

7774 Series Stainless Steel Insertion/Removal Assembly for Use with Meredian Electrodes

70-82-25-44

Rev. 1

10/07

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About This Document

Abstract

This manual covers the Stainless Steel Insertion/Removal Assembly for Meredian Electrodes.

There are additional 7774 options with CPVC Plastic wetted materials covered by Manual 70-82-25-14.

Revision Notes

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

Rev. ID	Date	Notes
0	2/97	This document is the initial release of the Honeywell version of this manual. The manual was previously released as L&N p/n 177988 Rev. J1.
1	10/07	Text edits and add CRN approval.

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	Honeywell ID #
pH Meredian Electrodes	70-82-25-69
ORP Meredian Electrodes	70-82-25-49
Preamplifier Modules	70-82-25-36
080239 Preamplifier Kit	70-82-25-64
Adapter Modules	70-82-25-13 70-82-25-65

Contacts

The following list identifies important contacts within Honeywell.

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1. Introduction

1.1 Overview

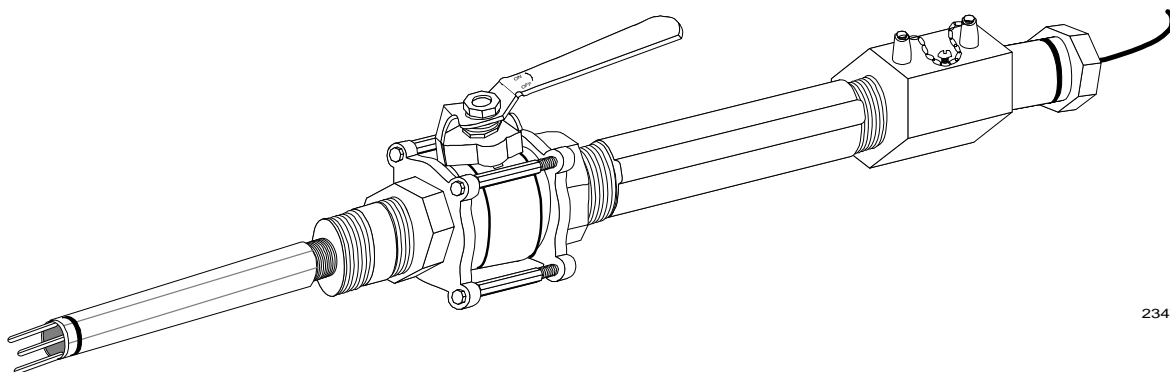
About Insertion/Removal Assemblies

The Stainless Steel Insertion/Removal Assemblies are designed for use with either the Meredian or Durafet Electrode in a pipeline or closed vessel.

You can remove the electrode for inspection and maintenance without shutting down the system and releasing the Pressure. Figure 1-1 shows a typical assembly consisting of the electrode, valve assembly, and support tube assembly.

ATTENTION

Pressure must not exceed the maximum specifications for the electrode supplied and must withstand reduction to 344.8 kPa (50 psig) during insertion and removal of the electrode.



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Figure 1-1—7774 Stainless Steel Insertion/Removal Assembly

Refer to the Specifications in this section for pressure and temperature data and information on wetted materials.

1.2 Description

Assembly items

Catalog number suffix designations and components are described in the back of this section. The assembly usually includes these items:

Item	Meridian Electrode	See
Valve Assembly 31741450	X	Figure 1-2
Support Tube Assembly 31063261	X	Figure 2-2
Preamplifier module per Catalog Table I	X	
Electrode per Catalog Table II	X	

The Valve Assembly 31741450, Figure 1-2, consists of a 1-1/4" valve, a 1-1/4" NPT mounting nipple, a special valve nipple, and a stuffing box, Figure 2-5, all made of 316 stainless steel. Support Tube assembly 31063261 which slides into the stuffing box, is fitted on one end with a cable clamp. The support tube assembly is also made of 316 stainless steel.

The user must install the electrode in the support tube assembly.

