature compensator for analog instruments	31055546
	pH Meas Elect. (1), -5 to + 40°	31117389
	pH Meas Electrode (1), 10 to 80°	31117390
	pH Meas Electrode (1), 40 to 110°	31117391

Table 2-1. Replacement Parts for Meredian Glass and ORP Electrodes (Cont.)

	Description	Part No.
TEMPERATURE COMPENSATOR	Temperature Compensator	31152170
	Temperature Compensator	31152179
	Temperature Compensator	31022290
	Temperature Compensator	31022292
ADDITIONAL PARTS	Dual O-ring, Ethylene-Propylene (black)	31082152
	Measuring Electrode Coaxial Cable with Integral Connector Cap, 12 Ft long	31040849
	Combination Electrode coaxial cable with integral connector cap	31198160

Accessories and Supplies

Table 2-2. Accessories and Supplies

Description	Part No.
For 7758-01, -04 and -05: 6-Conductor Cable, Belden 8446, length as required. (interconnection between preamp module and measuring instrument).	834023
For 7758-02: Low-loss coaxial cable for measuring and reference electrodes. (interconnection between junction box and direct measuring instrument. Length as specified.	31835002
Two-Conductor Cable for automatic temperature compensator (interconnection between junction box and instrument). Length as specified.	31833070

Maintenance Kits

To simplify and expedite maintenance, it is recommended that one of the following Kits be stocked, depending upon process needs. All four kits are furnished with the items listed in table 2-3.

Table 2-3. Maintenance Kits

Description	Kit No.
Kit Includes two Measuring Electrodes 31117389, -5 to + 40° C	31324441
Kit Includes two Measuring Electrodes 31117390, 10 to 80° C	31324442
Kit Includes two Measuring Electrodes 31117391, 40 to 110° C	31324443
Kit Includes one Meredian Electrode 31117486, 10 to 100° C	31008473
Kits include the following parts except as noted: Reference electrode, one, junction-porous plug. Not included in 31008473 Kit	31109069
Buffer solution, 4.008 pH at 25° C, 1 Pint	31103001
Buffer solution, 6.865 pH at 25° C, 1 Pint	31103002
Buffer solution, 9.18 pH at 25° C, 1 Pint	31103003
Dual O-ring (3)	31082124
O-Ring washer (3)	31301393
Compression Nut (1)	31003495
Beaker, polypropylene, 260 ml (1)	31122187
Large O-ring, two, not used with 7758	31082122
Six Pack electrolyte for reference electrode (1) (not included in 008473 kit)	31103065

3. Durafet® pH Electrodes

3.1 Introduction

These individual electrode mountings, supplied in sets of one or two (see Section 1.2, Model Selection Guide), are each designed to support one measuring electrode and/or reference electrode for continuous "in-line" measurements of pH. The mounting has a male 3/4" NPT thread and, as shown in Figure 3-1, requires a pipe tee for pipe lines up to 2-1/2 inches. If used in a 3" or larger pipe line, it requires a 3/4" NPT tap in the wall of the pipe. The mounting can also be welded into the pipe line if so desired. For limits of pressure and temperature, refer to the performance specifications. See also Honeywell manual 70-82-25-63 supplied with Durafet electrodes.

The mountings are designed to be disassembled easily without the use of tools.

The 7758 Assembly may include, in addition to the electrode mountings, an electronic preamplifier module for use in a measuring system with 7082, 7084, 7075, 7076 or 7079 pH Analyzers. As shown in Section 1.2, MSG, Table I identifies your particular assembly. An adapter module may be supplied for use with pH Analyzers not manufactured by Honeywell. See Manual 70-82-25-13.

If the electrodes are supplied with the assembly, it will be indicated by the value of Table III. A separate automatic temperature compensator is not required since the temperature compensator is part of the Durafet electrode.

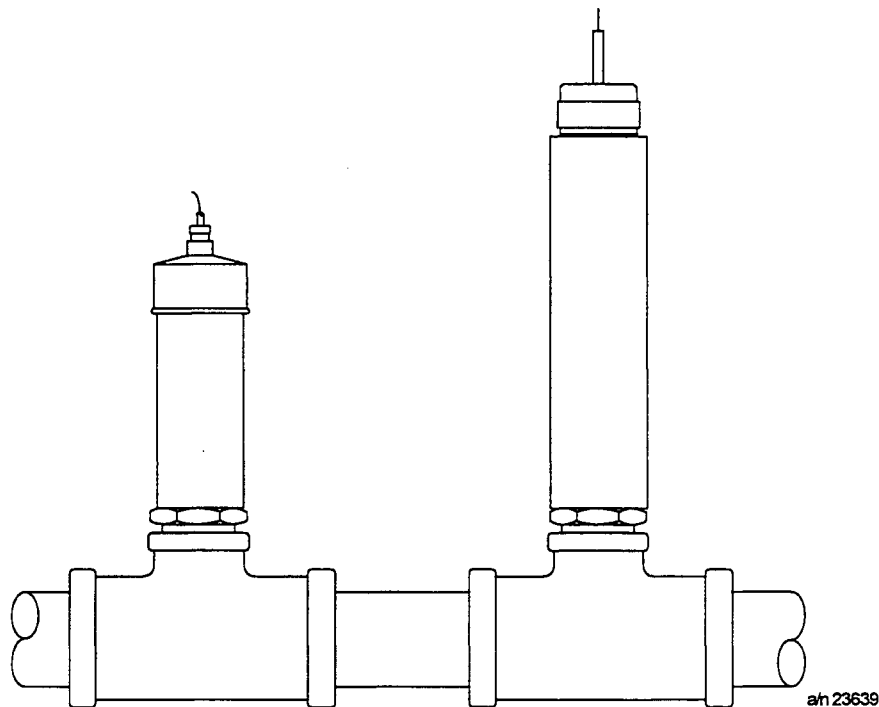


Figure 3-1. 7758 Durafet Electrode Mounting with Separate Reference Electrode (Left)

3.2 Description

As shown in Figure 3-2, each electrode mounting consists of several parts. The electrode is supported in the pipe or tee by a housing consisting of a special 3/4" NPT bushing and threaded cover. It is sealed by means of the plastic knurled compression nut, tubular spacer, O-ring washer, and dual O-ring. The grommet serves to seal the electrode's leadwire. A second plastic spacer is furnished with each mounting to permit greater electrode extension, required when the pipe line is 2" or larger. A spare dual O-ring and O-ring washer are supplied with each mounting.

