Honeywell

7777 Immersion/In-Line Mounting Meredian® II pH/ORP Electrodes Installation and Maintenance Manual

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TotalPlant

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About This Document

Abstract

This manual provides immersion and in-line installation and mounting instructions for Meredian® II pH/ORP Electrodes.

Revision Notes

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

Rev. ID	Date	Notes
0	11/96	This is the initial release of the Honeywell version of this manual. The manual was previously released under L&N p/n 277736 Rev. B4. The format has been changed and updates and deletions have been made.

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 #

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 #

Trademarks

Meredian is a trademark of Honeywell Inc.
Ryton is a trademark of Phillips Chemical Company
Teflon is a trademark of E. I. DuPont De Nemours & Company, Inc.

Contacts

The following list identifies important contacts within Honeywell.

Organization	Telephone	Address
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Contents

Tables

Figures

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 7777 Meredian II pH/ORP Electrodes. The set consists of the following manuals.

- this manual
- Instruction Manual 70-82-25-56 Meredian Combination Industrial Electrodes for pH and ORP
- Instruction Manual 70-82-25-57 Preamplifier Modules 31075704 and 31075705 for Use with Meredian II pH Electrodes (optional)
- instruction manual for the pH/ORP instrument

Instruction Manual 70-82-25-57 is provided if a preamplifier module is specified in the 7777 catalog number (Table I= 2 or 3).

What this manual contains

This manual contains instructions for the immersion and in-line mounting of the 7777 electrodes. It also contains general descriptions of the electrodes and the optional preamplifier module. **More detailed information about installation, use, and maintenance of the electrodes and preamplifier module is provided in the other manuals in the set.**

CAUTION

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

2. Specifications

2.1 Physical

Materials in contact with process solution

Electrode: Ryton body, glass electrode, ethylene propylene monomer (EPM) seal, ceramic junction
Electrode protector 31075715: Polypropylene (*Table II* = 01 or 02 only)
Preamplifier: Glass filled polypropylene housing, EPM seals. (Immersed only with 7777-□-01 or -02 options.)

Dimensions

Electrode: 2.5 cm (1 in.) diameter, 15.2 cm (6 in.) long
Preamplifier: See manual supplied with preamplifier
Junction Box: See Figure 3-1
Immersion/In-Line Mounting: See Appendix A

2.2 Classification

FM

Factory Mutual (FM) Approved Intrinsically Safe for Class I, Division 1, Groups A, B, C and D Hazardous Areas when used with 7079 Series Analyzers and Honeywell Barriers per Directions 177849.
FM Approval does not include Table I = 3.

NEMA

Preamplifier modules have a NEMA 4X, NEMA 6 enclosure.

2.3 Pressure and Temperature Limits

Temperature

Electrodes: -5 to 110 °C (23 to 230 °F), depending on catalog number. For detailed electrode specifications, see manual supplied with the electrodes.
Preamplifier Modules: Upper temperature limits are:
31075704 (for use with analog-based instruments) : 70 °C (158 °F)
31075705 (for use with microprocessor-based analyzers) : 85 °C (185 °F)

Pressure

344.8 kPa @ 100 °C (50 psig @ 212 °F)
689.5 kPa @ 50 °C (100 psig @ 122 °F)

2.4 Model Selection Guide

Base number

Base Number	Table I	Table II
7777	( )	( ) ( )

Table I - preamplifier module selection

0	No preamplifier, no junction box; for use with 7082-3-□ pH or ORP, 7079-44 pH or any direct-measuring instrument within 3.66 m (12 ft) of the electrode mounting.
1	31316260 six terminal junction box for direct-measuring ORP instruments more than 3.66 m (12 ft) from the electrode mounting.
2	31075704 Preamplifier Module for use with analog-based instruments,
3	31075705 Preamplifier Module for use with microprocessor-based analyzers.

Table II - Meredian II combination electrode selection

Table II	Application	When Table I =	Electrode Supplied
01 (See Note 1)	Immersion	2 or 3	31074396 pH, High Temperature, 20.3 cm (8 in.) quick disconnect lead
02 (See Note 1)			31074397 pH, Low Temperature, 20.3 cm (8 in.) quick disconnect lead
03			31074386 pH, High Temperature, 3.66 m (12 ft) quick disconnect lead
04			31074387 pH, Low Temperature, 3.66 m (12 ft) quick disconnect lead
05	Immersion (See Note 2)	0	31074382 pH, High Temperature, 3.66 m (12 ft) skinned and tinned lead
06			31074383 pH, Low Temperature, 3.66 m (12 ft) skinned and tinned lead
07	Immersion	0 or 1	31074388 Gold ORP, 3.66 m (12 ft) skinned and tinned lead
08			31074389 Platinum ORP, 3.66 m (12 ft) skinned and tinned lead
13	In-Line	2 or 3	31074398 pH, High Temperature, 3.66 m (12 ft) quick disconnect lead
14			31074399 pH Low Temperature, 3.66 m (12 ft) quick disconnect lead

Note 1: Electrode Protector 31075715 is supplied.
Note 2: For in-line mounting of these electrodes, order 31074331 smooth tip separately and install on site as described in the manual supplied with the electrode.

3. General Assembly Instructions

3.1 Selecting Materials of Construction

Preamplifier, electrode, and electrode protector

The materials of construction of the preamplifier module, electrode and electrode protector are listed under specifications. Materials of wetted parts must be compatible with the process temperature and corrosion conditions.

User-supplied components

Pipe. pipe couplings, and tees must be supplied by the user. Select the materials to be compatible with the process temperature and corrosion conditions.

3.2 Sealing Pipe Joints

When making pipe joints apply Teflon tape pipe sealant to male threads. Wrap the threads with the tape overlapping by 50% on each wrap. Start the wrap at the end of the pipe and wrap in the direction of the thread at least two turns.

3.3 Meredian II Electrode Preparation

Prepare Meredian II combination electrodes as described in the electrode manual supplied. If you want to shorten the electrode cable, refer to that manual for instructions.

3.4 Preamplifier Module

When preamplifier is supplied

A preamplifier module is supplied when Table I of the 7777 catalog number is specified as 2 or 3. The preamp module contains the replaceable preamplifier assembly which is potted and sealed against humidity in a metal can. The can has quick disconnects on one end for the Meredian II electrode cable input and on the opposite end for the output cable.

Instructions for preparing preamplifier

Prepare the preamplifier module as described in the manual supplied with the preamplifier.

CAUTION

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

Selecting location for remotely mounted preamplifier

When the preamplifier module is to be remotely mounted, it should be located within a convenient distance of the electrode. Allow enough slack between the electrode and the preamp to allow for removal of the electrode for maintenance. The cable from the electrode to the preamp module should be secured against continuous flexing. Continuous motion of the cable can build a charge between the outer and inner conductors of the coax cable which would produce an erratic reading.

Mounting the preamplifier module

The module is designed for surface mounting. (Dimensions required for mounting the module are provided in the manual supplied with the preamplifier.) A mounting bracket constructed of nickel-plated steel and a plastic quick release locking strap are provided to facilitate mounting.

The module may be mounted in any convenient position in addition to the vertical mounting shown in the preamp manual.

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 which could enter the preamp module during installation or maintenance. Damage to the equipment may result.

The preamp module mounting bracket arrangement must never be used to support the immersion pipe and electrode assembly. The plastic locking strap is designed to secure the preamp module only.

See the manual supplied with the preamplifier for addition instructions for mounting the preamplifier module.

Sealing electrical connections to the preamplifier

All electrical connections to the preamp must be completed and the 3/4 in. NPT connections 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 so that the grommet can be spread to permit cable insertion.

3.5 Overview of Assembly

Where assembly instructions are provided

An overview of the order of assembly is provided in this section.

Instructions for unpacking, preparing, and maintaining the electrodes are provided in the manual supplied with the electrodes.

More detailed instructions for connecting the electrode leads to the preamplifier module are provided in the manual supplied with the preamplifier.

Instructions for cabling from the electrode directly to the instrument, or from the preamplifier or junction box to the instrument, are provided in this manual.

The recommended configurations for submersed mounting of electrodes are described in Section 4 of this manual.

The recommended configuration for in-line mounting of electrodes is described in Section 5 of this manual.

Installation tasks

Table 3-1 lists the tasks required to install submersed electrodes. Table 3-2 lists the tasks required for in-line mounting of electrodes.

Table 3-1 Installation Tasks for Submersed Electrodes

Step	Action
1	Read the general information about immersion mounting at the beginning of Section 4.
2	Decide which support arrangement is appropriate for your application.
3	Prepare the support arrangement.
4	Determine which sub-section in Section 4 describes your intended installation.
5	Obtain the required materials listed for your installation.
6	Assemble the required pipe and pipe coupling(s) in the arrangement pictured for your installation.
7	Thread the electrode leads through the pipe (if any) that will cover the electrode cable.
8	Connect the electrode cable to the preamplifier or junction box (if used). Instructions for cabling to the preamplifier are provided in the preamp manual. Instructions for cabling to a junction box are provided in this manual.
9	If a preamplifier module is used, connect preamplifier output cable to the output side of the preamplifier module as described in the manual supplied with the preamplifier.
10	If a preamplifier module is used, complete assembly and mounting of the preamplifier module as described in the manual supplied with the preamplifier.
11	Perform a pressure test as described in this section.
12	Complete cabling to the instrument (from preamplifier, junction box, or directly from electrode) as described in this manual and in the preamplifier manual.
13	Mount the unit with the support prepared in Step 3.

Table 3-2 Installation Tasks for In-Line Electrodes

Step	Action
1	Read the general information about in-line mounting at the beginning of Section 5.
2	Select an appropriate location and install the required pipe tee.
3	Obtain the required materials listed in 5.2.
4	Connect the electrode cable to the instrument (as described in the manual supplied with the instrument) or to the remotely mounted preamplifier (as described in the preamp manual).
5	If a preamplifier module is used, connect preamplifier output cable to the output side of the preamplifier module as described in the manual supplied with the preamplifier.
6	If a preamplifier is used, complete assembly and mounting of the preamplifier module as described in the preamp manual.
7	Insert electrode in pipe tee.
8	Complete cabling to the instrument as described in this manual and in the manual supplied with the preamp.