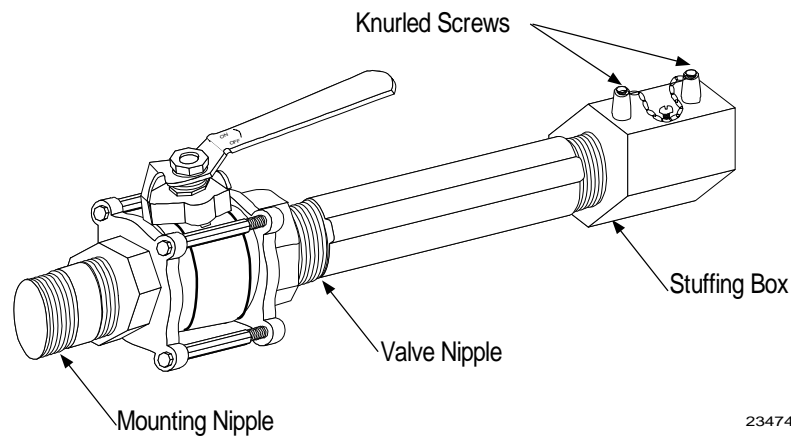


Figure 1-2 —Valve Assembly 31741450

Document references

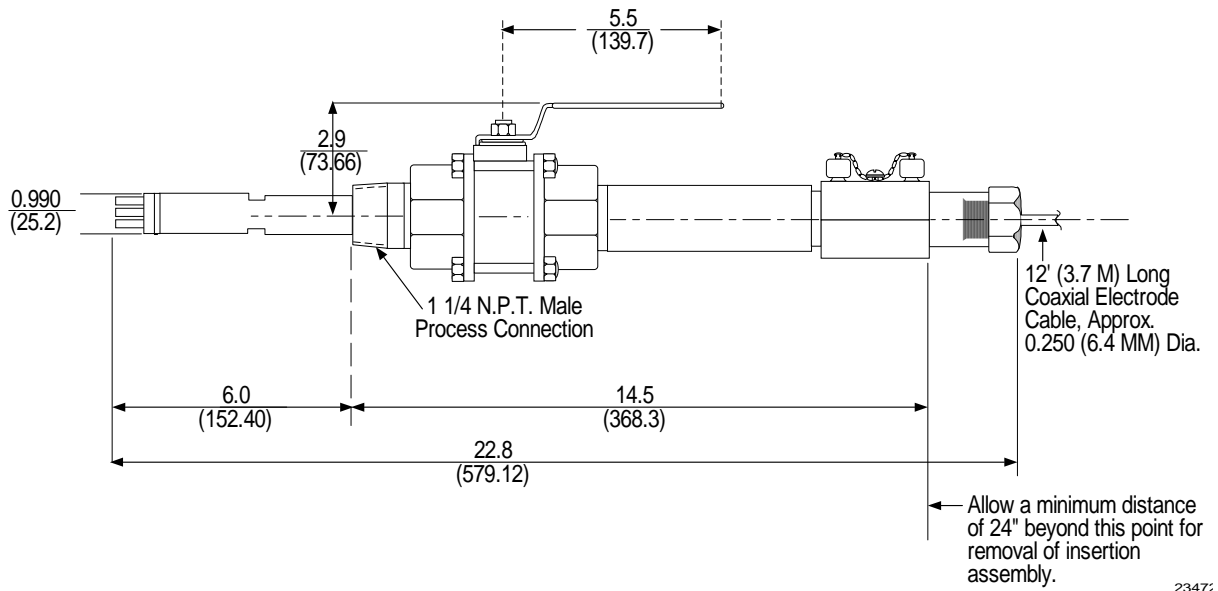
Meridian electrodes are described in Directions 70-82-25-69 for pH or 70-82-25-49 for ORP (oxidation reduction potential).

1.3 Specifications

Operation/Physical Data

The following table lists general operation and physical data for reference.

