

7774 Series CPVC Plastic Removal/Insertion Assembly for Use with Durafet[®] II pH Electrodes

70-82-25-89

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About This Document

Abstract

This manual contains instructions for installation and use of the 7774 series CPVC Plastic Removal/Insertion Assembly for use with Durafet[®] II pH electrodes.

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Symbol Definitions

The following table lists those symbols used in this document to denote certain conditions.

Symbol	Definition
	This CAUTION symbol on the equipment refers the user to the Product Manual for additional information. This symbol appears next to required information in the manual.
	WARNING PERSONAL INJURY: Risk of electrical shock. This symbol warns the user of a potential shock hazard where HAZARDOUS LIVE voltages greater than 30 Vrms, 42.4 Vpeak, or 60 Vdc may be accessible. Failure to comply with these instructions could result in death or serious injury.
	ATTENTION, Electrostatic Discharge (ESD) hazards. Observe precautions for handling electrostatic sensitive devices
	Protective Earth (PE) terminal. Provided for connection of the protective earth (green or green/yellow) supply system conductor.
	Functional earth terminal. Used for non-safety purposes such as noise immunity improvement. NOTE: This connection shall be bonded to protective earth at the source of supply in accordance with national local electrical code requirements.
	Earth Ground. Functional earth connection. NOTE: This connection shall be bonded to Protective earth at the source of supply in accordance with national and local electrical code requirements.
	Chassis Ground. Identifies a connection to the chassis or frame of the equipment shall be bonded to Protective Earth at the source of supply in accordance with national and local electrical code requirements.

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1. Introduction

1.1 About This Manual

Manual part of a set

This manual is part of a set documenting installation and use of the 7774 Series CPVC Plastic Removal/Insertion Assembly with the Durafet II pH Electrodes.

The set consists of the following manuals.

- this manual
- Instruction Manual 70-82-25-87 Durafet II Industrial pH Electrode Series
- Instruction Manual 70-82-25-13 Durafet II Models 31079290 and 31084755 Industrial Preamplifier Adapter Modules (7774-55 or -56)

or

Instruction Manual 70-82-25-65 Durafet II Model 31075773 Industrial Preamplifier, Battery Powered Adapter Module (7774-57)

- Instruction manual for the pH instrument. Note that if a Honeywell internal preamplifier is used with a Honeywell analyzer, a manual is also supplied with the internal preamp kit.

What this manual contains

This manual contains instructions for the installation and use of the 7774 Series CPVC Plastic Removal/Insertion Assembly. It also contains information about the optional 31079288 preamplifier module (7774-50) and wiring information on the Cap Adapter option, for which there are no separate manuals.

Also included are general descriptions of the Durafet II electrodes and the optional 31079290, 31084755, and 31075773 Industrial Preamplifier Adapter Modules. **More detailed information about installation, use, and maintenance of the electrodes and preamplifier adapter modules is provided in the other manuals in the set.**

CAUTION

Read the electrode and preamplifier module manuals before installing and using the Durafet II electrodes. Failure to follow the installation instructions could result in damage to the equipment.

1.2 Overview

The 7774 Series of electrode mountings enables a user to interface a Durafet® II pH electrode to a process through the use of a CPVC ball valve assembly. This allows the insertion and removal of the electrode for calibration and maintenance without shutting down the process.

The Honeywell Durafet II Series of industrial electrodes has been designed to provide accurate and stable pH measurements for a wide variety of industrial applications. The Durafet II pH electrode is a non-glass pH electrode. The pH measurement is based on ISFET (Ion Selective Field Effect Transistor) technology, which results in a solid state pH sensing electrode. The Durafet pH electrode is more rugged than the traditional glass pH electrode. The practically unbreakable pH electrode reduces replacement and inventory costs. The solid state sensing element is packaged in a durable Ryton® body that results in a pH electrode that has extended life in a wide variety of process conditions. The ISFET technology also produces an electrode that is up to 10 times faster than glass electrodes. This fast response improves product quality and provides better process control to optimize chemical usage.

1.3 Description

Designed for convenient removal of electrode

The 7774 CPVC Plastic Removal/Insertion Assembly is designed for use with the Durafet II Electrode in a pipeline or closed vessel where it is desirable to remove the electrode for inspection and maintenance without shutting down the system and releasing the pressure. The assembly comprises a Durafet II Electrode and a 31074357 Removal Device which are shown assembled in Figure 1-1.

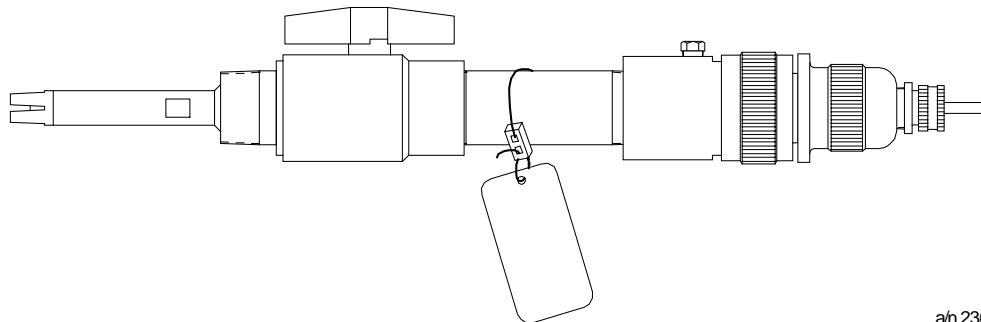


Figure 1-1 7774 CPVC Plastic Removal/Insertion Device with Durafet II Electrode

Maximum process pressure and temperature

The 7774 CPVC Plastic Removal/Insertion Assembly is to be used in applications for which maximum pressure does not exceed 100 psig, and can be reduced to 50 psig during insertion and removal of the electrode. Maximum operating temperature is 88 °C.

Optional external preamp

The 7774 CPVC Removal/Insertion Assembly can include various preamplifier and adapter modules in NEMA 4X enclosures. The preamp is an environmentally sealed (encapsulated) high impedance amplifier.

Cap Adapter option

A Cap Adapter option is available for 7774 CPVC Removal/Insertion Assemblies. The Cap Adapter is a preamplifier electronics module that is integral to the electrode cable. The sealed Cap Adapter electronics requires no maintenance and no separate installation.

Wetted parts resist corrosion

The electrode is made from polyphenylene sulfide (Ryton) which is resistant to corrosive solutions over a wide range of temperatures. Sample solutions come into contact with the Ryton, ceramic, EPM, and silicon materials of the electrode. The only other materials of the 7774 CPVC Plastic Removal/Insertion Assembly with which the sample solution may come into contact, are in the removal device which is comprised of CPVC plastic, Teflon, EPM and Viton materials.

Items furnished

In general, the separate items furnished are as follows: The removal device, a Durafet II Electrode and cable (with Cap Adapter if 7774D), a preamplifier module (or adapter module) in a plastic housing (omitted in 7774-25), and a CPVC plastic adapter coupling. The electrode and the adapter coupling assembly are shown in Figure 1-2.

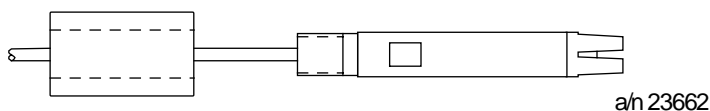


Figure 1-2 Durafet II Electrode with Adapter Coupling

Removal device components

The 31074357 Removal Device is shown in Figure 4-1. This device consists of a ball valve that is connected to the closed system by a 1 1/2 in. CPVC Schedule 80 mounting nipple, and to a housing by a 6 in. long Schedule 80 CPVC nipple into which the support tube for the electrode mounting is inserted. A compression handle provides a seal around the electrode support tube. The Durafet II Electrodes are described in the manual supplied with the electrodes.

1.4 Installation Overview

Installation tasks

Table 1-1 lists the tasks required to assemble and install the insertion/removal assembly when it is used with Durafet II electrodes.

Table 1-1 Assembly and Installation Tasks to Use 7774 CPVC Plastic Removal/Insertion Assembly with Durafet II Electrodes

Step	Action
1	Select location based on the information in Section 3 of this manual.
2	Install the ball valve and nipple assembly in the process pipeline or tank wall following the instructions in Section 4 of this manual.
3	If an immersion depth greater than 15.2 cm (6 in.) is required, replace support tube supplied with a substitute support tube fabricated at your site as described in Section 5 of this manual.
4	If solids in the process make purging of the assembly desirable, install the purge line as described in Section 5 of this manual.
5	Thread electrode cable through support tube as described in Section 5 of this manual.
6	Thread electrode cable through adapter coupling and install adapter coupling on electrode as described in Section 5 of this manual.
7	<p>Connect the electrode cable to the external preamplifier, adapter module, analyzer's internal preamplifier, or to the instrument's input terminals (Cap Adapter).</p> <ul style="list-style-type: none"> • Instructions for cabling to the external 31079288 preamplifier are provided in Section 6 of this manual. • Instructions for cabling to a preamp adapter module are provided in Section 6 and in the manual supplied with the adapter module. • Instructions for cabling to the analyzer's internal preamplifier are provided in the manual supplied with the internal preamp kit. • Instructions for wiring to the instrument's input terminals when using a Cap Adapter are provided in Section 6.3 and the instrument manual. <p><i>Note that special instructions for using the 31079288 external preamplifier in locations with high humidity and condensation are provided in Section 6.</i></p>
8	<p>If the electrode was not cabled directly to the instrument, complete cabling from the 31079288 external preamp or from one of the adapter modules to the instrument.</p> <ul style="list-style-type: none"> • Instructions for cabling the external preamp to the instrument are provided in Section 6. (If the preamp is more than 61.0 (200 ft) from the instrument, you can use junction box 31316260 as described in Section 6.) • Instructions for cabling an adapter module to the instrument are provided in the manual supplied with the adapter.
9	<p>If a preamplifier module is used, complete assembly and mounting of the preamplifier module as described in Section 6.</p> <p>If an adapter module is used, complete assembly and mounting of the adapter module as described in the adapter manual.</p>
10	Standardize the system as described in the manual provided with the measuring instrument.
11	Insert the electrode and support tube in the ball valve and nipple assembly as described in Section 7 of this manual.
12	When required for maintenance, remove the electrode from the process as described in Section 7 of this manual.