3.6 Pressure Test

When to perform the test

Before submerging an assembly, it is recommended that a low pressure test be performed to test the various seals made during the assembly operation.

How to perform the test

Table 3-3 lists the steps for pressure testing the assembly.

Table 3-3 Instructions for Pressure Test

Step	Action
1	Double back the cable into the immersion pipe.
2	Connect a source of low pressure air to the immersion pipe. (Approximately 69 kPa (10 psi) will simulate immersion in 6.10 m (20 ft) of water)
3	Immerse the assembly in a shallow tank of water and look for any indication of air bubbles streaming from the assembly.
4	If a preamplifier is included in the assembly, check around the two pipe connections of the preamplifier module and around the two O-ring seals of the preamplifier module connecting rings. Air bubbles indicate a possible leakage point and must be corrected.
5	To seal leaking connections: Use extra Teflon tape on pipe joints. Use silicone grease on O-ring seals. Make the connecting rings on the preamplifier snug.

3.7 Final Electrical Connections

Preamplifier Output Cable

At the end of the immersion pipe opposite the electrode, various arrangements can be made for the electrical connections of the output cable.

- A 3/4 in. NPT pipe coupling and a 3/4 in. NPT cable grip can be used to secure the cable exit point.
- Another approach would be to attach junction box 31316260, directly to the 3/4 in. pipe and terminate preamplifier output cable 31075723 inside the junction box. This is helpful if the pH/ORP analyzer or recorder is at some distance from the electrode mounting. Use Honeywell cable 834088 to make the connection from the junction box to the instrument. Carefully note conductor colors and assure that connections are made as shown in the manual supplied with the preamplifier.

Preamplifier conductor signals

If the measuring instrument is within 6.10 m (20 ft) of the preamplifier module, output cable 31075723 can be used for the final connection.

Check the pH instrument directions for the correct connections before attempting to power up the measuring system. If extension cable is used, carefully note conductor colors and assure that connections are made as indicated in the preamplifier manual.

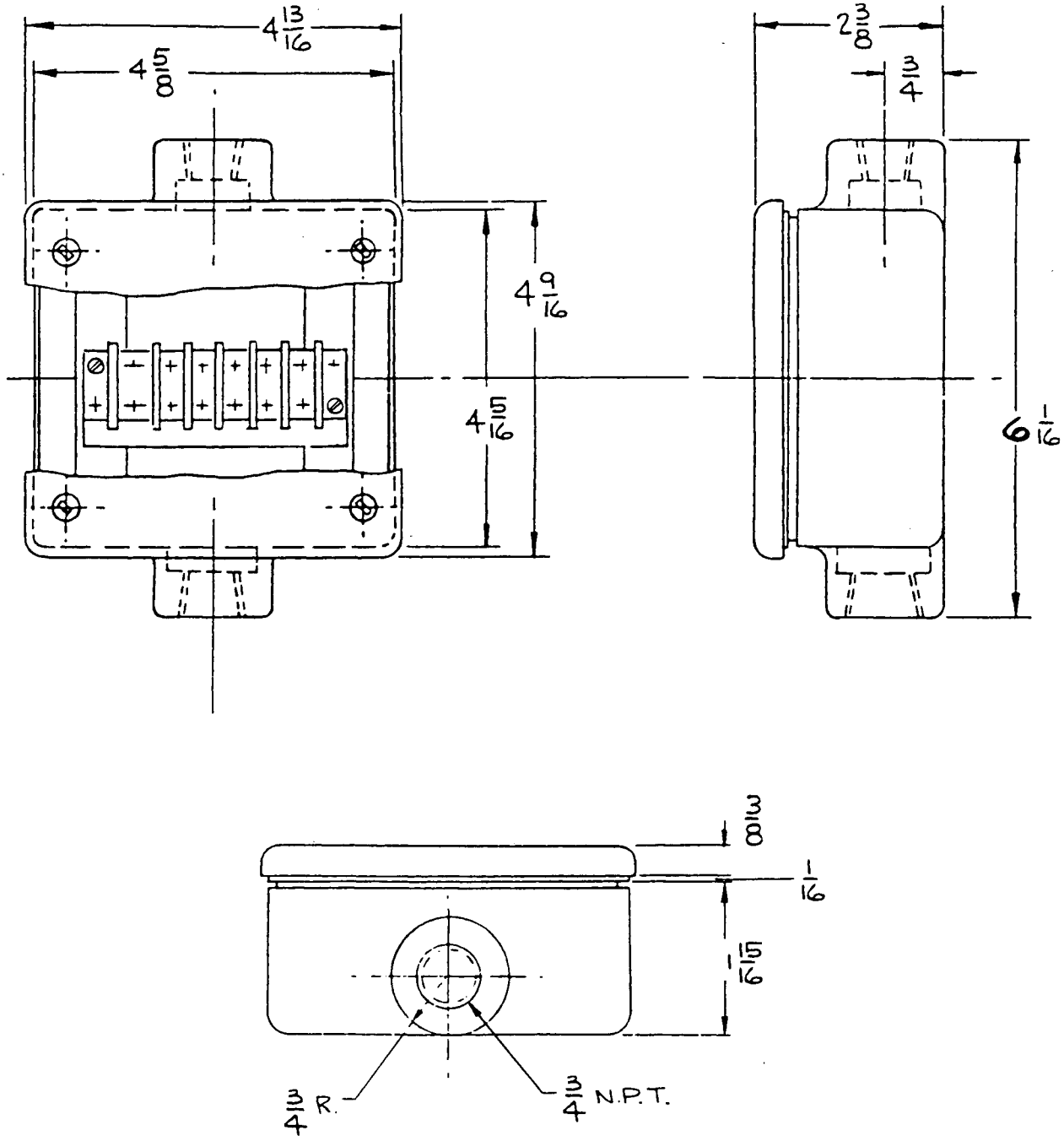
CAUTION

Do not reverse the blue and green wires (dc voltage supply). If a preamplifier is included in the assembly, its circuit will be damaged.

Location of junction box

The 31316260 junction box (see Figure 3-1) can also be wall mounted. In any case, allow sufficient overhead space and cable length to allow easy access and withdrawal of the immersion assembly for cleaning, electrode maintenance or preamplifier replacement.

Figure 3-1 provides dimensions of junction box 31316260.



a/n 23395

Figure 3-1 Outline and Dimension Drawing for 31316260

4. Immersion Mounting

4.1 General Information

Intended Use

The 7777 Immersion Mounting (Table II = 01, 02, 03, 04, 05, 06, 07, 08) is designed specifically for the Meredian II Combination pH or ORP electrode in any immersion-type industrial measurement in open tanks or pits. It can be used in a variety of configurations to accommodate many techniques for support, immersion, and removal of the electrode or electrode/preamplifier system in a process solution.

A variety of mounting configurations are used according to the process application. By using accessory parts such as pipe, pipe fittings and cable grips, an immersion assembly can be built to suit a specific application.

Figure 4-1 shows some suggested support arrangements.

Figures 4-2 through 4-6 indicate configurations possible for immersion mounting. Either rigid or flexible connections can be used on either side of the preamplifier module or junction box.

Included in assembly

Depending on the catalog number configuration, an assembly may include a Meredian II combination electrode, a preamplifier module or junction box and an electrode protector. The catalog suffix system is indicated in Section 2.

When Table I of the catalog number is 2 or 3, a preamplifier module is provided which serves as an interface between the pH electrode and the pH instrument. Preamplifier Module 31075704 (Table I = 2) is used with Honeywell analog-based analyzers, transmitters and recorders. Preamplifier Module 31075705 (Table I = 3) is used with Honeywell microprocessor-based analyzer/controllers. Refer to the preamplifier manual for connections from the preamplifier to the instrument.

When Table I of the catalog number is 0, a preamplifier module is not provided because the Meredian II Electrode, in this case equipped with skinned and tinned cable terminations, is wired directly to the pH or ORP instrument. Refer to the directions furnished with those instruments for the proper electrical connections. When Table I = 1, a junction box is provided to connect Meredian II ORP electrodes to direct-measuring instruments that are located more than 3.66 m (12 ft) from the electrode mounting.