Parameter	Description
Pressure and Temperature Limits	689.5 kPa at 60°C (100 psig at 140°F) 344.8 kPa at 100°C (50 psig at 212°F) 206.8 kPa at 130°C (30 psig at 266°F) For CRN Approval, maximum operating pressure and temperature limits: 310.3 kPa at 60°C (45 psig at 140°F)
Maximum Pressure for Insertion or Removal	344.8 kPa (50 psig) Temperature limits may depend on electrode selection.
Preamplifier Module 079288 Temperature Limits	–40 to 70°C (–40 to 158°F)
Mounting	1-1/4 " NPT male process connection. See Figure 1-3.
Mounting Position	Electrode mounting can be used in any position, except B = 01 or 07, in which case electrode must be between vertical and 15° from horizontal with tip of electrode down.
Insertion Depth	6" (152mm) into process.
Overall Length	16.8" (427mm) measured from process connection. See Figure 1-3.
Allowance Required for Electrode Removal	Approximately 38.5" (978mm) measured from the process connection. See Figure 1-3.
Electrical Classification	Suitable for use in Class I, Division 2, Groups B, C, D, locations. FM approved intrinsically safe for Class I, Division 1, Groups A, B, C, or D. When used with APT2000 Series Transmitters and suitable barriers. FM approval does not include Table I = 30, 46, 80, 95, or 96.
Wetted Materials	Meredian Electrode: Ryton body, glass electrode, Viton A,, ceramic junction. Durafet Electrode: Ryton body, Hastelloy C, EPM, ceramic junction, epoxy, silicon. Mounting: 316 Stainless Steel, Teflon seals.
Electrode Size	Mounting is designed for 15.32" (12mm) diameter electrode, 6" (152mm) long.
Housing Size	Electrode housing is 6" (152mm) long. Its outside diameter is 1" (25.4mm).
Weight	Approximately 11lb (5kg) including electrode for Insertion/removal Assembly. Approximately 4lb (1.8kg) Preamplifier Module, Table I = 30, 60, 80, 95, or 96. Approximately 1.5lb (0.7kg) Preamplifier Module, Table I = 90. Approximately 1lb (0.5 kg) Preamplifier Module, Table I = 97.
Approvals	Manufactured to comply with ASME boiler and pressure vessel code Section III, Div. 1, UG-101 CRN# 0F11607.5C



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Figure 1-3 —Outline & Dimensions Drawing—Catalog 7774 Stainless Steel Insertion/Removal Assembly

2. Installation and maintenance

2.1 Mounting the valve assembly

Procedure

Secure the valve assembly to the process solution container by means of either a threaded hole (1-1/4" NPT) or by welding the valve nipple in place.

ATTENTION

Use of electrodes corresponding to Model Selection Guide Table II = 01, -05, -06, -07 must be mounted between vertical and 15 degrees from the horizontal, see Figure 2-1. This ensures that the liquid in the electrode will remain at the tip.

For heavy paper stock or other high solids media, install the valve assembly at about a 45° angle pointing downstream to prevent solids buildup. If possible, install the valve assembly in a low pressure point of the pulp line after any pipe restrictions.

Use a good thread compound for all threaded joints. Allow mounting clearance given in Specifications.

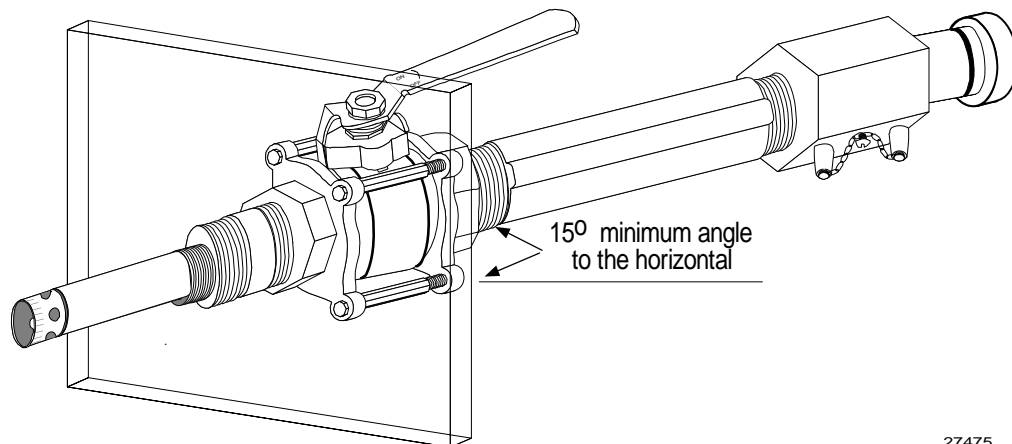


Figure 2-1—Final Position of Inserted Tube in Pressurized Vessel

2.2 Preparing the support tube assembly

Removing O-ring retainer

Refer to Figure 2-2. The O-ring retainer is used as a safety stop when removing and inserting an electrode for maintenance or replacement. The O-ring and retainer must be removed from the support tube assembly to insert the assembly into the stuffing box as outlined in the following procedure.