2. Specifications and Model Selection Guide

2.1 Specifications

Pressure and Temperature Limits

689.5 kPa at -5 °C to 50 °C (100 psig at 23 °F to 122 °F), nonshock.

344.8 kPa at 88 °C (50 psig at 190 °F), nonshock. (See Figure 3-2.)

Maximum pressure for insertion or removal: 344.8 kPa (50 psig).

Mounting

1 1/2 in. NPT male process connection. (See Figure 3-1.)

For mounting of preamplifier module 31079288, see Figure 6-5.

For mounting preamp adapter modules, see the manual supplied with the module.

Purge Port Connection

1/4 in. NPT female. Purge fluid temperature and pressure not to exceed 7774 CPVC temperature and pressure specifications.

Insertion Depth

Nominal 15.2 cm (6 in.) insertion (into process). For deeper insertion, replace standard CPVC plastic support tube with desired length support tube. (See Figure 3-1.)

Overall Length

Measured from process connection: approximately 50.8 cm (20 in.). (See Figure 3-1.)

Space Required for Electrode Removal

Measured from process connection: approximately 1.42 m (56 in.). (See Figure 3-1.)

Wetted Materials

Durafet II Electrode: Ryton, ceramic, EPM, silicon.

Mounting: Chlorinated polyvinyl chloride (CPVC), Viton, EPM and Teflon seals.

Electrode Size

Diameter: 2.5 cm (1 in.).

Length: 15.2 cm (6 in.).

Weight

Removal device including electrode: approximately 1.6 kg (3.5 lb).

Polypropylene preamplifier module: approximately 0.7 kg (1.5 lb).

2.2 Model Selection Guide

2.2.1 CPVC Plastic Assembly and Durafet II Electrodes with Pre-amplifier

Table I specifies a unit either with or without an internal preamplifier; Table II, lead lengths; Table III, available options. Restrictions (indicated by a letter in the availability column) and notes follow Table III.

(Reference: Model Selection Guide 51-52-16-28)

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Table I
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Table II
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Table III
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KEY NUMBER	Description	Selection	Availability
7774	Electrode Mounting	07774	↓

TABLE I

Electrode Type, Instrument, Preamp (CPVC Assembly)				
Electrode Type	Instrument	Preamp		
Durafet II pH Electrode	9782-03 Analyzers, 7082-4_, 76 Analyzers (w/internal Durafet Series preamp)	None (direct electrode to instrument connection) - Preamp internal to instrument	25	•
	Other Honeywell Analyzers or Transmitters (w/o internal preamp)	31079288 (includes a 31079236 preamp and a 31075723 20ft quick disconnect cable) Note 1	50	•
	pH Analyzers or Transmitters Other than Honeywell	31079290 Interface Module - 120 VAC Power	55	•
31084755 Interface Module - 240 VAC Power		56	•	
31075773 Interface Module - Battery Powered		57	•	

TABLE II

Electrode Type, Leads, Temp. Range, Part Number (CPVC Assembly)					
Electrode Type	Leads	Temp. Range	Part Number		
Durafet II pH Electrode	12' Separate Quick Disconnect (51204782-001)	-10 to 110°C	51205554-002	51	c
	20' Separate Quick Disconnect (51204782-002)	10 to 110°C	51205554-002	52	c
	30' Separate Quick Disconnect (51204782-003)	10 to 110°C	51205554-002	53	c
	40' Separate Quick Disconnect (51204782-004)	10 to 110°C	51205554-002	54	c
	50' Separate Quick Disconnect (51204782-005)	10 to 110°C	51205554-002	55	c

07774 ↙

Selection

TABLE III - OPTIONS

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	•
Certificate of Calibration	Yes	10	•

Note 1: For longer preamp to instrument cables, see Accessories and Spare Parts List.

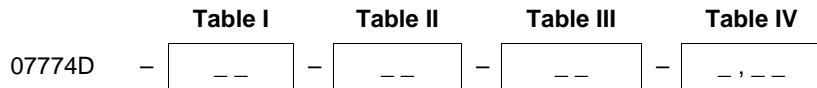
RESTRICTIONS

Restriction Letter	Available Only With		Not Available With	
	Table	Selection	Table	Selection
c	I	25, 50, 55, 56, 57		

2.2.2 Durafet II with Cap Adapter

Table I specifies ball valve assembly material. Table II specifies electrode type and temperature sensor; Table III, Cap Adapter cable lengths. Table IV specifies options. Restrictions (indicated by a letter in the availability column) follow Table IV.

(Reference: Model Selection Guide 51-52-16-60)



KEY NUMBER	Description	Selection	Availability
7774	Durafet II Electrode Mounting	07774D	↓

TABLE I - Ball Valve Assembly

Material of Construction	Selection	Availability
Plastic (CPVC)	01	•
Stainless Steel	02	•
None	00	•

TABLE II - Electrode Type, Temperature Sensor, Electrode Part Number

Electrode Type	Temperature Sensor	Part Number	Selection	Availability
3/4" Threaded	8550 Ohm Thermistor	51205554-002	01	c
	100 Ohm RTD	51205554-010	02	
	1000 Ohm RTD	51205554-011	03	
12 mm	8550 Ohm Thermistor	51204976-001	04	d
	100 Ohm RTD	51204976-006	05	
	1000 Ohm RTD	51204976-007	06	

TABLE III - Cap Adapter Cable Length

Cable Length	Selection	Availability
None	00	•
4 feet	01	•
8 feet	02	•
12 feet	03	•
20 feet	04	•
50 feet	05	•

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TABLE IV - 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	•
Certificate of Calibration	Yes	10	•

RESTRICTIONS

Restriction	Available Only With		Not Available With	
	Letter	Table	Table	Selection
c		I	00, 01	
d		I	00, 02	

Series 7774D Accessories and Replacement Parts

NOTE: For replacement electrodes see Replacement Electrodes Price List, pages RE-1 and 2.

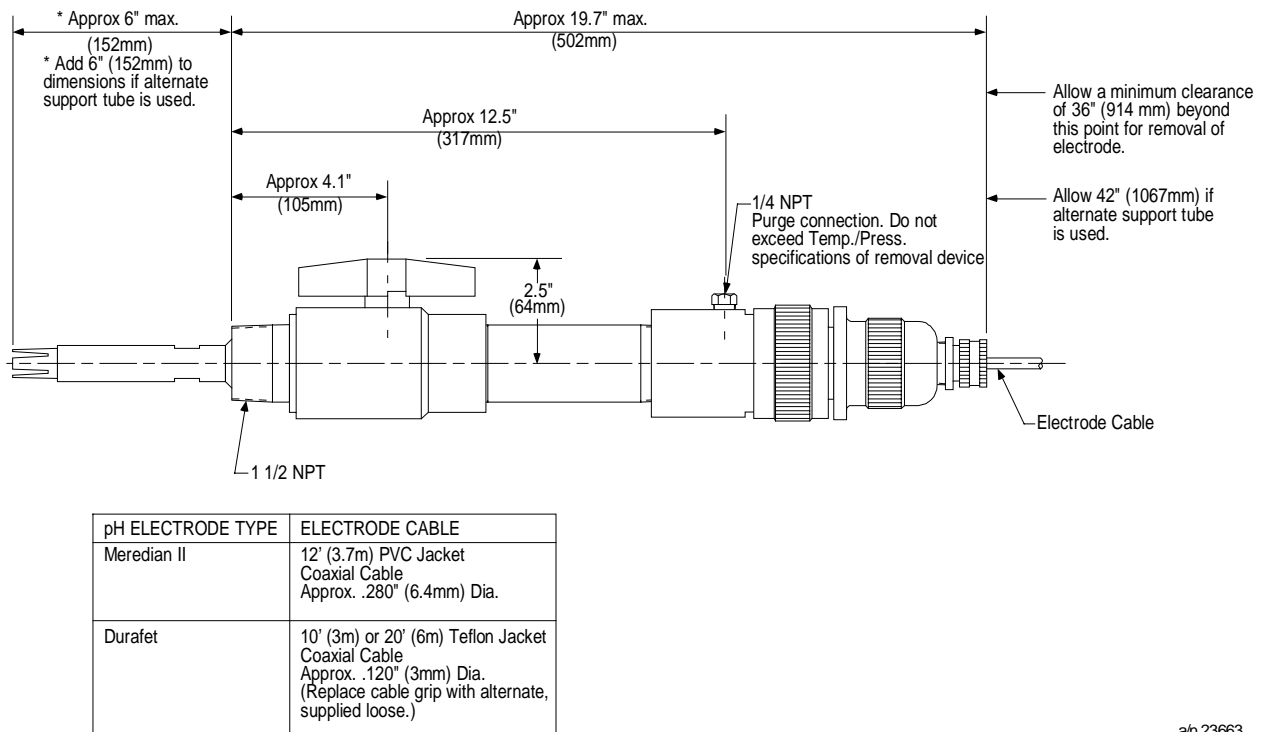
Description	Part Number
Directions Stainless Steel Assembly	70-82-25-88
Directions CPVC Assembly	70-82-25-89
Directions - Durafet II Electrode	70-82-25-87
pH Buffer Solutions	
4.01	31103001
6.86	31103002
9.18	31103003
CPVC Nipple for 12 Inch Insertion Length.	074344
CPVC Valve Assembly (includes support tube assembly). Adapter Coupling (31074342) must be ordered separately.	31074357
Adapter Coupling	31074342
Stainless Steel Valve Assembly (does not include support tube assembly).	31741450
Durafet II Support Tube Assembly - Stainless Steel	31086303-002
Durafet II Gel Re-fill Kit	
Stainless Steel Assembly	51205807-001
CPVC Assembly	51205807-002
Cap Adapter Transission Cable	51450825-001

3. Selecting Installation Location

3.1 Dimensions

Allowing clearance for removal of electrode from assembly

Figure 3-1 provides dimensions for the removal/insertion assembly, including electrodes. Allow at least 0.91m (36 in.) clearance for removal of the electrodes. Be aware that if a custom support tube is fabricated at your site as described in Section 5 of this manual, then additional clearance will be required. Avoid locations where the operator must take an awkward position to perform the insertion or removal operation.