Minimum Immersion Depth

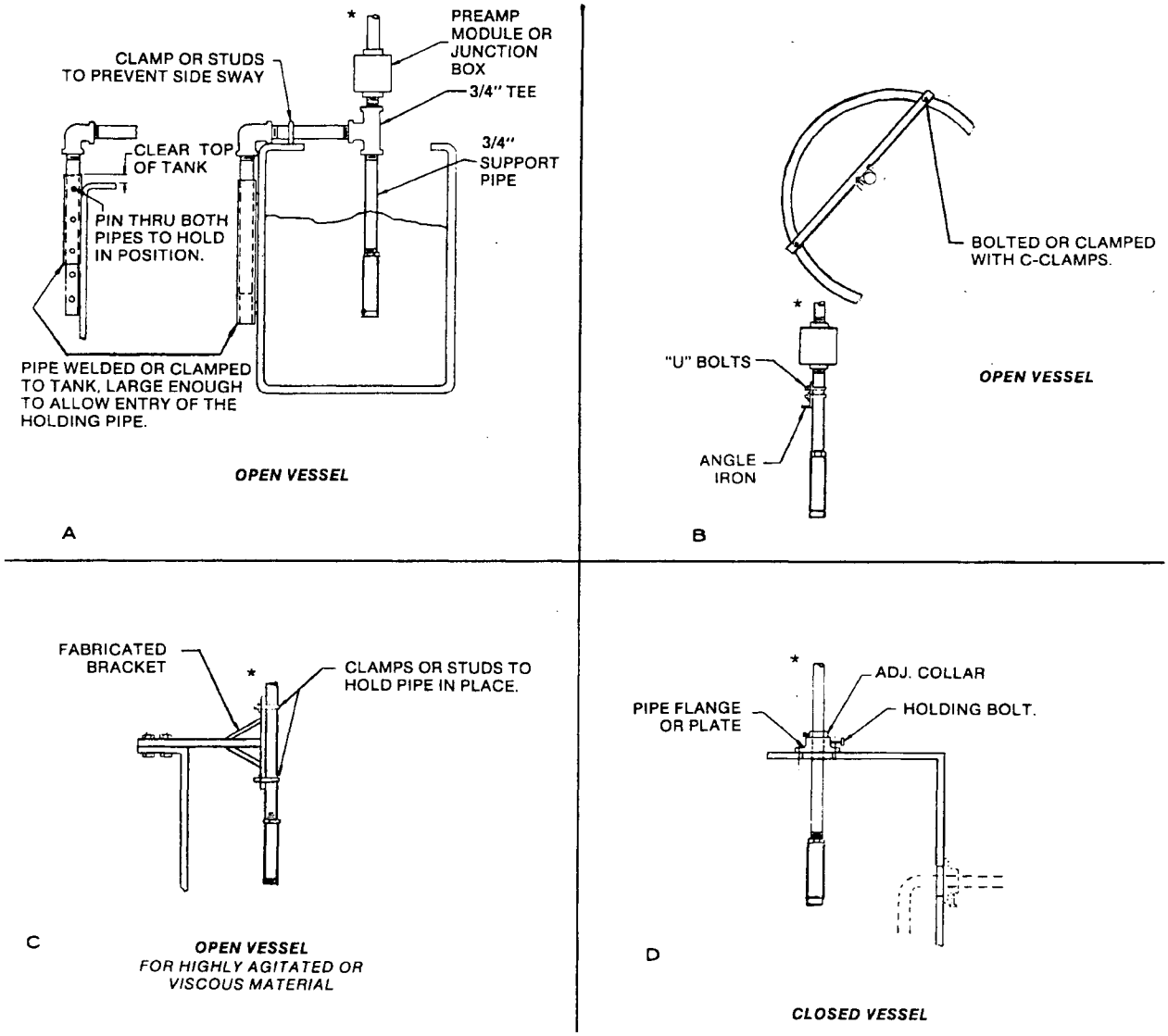
In all cases, the electrode body should be immersed a minimum of 7.6 cm (3 in.) into the process liquid to ensure proper temperature compensation.

Two basic measuring systems

Two basic measuring systems are used: one for direct-measuring analyzers designed for a high impedance input directly from the pH or ORP electrode, and a second for a low impedance input from the preamplifier module by which the electrode signal can be transmitted long distances using ordinary cable.

Input Signal to Preamplifier

The input to the preamp module is the high impedance, low-level emf from the Meredian II pH electrode mounted in the immersion assembly. Shielded low-loss cable connects the electrode to the preamplifier input. The module output is a low impedance, high level signal which is easily carried long distances over unshielded cable.



* *ALLOW SUFFICIENT FLEXIBLE LENGTH FOR REMOVAL OF ELECTRODE.*

a/n 23396

Figure 4-1 Suggested Support Arrangements

4.2 Preamplifier Module Submersed

Application

Figure 4-2 illustrates this configuration. It is applicable to only the following catalog numbers:

7777-2-01
7777-2-02
7777-3-01
7777-3-02

Materials required

The material supplied with these catalog numbers is listed below.

Quantity	Item
1	Preamplifier Module
1	31075723 Preamp Module Output Cable
1	Meredian II pH Combination Electrode with 20.3 cm (8 in.) quick disconnect leads
1	31075715 Electrode Protector

Materials supplied by the user are listed below.

Quantity	Item
1	Length 5.79 m (19 ft maximum) of 3/4 in. Schedule 80 plastic pipe, threaded on both ends; or 3/4 in. Schedule 40 metal pipe, threaded on both ends. Metal pipe is recommended where process flow conditions or stirring would cause the plastic pipe to bend, twist, or vibrate excessively beyond its support point.
1	3/4 in. NPT pipe coupling
1	3/4 in. NPT cable grip for 1/4 in. diameter cable
1	Junction box with 6-point terminal board; required only if distance between preamp and instrument is greater than 6.10 m (20 ft).

Assembly

See Table 3-1 for order of assembly tasks. Assemble the materials as shown in Figure 4-2. Note that Electrode Protector 075715 must be mounted on the end of the electrode body.

CAUTION

The electrode protector and fittings to the preamp module are to be hand tightened only. Over-tightening may result in damage to the equipment. See the manual supplied with the preamplifier module for additional assembly instructions.

Dimensions

For mounting dimensions, see Appendix A, drawing B-DIM-040615-1-3.

Pressure test

Perform a submersible pressure test (see 3.6).

Final electrical connections

Make final electrical connections (see 3.7)

Mounting

Mount the assembly. See Figure. 4-1 for mounting suggestions.

Figure 4-2 illustrates the configuration of components used for mounting electrode with the preamplifier module submersed.

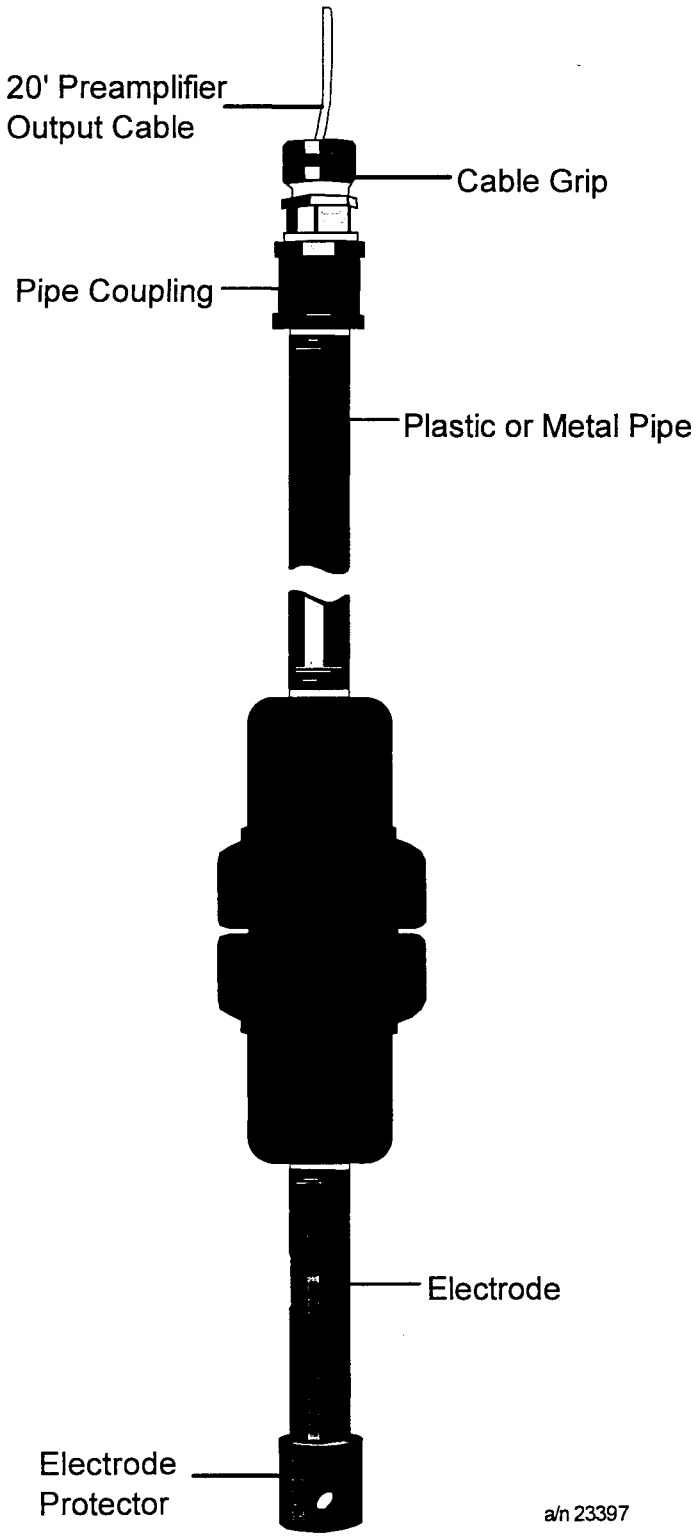


Figure 4-2 Submersed Preamplifier Module

4.3 Preamplifier Module Not Submersed

Application

Figure 4-3 illustrates this configuration. Among the catalog numbers to which it applies are:

7777-2-03
7777-2-04
7777-3-03
7777-3-04

Materials required

The material supplied with these catalog numbers is listed below.

Quantity	Item
1	Preamplifier Module
1	31075723 Preamp Module Output Cable
1	Meredian II pH Combination Electrode with slotted tip and 3.66 m (12 ft) quick disconnect leads

Materials supplied by the user are listed below.

Quantity	Item
1	Length 3.35 m (11 ft) minimum, 3.51 m (11.5 ft) maximum of 3/4 in. Schedule 80 plastic pipe, threaded on both ends; or 3/4 in. Schedule 40 metal pipe, threaded on both ends. Metal pipe is recommended where process flow conditions or stirring would cause the plastic pipe to bend, twist, or vibrate excessively beyond its support point.
1	3/4 in. NPT pipe coupling
1	3/4 in. NPT cable grip for 1/4 in. diameter cable

Assembly

See Table 3-1 for order of assembly tasks. Assemble the materials as shown in Figure 4-3.

CAUTION

Fittings to the preamp module are to be hand tightened only. Over-tightening many result in damage to the equipment. See the manual supplied with the preamplifier for additional assembly instructions.

Dimensions

For mounting dimensions, see Appendix A, drawing B-DIM-040615-1-2.

Pressure test

Perform a submersible pressure test (see 3.6).

Final electrical connections

Make final electrical connections (see 3.7).

Mounting

Mount the assembly. See Figure 4-1 for mounting suggestions.
Figure 4-3 illustrates the configuration of components used for mounting electrode with the preamplifier module not submersed.