If specified by the assembly catalog number suffix, the measuring and reference electrodes may be supplied with the assembly. The Durafet pH measuring electrode, if supplied, is a connector-cap type. A 10-foot or 20-foot long shielded cable with an integral connector is supplied with the assembly.

If specified by the assembly catalog number, a preamplifier module may be supplied. This sealed electronic circuit is housed in a weatherproof corrosion resistant polypropylene housing. Its output is a high-level low-impedance signal, easily carried long distances over ordinary cable. It requires no line-voltage supply: the dc operating voltage is supplied from the measuring instrument.

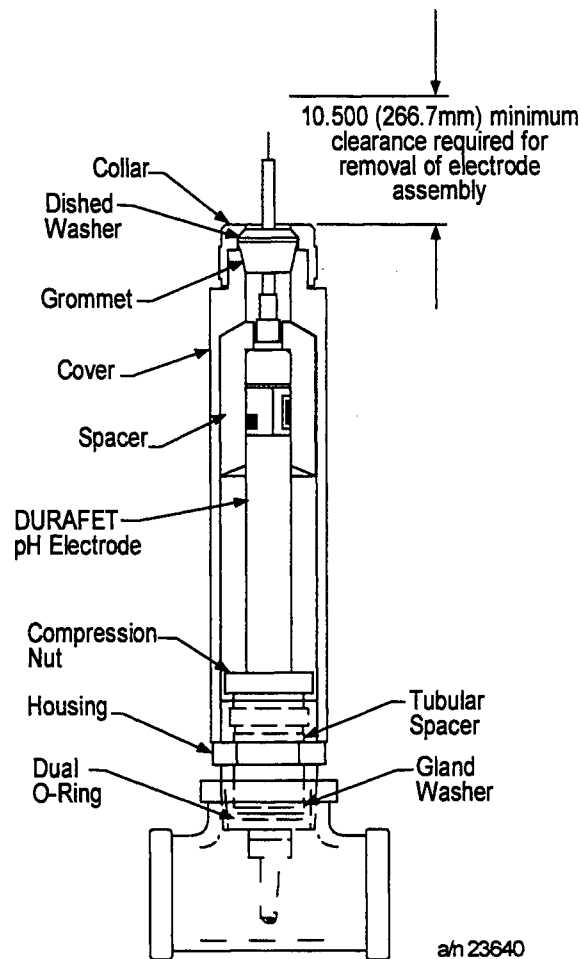


Figure 3-2. Cutaway View of Assembled Mounting (3/4" pipe tee shown is not included with mounting)

3.3 Electrode Mounting

3.3.1 Location

The installation requires a pipe-line tee with a 3/4 NPT center opening for each of the electrode mountings used. The relative locations of the electrodes is not of great importance. Most users keep the distance between the two mountings to a minimum.

Dimensions of the 7758 Electrode mounting are given in Figure 3-3. Mount and tighten the bushing in the 3/4 NPT of the pipe tee using a suitable pipe compound. Good results have been obtained using Loctite high performance pipe sealant with Teflon. For pipe lines of 3" and larger diameter, drill and tap the pipe wall for 3/4 NPT.

If a 3/4 NPT plastic pipe tee is required, use Honeywell part 31120167 CPVC plastic pipe tee. Use Teflon tape to seal threads on plastic tee.

3.3.2 Assembling Electrode Mounting

1. After the mounting bushing is installed in the pipe line, insert one of the dual O-rings in the seat in the bushing and place one of the polypropylene washers and the tubular spacer over it. Mount the knurled plastic compression nut but do not tighten it and do not compress the O-ring. Refer to Figures 3-2 or 3-3, which illustrate the assembled mounting. The internal parts of the mounting arranged in order of assembly are shown in Figures. 3-2 and 3-3 for Durafet electrodes and separate reference electrodes respectively.
2. Lubricate the lower half of the electrode very lightly with silicone grease.

CAUTION

On Durafet Electrodes, avoid smearing any grease on the sensor chip as this will adversely affect the sensitivity of the electrode.

3. Carefully insert the electrode into the mounting (not too far) and tighten the compression nut just enough to provide some resistance to electrode motion.

Reference Electrode

1. If the pipeline is 2" or more in diameter, slip the 31301576 plastic spacer provided onto the cable. This effectively extends the electrode deeper into the pipe-line to provide the proper immersion. See Figure 3-3 for proper positions of the spacer.
2. Run the cable for the reference electrode through the stainless steel cover supplied with the parts. Lower the cover over the electrode, gently pushing the electrode down into the mounting. Screw the cover down, then remove it again. The reference electrode should now be in the proper position. Tighten the knurled compression nut by hand.
3. Spread a thin coating of silicone grease along the reference electrode cable and run the cable through the rubber boot. Slide the boot along the cable and pull it over the top of the steel cover. Silicone grease on the leadwire cable will help to make a better seal. The reference electrode assembly is now complete and installed.
4. Make certain during both installation and removal of the electrode that the rubber boot is rolled or pushed up off the steel cover when the cover is being rotated. This will avoid excessive twisting of the cable.

Durafet Electrode

1. Run the cable for the Durafet Electrode through the collar, dished washer and split grommet. Push the cable end with the circular connector through the 316 SS cover. Slip the 31301576 Spacer onto the cable if the pipe line is 2" or more in diameter. In any case slip the 31120169 spacer onto the cable. Connect the cable to the Durafet Electrode. See "Electrode Preparation" in Manual 70-82-25-63 supplied with each Durafet Electrode, and "Preamplifier Connection" in this manual.
2. Next lower the cover over the electrode, making sure all spacers are properly in place; see Figure 3-2 or 3-4. Gently push the electrode down into the mounting. Screw the cover down, then remove it again. The Durafet Electrode should now be in the proper position. Check orientation of the sensor surface with respect to flow. See "Electrode Preparation" in Manual 70-82-25-63. Tighten the knurled compression nut by hand.
3. Seat the grommet into the tapered end of the 316 SS cover. Hand tighten the collar being careful to center the dished washer in place.