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Figure 3-1 Outline and Dimension Drawing of 7774 Plastic Electrode Removal/Insertion Assembly

3.2 Factors to Consider When Selecting an Installation Location

WARNING

The 7774 Removal/Insertion Assembly is designed to support ONLY its own weight. Do not install in locations where it would be used as a footrest or hand grip. Do not hang or support any other piping or objects (i.e., junction boxes or preamplifier modules) from the assembly. Failure to observe these precautions may result in damage to the assembly and release of process fluid, resulting in serious personal injury.

Presence of corrosives

Do not use the electrode assembly in solutions that will attack the removal device or electrode materials.

Process temperature and pressure

Do not use the assembly in a solution where the temperature is greater than 88 °C (190 °F).

Do not install the 7774 Assembly where pressures and/or temperatures may occur outside the operating range given in Figure 3-2. Both pressure and temperature must be within the shaded area of the curve.

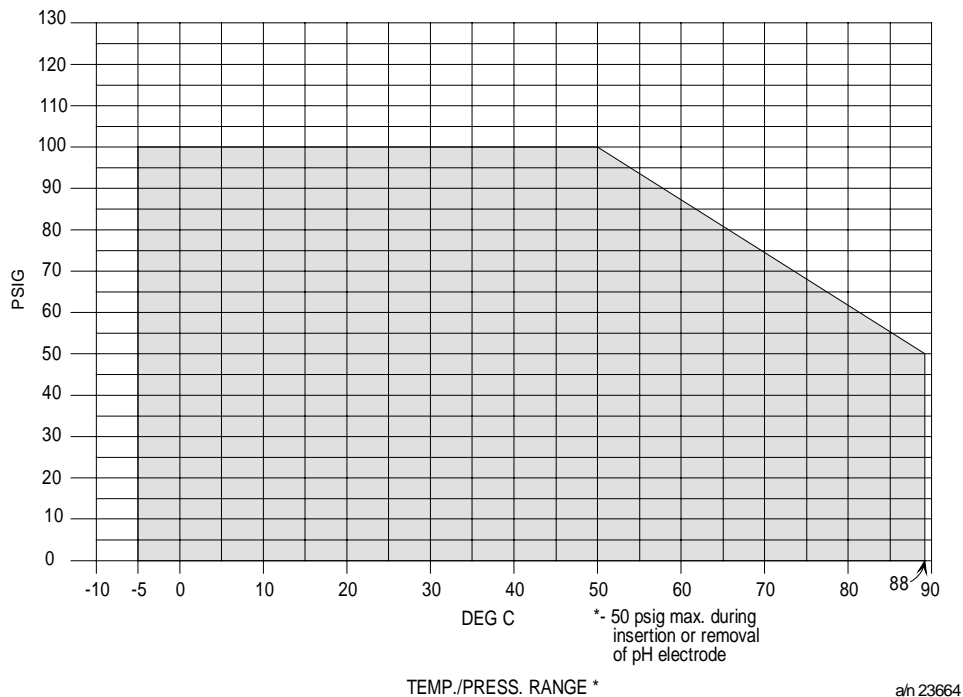


Figure 3-2 Temperature/Pressure Range — 50 psig Maximum During Insertion or Removal of Electrode

Pressure shock

Avoid installations where the 7774 Assembly will be exposed to pressure shock caused by water hammer.

Immersion depth

The pH electrode must be immersed in the process solution at least 5.08 cm (2 in.) as measured from the protective tip. Allow for insertion depth from the outside wall of the mounting surface as indicated by the dimensions in Figure 3-1.

If vertical insertion (from above) is used, assure that the tank or pipeline is full under all process conditions. If a pipeline is not always full, use a vertical mounting and insert the electrode far enough into the pipe so that the electrode tip is at least 10.6 cm (4 in.) below the horizontal exit pipe which may empty out. To assure a good reading, assure that air space will not interfere at the point of measurement. (If the electrode becomes dry after use, it may require maintenance before being returned to service. See the manual supplied with the electrode for details.)

Suspended solids

The electrode can be mounted in any position. It is recommended that the removal device be mounted such that the electrode is pointed downstream in the direction of flow when suspended solids may be present. If the electrode must be mounted pointing upstream, against the direction of flow, the tip may become clogged.

In applications where vertical mounting is required, avoid a position with the electrode pointed up as this will permit clogging by solids settling in the tip area.

Requirement for circulation of solution around electrode

Allow at least 12.7mm (1/2 in.) clearance beyond the end of the electrode and 3.2 mm (1/8 in.) to 4.8 mm (3/16 in.) radius clearance surrounding the electrode to permit circulation of the solution.

Ambient temperature

Avoid locations where excessive temperature changes occur.

Proximity to pumps

Locate the removal/insertion assembly on the pressure side of pumps, not the vacuum side.

Vibration

The removal device should not be mounted on pipelines or vessels with excessive vibration unless a support is provided on the 15.2 cm (6 in.) long valve nipple.

4. Installing the Valve and Nipple Assembly

4.1 Introduction

Installation location

Once an installation location that meets the criteria provided in Section 3 has been selected, the actual installation can begin with the mounting of the valve and nipple assembly in the process pipeline or tank wall.

Materials required

To install the valve and nipple assembly the following are required:

- 31074357 Removal Device (see Figure 4-1)
- 31811069 Teflon Tape Sealant
- strap wrench

4.2 Installation

Procedure

The procedure for installing the valve and nipple assembly (Figure 4-1) is presented in Table 4-1.

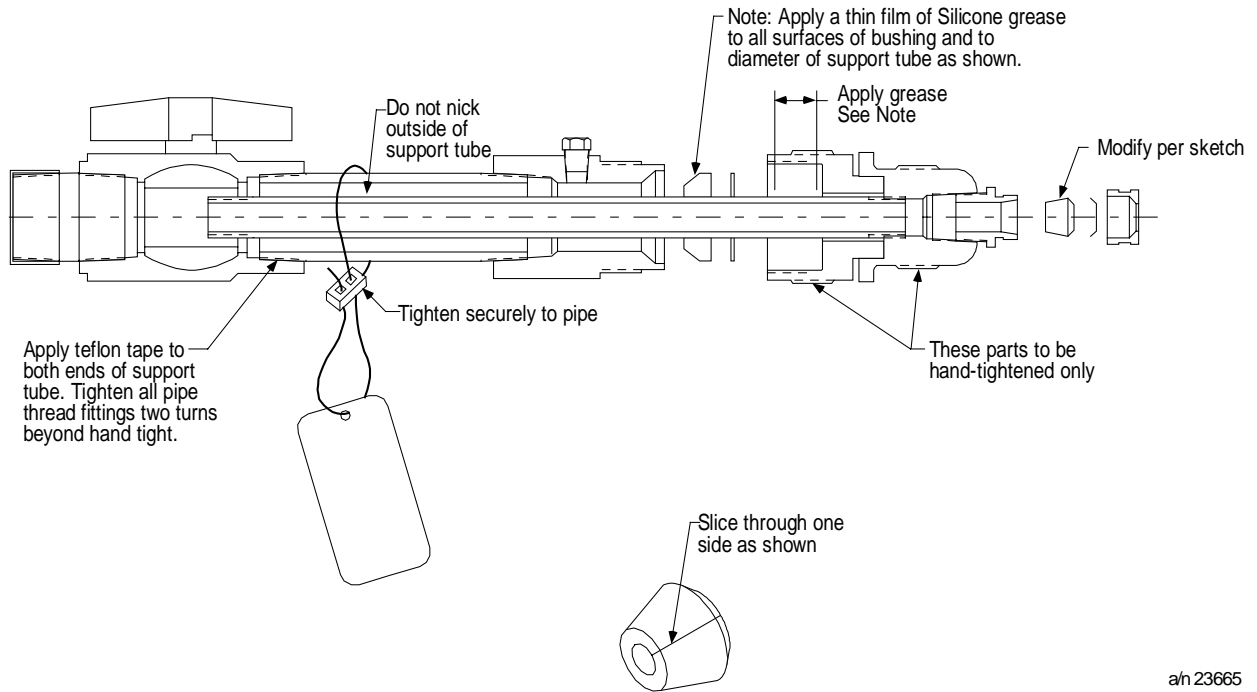
WARNING

Before installing the nipple and valve assembly in the process pipeline, make sure the pipe is empty and depressurized. Before installing the assembly in a tank, be sure the level of the contents of the tank is below the location selected for installation of the assembly. Failure to observe this precaution may result in release of process fluid, resulting in serious personal injury.

Table 4-1 Procedure for Installing Valve and Nipple Assembly

Step	Action
1	Referring to Figure 4-1, loosen the compression handle by turning it counterclockwise until it is free from the housing.
2	Withdraw the assembly keeping the bushing and washer on the support tube.
3	Remove the protective cap from the mounting nipple by turning the cap counterclockwise. DO NOT CUT IT OFF, AS DAMAGE TO THE NIPPLE THREADS MAY OCCUR.
4	Apply Teflon tape to the mounting nipple. Wrap the tape on the threads in a clockwise direction as viewed from the threaded end. Overlap the tape by 50 % on each wrap.
5	Install the mounting nipple and valve assembly in the pipe or tank and tighten hand tight.

Step	Action
6	Using a strap wrench on the mounting nipple, tighten the assembly an additional 1-1/2 to 2 turns. DO NOT USE STILLSON OR CHAIN TYPE WRENCHES AS THEY MAY DAMAGE AND WEAKEN THE PLASTIC. DO NOT USE THE VALVE HANDLE FOR LEVERAGE.
7	Close the ball valve by turning the handle perpendicular to the valve body.