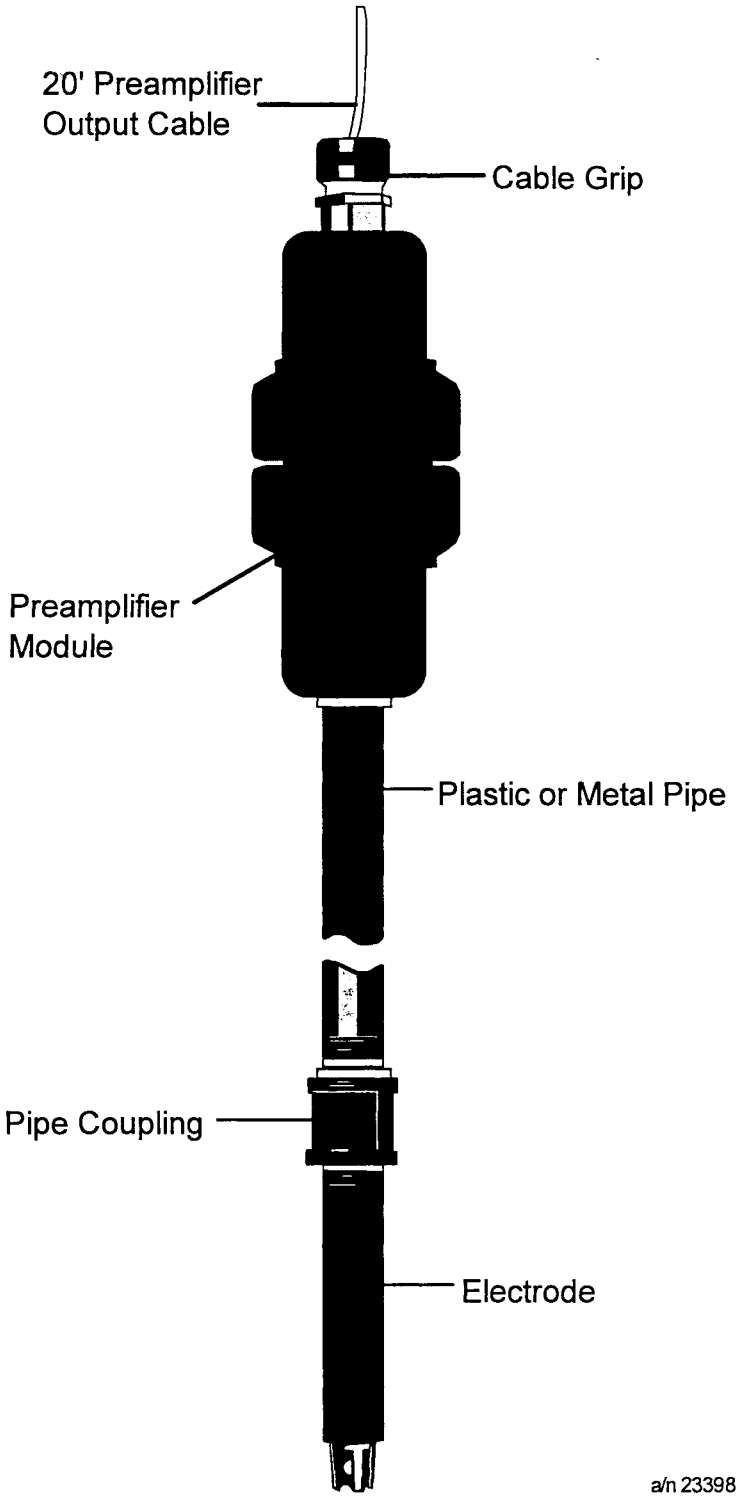


Figure 4-3 Preamplifier Not Submersed

4.4 Preamp Module Remote Mounted

Application

Figure 4-4 illustrates this configuration. Among the catalog numbers to which it applies are:

7777-2-03
7777-2-04
7777-3-03
7777-3-04

Materials required

The material supplied with these catalog numbers is listed below.

Quantity	Item
1	Preamplifier Module
1	31075723 Preamp Module Output Cable
1	Mounting bracket for preamp module
1	Meredian II pH Combination Electrode with slotted tip and 3.66 m (12 ft) quick disconnect leads

Materials supplied by the user are listed below.

Quantity	Item
1	3/4 in. Schedule 80 plastic pipe, threaded on both ends; or 3/4 in. Schedule 40 metal pipe, threaded on both ends. Metal pipe is recommended where process flow conditions or stirring would cause the plastic pipe to bend, twist, or vibrate excessively beyond its support point. Pipe length to be determined by user. When planning pipe length, allow enough cable between the pipe and the preamp to permit removal for servicing.
2	3/4 in. NPT pipe coupling
3	3/4 in. NPT cable grip for 1/4 in. diameter cable

Assembly

See Table 3-1 for order of assembly tasks. Assemble the materials as shown in Figure 4-4.

Dimensions

For mounting dimensions, see Appendix A, drawing B-DIM-040615-1-2.

Pressure test

Perform a submersible pressure test (see 3.6).

Final electrical connections

Make final electrical connections (see 3.7).

Mounting

Mount the assembly. See Figure 4-1 for mounting suggestions.

Figure 4-4 illustrates the configuration of components used for mounting electrode with the preamplifier module remotely mounted.

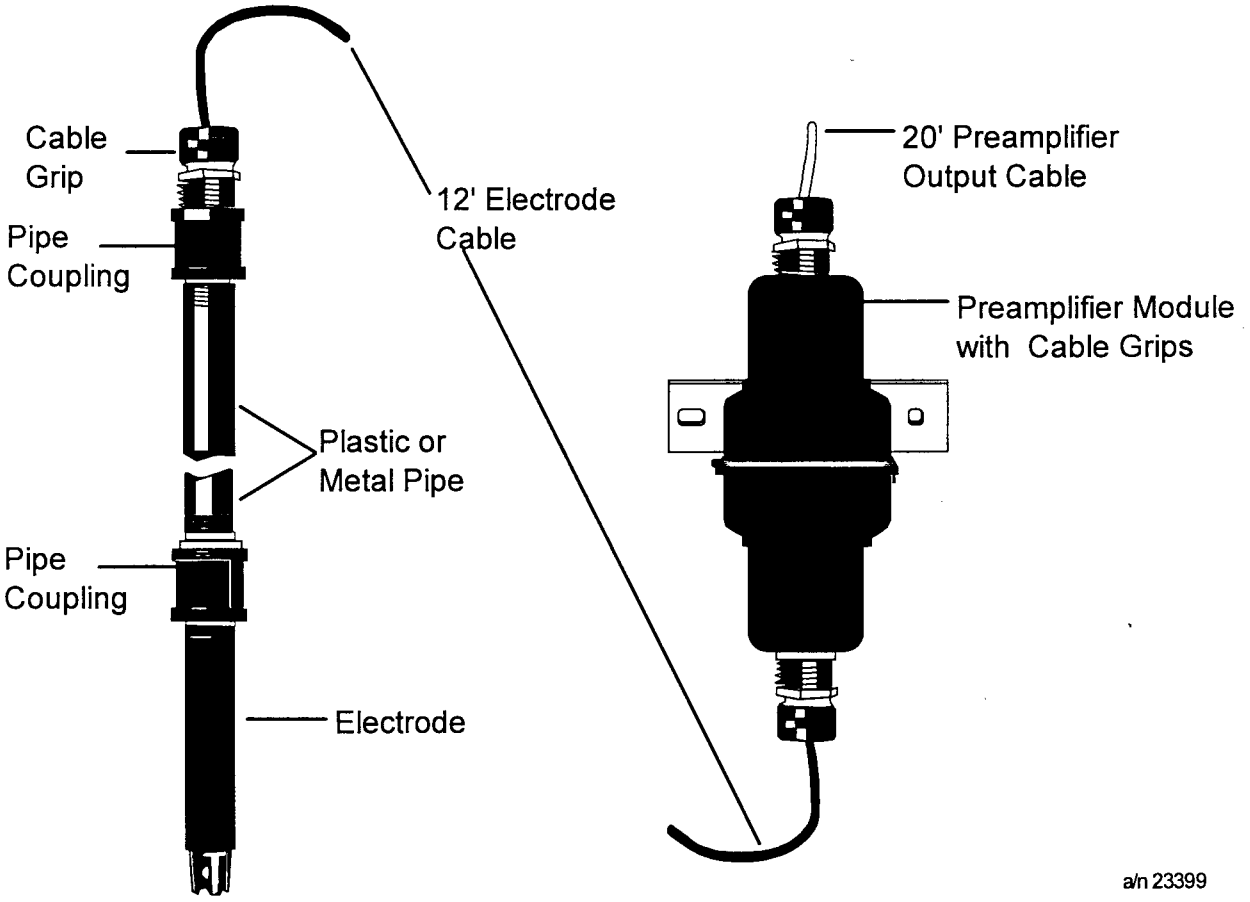


Figure 4-4 Preamplifier Module, Remotely Mounted

4.5 With Junction Box

Application

Figure 4-5 illustrates this configuration. It is applicable to only the following catalog numbers:

7777-1-07
7777-1-08

Materials required

The material supplied with these catalog numbers is listed below.

Quantity	Item
1	31316260 six-terminal junction box
1	Meredian II ORP Combination Electrode with slotted tip and 3.66 m (12 ft) skinned and tinned leads

Materials supplied by the user are listed below.

Quantity	Item
1	Honeywell output extension cable 31835002
1	Length 3.35 m (11 ft) minimum, 3.51 m (11.5 ft) maximum of 3/4 in. Schedule 80 plastic pipe, threaded on both ends; or 3/4 in. Schedule 40 metal pipe, threaded on both ends. Metal pipe is recommended where process flow conditions or stirring would cause the plastic pipe to bend, twist, or vibrate excessively beyond its support point.
1	3/4 in. NPT pipe coupling
determined by user	3/4 in. NPT cable grip for 1/4 in. diameter cable

Assembly

See Table 3-1 for order of assembly tasks. Assemble the materials as shown in Figure 4-5. The 31316260 junction box is used to connect the Meredian II ORP electrode to direct-measuring analyzers located more than 3.66 m (12 ft) from the electrode mounting.