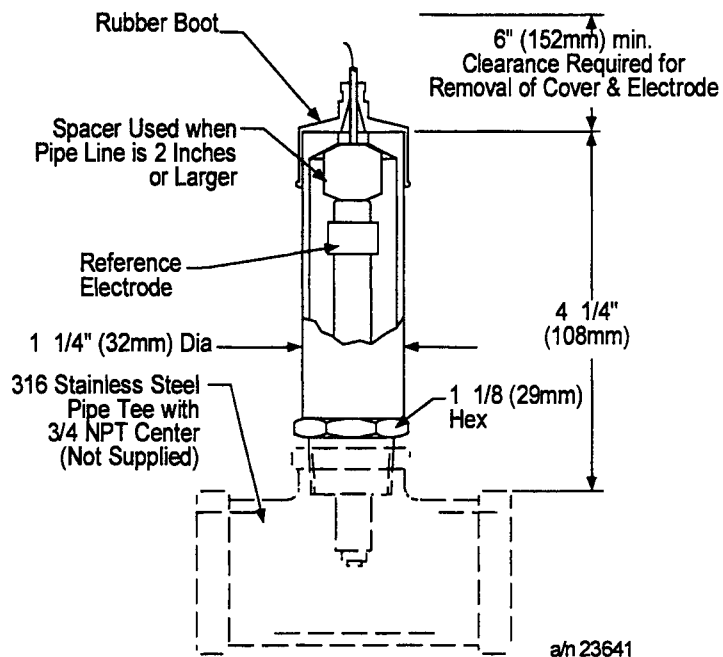


Figure 3-3. Assembled Mounting Using a Reference Electrode (Spacer shown above electrode provides greater depth of insertion needed for larger pipes)

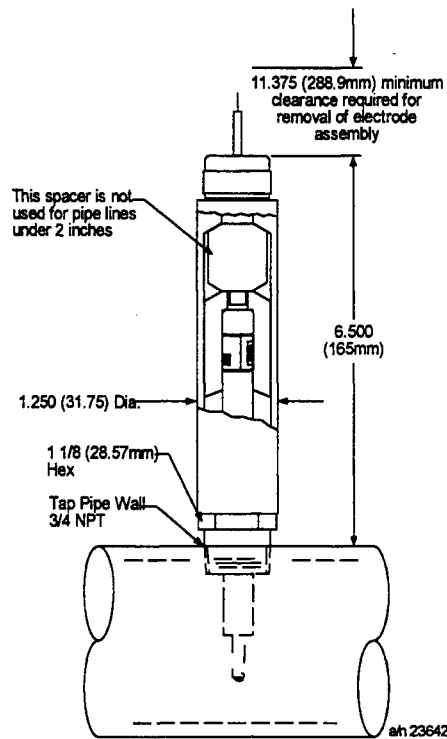


Figure 3-4. 7758 Durafet Electrode Mounting Dimensions, Shown Threaded into a Larger Pipe (Top spacer is not used for pipe lines under 2 inches)

3.4 Pre-amplifier Connection

The pre-amplifier module is constructed of corrosion-resistant glass-filled polypropylene. It is rated NEMA 4X corrosion-resistant, and IP65. The pre-amplifier module does not require line voltage power; the dc operating voltages are supplied from the pH instrument through the pre-amplifier cable.

CAUTION

Do not over-tighten any fitting into the pre-amplifier module housing.

The pre-amplifier module contains a replaceable pre-amplifier assembly which is sealed against humidity in a metal can. The can has quick disconnects on one end for the output cable and on the opposite end for the Durafet electrode cable.

If Table I of the 7758 Mounting is 00, the Durafet pH electrode cable is connected directly to the 7082 pH Analyzer. The 080239 Pre-amplifier Kit must be installed in the 7082 before the electrode cable can be connected. See Manual 70-82-25-64 (supplied with the 080239 Kit) for pre-amplifier installation instructions.

If Table I of the 7758 Mounting is 06, see below for installation and connections for the 31079288 Pre-amplifier Module.

If Table I of the 7758 is 07, the pH electrode cable is connected to the adapter module. Output from the adapter module is fed to pH analyzers which are manufactured by vendors other than Honeywell. For installation instructions, refer to Honeywell Manual 70-82-25-13 supplied with Honeywell 31079290 Adapter module.

Installation and Connections for 31079288 Preamplifier Module

Remove both end caps from module according to Figures 3-5 and 3-6.

Cables terminate with a round 7-pin keyed metal connector on one end and a rectangular plastic 8-pin keyed push-on connector on the other end. The round connector mates with the Durafet electrode cable. The rectangular connector mates with the cable going to the pH Analyzer.

Connectors are constructed with high resistance insulating material which can be contaminated if exposed to oil and salt from bare hands. Avoid contaminating the internal area of the connectors. Also ensure that the mating half of the connector, located on the input side of the preamplifier inside the plastic housing, is kept clean and dry.

ATTENTION

Do not allow liquids or other foreign matter to contact the cable connectors. Leave the protective cap in place on the circular connector whenever the cable is not installed on the electrode.