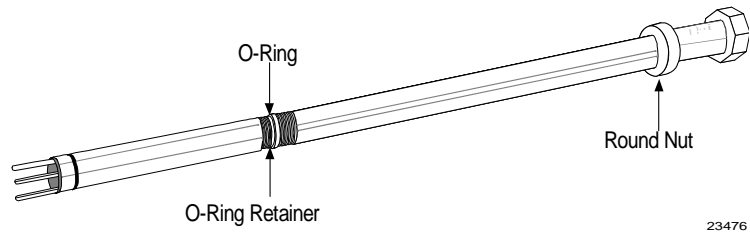


Figure 2-2— Support Tube Assembly 31063261

Refer to Figure 2-3 and remove the O-ring and retainer from the support tube assembly as shown. Lay them aside.

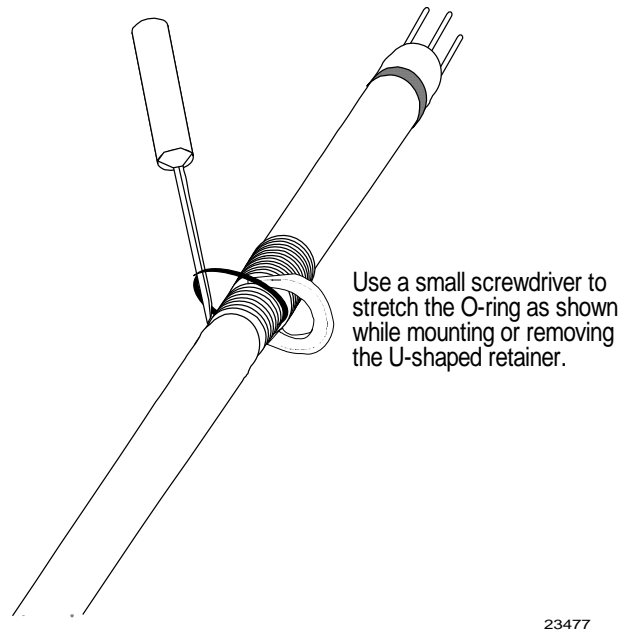


Figure 2-3— Mounting/Removing O-ring and Retainer

Inserting support tube assembly

Use the procedure in Table 2-1 to insert the support tube assembly into the stuffing box.

Table 2-1 Inserting Support Tube Assembly into Stuffing Box

Step	Action
1	Refer to Figure 1-2. From the stuffing box, remove the knurled screw that is closest to the valve and unscrew the stuffing box from the valve assembly. Remove the plastic washer, metal gland ring and compression seal from the stuffing box and lay them aside.
2	Remove the other knurled screw from the stuffing box.
3	Hold the stuffing box in your left hand so that you can read the embossed instructions found on one face of the box.
4	Hold the support tube assembly in your right hand with the electrode housing pointing to the left.
5	Slide the support tube assembly into the stuffing box as far as it will go (until the round nut on the right side of the tube is seated into the stuffing box).
6	Replace the knurled screw on the right end of the stuffing box.
7	Replace the compression seal on the support tube with the beveled edge facing the stuffing box. Then slip the gland ring and plastic washer (in that order) over the left end of the support tube assembly and push them and the compression seal into the left side of the stuffing box.
8	Refer to Figure 2-3 and replace the O-ring and retainer.

2.3 Installing the electrode

Preparing electrode

Refer to the directions supplied with the electrode and follow the instructions for preparing the electrode.

Installing electrode

Use the procedure in Table 2-2 to install the electrode.