Location of junction box

The junction box may be mounted directly on the immersion pipe as shown in Figure 4-5, or remotely mounted. If the box is remotely mounted, use Figure 4-6 as an example of the immersion assembly.

CAUTION

Do not immerse the junction box. If the junction box is immersed, damage to the equipment will result.

Dimensions

For mounting dimensions, see Appendix A, drawing B-DIM-040615-1-1.

Pressure test

Perform a submersible pressure test (see 3.6).

CAUTION

Do not immerse the junction box. If the junction box is immersed, damage to the equipment will result.

Connection of electrode cable to junction box

Make final electrical connections (see 3.7). Connect the leads from the electrode cable to the terminal board in the junction box.

The leads are identified below.

Table 4-1 ORP Electrode Leads

Lead	Function
center coax lead	measuring lead
orange lead	reference lead (see Note 1)
pair of white leads (see Note 2)	temperature compensator leads
white lead on center coax (see Note 1)	shield connection (see Note 1)

Note 1: A separate reference lead is sometimes omitted. In that case the coaxial shield carries the reference and no shield connection is made at the measuring instrument.
Note 2: If the electrode cable has been shortened, two additional white leads have been exposed. These are not used in ORP measurements and may be cut off at the outer cable jacket.

Connection of junction box to measuring instrument

Use Honeywell cable 31835002 to continue the cable run from the junction box to the direct-measuring instrument.
Prepare each end of the cable as instructed in the manual supplied with the electrode.
Check the manual supplied with the direct-measuring instrument BEFORE connecting the cable from the junction box to the instrument.

Mounting

Mount the assembly. See Figure 4-1 for mounting suggestions.
Figure 4-5 illustrates the configuration of components used for mounting electrode with the junction box on the immersion pipe.

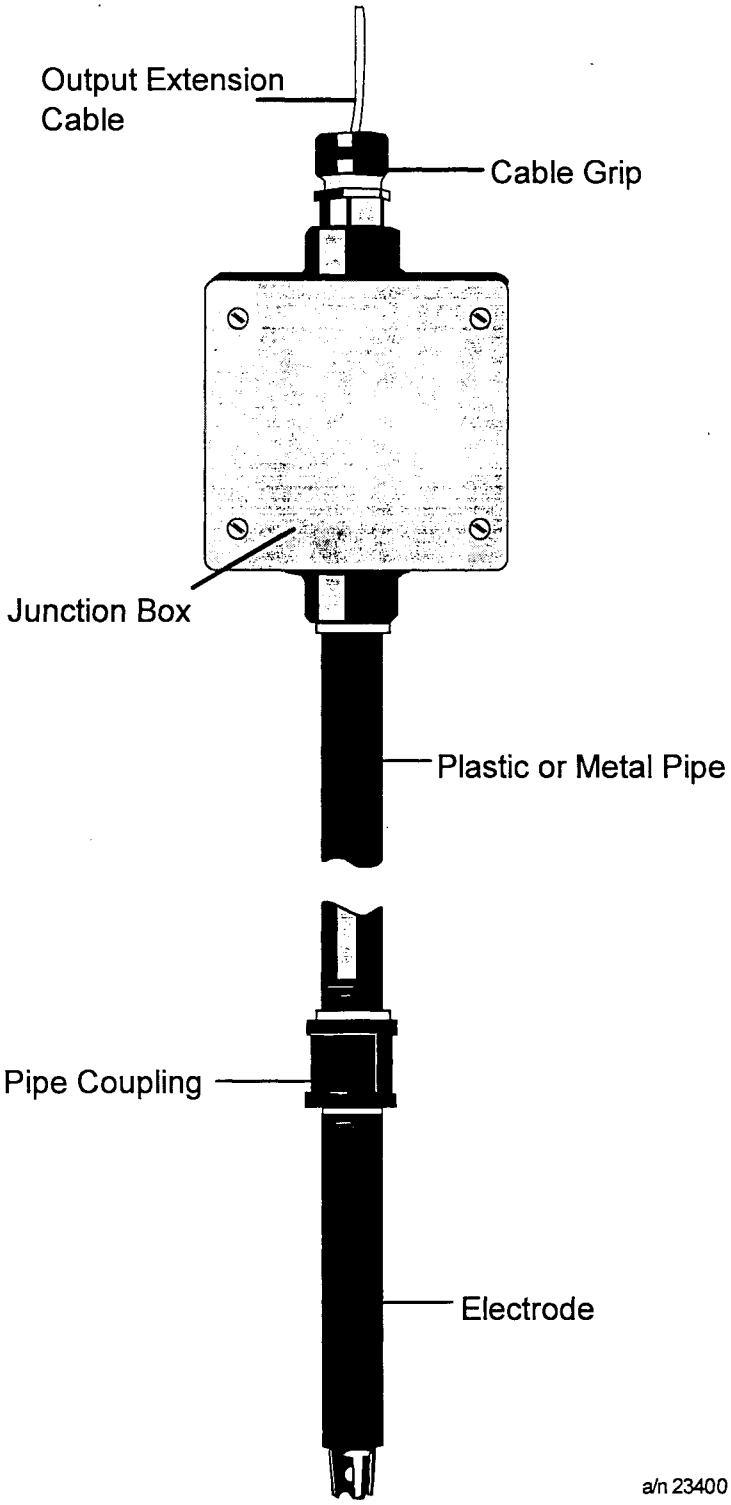


Figure 4-5 Electrode with Junction Box

4.6 Direct Electrode-To-Instrument Connections

Application

Figure 4-6 illustrates this configuration. Among the catalog numbers to which it applies are:

7777-0-05
7777-0-06
7777-0-07
7777-0-08

Materials required

The material supplied with these catalog numbers is listed below.

Quantity	Item
1	Meredian II Combination Electrode with slotted tip and 3.66 m (12 ft) skinned and tinned leads

Materials supplied by the user are listed below.

Quantity	Item
1	3/4 in. Schedule 80 plastic pipe, threaded on both ends; or 3/4 in. Schedule 40 metal pipe, threaded on both ends. Metal pipe is recommended where process flow conditions or stirring would cause the plastic pipe to bend, twist, or vibrate excessively beyond its support point. Pipe length to be determined by user. When planning pipe length, allow enough cable between the pipe and instrument to permit removal of electrode for servicing.
2	3/4 in. NPT pipe coupling
1	3/4 in. NPT cable grip for 1/4 in. diameter cable

Assembly

See Table 3-1 for order of assembly tasks. Assemble the materials as shown in Figure 4-6.

Dimensions

For mounting dimensions, see Appendix A, drawing B-DIM-040615-1-1.

Pressure test

Perform a submersible pressure test (see 3.6).

Final electrical connections

Make final electrical connections (see 3.7).

Mounting

Mount the assembly. See Figure 4-1 for mounting suggestions.

Figure 4-6 illustrates the configuration of components used for directly connecting the electrode to the instrument.

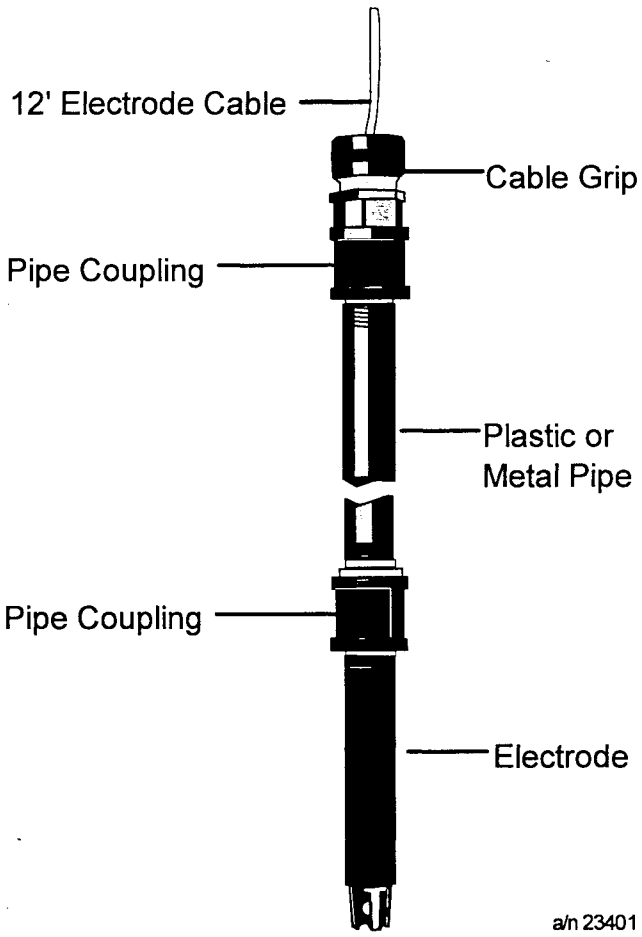


Figure 4-6 Direct Electrode-to-Instrument Connection

5. In-Line Mounting

5.1 General Information

Choice of pipe tee

The Catalog 7777 in-line mounting (Table II = 13 or 14) uses a Meredian II combination electrode body with 3/4 in. NPT external threads at both ends. This allows for insertion of the electrode directly into a Schedule 40, 3/4 in. NPT metal pipe tee in a pipe line. The electrode will NOT fit into plastic pipe tees, with the exception of the special Honeywell pipe tee 31120167.

Avoiding damage to the electrode

All Meredian II pH electrodes for in-line mounting are supplied with an exposed membrane in the form of a glass bulb. Exercise extreme care when inserting or removing the electrode from the pipe tee to prevent damage to the pH bulb.

Ensuring accurate temperature sensing

When process temperature varies considerably from ambient temperature, insulate the entire Meredian II electrode body to ensure accurate process temperature sensing.

Included in assembly

The Meredian II pH in-line electrodes are equipped with quick disconnects on the electrode cable and therefore must be used with preamplifier modules 31075704 or 31075705.

When Table I of the 7777 catalog number is 2 or 3, a preamplifier module is provided which serves as an interface between the pH electrode and the direct-reading pH instrument. Preamplifier Module 31075704 (Table I = 2) is used with Honeywell analog instruments. Preamplifier Module 31075705 (Table I = 3) is used with Honeywell microprocessor-based analyzer/controllers. Refer to the manual supplied with the direct-reading pH instrument for an operational description of the measuring circuits.