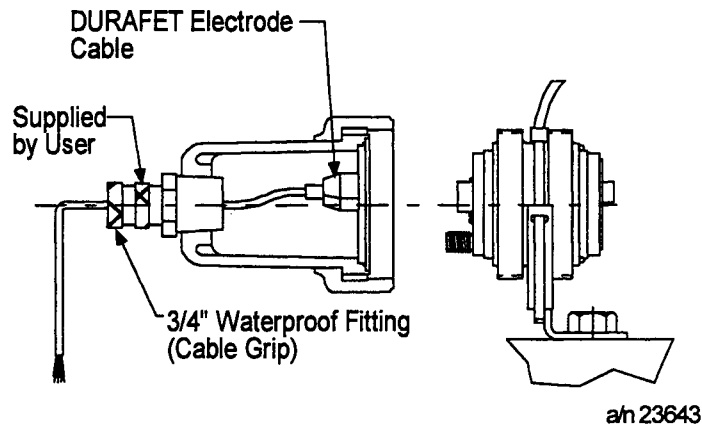


Figure 3-5. 31079288 Preamplifier Module, Input End Removed

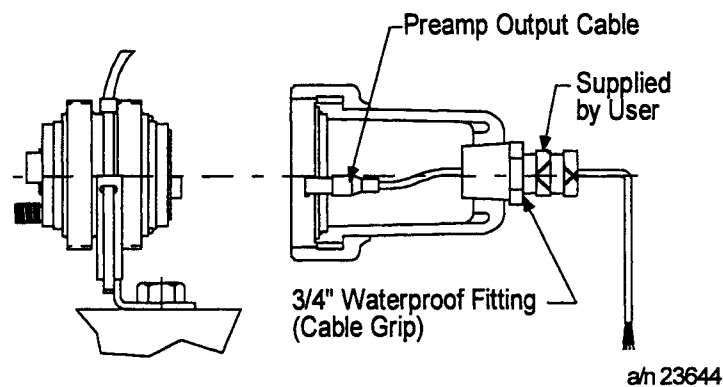


Figure 3-6. 31079288 Preamplifier Module, Output End Cap Removed

These areas may be cleaned by spraying with TF grade Freon or by wiping clean with a cotton swab moistened with isopropyl or grain alcohol. Allow connectors to dry completely before making connections.

1. When attaching the connector to the electrode, align key and keyway and be careful not to cross the threads on the connector.
2. Tighten the knurled metal shell of the connector firmly onto the electrode to ensure good electrical contact and sealing.
3. Plug the cable's rectangular connector into the receptacle on the preamplifier. The rectangular connector contains a polarizing key for the proper orientation. Do not force it on.

The separate reference electrode connection on the preamplifier is used when Table III = 24, 25, 26, 27, 28 or 44, 45, 46, 47, 48. See Installation Wiring Diagram in Figure 3-7.

Precautions for Using Durafet Electrodes in High Humidity and Condensation Areas

The Durafet preamplifier is suitable as shipped for relative humidity conditions up to about 85-90%, non-condensing. If condensation occurs, water must be prevented from accumulating in the 6 and 8 pin connectors; otherwise erratic performance and damage to the connectors may result.

For the Durafet Connectors, use silicone grease to provide protection from condensation. Before applying silicone grease, be sure that the connectors are clean and dry. After treatment with silicone grease, it is important to keep foreign material out of the connectors. Please handle all treated parts with care.

Use Honeywell part 31090011, a 0.3 oz Tube of High Vacuum Silicone Grease. Dow Corning High Vacuum Silicon® Grease or Dow Corning #4 Silicone Electrical Insulating Compound may also be used. To apply the silicone grease:

1. Hold the opened end of the silicone grease tube against the pins of one of the two male connectors of the preamp, and carefully squeeze enough grease into the connector to slightly overfill it.
2. Repeat the procedure for the second male connector, completely filling it.
3. Hold the tube of silicone grease tightly against one of the rectangular female cable connectors and squeeze grease through the small openings until it is forced out of the small slots in the sides of the connector body. Repeat the process over the rest of the face of the female connector.
4. Initially, you will see gold plated connector contacts through these slots. By filling these spaces with silicone grease, you will prevent the accumulation of condensed water in these spaces.
5. Perform the same procedure on the second rectangular cable in the same manner. Do not apply grease to the circular connector. The circular electrode connection is gasketed to prevent water intrusion.
6. Firmly insert the cable connectors into their mates on the preamplifier can. Press firmly for full insertion and hold for several seconds to allow excess silicone grease and entrapped air to escape. Wipe off all excess grease from the external surfaces of the assembly.

Maintaining Silicone Grease Protected Connectors

When disconnected, the connectors that have been protected with silicone grease must be protected from dirt and dust. A small additional application of the grease is recommended before they are reconnected. If there is any uncertainty about cleanliness, we suggest that the connectors be thoroughly blown clean with compressed air or inert gas that is water and oil free. Then repeat the application of silicone grease as described in the section above.