Table 2-2 Installing the Electrode

Step	Action
1	Apply a thin film of silicone grease (supplied) about one inch wide near the membrane end of the electrode body. Start the film about 3/4" from end of body. <i>Caution:</i> Keep silicone grease away from the glass membrane and the reference junction of the electrode.
2	Slide one of the dual O-rings supplied over the membrane end of the electrode body and position it about 1/2" from the membrane end.
3	Refer to Figure 2-4 and remove the compression nut from the electrode housing. Remove the cap nut, washer, and cable grip grommet from the other end of the insertion tube assembly.
4	Hold the support tube assembly in one hand with the electrode housing facing up. Feed the electrode cable into the electrode housing. The cable should drop out of the other end of the support tube assembly. Continue feeding the electrode until the dual O-ring on the electrode body is seated in the electrode housing.
5	Replace the compression nut and O-ring on the electrode housing. Tighten the compression nut hand-tight only. DO NOT OVER-TIGHTEN. The nut is properly tightened when it presses the O-ring against the electrode housing. This action positions the double O-ring on the electrode body and completes the seal between the electrode and the housing.
6	Note that the cable grip grommet is slit along its axis. Spread the grommet and slip it around the cable with the small end facing the support tube assembly. Push the grommet into the tube assembly, allowing a small amount of slack to remain inside the tube assembly.
7	Replace the cap nut and washer. Hand-tighten the cap nut.
8	The support tube assembly is ready for insertion into the process solution through the valve assembly.

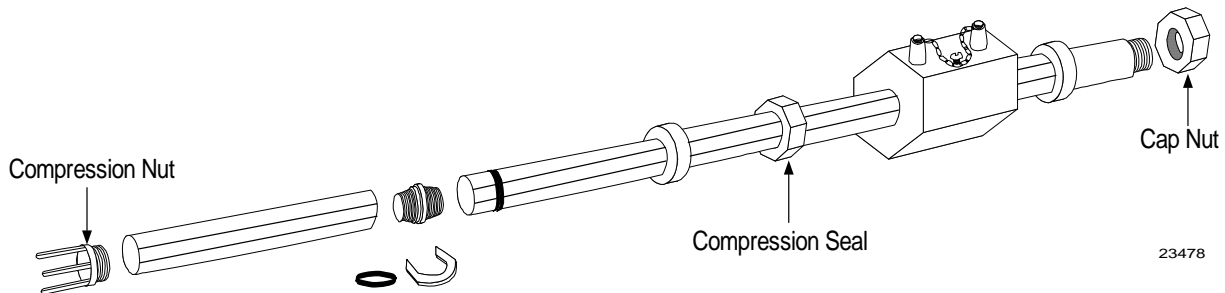


Figure 2-4—Support Tube Assembly with Stuffing Box, Exploded view

2.4 Making preamplifier input connections

Wiring reference

Wiring connections to the preamplifier modules are described in Directions Book p/n 70-82-25-36.

CAUTION

Observe all the precautions in the Preamplifier Module directions, and note that it is important to avoid touching the special plastic terminal block with bare fingers as the oils and salts from bare skin can form a leakage path which could affect the necessary high insulation resistance from the terminal to ground. This precaution also applies to the inner insulation of the electrode cable.

Making cable connections

Connect the orange lead of the pH electrode cable to terminal R and connect the inner conductor in this coaxial cable to terminal E on the special terminal block under the metal cover. Replace the metal cover, being careful that no conductors contact the cover. If there is a separate black-and-white shield lead, connect it to terminal SC.

ATTENTION

For most ORP measurements, reverse these connections.

If automatic temperature compensation is used, connect the compensator leads to terminal TM and TA (TH and TG when Table I = 80). For fixed compensation, connect a suitable precision resistor across these terminals according to the process temperature; the value of this resistor is given in the Directions for the measuring instrument used.

Leave 6 inches of slack electrode cable in the Preamplifier Module housing.

2.5 Making preamplifier output connections

Cable details and connection reference

These connections require the use of six-conductor cable. Using cable part number 834023, connect the preamplifier terminals according to the Operator's Manual supplied with the measuring instrument.

2.6 Making other connections (no preamplifier)

General wiring details

If Table I of the catalog number is 40, refer to the measuring instrument instructions for specific connections. Junction box and cables are listed in the Accessories and Supplies section.

CAUTION

Do not ground the shield of electrode coaxial cable.

For pH, connect the inner conductor to the measuring electrode input and the orange lead to the reference electrode input. If there is a separate black-and-white shield lead, connect it to the SHIELD or REFERENCE terminal. Connect temperature compensator leads to the appropriate terminals.

For most ORP measurements, the electrode center conductor is connected to the (+) or REFERENCE input and the orange lead to (-) or MEASURING input.

Refer to the following manuals to learn how to connect the electrode to these instruments:

- UDA 2182 (manual 70-82-25-119)
- APT 2000 (manual 70-82-25-92)
- APT 4000 (manual 70-82-25-103)

CAUTION

Guard against flexing the cable; run it in an open tray or equivalent. Continuous motion of the cable can build a charge between the inner and outer conductors in this insulation cable, causing erratic readings.