Input to the preamplifier module

The input to the preamp module is the high impedance, low-level emf from the Meredian II pH electrode in the in-line assembly. Shielded low-loss cable connects the electrode to the preamp input. The module output is a low impedance, high-level signal which is easily carried long distances over unshielded cable.

Orientation of electrode

For reliable measurement, the electrode must be immersed in the process fluid. Therefore, orientation of the electrode vertical to the horizon is not recommended, as this orientation may prevent sufficient depth penetration to reliably immerse the electrode. The electrode mounting angle should be at least 45 degrees from vertical as shown in Figure 5-1. If solids are present in the process fluid, avoid angles exceeding 90 degrees from vertical to minimize accumulation of solids around the electrode.

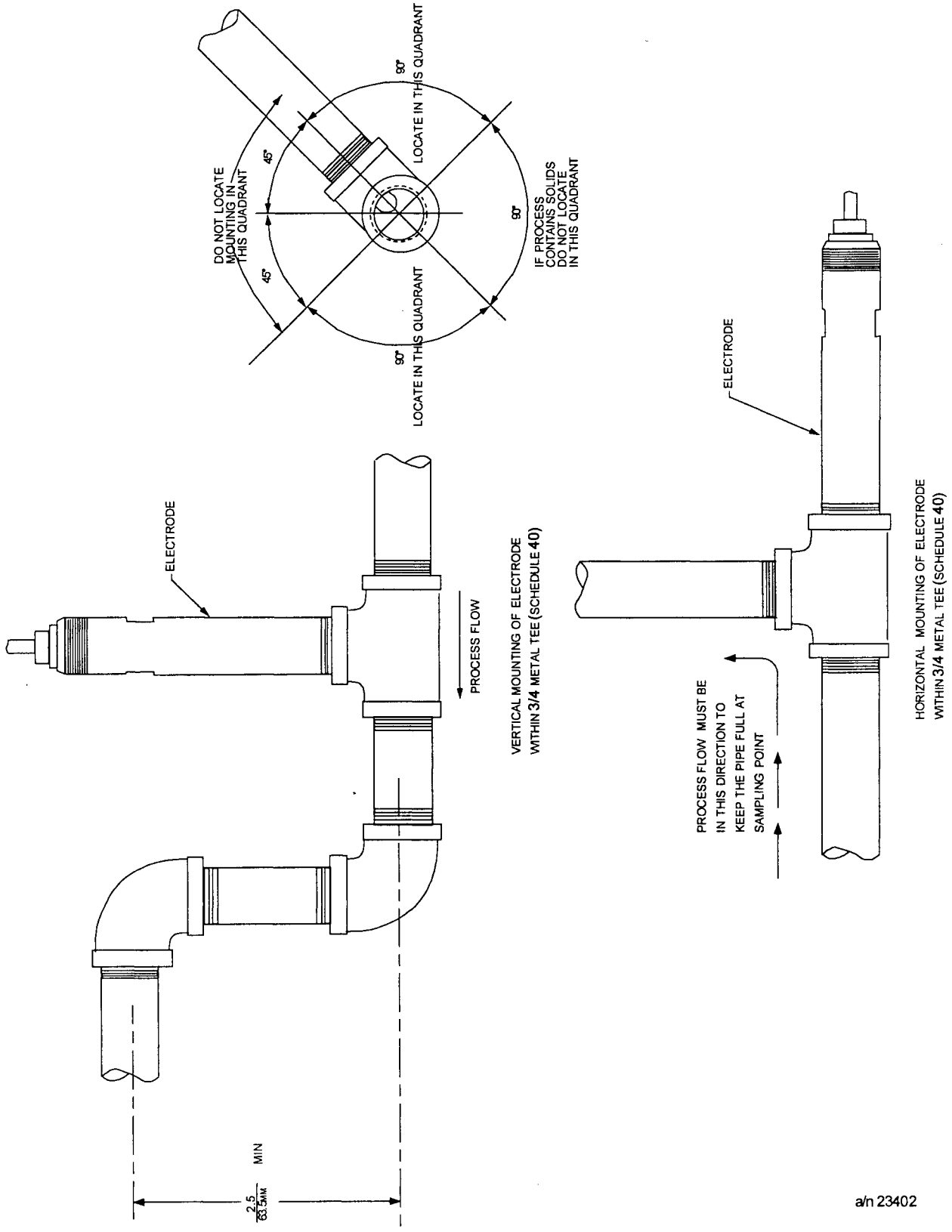


Figure 5-1 Proper Mounting Angle for Electrode

5.2 Preamplifier Module Remotely Mounted

Application

Figure 5-2 illustrates this configuration. It is applicable only to the following catalog numbers:

7777-2-13
7777-2-14
7777-3-13
7777-3-14

Materials required

The material supplied with these catalog numbers is listed below.

Quantity	Item
1	Preamplifier Module
1	31075723 Preamp Module Output Cable
1	Mounting bracket for preamp module
1	Meredian II pH Combination Electrode with smooth tip and 3.66 m (12 ft) quick disconnect leads

Materials supplied by the user are listed below.

Quantity	Item
1	3/4 in. NPT Schedule 40 metal pipe tee or special Honeywell plastic pipe tee 31120167 (Electrode will not fit correctly into standard plastic pipe tee.)
2	3/4 in. NPT cable grip for 1/4 in. diameter cable

Assembly

See Table 3-1 for order of assembly tasks. Orient the electrode as shown in Figure 5-1. Assemble the materials as shown in Figure 5-2.

Orientation of electrode

The Meredian II electrode must be positioned so that the process solution is in constant contact with both the glass membrane (bulb-shaped measuring electrode) and the reference electrode. See the manual provided with the electrode for details.

Dimensions

For mounting dimensions, see Appendix A, drawing C-DIM-040615-1-4.

Final electrical connections

Make final electrical connections (see 3.7).

Figure 5-2 illustrates the configuration of components used for mounting electrode in-line with the preamplifier module remotely mounted.

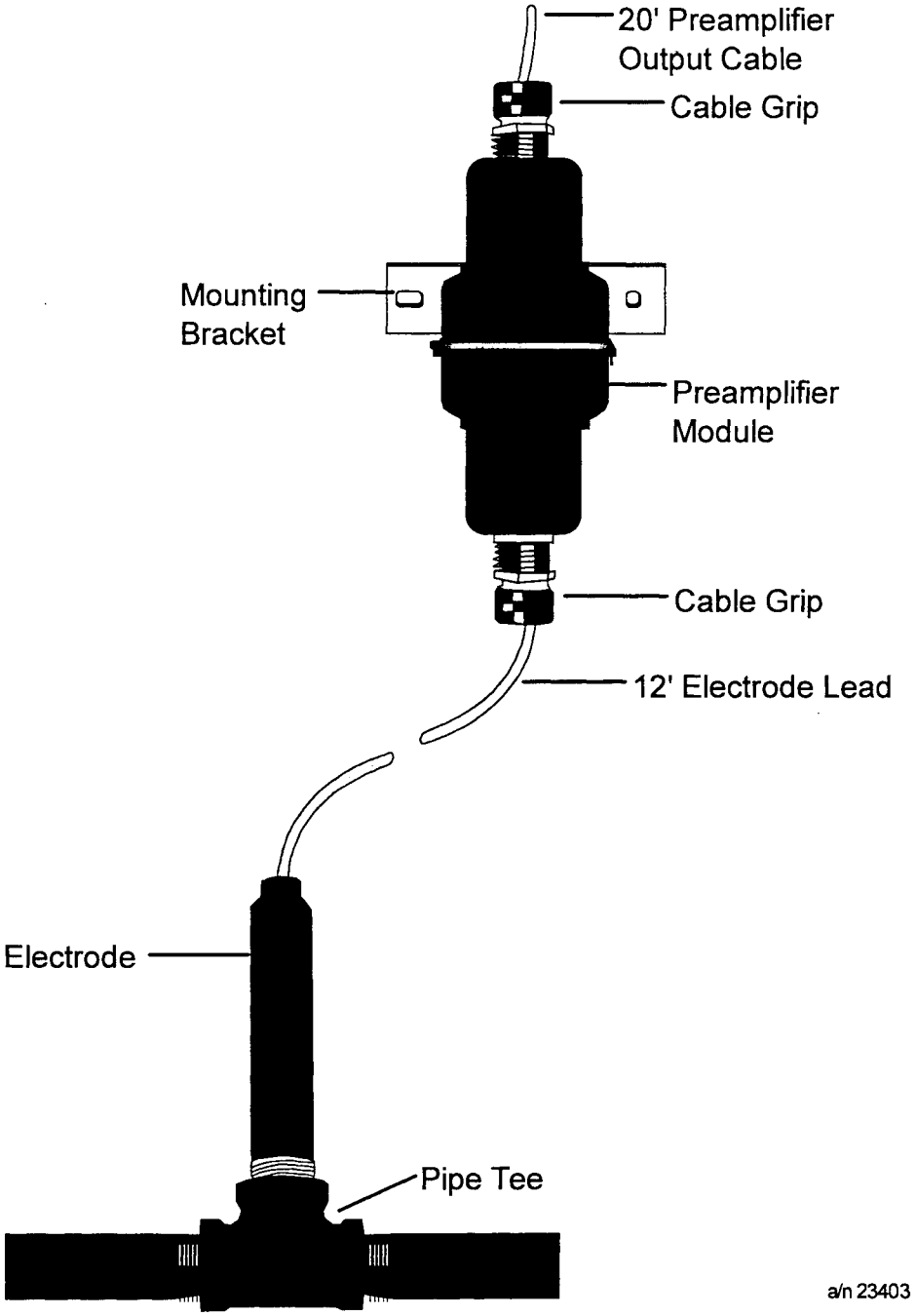


Figure 5-2 In-Line Mounting of Electrode with Remotely Mounted Preamplifier Module

6. Maintenance, Standardization, Replacement Parts

6.1 Maintenance

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 glass bulb and reference electrode. The manual supplied with the electrode contains instructions for periodic checking, trouble-shooting, and 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, rejuvenation of the pH glass membrane and treatment for a clogged junction or severely dry electrode.