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**Figure 4-1 31074357 Removal Device
(Adapter Coupling 31074342 required for electrode installation)**

5. Assembling the Components

5.1 Introduction

Tasks

Once the valve and nipple assembly has been installed in the pipeline or tank, you are ready to assemble the electrode, support tube, and adapter coupling as described in Section 5.3. However, before assembling the components, consider whether you need a longer support tube and/or a purge line.

The standard support tube supplied with the assembly affords a 15.2 cm (6 in.) immersion depth. When greater immersion depth is required, use Optional Support Tube 31074344 for a 30.5 cm (12 in.) immersion depth, or fabricate a custom support tube. See Section 5.2 for details.

If your process contains debris that may clog the valve assembly, install a purge line as described in Section 5.3.

Materials required

To assemble the electrode and support assembly the following are required:

- 31074357 Removal Device (see Figure 4-1)
- 51205554-002 Durafet II Electrode
- Cable (length specified by Model Selection Guide selection)
- 31811069 Teflon Tape Sealant
- 31074342 Adapter Coupling
- strap wrench
- 15/16 open end wrench

Additional material is required for using a different support tube or installing a purge line.

5.2 Using an Alternate Support Tube

Standard support tube

Support tube 31074343, supplied with the removal device, provides a 15.2 cm (6 in.) immersion depth of the electrode into the process liquid. When a greater depth is required there are two alternatives:

- Use Optional Support Tube 31074344 for an immersion depth of 30.5 cm (12 in.).
- Make a custom support tube by cutting a length of 1/2 in. CPVC Schedule 80 pipe 9 3/8 in. longer than the desired immersion depth. The pipe must then be threaded 1/2 NPT on each end.

ATTENTION

Immersion depths greater than 30.5 cm (12 in.) are not recommended.

The support tube must be secured to support grip (Figure 4-1) as described next.

Securing optional or custom support tube to support grip

The procedure for securing the optional or custom support tube to the support grip is provided in Table 5-1.

Table 5-1 Procedure for Securing the Optional or Custom Support Tube to the Support Grip

Step	Action
1	Slide the bushing and washer off the standard support tube.
2	Turn the compression handle counterclockwise to remove it from the support grip.
3	Using a strap wrench, loosen and remove the standard support tube (Figure 4-1).
4	Install the longer support tube by wrapping one end with Teflon tape, overlapping by 50 % on each wrap. Wrap the tape in a clockwise direction as viewed from the threaded end of the support tube.
5	Thread this end into the support grip by hand and tighten an additional 2 turns using a strap wrench. DO NOT USE STILLSON OR CHAIN TYPE WRENCHES AS THEY MAY DAMAGE OR SCORE THE SUPPORT TUBE AND PREVENT A GOOD SEAL WITH THE BUSHING.
6	Reassemble the compression handle, washer and bushing on the support tube. Note the proper orientation of the bushing with the tapered surface facing away from the compression handle.
7	Hand tighten the support grip to the compression handle.

5.3 Installing a Purge Line

Purpose

A purge port is provided on the removal device housing. Water or some other fluid source can be piped to this port for removing accumulated debris from the valve assembly.

If purging is required, the purge line must be installed as described in Table 5-2 before the electrode and support tube are assembled.

WARNING

Note that the purge fluid temperature and pressure must not exceed the 7774 Assembly temperature and pressure specifications as indicated in Figure 3-2. Failure to observe this precaution may result in release of process fluid, resulting in serious personal injury.

ATTENTION

A pressure gage can also be installed in the 1/4 in. NPT purge port. The gage will serve as a local indication of process pressure to confirm that the pressure is below 50 psig as required for insertion or removal of the electrode.

Table 5-2 Procedure for Installing Purge Line

Step	Action
1	When shipped, a plug is in the purge port. Remove the plug (Figure 4-1).
2	Install a purge line to the 1/4 in. NPT purge port opening.
3	Install a shutoff valve in the purge line near the removal device.

5.4 Assembling the Electrode, Support Tube, and Adapter Coupling

Procedure

Before the electrode can be inserted into the nipple and valve assembly, the electrode must be connected to an adapter coupling and support tube as described in Table 5-3. Part of the task is to thread the cable (that is attached to the electrode) through the adapter coupling and support tube so that the cable can be connected to a preamp, junction box, or analyzer as described in Section 6.

CAUTION

It is important to avoid contamination of the internal area of the cable connector. Avoid touching the contacts of the connector. Contamination such as oils and salts from bare hands can form a leakage path which could affect the necessary high resistance required between the conductors.

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

Failure to observe these precautions could result in loss of measurement accuracy.

Table 5-3 Procedure for Assembling Electrode, Support Tube, and Adapter Coupling

Step	Action
1	Refer to Figure 4-1. Feed the connector end of the electrode cable through the cable grip and support tube.
2	Feed the electrode cable through the adapter coupling with the large 3/4 NPT opening of the coupling toward the electrode.
3	Connect the cable to the Durafet II Electrode. (See the instructions for electrode preparation in the manual supplied with the electrode, and the instructions for preamplifier connection in this manual.)
4	Install the coupling on the electrode by wrapping the electrode threads with Teflon tape, overlapping by 50 % on each wrap. Wrap the tape in a clockwise direction as viewed from the cable end of the electrode.
5	Hand tighten the coupling on the electrode, then tighten an additional 1-1/2 to 2 turns using a strap wrench. DO NOT USE STILLSON OR CHAIN TYPE WRENCHES.
6	Assure that the bushing and washer are in place on the support tube.
7	Apply Teflon tape to the 1/2 in. NPT thread on the support tube and turn the tube hand tight onto the coupling.
8	Using the wrench flats on the electrode, tighten the electrode an additional 1-1/2 turns to 2 turns using a 15/16 open end wrench. Do not score or gouge the support tube surface because the bushing (Figure 4-1) makes a seal on the tube surface.
9	Refer to Figure 4-1. Spread the tapered grommet at the slit and slip it around the electrode cable with the tapered end of the grommet toward the cable grip. Slide the grommet into the cable grip. Make sure the green grip ring of the cable grip is in place.
10	Tighten the compression nut on the cable grip to prevent strain on the electrode.

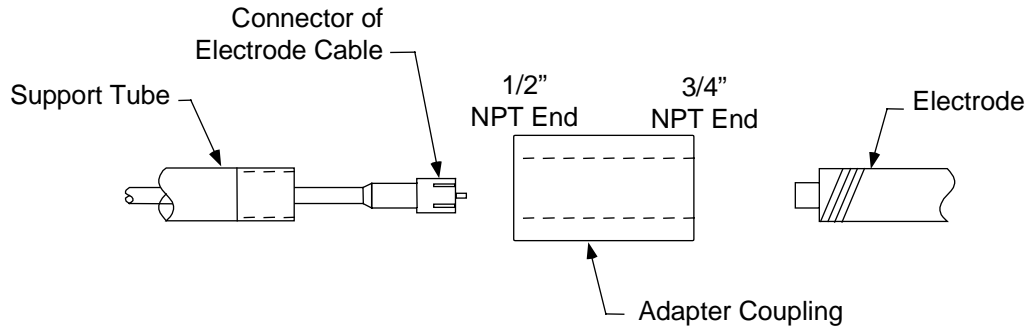


Figure 5-1 Inserting the Electrode Cable Through Support Tube and Adapter Coupling
(Adapter Coupling 31074342 and support tube are shown at right. Electrode is on the left.)

6. Electrical Connections

6.1 Cabling the Electrode

6.1.1 Possible System Configurations

Variety of applications

The Durafet II electrode can be cabled to:

- the 31079288 external preamplifier (7774-50) as described in Section 6.1.3. The NEMA 4X 31079288 preamplifier module, constructed of corrosion-resistant glass-filled polypropylene, contains a replaceable preamplifier assembly which is sealed against humidity in a metal can. The can has quick disconnects on one end for the electrode cable (input) and on the opposite end for the output cable.
- a preamplifier adapter module 31079290 (7774-55), 31084755 (7774-56), or 31075773 (7774-57) as described in the manual supplied with the adapter; output from the adapter is fed to a pH instrument not manufactured by Honeywell.
- an analyzer's internal preamplifier (7774-25) as described in the manual supplied with the internal preamplifier kit 080239 (purchased separately).
- an instrument's input terminals when using the Cap Adapter cable.

6.1.2 Electrode Cables

Cable connectors – without Cap Adapter

The electrode cable terminates with an edge connector with cap and ferrule on one end and a rectangular plastic 8-pin keyed push-on connector on the other end.

The edge connector mates with the Durafet II electrode.

The rectangular connector mates with the input side of the preamplifier (regardless of whether the preamplifier module is external or internal to the analyzer) or with a preamp adapter module.

Cable connectors – with Cap Adapter

The Cap Adapter is integral with the electrode cable. The cable has an edge connector on one end and tinned leads on the other.

Avoid contamination

The connectors are constructed with high resistance insulating material which can be contaminated if exposed to oil and salts from bare hands. Avoid contaminating the internal area of the connectors. Also ensure that the mating half of the connector (located inside the plastic housing on external preamplifier 31079288) is kept clean and dry.

CAUTION

Do not allow liquids or other foreign matter to contact the cable connectors. Save the protective cap for the connector and put the cap on the connector whenever the cable is not installed on an electrode.

How to clean the connectors

The connectors can be cleaned by wiping with a cotton swab moistened with isopropyl or grain alcohol. **Allow connectors to dry completely before making connections.**

6.1.3 Cabling Procedure

External preamp 31079288 end cap removal

The external preamp 31079288 has two removable end caps that protect the connections to the unit. These end caps must be removed to access the preamp's connectors. See Section 6.5 for more information about the preamp. Figure 6-6 and Figure 6-7 show the preamp with the end caps removed.

CAUTION

Do not overtighten any fitting into the external preamp module housing. Damage to the preamplifier end caps may result.

How to attach the cable to the electrode

Remove the protective cap from the cable. Loosen the ferrule and slide back the ferrule, small o-ring, and plastic cover to expose the cable connector. Align the cable connector keyway with the electrode key (small black tab on the top of the electrode). Slide the plastic cover over the electrode end and hand-tighten the cover on to the electrode.