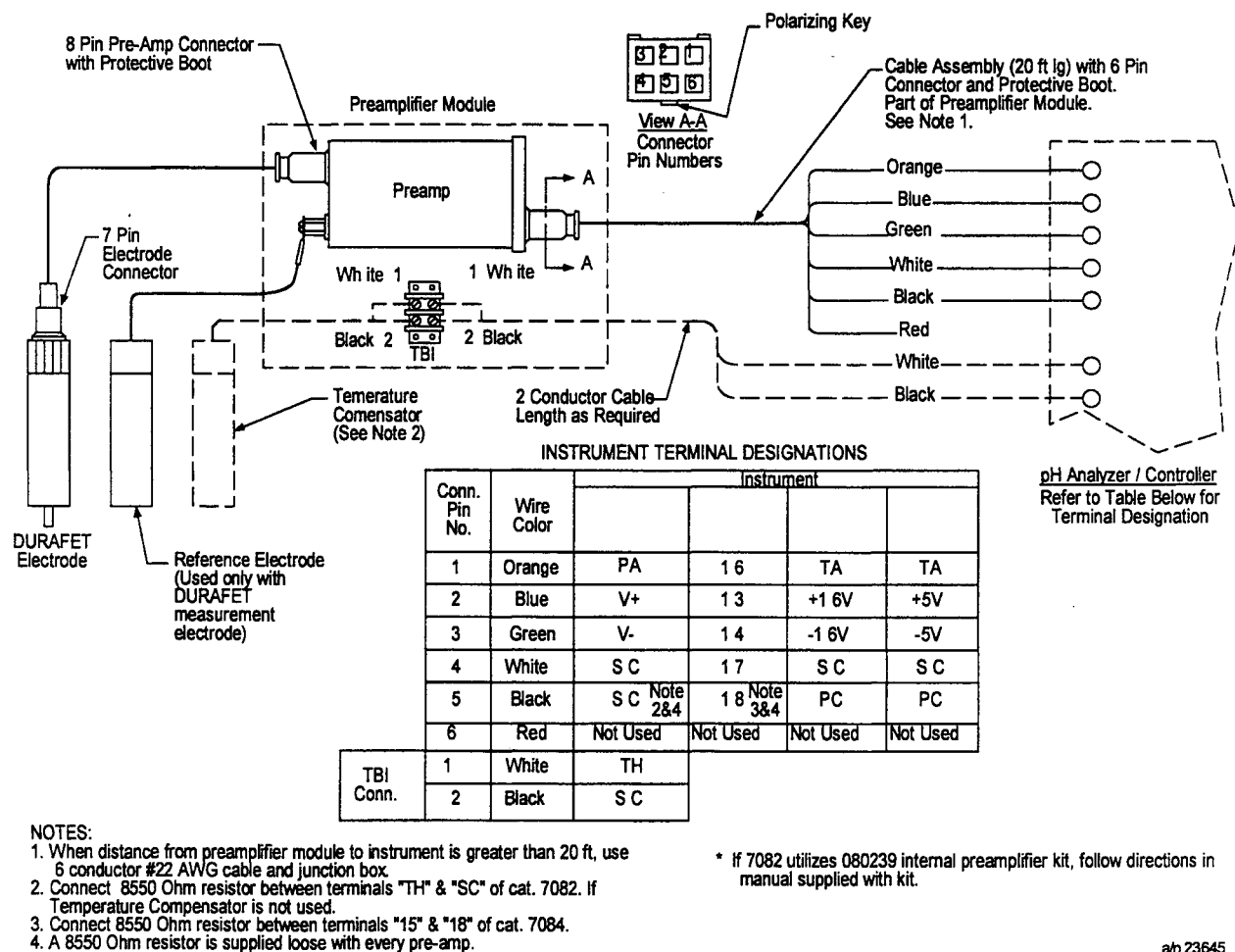


Figure 3-7. Installation Diagram for Durafet pH Electrode with Remote Preamp

Connecting External Preamplifier

When the Model 31079288 external preamplifier is specified, an output cable is supplied which has a polarized rectangular connector and rubber protective boot on one end.

1. Connect the polarized connector to the output side of the preamplifier, as illustrated in Figure 3-6.

ATTENTION

You must prepare the other end of this cable to accommodate the termination at the measuring instrument or junction box to which the cable will be attached. See Figure 3-7.

2. When the connector is firmly in place, do not force it on, slide the protective boot firmly over the connector.
3. Replace the end caps, ensuring that the o-rings are lightly lubricated with silicone grease, Honeywell part number 31090011. Leave a few inches of cable slack in the preamplifier module.

Note that the covers are slotted and the holder is keyed. A white mark on the covers and holder threads indicates the location of the slots and keys.

When replacing a cover:

1. Align its mark with the mark on the holder threads before tightening the connecting ring.
2. With the O-ring in place, hold the cover firmly in position while tightening the connecting ring.

Preamplifier Mounting

When mounting the preamplifier module, allow enough slack between the electrode and the preamplifier to permit removal of the electrode for maintenance.

The module is designed for surface mounting. Figure 3-8 illustrates the dimensions required for mounting the module. A mounting bracket constructed of nickel-plated steel and a plastic quick release locking strap are provided to facilitate mounting. The module can be mounted in any convenient position in addition to the vertical mounting shown in Figure 3-8.

Do not mount the module where the temperature limits will exceed the Specifications outlined at the beginning of this manual.

Do not mount the module over or near sources of corrosive vapors which could enter the preamplifier module during installation or maintenance.

All electrical connections to the preamplifier must be completed and the 3/4" NPT connections must be sealed before exposing the unit to corrosive or wet conditions.

Before installing cabling, remove the grommets from the cable grips and cut one side along the axis to permit cable insertion.

Do not use the preamplifier module mounting bracket to support anything but the 31079288 module. The plastic locking strap is designed to secure the preamplifier module only.