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.

6.2 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.

Buffer solutions for standardizing are listed in the electrode manual.

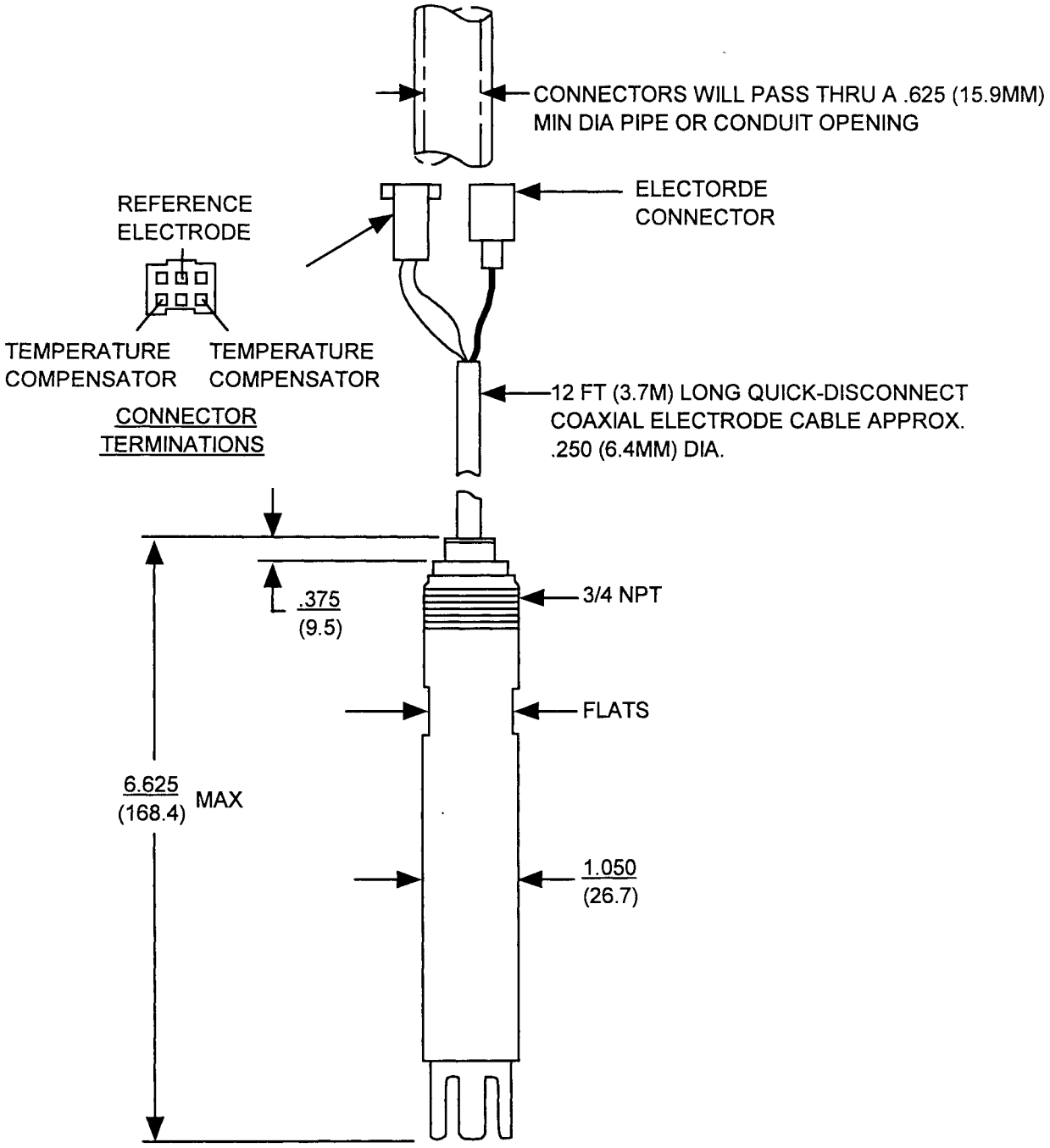
6.3 Replacement and Accessory Parts

Description	Part Number
Meredian II electrode	*see Table II description in 2.4 of this manual*
silicone grease (0.3 oz tube)	31090011 *(supplied with every preamp module)*
Teflon tape, 1/2 in. x 260 in. roll	31811069 *(provided with every Catalog 7777)*
CPVC pipe tee, special dimension 3/4 in. NPT for in-line mounting	31120167
electrode protector	31075715 *(provided with Catalog 7777, Table II = 01 or 02 only)*
junction box, six-terminal	31316260
cable grip, 3/4 in. NPT aluminum for 1/4 in. diameter cable	31074354
output extension cable, pH Contains six conductors (Alpha A1176 or Belden 9430, brown wire not used)	31834088 *(specify length)*
output extension cable, ORP (#22 coax)	31835002 *(specify length)*
electrode tip, smooth for in-line mounting	31074331
parts for preamplifier module	*see manual supplied with preamplifier*

Appendix A

Dimension Drawings for Catalog 7777 -□-□□ Mounting Configurations

Catalog 7777 - □ - □□ Mounting Configuration	Dimension Drawing
7777-2-03 7777-2-04 7777-3-03 7777-3-04	B-DIM-040615-1-2
7777-2-01 7777-2-02 7777-3-01 7777-3-02	B-DIM-040615-1-3
7777-□-05 7777-□-06 7777-0-07 7777-0-08 7777-1-07 7777-1-08	B-DIM-040615-1-1
7777-2-13 7777-2-14 7777-3-13 7777-3-14	C-DIM-040615-1-4



NOTES

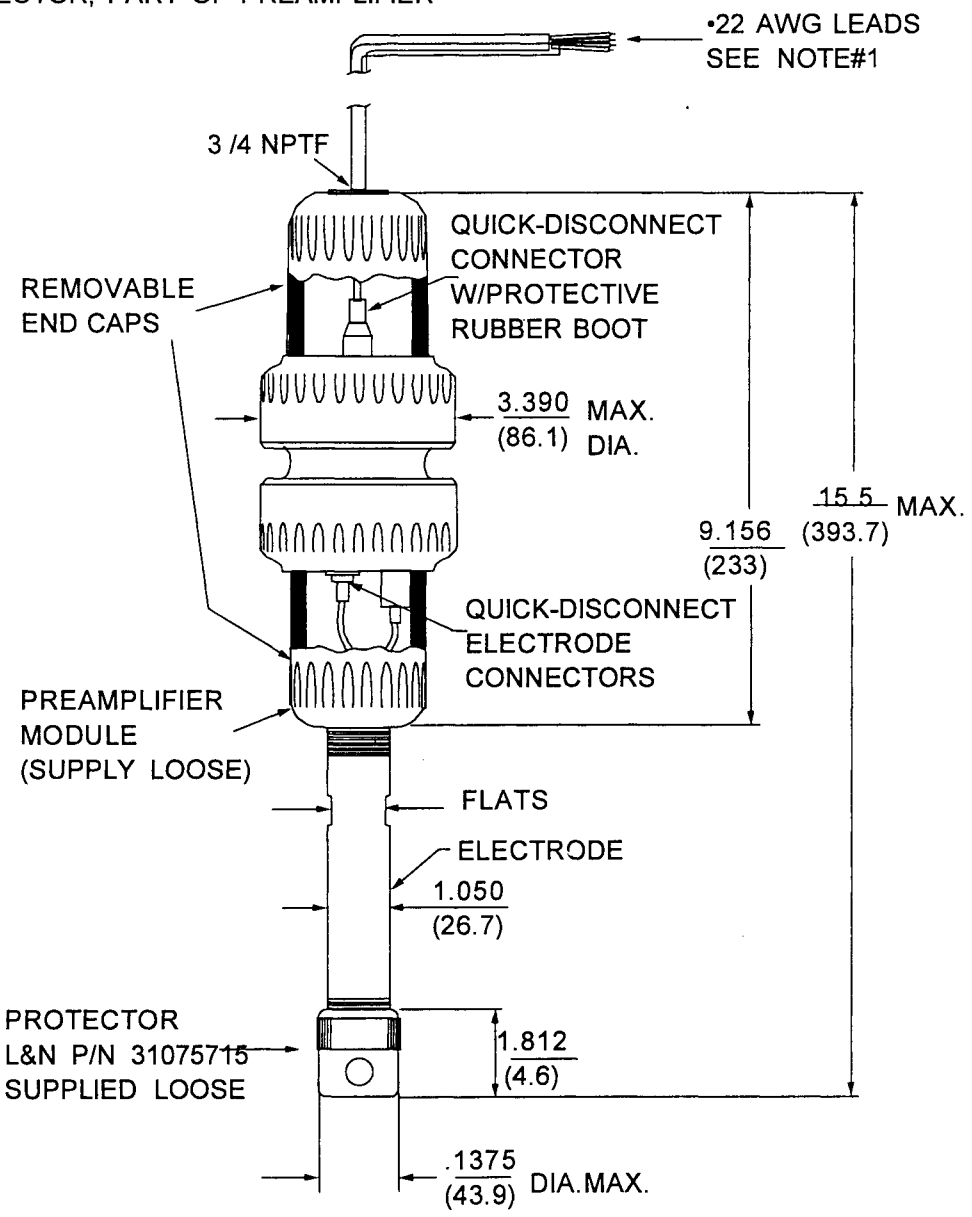
1. FOR MOUNTING OF PREAMPLIFIER MODULE (HONEYWELL P/N 31075704 & 31075705) REFER TO DWG. C-DIM-040615-8-1.