ATTENTION

Make sure the o-ring on the electrode is seated on the shoulder of the electrode, below the threads.

CAUTION

Be careful not to cross the threads on the connector.

Slide the o-ring and ferrule down the cable to the back of the cover cap. Hand-tighten the ferrule onto the cover cap.

How to attach the cable to the external preamplifier, adapter module, or analyzer internal preamp

The electrode cable's rectangular connector contains a polarizing key to ensure proper orientation.

CAUTION

When plugging the cable's rectangular connector into the receptacle on a preamplifier or adapter module, do not force the connector into the receptacle. Use of too much force can damage the equipment.

Note that, in addition to the rectangular receptacle used for the Durafet II electrode cable, the input side of the 31079288 preamplifier module also contains a circular standoff. This standoff is not used.

Connect the yellow shield wire to the preamp mounting screw adjacent to the standoff. In the case of an adapter module, connect the yellow wire to the earth ground terminal.

Additional instructions for connecting the electrode cable to one of the preamp adapter modules are provided in the manual supplied with the adapter module.

See Figure 6-3.

6.2 Connecting an Adapter Module or External Preamp Output to an Instrument

6.2.1 Preamp Adapter Output

Instructions elsewhere

Instructions for connecting one of the adapter modules to the instrument are provided in the manual supplied with the adapter. Check the manual supplied with the instrument, too, to see if any additional instructions or precautions are provided.

6.2.2 External 31079288 Preamp Output

CAUTION

Do not overtighten any fitting into the external preamp module housing. Damage to the preamplifier end caps may result.

Preamplifier output cable

A 6.10 m (20 ft.) cable is provided with the 31079288 preamp. Lengths up to 200 ft. are available. See Parts section for these cable part numbers. These cables have a 6-pin polarized rectangular connector with a protective rubber boot on one end, and six color-coded wires on the other. The signal carried by each conductor is identified in Table 6-1. (See also Figure 6-2 and Figure 6-3.)

Preamp requires no line-voltage supply

The 31079288 external preamp receives its dc power from the pH instrument through the preamp output cable. The color-coded conductors used for power are identified in Table 6-1.

Installing cable grips

Cable grips are used on the output cable. Put the cable through the grips before connecting the cable.

To fit the connector on the cable through the grip, remove the grommets from the cable grip and cut one side along the axis. The grommet can be spread to permit cable insertion.

Preamp output connection

The rectangular connector on the output cable mates with a connector on the output side of the preamp (see Figure 6-3). The connector is keyed to ensure correct orientation.

When the connector is firmly in place (DO NOT FORCE), slide the protective boot firmly over the connector.

Special instructions for sites with condensing conditions are provided in Section 6.4.

Connection to instrument or to intermediate junction box

If the measuring instrument is within 61.0 m (200 ft) of the preamplifier module, any of the output cables can be used for the final connection to the instrument.

If the distance between the external preamp and the instrument is more than 61.0 m (200 ft), connect the output cable to a junction box (part number 31316260 shown in Figure 6-1), then use cable 31834088 to make the connection from the junction box to the instrument.

Prepare the end of the output cable or extension cable 31834088 to accommodate the terminals at the junction box or instrument. When making connection to the instrument, refer to the instrument manual and to Table 6-1 which shows conductor colors and functions.

Mounting junction box

Figure 6-1 shows the junction box. Note that the junction box can be wall-mounted. Allow enough overhead space for ease of access. Allow enough slack in the output cable to permit servicing.

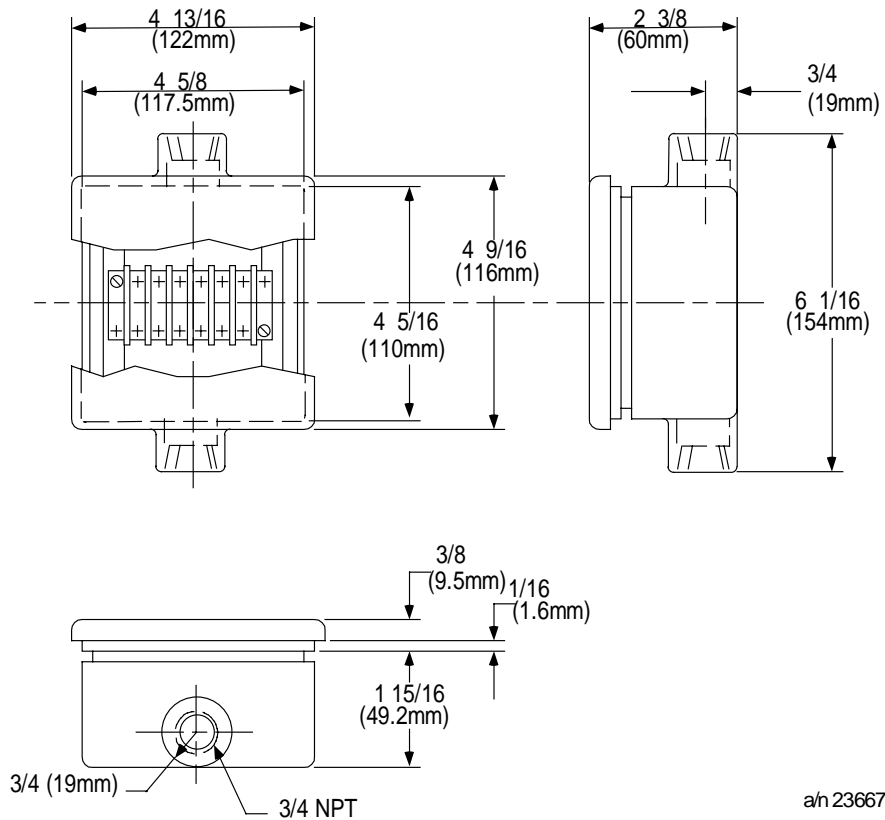


Figure 6-1 31316260 Junction Box Outline and Dimensions

Preamplifier output conductor signals

Figure 6-2 illustrates the rectangular connector of preamp output cable. The signal associated with each pin number on the picture, as well as the corresponding output cable conductor color is shown in Table 6-1.

Carefully note conductor colors. When connecting the output cable to the junction box, and when wiring extension cable 31834088, assure that connections are made as shown in Table 6-1 and in the manual supplied with the instrument. Check that the connections match those required by the instrument before applying power to the measuring system.

CAUTION

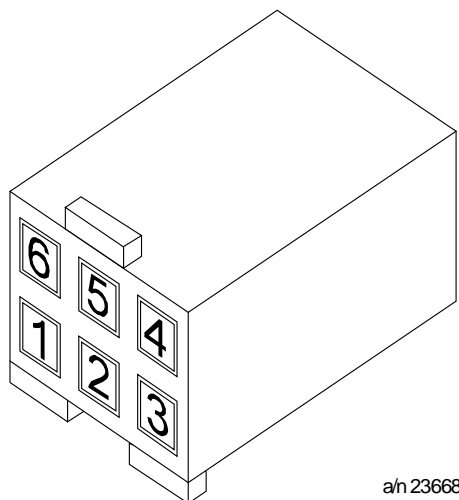
Do not reverse the blue and green wires (dc voltage supply). Reversal will damage the preamplifier circuit.

Table 6-1 31079288 Preamplifier Output Cable Conductors

Connector Pin Number (see Figure 6-2)	Signal	Output Cable Conductor Color
1	output	orange
2*	positive power supply	blue
3*	negative power supply	green
4	signal common	white
5	power common	black
6	no connection	red

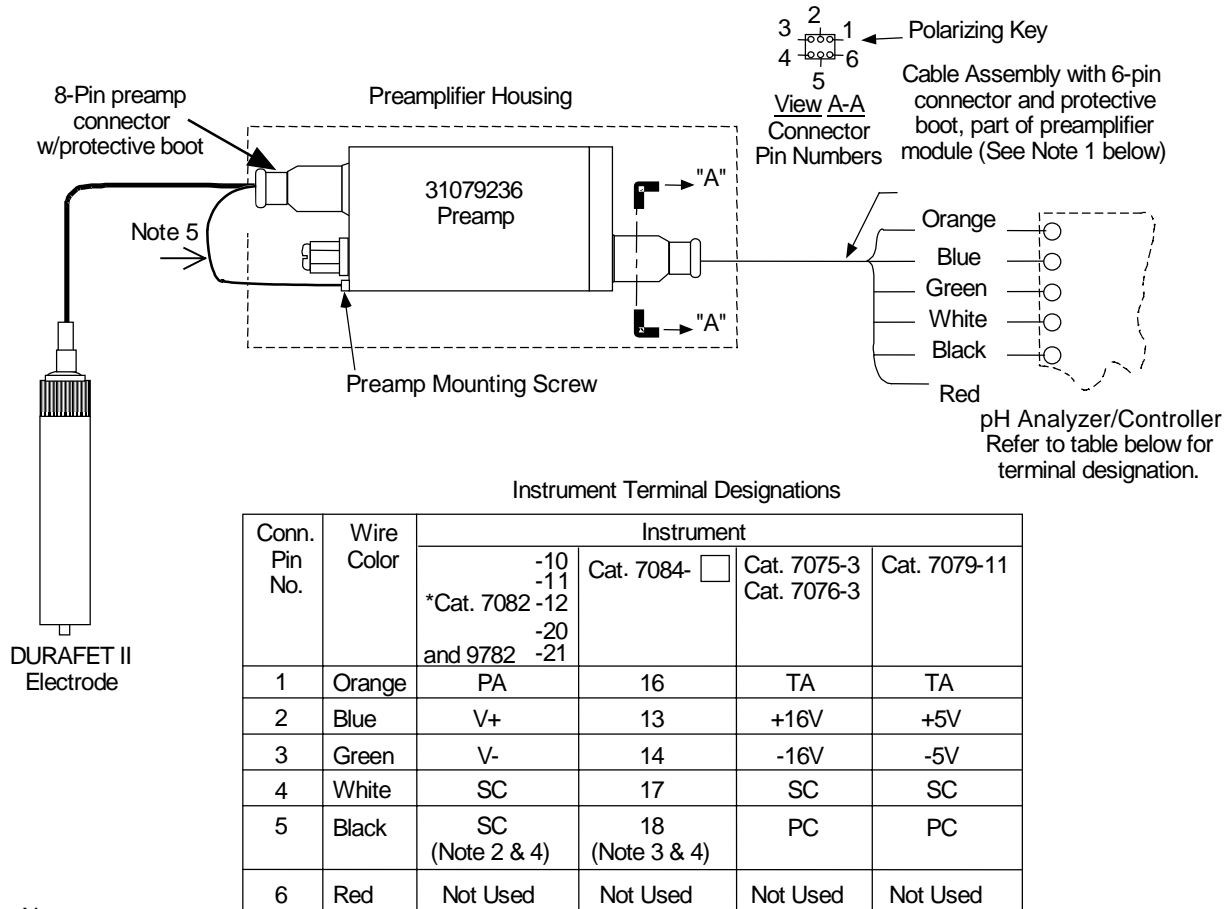
*If the power supply is not connected exactly as defined, irreparable damage to the preamplifier will result.