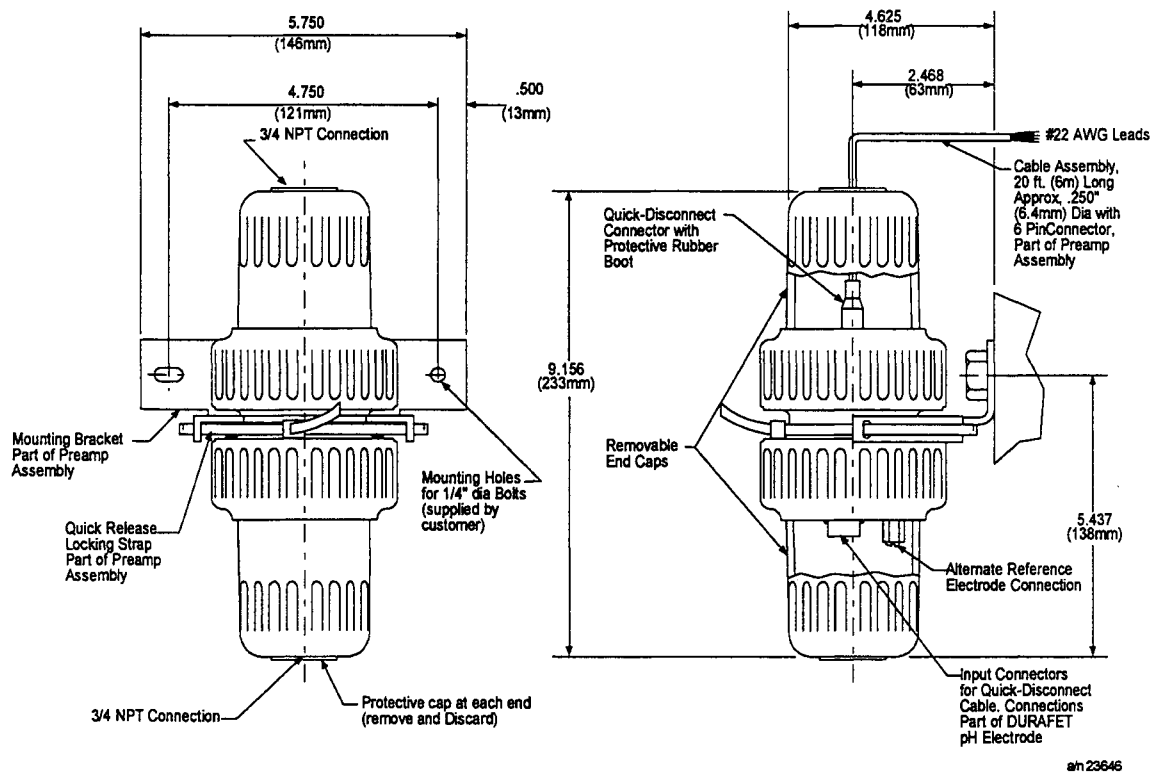


Figure 3-8. Outline and Dimension Drawing for 31079288 Preamplifier Module

Final Electrical Connections

Various arrangements can be used for electrical connections to the output cable. A 3/4" NPT pipe coupling and a 3/4" NPT cable grip can be used to secure the cable exit point.

An alternative approach is to use a junction box (Honeywell P/N 31316260) and terminate cable (Honeywell P/N 31075723) inside the junction box. See Figure 3-9. This is helpful if the pH instrument is at some distance from the electrode mounting. Use cable (Honeywell P/N 31834088) to connect from the junction box to the instrument.

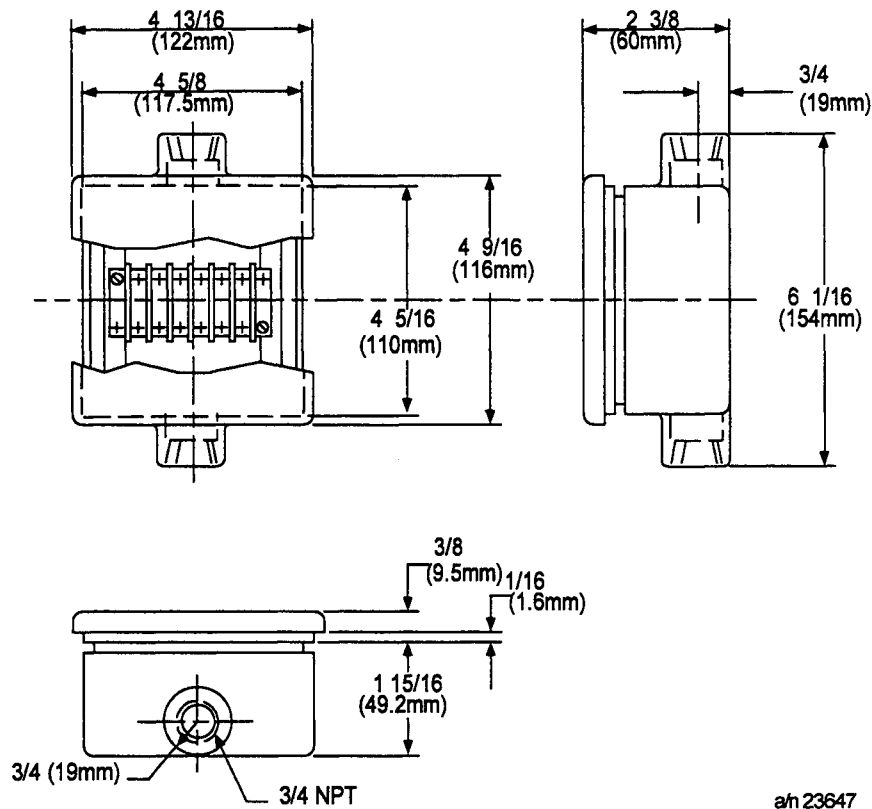
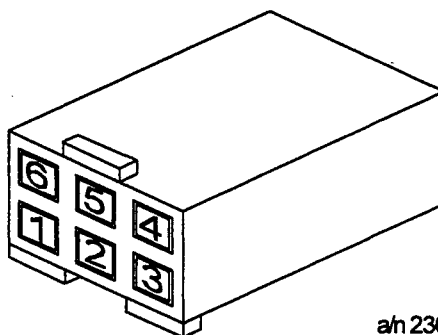


Figure 3-9. Outline and Dimension Drawing for 31316260 Junction Box

Figure 3-10 illustrates the rectangular connector of cable 31075723, and the electrical function of each colored conductor in the cable is listed in Table 3-1.

CAUTION

Do not reverse the blue and green wires (dc voltage supply). The preamplifier circuit will be damaged.



ah 23648

Figure 3-10. Output Cable Connector, Pre-amplifier End

Table 3-1. Electrical Function of Conductors in Output Cable

Pin No.	Signal	Conductor Cable
1	Output	Orange
2*	Positive Supply	Blue
3*	Negative Supply	Green
4	Signal Common	White
5	Power Common	Black
6	No Connection	Red

CAUTION

*If power supply is not connected exactly as defined, irreparable damage will result.

Figure 3-7 shows the connections required for installation of the pH preamplifier. Ensure that the connections are correct before attempting to power-up the measuring system. If extension cable is used, carefully note conductor colors.

Refer to Figure 3-10 for the junction box (Honeywell P/N 31316260). Note that the junction box can be wall-mounted. Allow sufficient overhead space and cable length for easy access for cleaning, electrode maintenance, or preamplifier replacement.

3.5 Maintenance and Calibration

For calibration procedures, refer to the instrument manual for the instrument being used with the electrode. The calibration interval depends upon the operating conditions. It is recommended that when an electrode is used for the first time, it should be recalibrated at relatively short intervals. With experience, the interval may be lengthened.

See Honeywell Manual 70-82-25-63 (supplied with the Durafet electrode at shipment) for precautions, cleaning, and storage information.

3.6 Replacement Parts

Table 3-2 lists the replacement parts for Durafet Preamplifier Module 31079288. The Item numbers refer to Figure 3-11.