2. FOR PREAMPLIFIER & MEASURING INSTRUMENT CONNECTIONS REFER TO THE FOLLOWING INSTALLATION DIAGRAMS:
   DWG. B-ID-040615-8-1 FOR CAT 7777-2MM
   DWG. B-ID-040615-8-2 FOR CAT 7777-2MM

a/n 23404

Figure A-1 B-ID-040615-1-2

31075723 CABLE ASSY 20FT. (6M) LONG
APPROX. 0250 (6.4) DIA. WITH 6
PIN CONNECTOR, PART OF PREAMPLIFIER
MODULE.

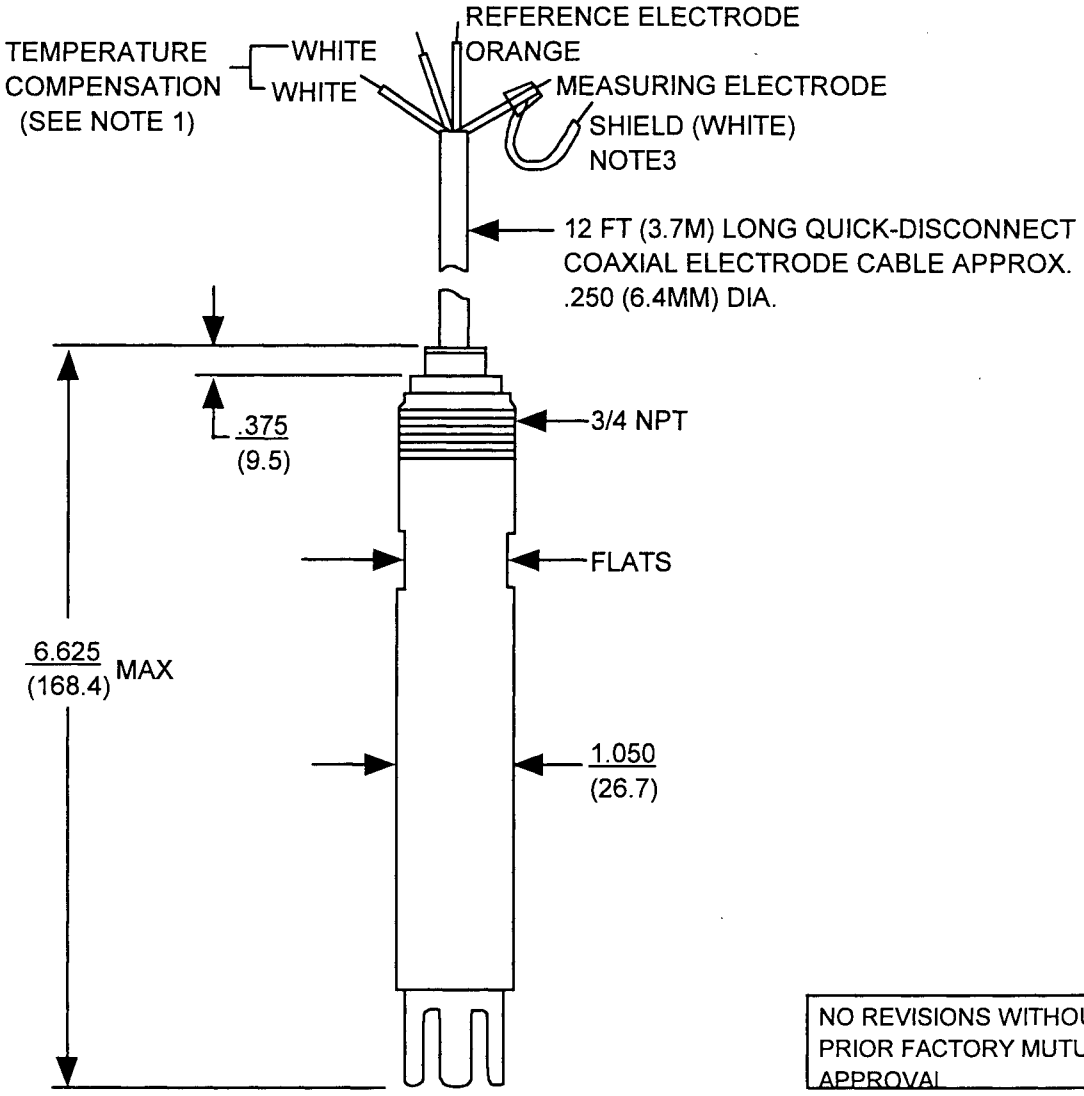


NOTE:
1.FOR MEASURING INSTRUMENT CONNECTIONS
REFER TO THE FOLLOWING INSTALLATION DIAGRAMS.
DWG. B-1D-040615-8-1 FOR CAT.7777-2- [] []
DWG. B-1D-040615-8-2 FOR CAT.7777-3- [] []

UNLESS OTHERWISE STATED: ALL DIMENSIONS IN INCHES AND MILLIMETERS INCH/(MILLIMETER)
UNLESS OTHERWISE STATED: TOL.IS15 +.060(-1.52)

a/n 23405

Figure A-2 B-ID-040615-1-3



NOTES

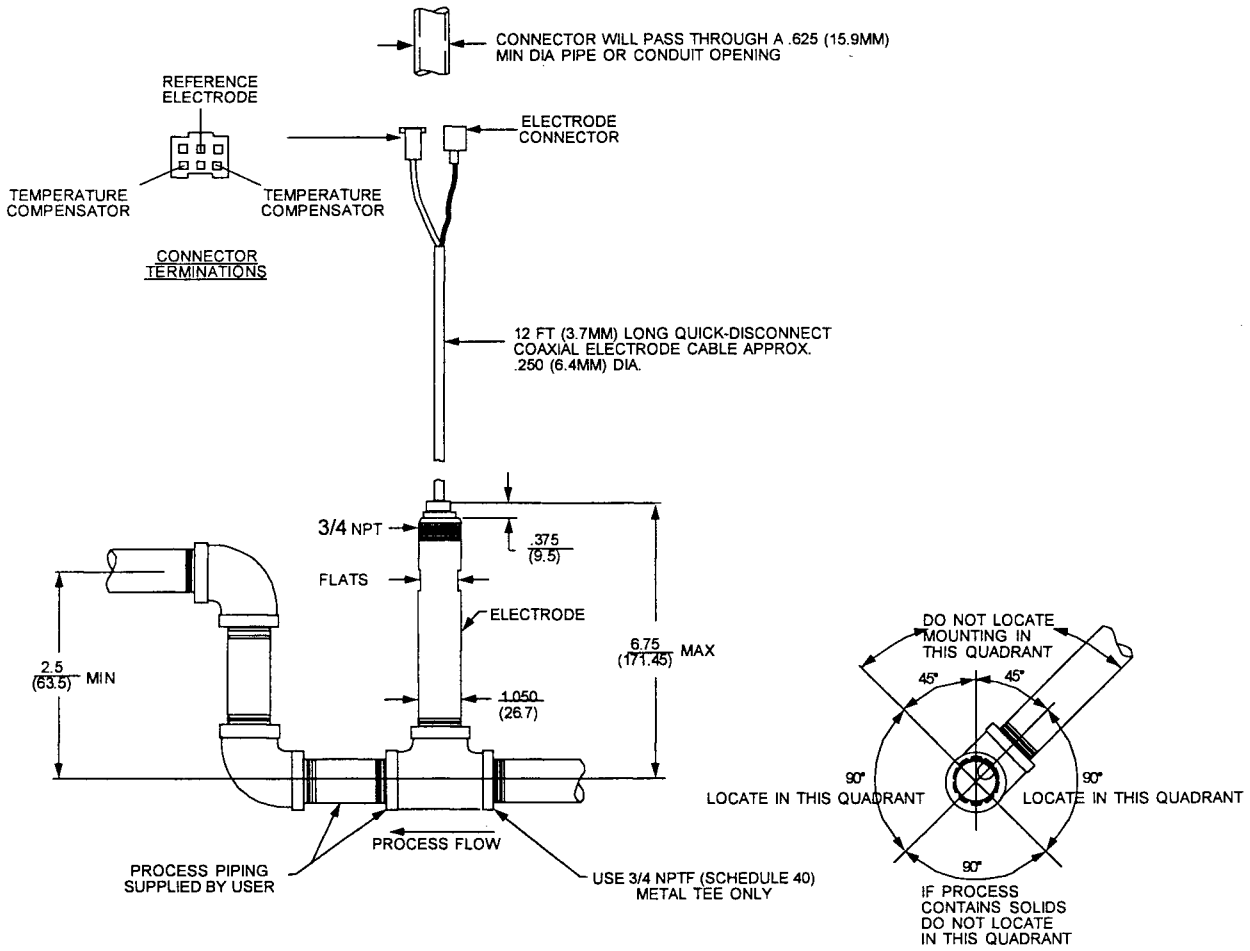
1. TEMPERATURE COMPENSATION LEADS ARE NOT USED ON CAT 7777-0[07/08] OR 1-08 REDOX ELECTRODES.
2. WHEN CAT 7777 -1 - 0[7/8] OR 08 IS SPECIFIED REFER TO A-DIM-1577-181-2 FOR MOUNTING OF JUNCTION BOX (HONEYWELL P/N 31316260).
3. A SEPARATE REFERENCE LEAD IS SOMETIMES OMITTED. IN THAT CASE THE COAXIAL SHIELD CARRIES THE REFERENCE AND NO " SHEILD" CONNECTION IS MADE AT THE MEASURING INSTRUMENT.

UNLESS OTHERWISE STATED: ALL DIMENTIONS IN INCHES AND MILLIMETERS INCH/(MILLIMETER)

UNLESS OTHERWISE STATED: TOL. IS ±.060 (±1.52)

a/n 23406

Figure A-3 B-ID-040615-1-1



NOTES:

1. FOR PREAMPLIFIER OUTLINE & MOUNTING DIMENSIONS REFERTODWG. C-DIM-040618-B-1
2. FOR PREAMPLIFIER & MEASURING INSTRUMENT CONNECTIONS REFER TO THE FOLLOWING INSTALLATION DIAGRAMS:
   DWG. B-ID-040615-8-1 FOR CAT 7777-2- [ ]
   DWG. B-ID-040615-8-2 FOR CAT 7777-3- [ ]

UNLESS OTHERWISE STATED:
ALL DIMENTIONS IN INCHES AND MILLIMETERS INCH/(MILLIMETER)

a/n 23407

Figure A-4 B-ID-040615-1-4