2.7 Inserting the tube assembly

Standard Applications

Use the procedure in Table 2-3 to insert the tube assembly into a valve assembly used in a standard application.

Table 2-3 Inserting Assembly in Valve Assembly used in Standard Application

Step	Action
1	Remove both knurled screws from the stuffing box and slide the support tube assembly into the valve nipple. Ensure that the glass electrode tip does not touch the ball of the valve during insertion.
2	Screw the stuffing box onto the nipple and replace and tighten the forward knurled screw. Hand-tighten the stuffing box so that the tube slides stiffly when pushed.
3	Reduce the process pressure to 344.8 kPa (50 psig) or less. Open the valve.
4	Push the support tube assembly all the way in. Replace and tighten the back knurled screw on the stuffing box. Note that the shoulder of the tube must be seated in the stuffing box before the knurled screw is tightened.
5	Hand-tighten the stuffing box, and return the process to normal operating pressure.

2.8 Removing the tube assembly

Procedure

Use the procedure in Table 2-5 to remove the tube assembly from the valve assembly.

WARNING

Do not stand behind the valve assembly when performing Step 2 in this procedure.

Table 2-5 Removing Tube Assembly from Valve Assembly

Step	Action
1	Reduce process pressure to 344.8 kPa (50 psig) or less.
2	Grasp the exposed end of the tube assembly in one hand and remove the back knurled screw from the stuffing box. Loosen the stuffing box slightly.
3	Allow the tube assembly to be forced out slowly to its stop. Close the ball valve.
4	Remove the other knurled screw. Unscrew the stuffing box and withdraw the tube assembly.

2.9 Maintaining the assembly

Routine maintenance

Routine maintenance consists of periodic inspection and cleaning. In addition, other electrode maintenance includes checks, rejuvenation of the glass membrane, and treatment for a clogged junction or severely dry electrode.

General reference and guidelines

- The removal procedure is described in Table 2-5.
- Ensure that the electrode is immersed at least 6 inches.
- Guard against the electrode becoming dry and remaining dry for more than a short period of time.
- Refer to Meredian Electrode Directions 70-82-25-69 or 70-82-25-49.

2.10 Calibrating pH measurement system

Periodic calibration

Except for periodic electrode inspection and, in some cases, cleaning the electrode, the only routine operating procedure in pH measurements is calibration. The calibration of any pH measuring instrument and its electrode system is required because all electrodes (for various reasons) 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 calibration according to conditions and experience. Procedures for calibration are given in the measuring instrument directions.

2.11 Cleaning the electrode

Reference document

Refer to Meredian Electrode Directions for electrode cleaning instructions. Thoroughly rinse the electrode with water after any type of cleaning.

General cleaning procedure

Use the procedure in Table 2-6 to routinely inspect and clean the electrode.

Table 2-6 Electrode Inspection and Cleaning

Step	Action
1	It may not be necessary to pull the electrode out of its housing for routine inspection and cleaning but it is desirable to remove the compression nut periodically and rinse off solids. Then grasp the plastic body of the electrode and gently withdraw it partially from the housing.
2	Remove and examine the dual O-ring to make certain no salts or granular materials are present. If necessary, clean the O-ring and O-ring seat, and coat the surfaces with silicone grease. Keep the silicone grease away from the glass membrane and reference junction.
3	To return the electrode to the housing, slip the O-ring onto the electrode, gently push the electrode and pull the cable to return the electrode to seat it in the housing.
4	Replace the compression nut and tighten it firmly by hand.

2.12 Cleaning the terminal block

About the Terminal Block

The special terminal block in a junction box or Preamplifier Module may need attention if contaminated. The block is made from an extremely high-resistance material. Oils and salts (for example, from perspiration) form leakage paths which can cause erroneous pH readings. Always keep these parts clean and dry, and avoid touching.

Cleaning procedure

If any part of the special terminal block becomes contaminated, spray it with a high quality electronic cleaner/degreaser, or wipe it clean with a lint-free cloth or lens tissue moistened with isopropyl or grain alcohol. If this is not effective, remove the special terminal block using clean forceps or rubber finger cots, and wash it with water and detergent. Use distilled water if tap water has a high mineral content. Allow connectors to dry completely before making connections.