Figure 6-2 illustrates the connector on the preamplifier end of the output cable.



a/h 23668

Figure 6-2 Output Cable Connector, Preamp End



Notes:

1. When distance from preamplifier module to instrument is greater than 200 ft., use 6 conductor #22 Awg cable (P/N 834088 or equivalent) and junction box (P/N 316230).
2. Connect 31233300 resistor (8550 Ω) between terminals "TH" & "SC" of Cat. 7082 or 9782.
3. Connect 31233300 resistor (8550 Ω) between terminals "15" & "18" of Cat. 7084.
4. A 31233300 resistor is supplied loose with every preamp.
5. Connect yellow shield wire on the electrode cable to the preamp mounting screw adjacent to standoff connector.

* If 9782 utilizes an internal preamplifier kit, follow directions in manual 278578 supplied with kit.

Figure 6-3 Installation Wiring Diagram for Durafet II pH Electrode and External Preamp

6.3 Connecting a Cap Adapter to an Instrument

6.3.1 Cap Adapter

The Cap Adapter is an integral part of the electrode cable. It is essentially a preamplifier that does not require separate mounting. The output from the Cap Adapter can be connected directly to a pH instrument. The Cap Adapter and cable for Durafet II electrodes are available in lengths of 4', 8', 12', 20', and 50'. One end of the Cap Adapter cable is the mating connector to the edge connector of the Durafet II electrode. The other end of the cable terminates with tinned leads. The tinned leads connect to the input terminals of the pH instrument as described below.

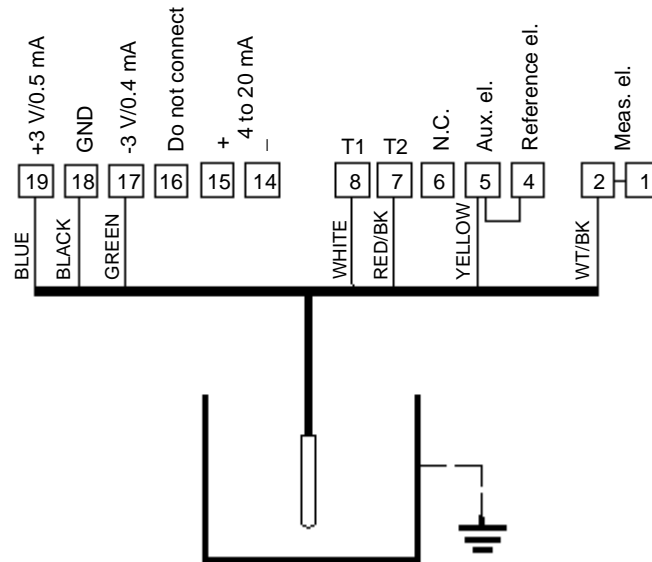
6.3.2 Connection to a 9782 pH Analyzer

The Cap Adapter is connected to a 9782P-01 analyzer. (See *9782 Instruction Manual for more detailed description of the 9782.*) Connect the tinned leads of the Cap Adapter cable as follows:

Wire Color	9782 Terminal
Orange	PA
Blue	V+
Green	V-
White	SC
Black	SC
Red	TH
Yellow	Ground Screw
White/Black	Not Used
Red/Black	TH

6.3.3 Connection to an APT2000 pH Transmitter

The Cap Adapter can be connected to the APT2000 pH Transmitter. (See the APT2000 pH Transmitter Manual, part number 70-82-25-92, for more detailed description of the APT2000.)



NOTE:

Orange and Red wires are not typically connected. These should be clipped and electrically sealed to avoid possible contact with other conductors.

Figure 6-4 Connecting to an APT2000 pH Transmitter

6.4 Using the 31079288 External Preamp at Sites with High Humidity and Condensation

6.4.1 Use of Module as Shipped for Non-Condensing Conditions

Relative humidity upper limit

The Durafet II external preamplifier 31079288 is suitable as shipped for relative humidity conditions up to approximately 85 % to 95 % **non-condensing**.

CAUTION

If condensation occurs, it is possible for water to accumulate in the rectangular connectors for input and output cables, causing erratic performance and damage to the connectors. To avoid these problems, take the precautions described in Section 6.4.2.

6.4.2 Precautions Against Condensation Problems

Silicone grease on rectangular connectors only

The use of silicone grease provides protection for the preamp rectangular male connectors, and on the mating female connectors on the electrode and preamp output cables. Instructions are provided below.

CAUTION

Do not apply grease to the edge connector on the end of the electrode cable that connects to the electrode. This connection has an O-ring to prevent entry of moisture. Also, do not apply grease to the unused standoff on the input side of the preamp.

Approved grease

Use high-vacuum silicone grease purchased from Honeywell (part number 31090011 for .3 oz. tube) or Dow Corning high-vacuum silicone grease or Dow Corning #4 silicone electrical insulating compound.

Procedure for applying grease

The procedure for applying silicone grease to the rectangular connectors is provided in Table 6-2.

Table 6-2 Procedure for Applying Silicone Grease to Connectors

Step	Action
1	Make sure the connectors are clean and dry. A cotton swab moistened sparingly with isopropyl or grain alcohol may be used to clean the connectors. Allow the connectors to dry completely before applying grease.
2	Hold the opened end of the silicone grease tube against the pins of one of the rectangular male connectors on the preamp and carefully squeeze enough grease into the connector to slightly overfill it.
3	Repeat the procedure to slightly overfill the other rectangular connector on the preamp.
4	Hold the tube of silicone grease tightly against the rectangular female 8-pin connector on the electrode cable and squeeze grease through the small openings until grease is forced out of the small slots in the sides of the connector body. (Initially you will see gold-plated connector contacts through these slots. It is necessary to completely fill the spaces with silicone grease to prevent accumulation of condensed water there.) Repeat the process over the rest of the face of the female connector.
5	Repeat the procedure on the 6-pin female connector on the preamp output cable.
6	Firmly insert the cable connectors into their mates on the preamplifier can, pressing firmly for full insertion, and holding for several seconds to allow excess silicone grease and trapped air to escape.
7	Wipe off all excess grease from the external surfaces of the assembly.

Aftercare of treated connectors

After disconnecting connectors that have been treated with silicone grease, it is important to keep foreign matter out of the connectors. Handle all treated parts with care. A small additional application of grease is recommended before they are reconnected.

If there is any uncertainty about whether the connectors are clean, blow the connectors clean using compressed air or inert gas that is free of water and oil. Follow this cleaning with a repeated application of silicone grease as described previously.

6.5 Assembly and Mounting of 31079288 External Preamp Module

6.5.1 End Cap Assembly

Threaded rings

The 31079288 preamp end caps are secured to the module by means of threaded rings.

O-rings and lubricant required

An O-ring (part number 31075703) must be used with each threaded ring. The O-ring must be lightly lubricated with silicone grease (part number 31090011). See Figure 8-1 for the correct position of the O-rings.

Slack in cable necessary

Before replacing each end cap, push a few inches of cable into the preamplifier module to provide some cable slack for future removal of the end cap.

Keyed for correct assembly

The end caps are slotted and the holder is keyed. A white mark on the covers and holder threads indicates the location of the slots and keys. The mark on each ring must be aligned with the corresponding mark on the holder threads. Once the O-ring is in place and the marks are aligned, hold the cover firmly in position while tightening the connecting ring.

Sealing NPT fittings to the preamplifier

All electrical connections to the preamp must be completed and the 3/4 in. NPT connections in the end caps must be sealed before exposing the unit to corrosive or wet conditions.

CAUTION

Do not overtighten any fitting into the external preamp module housing. Damage to the preamplifier end caps may result.

6.5.2 Mounting the Module

Designed for surface mounting

The 31079288 preamp module is designed for surface mounting. (Dimensions required for mounting the module are provided in Figure 6-5.) A mounting bracket constructed of nickel-plated steel and a plastic quick release locking strap are provided to facilitate mounting.