Table 3-2. Replacement Parts for Durafet Preamplifier Module 31079288

Item No.	Description	Part No.
1	Cover	31075700
2	Connecting Ring	31075701
3	Housing	31075702
4	O-Ring	31075703
5	Plug Protector	31095234
6	Screw Terminal Clamp	31041395
7	Support Bracket	31075717
8	Fastener Ty-Wrap	31075716
9	Cable Ass'y, Preamp Output	31075723
10	Caution Tag	31075719
13	O-Ring	31055836
15	Preamplifier	31079236

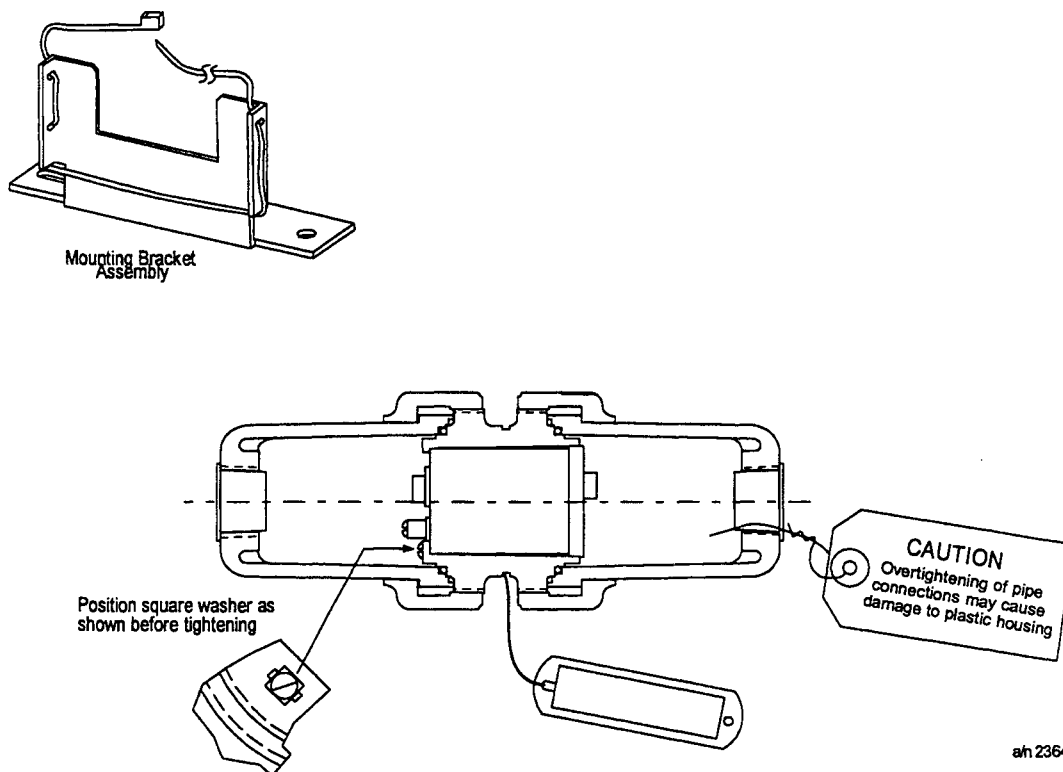


Figure 3-11. Component Parts for Preamplifier 31079288

4. Low Volume Flow Through Electrode Mounting for High Purity Water

4.1 Introduction

This electrode mounting incorporates a small volume to provide high flow velocity with relatively low sample flow rates. High velocity prevents accumulation of suspended solids in the flow chamber which may slow down electrode response. The configuration provides mounting locations for a Meredian combination measuring/reference electrode and a compact temperature compensator.

4.2 Installation

Flow Chamber Assembly and Mounting

1. Seal all pipe connections to the flow chamber with Teflon pipe tape or nuclear grade pipe sealant as required by the installation.
2. Install the 3/4 inch NPT stainless steel bushing into the flow chamber.
3. Install 1/8 inch NPT tubing fittings (not included) into the bottom and upper side ports.
4. Install the 1/8 inch NPT Temperature Compensator into the lower side port of the flow chamber.

Do NOT install the Measuring Electrode until the assembly is mounted.

The mounting is normally installed on a grounded conductive panel to help provide good measurement signal stability. Mount the chamber assembly using a bracket and screws or bolts appropriate to the mounting surface. See Figure 4-1. Allow a 9 inch space for the flow chamber and cover plus 3 inches additional clearance overhead for cover removal.

1. Connect inlet and outlet tubing to the bottom and upper side fittings, respectively.
2. Remove the flow chamber cover (if necessary) to prepare for installation of the Measuring Electrode.

Measuring Electrode Installation

Before installing the Measuring Electrode, shake it down like a medical thermometer, according to the precaution in the Electrode Directions, to remove any bubbles from the glass membrane area.

1. Slide the plastic compression nut, spacer, washer, and dual O-ring onto the electrode.
2. Install this assembly into the top bushing of the flow chamber and hand tighten the compression nut.
3. Cut about 1/4 inch from the tip of the rubber boot to provide sufficient inside diameter for cable clearance.
4. Slide the shielded cable through the flow chamber cover and the rubber boot.
5. Install the flow chamber cover to complete the assembly.

Preamplifier Installation

See Figure 4-2 and make Preamplifier and Measuring Electrode electrical connections accordingly. The preamp "REF" terminal is connected to the screw near the bottom of the flow chamber.