2.13 Stopping leakage from the tube assembly

Background

DO NOT use excessive force when tightening the stuffing box as this may distort the end of the valve nipple on which the stuffing box is mounted. Leakage which cannot be stopped by normal tightening of the stuffing box may be due to slight distortion of the mating surfaces of the nipple and gland ring. Clean these surfaces to improve the sliding fit and eliminate distortion and resulting leaks.

Cleaning mating surfaces

Use the procedure in Table 2-7 to clean the mating surfaces between the gland ring and the nipple.

Table 2-7 Cleaning the Mating surfaces

Step	Action
1	Remove the stuffing box and take out the gland ring.
2	First clean the surfaces with a flat fine sandstone, changing the direction of stroke about 15 degrees per stroke to keep the surfaces parallel.
3	Replace the Viton washer (Figure 2-5, Detail 13).

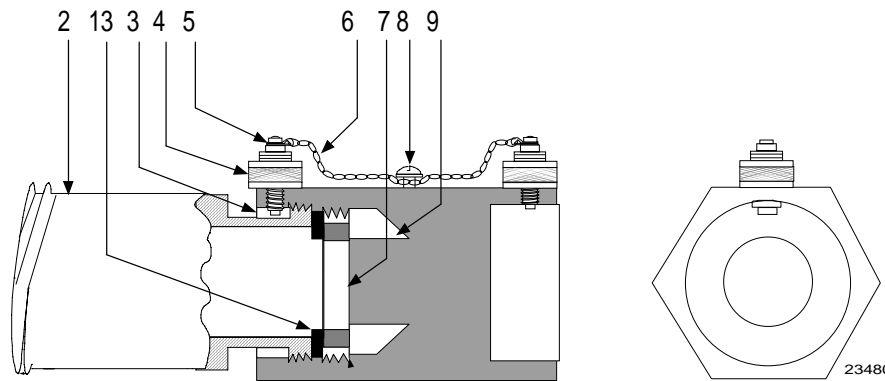


Figure 2-5—Details of the Stuffing Box

Detail reference for Figure 2-5

Detail Number	Part Number	Description
2	31076635	Valve nipple
3	31500697	Stuffing box
4	31004205	Screw
5	31001216	Washer
6	31500464	Chain
7	31001215	Gland ring
8	31004464	Screw, 3/16, 6-32 Fil HB
9	31071494	Compression seal
13	31301277	Viton washer

2.14 Replacement parts

Meridian electrodes

Part Number	Description
31741450 31020953 31020868	Valve Assembly (Figure 1-3) Mounting Nipple Valve only
31063261 31367430 31003618 31082150 31027158 31082053 31003239 31001823 31008721	Support Tube Assembly Electrode Housing, 316 SS Compression Nut, 316 SS O-ring for Compression Nut & Protective Tips Retainer O-ring for Retainer Cap Nut Washer Cable Grip Grommet, 1/8-in. diam. cable
31082124	Dual O-ring, Viton A, Brown
31082152	Dual O-ring, Ethylene-propylene rubber, Black
31316529 31101316	Preamp Module for 7774-30 Preamp for above
31026395 31022586	Preamp Module for 7774-60 Preamp for above
31028698 31022283	Preamp Module for 7774-80 Preamp for above
31117489	Meridian pH Electrode, 10 to 80°C, 12-ft. tinned lead
31050383	Meridian pH Electrode, 40 to 110°C, 12-ft. tinned lead
31050381	Meridian pH Electrode, 10 to 80°C, with built-in temperature compensator for our microprocessor based instruments, 12-ft. tinned lead
31020749	Meridian ORP Gold Electrode, (-)5 to 100°C, 12-ft. tinned lead
31020751	Meridian ORP Platinum Electrode, (-) 5 to 130°C, 12-ft. tinned lead

Accessories and supplies for Meredian Electrodes

Part Number	Description
31833070	2-conductor cable (specify length) for automatic temperature compensator between Junction Box and direct reading instrument
31835002	High Impedance Coaxial Cable (specify length) between Junction Box and direct measuring instrument
31090011	Silicone Grease, 0.3-oz. tube
Standard Buffered Reference Solutions, 1 pint:	
31103001	4.00 pH at 25°C
31103002	6.86 pH at 25°C
31103003	9.18 pH at 25°C

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