Orientation of the preamp module

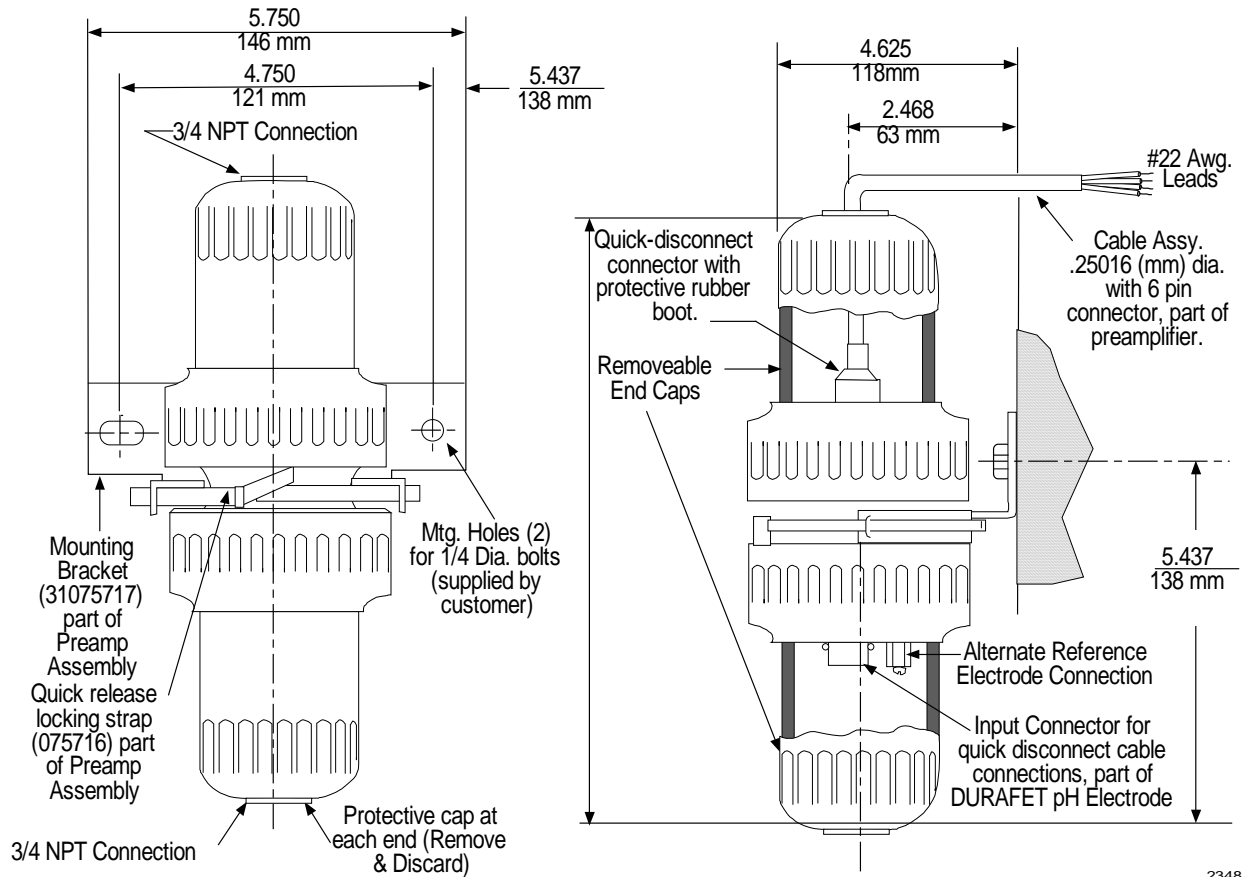
The module can be mounted in any convenient position in addition to the vertical mounting shown in the Figure 6-5.

CAUTION

Do not mount the module where the temperature will exceed the upper limit shown in the specifications. Do not mount the module over or near sources of corrosive vapors that could enter the preamp module during installation or maintenance. Damage to the equipment may result.

Correct use of bracket and locking strap

The preamp module mounting bracket arrangement must never be used to support anything other than the 31079288 module. The plastic locking strap is designed to secure the preamp module only.



**Figure 6-5 Outline and Dimensions Drawing
31079288 Preamplifier Module**

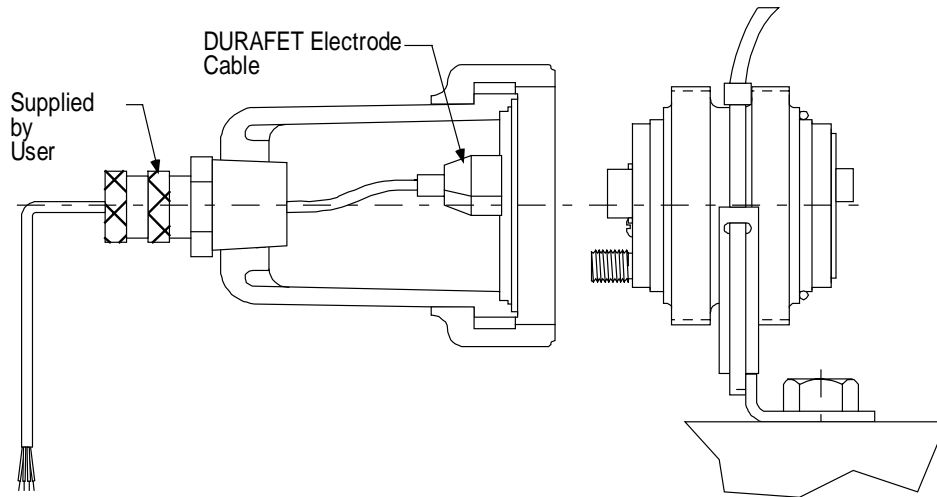


Figure 6-6 31079288 Preamplifier Module with Input End Cap Removed

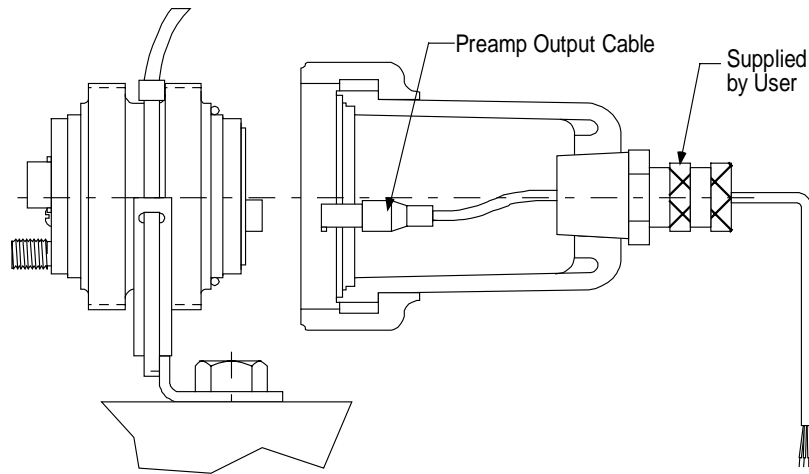


Figure 6-7 31079288 Preamplifier Module with Output End Cap Removed

7. Inserting and Removing the Electrode

7.1 Introduction

Prerequisites

Before attempting to insert the electrode in the process using the insertion assembly, you must complete the preparatory tasks described in the earlier sections of this manual.

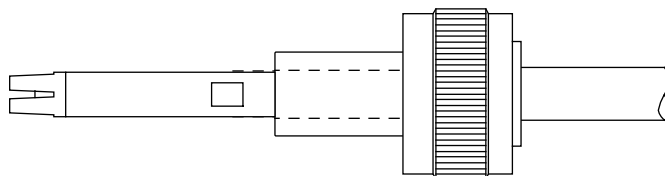


Figure 7-1 Durafet II Electrode Mounted on Support Tube Ready for Insertion into Insertion/Removal Device

Safety information

WARNING

Before attempting to insert the electrode into the process, reduce the process pressure to 50 psig or less. Failure to observe this precaution can result in serious personal injury.

WARNING

Leave the ball valve, in the valve and nipple assembly, closed until you reach the insertion or removal step where you are instructed to open the valve. Failure to observe this precaution will result in leakage of process fluid and may result in serious personal injury.

WARNING

Be sure to follow the instructions for tightening the support grip by turning it two turns after inserting the electrode. This step is important to prevent blowback of the tube assembly. The bushing acts as a safety stop against the adapter coupling if the support tube does blow back. Failure to observe this precaution can result in serious personal injury.

7.2 Insertion

Procedure

The procedure for inserting the electrode is described in Table 7-1.

Table 7-1 Procedure for Inserting Electrode

Step	Action
1	A thin film of silicone grease is applied at the factory to the bushing and to the support tube area covered by the compression handle (Figure 4-1). If this film has been wiped off, or if dirt or grit is present, clean these areas and reapply a new film of silicone grease, part number 31090011.
2	Separate the compression handle, from the support grip by turning the support grip counterclockwise approximately two turns.
3	Slide the compression handle along the support tube until the bushing and the washer are sandwiched between the handle and the electrode adapter coupling. The assembly should now appear as shown in Figure 7-1.
4	WITH THE BALL VALVE STILL CLOSED, slide the electrode and the tube assembly far enough into the removal device housing to attach the compression handle. Tighten the compression handle by turning it clockwise until drag is felt on the tube. This can be determined by rotating the tube by hand.
5	Check that the process pressure has been reduced to 50 psig or less. FAILURE TO OBSERVE THIS PRECAUTION CAN RESULT IN SERIOUS PERSONAL INJURY.
6	If an optional purge line has been used, open the purge line valve. Purge line pressure should be above the process pressure to effect sufficient purge flow through the removal device to clear any debris in the line.
7	Adjust the purge line pressure and/or the process pressure, as required, but do not exceed 50 psig process pressure at this time. FAILURE TO OBSERVE THIS PRECAUTION CAN RESULT IN SERIOUS PERSONAL INJURY.
8	Open the ball valve by turning the handle parallel to the valve, then push the electrode and support tube assembly all the way in using the support grip. Hold the assembly in place while performing the next step
9	Tighten the support grip by turning it two turns. This step is important to prevent blowback of the tube assembly. The bushing acts as a safety stop against the adapter coupling if the support tube does blow back.
10	Return the process to normal operating pressure.
11	Tighten the compression handle if leakage occurs from the bushing seal area.
12	If an optional purge line is used, turn off the purge line flow to avoid affecting the measurement.

7.3 Removal

Safety information

WARNING

Do not stand behind the removal device when removing the electrode. Failure to observe this precaution can result in serious personal injury.

Also see the safety information in Section 7.1

Procedure

The procedure for removing the electrode from the process is described in Table 7-2.

Table 7-2 Procedure for Removing Electrode

Step	Action
1	Reduce process pressure to 50 psig or less. FAILURE TO OBSERVE THIS PRECAUTION CAN RESULT IN SERIOUS PERSONAL INJURY.
2	DO NOT STAND BEHIND THE REMOVAL DEVICE. While holding the compression handle to prevent its turning, turn the support grip two turns counterclockwise.
3	Loosen the compression handle until the process pressure slowly pushes the support tube assembly out to its internal stop. If necessary, pull out by hand until the stop is reached.
4	Close the ball valve. If the valve does not close, assure that the support tube is pulled all the way back and try again.
5	Completely loosen the compression handle to withdraw the electrode support tube assembly.