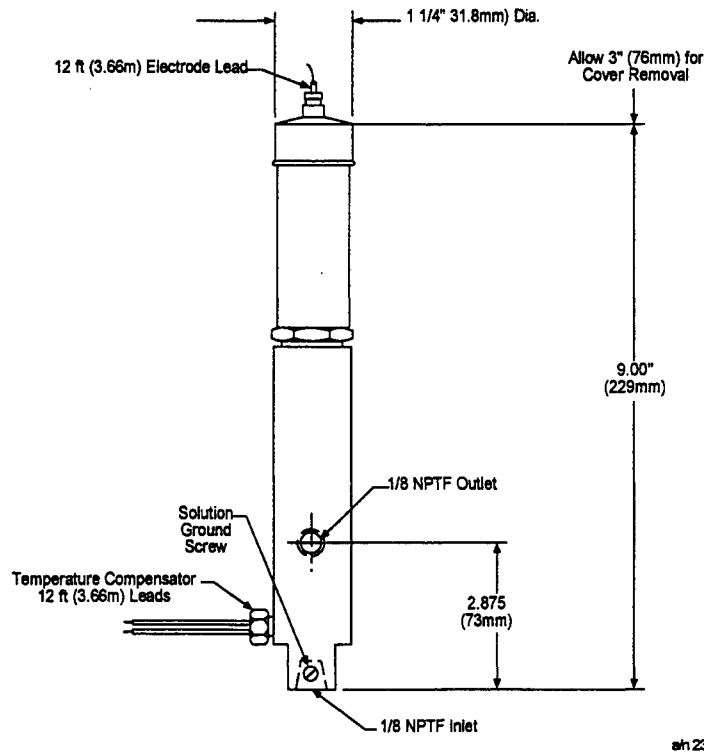


Figure 4-1. Mounting Drawing for 7758 High Purity Water Electrode

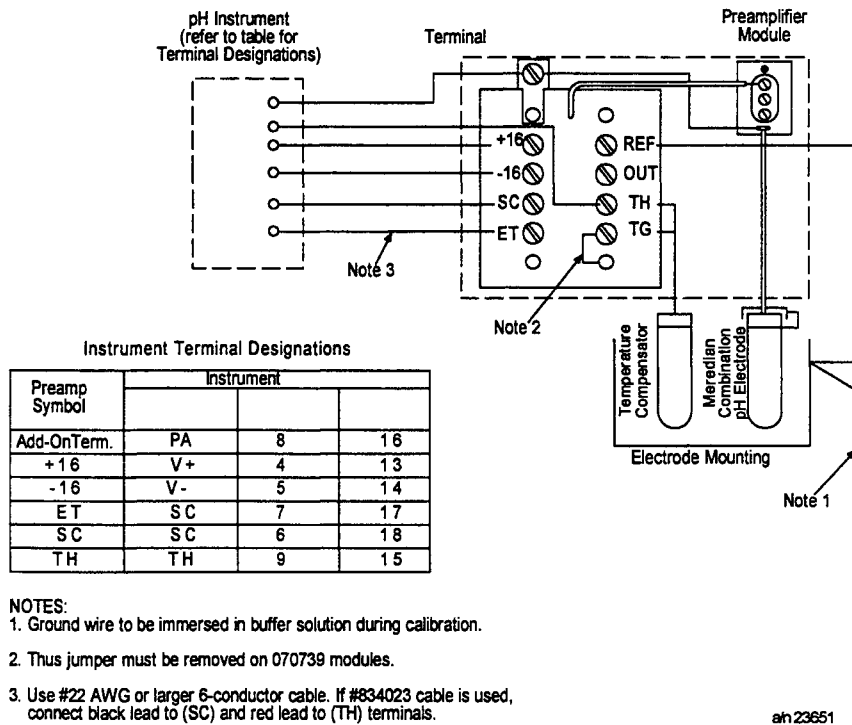


Figure 4-2. Installation Diagram for pH Electrode Mountings using 31028698 for High Purity Water Applications

4.3 Operation, Maintenance, and Calibration

The flow rate of high purity water samples should be limited to a few hundred cc/minute to minimize streaming potential effects which would appear as extreme flow sensitivity of the measurement.

The greatest stability of measurement in high purity water is obtained with discharge to atmospheric pressure. If not used for high purity water measurements, observe the pressure rating of the electrode, 100 psig.

When the Measuring Electrode is removed from the flow chamber for calibration in buffer solution, the "REF" to solution ground continuity must be maintained. This is accomplished by connecting another wire to the screw at the base of the flow chamber and immersing the uninsulated free end of this wire into the container of buffer solution along with the Measuring Electrode.

4.4 Replacement Parts

See Figure 4-3. All replacement parts are identified on this figure.

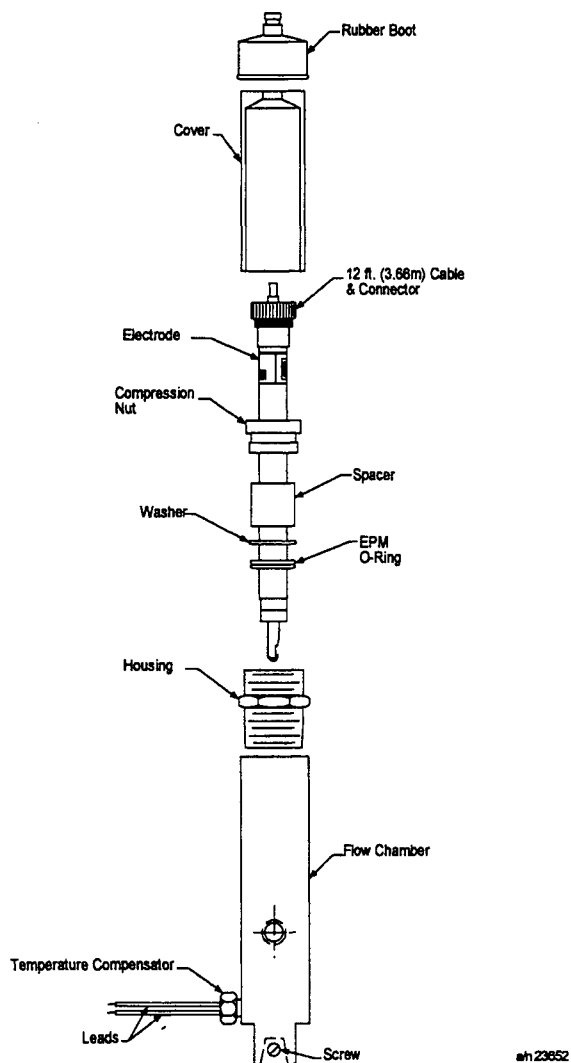


Figure 4-3. 7758-08 Electrode Mounting component parts, High Purity Water Option