WARNING

If an optional purge flow is turned on to aid in removal, TURN IT OFF immediately after closing the ball valve. Failure to shut off the purge line flow immediately after closing the ball valve may result in serious personal injury because the purge flow will create pressure inside the removal device. The pressure can propel the support tube assembly out of the device.

8. Maintenance and Replacement Parts

8.1 Maintenance of electrodes

Keeping electrode moist

When an electrode is removed from the process for any reason, assure that it does not become dry and remain dry for more than a short period of time. The electrode may require more frequent maintenance if used for a batch treatment installation which leaves the electrode dry between batches, or if it is exposed to process fluids that leave a deposit on the surface of the sensor chip (measuring electrode) and reference electrode. The manual supplied with the electrode contains instructions for cleaning the electrode. Thoroughly rinse the electrode with water after any type of cleaning.

In addition to periodic cleaning, other electrode maintenance includes electrode performance checks and treatment for a clogged junction or severely dry electrode. Instructions for removal from the process are provided in Section 7 of this manual.

CAUTION

Read the manual supplied with the electrode before attempting any maintenance procedures. Improper handling of the electrode can result in damage that will affect accuracy.

Cleaning the cables

If the cable connections get contaminated from oils, salts, perspiration, etc., clean these areas by wiping clean with a lint-free cloth or lens tissue moistened with isopropyl or grain alcohol. Allow the connection to dry before reconnecting.

8.2 Standardization

In addition to electrode maintenance, successful pH measurement relies on periodic standardizing of the measurement instrument and its electrode system. (This is required because all electrodes do not produce exactly the same potential in a solution of known pH. A periodic corrective adjustment eliminates any deviation from the standard value.) Establish regular intervals for standardizing according to conditions and experience. Procedures for standardizing are given in the measuring instrument instructions.

8.3 Leakage from the Removal Device

Table 8-1 indicates the possible sources of leakage from the removal device and the steps necessary to correct the problems. Note, however, that leakage between the housing and compression handle or along the support tube is normal during insertion or removal of the electrode.

Table 8-1 Removal Device Leaks and Remedies

Leak Source (See Figure 4-1)	Remedy
Between housing and compression handle	Perform removal steps (see Section 7.3). Inspect bushing and washer. Replace if deteriorated. Apply silicone grease to surface of new bushing. Inspect angled surface of housing. Keep this surface clean. Replace housing if the surface is scored.
Around cable grip or around cable exit	Perform removal steps (see Section 7.3). Inspect Teflon taped pipe thread seals at the adapter coupling. Leakage at these points may cause process fluid to fill the support tube. Remake the threaded joints after cleaning off and replacing the old tape sealant.
Around pipe threads* at nipple, housing or valve.	Perform removal steps (see Section 7.3). Remake the threaded joints after cleaning off and replacing the old tape sealant. Be careful not to turn the valve body when removing housing and nipple.
Valve stem under handle or from ball of valve when valve is shut off	Replace ball valve after process is shut down. There are no replaceable seals in the ball valve.
Around pipe threads* at nipple to process or valve	Shut down the process. Remake the threaded joints after cleaning off and replacing the old tape sealant.

* In each case, extra Teflon tape sealant may be necessary to prevent pipe threads from leaking.

8.4 Removing Removal Device Parts

Ball valve

If a new ball valve is installed, orient the valve body so that the heavy walled end is toward the process connection for added support strength. See Teflon tape note below.

Nipples

If nipples are replaced, use exact replacement to ensure pressure and temperature ratings, proper immersion length and proper operation of the removal device.

Teflon tape note

Use only Teflon tape on all valve, nipple and support tube pipe threads.

CAUTION

Liquid or paste sealants may contain solvents that weaken the CPVC material. Use of such sealants can result in damage to the equipment.

Bushing and washer

Replace the bushing and washer if they become swollen, cracked or damaged in any way that prevents a good seal on the support tube. Lightly grease the new bushing with silicone grease before installing.

Note that the support grip must be removed from the support tube before replacing the bushing and/or washer. Orient the bushing so that the tapered surface faces away from the compression handle (Figure 4-1.)

8.5 Replacement and Accessory Parts

Description	Part Number
Adapter coupling, 1/2 in. x 3/4 in. NPT	31074342
Durafet II electrode	51205554-002
Durafet II cables – without Cap Adapter	
12' cable	51204782-001
20' cable	51204782-002
30' cable	51204782-003
40' cable	51204782-004
50' cable	51204782-005
Durafet II cables – with Cap Adapter	
4' cable	51205965-006
8' cable	51205965-007
12' cable	51205965-001
20' cable	51205965-002
50' cable	51205965-005
Buffer solutions	
4.01	31103001
6.86	31103002
9.18	31103003
External preamplifier module	31079288 (<i>see Figure 8-1 for numbers of component parts</i>)
Internal preamplifier kit Required for 7082-4, -76 analyzers if external preamp is not used.	080239
Adapter module to provide standard pH electrode signal to a pH analyzer not manufactured by Honeywell. Analyzer must have manually adjustable temperature compensation, or fixed compensation at 25 °C (77 °F).	31079290, 120 Vac 31084755, 240 Vac 31075773, battery-powered
Cable grip, 3/4 in. NPT aluminum for 1/4 in. diameter output cable	31074354
Cable grip, 3/4 in. NPT aluminum for 1/8 in. diameter electrode cable	31084760
Preamp-to-instrument cables	
6.10 m (20 ft)	31075723
15.2 m (50 ft)	51309677-001
30.5 m (100 ft)	51309677-002
61.0 m (200 ft)	51309677-003

Description	Part Number
Removal device parts	<i>see Figure 8-1 in this manual</i>
Removal device, complete CPVC	31074357
Silicone grease (0.3 oz tube)	31090011 (<i>supplied with every preamp module</i>)
Teflon tape, 1/2 in. x 260 in. roll	31811069 (<i>provided with every 7774 Electrode</i>)
Support tube, 1/2 in. NPT Schedule 80 CPVC 6 in. insertion (standard) 12 in. insertion (optional)	31074343 31074344
Junction box, six-terminal	31316260
Output extension cable for use with 079288 preamp module and junction box Contains six conductors	31834088 (<i>specify length</i>); commercially available equivalent cables: Alpha A1176 or Belden 9430, brown wire not used

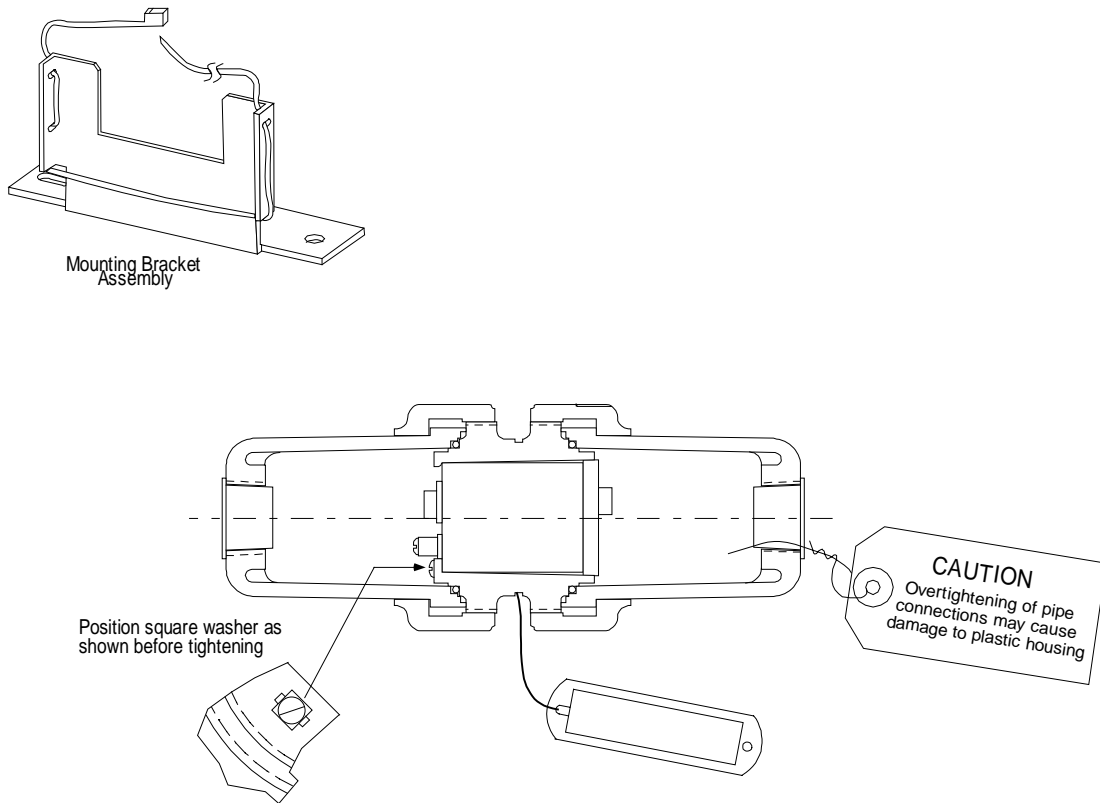


Figure 8-1 Component Parts for Preamplifier 31079288

REFERENCE ITEM DESIGNATOR (Drawing 31079288)	PART NUMBER	DESCRIPTION
1	31075700	Cover
2	31075701	Connecting Ring
3	31075702	Housing
4	31075703	O-ring, EPDM, 1.984 ID
5	31095234	Plug Protector
6	31041395	Screw Terminal Clamp
7	31075717	Support Bracket
8	31075716	Locking Strap
9	31075723	Cable Assembly, Preamp out (20 ft)
10	31075719	Caution Tag
13	31055836	O-ring
15	31079236	Preamplifier
---	31074354	Cable grip, 3/4 in. NPT aluminum for 1/4 in. diameter output cable
---	31084760	Cable grip, 3/4 in. NPT aluminum for 1/8 in. diameter electrode cable

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