Honeywell

4909 316SS Conductivity Cell Insertion/Removal Assembly Operations Manual

70-82-25-68

Rev. 1
7/99

TotalPlant

Copyright, Notices, and Trademarks

Revision 1 – 7/99

While this information is presented in good faith and believed to be accurate, Honeywell disclaims the implied warranties of merchantability and fitness for a particular purpose and makes no express warranties except as may be stated in its written agreement with and for its customer.

In no event is Honeywell liable to anyone for any indirect, special or consequential damages. The information and specifications in this document are subject to change without notice.

Honeywell
Industrial Automation and Control
Automation College
2820 West Kelton Lane
Phoenix, AZ 85023

(602) 313-5669

About This Document

Abstract

This document is intended to support the installation, operation and maintenance of the 4909 Conductivity Cell Assembly.

Revision Notes

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

Rev. ID	Date	Notes
0	2/87	This document is the initial Honeywell release of the L&N manual p/n 177770. There has been no significant changes made to this manual. The format has been changed to reflect the Honeywell layout and some part numbers have been changed to reflect Honeywell database structure.
1	6/99	Edits were made to make descriptions consistent and a new MSG was added.

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 #
9782 Series Conductivity/Resistivity Analyzer/Controller Operator's Manual	70-82-25-74
7079-17 Two-Wire Transmitter for Conductivity/Resistivity Operation and Maintenance Manual	70-82-25-51

Contacts

The following list identifies important contacts within Honeywell.

Organization	Telephone	Address
Honeywell TAC	1-800-423-9883 Voice	1100 Virginia Drive Fort Washington, PA 19038

Contents

Tables

Figures

1. Introduction

1.1 Description

The stainless steel 4909 conductivity cell assembly is designed for use in a pipe line or closed vessel where it is desirable to remove the cell for inspection and maintenance without shutting down the system and releasing the pressure. The assembly comprises a 4908 Insertion Cell and a 31741450 Cell Removal Device which are shown assembled in Figure 1-1. It is to be used in applications for which maximum pressure does not exceed 200 psi and can be reduced to 50 psi during insertion and removal of the cell. Maximum operation temperature is determined by the temperature compensator range. Do not use in solutions above 284°F (140°C).

The depth of insertion is 6-1/2 to 9 inches from the mounting nipple on the removal device.

The entire insertion-cell assembly is made of polyethersulfone (PES), which is resistant to most corrosive inorganic chemicals over a wide range of temperatures (A common exception is chlorinated hydrocarbons and ketones). Sample solutions come into contact with the PES and the platinum or nickel electrode surface of the cell (Any constant cell can be supplied with either electrode material). The only other materials of the 4909 Assembly with which the sample solution may come into contact with are the stainless steel removal device, a stainless steel retainer ring and a Viton-A O-ring. The automatic temperature compensator may be built into the insertion cell as selected in Table III of the Model Selection Guide (MSG). See Section 1.3.

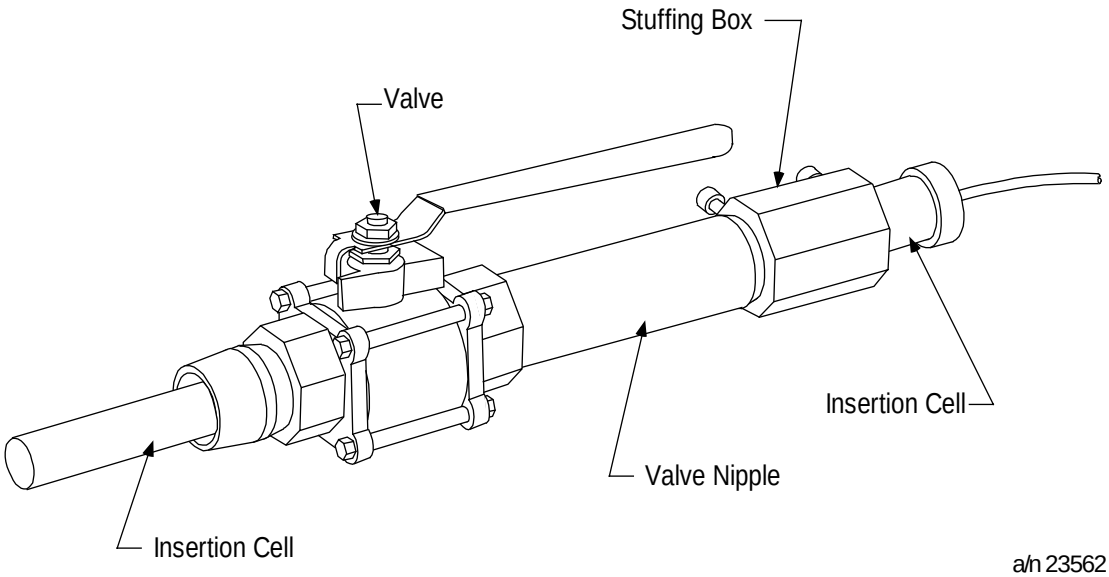


Figure 1-1. 4909 Conductivity Cell Assembly Installed in 31741450 Removal Device

CAUTION

Specific parameters of your process may prohibit the use of nickel elements. For example, always use a platinum-element cell (Table II = 44) if the cell will measure or be exposed to regeneration acids.

1.1.1 4908 Insertion Cell

General

The molded conductivity cell and its one-inch diameter mounting tube (with retaining ring) comprise a one piece cell unit and are made of polyethersulfone. The retaining ring and an O-ring which secures it in a concentric groove in the cell mounting tube are supplied in place. This stainless steel ring serves as a stop during the removal operation. The retainer O-ring is Viton-A. The insertion cell is normally supplied with six feet of Tefzel-sheathed cable, but various lengths of cable can be furnished as specified in Section 1.3, Table IV of the MSG.

Conductivity Cell

The cells having constants of 5, 10, 20, 25 or 50 cm^{-1} are intended for making measurements in highly conductive solutions. They differ in construction from those having constants of 0.01, 0.1, or 1 cm^{-1}. On the 5 to 50 constant cells, the electrodes are short tubes located midway inside the two parallel tubular channels that run lengthwise through the cell, and are open to the sample at both ends of the cell. The channels are larger on the 25 constant cell and they are elliptical on the 5 and 10 constant cell. The 0.01, 0.1 and 1.0 constant cells have a removable cell guard which is screwed onto the cell body to protect the electrode surfaces. Electrodes are three discs on the 1.0 constant cell, parallel plates on the 0.1 constant cell, and a pair of concentric wires wound on the cell body on the 0.01 constant cell. Cells must be used with the guard in place or the cell constant may differ from that specified.

Table 1-1 lists the specific conductance possible with each of the cell constants. This table is provided for general information only, and is not needed for measurements.

1.1.2 31741450 Removal Device

This device consists of a ball valve which is connected to the closed system by a 1-1/4 inch standard pipe thread mounting nipple and to a stuffing box by a 6-5/8 inch long special nipple into which the cell mounting tube is inserted. The stuffing box provides a seal around the cell mounting tube. The material used is 316 stainless steel.

1.2 Specifications

Cell Constants: 0.01, 0.1, 1.0, 5, 10, 20, 25 and 50 cm^{-1}

Electrode Material: Nickel or platinum, as specified

Maximum Pressure Limit: 200 psi @ 100°C

Maximum Temperature Limit: 140°C (refer to automatic temperature compensator, when specified, for upper limit).

Mounting: 1-1/4” NPT male pipe threads.

Insertion Depth: Varies between 6-1/2” and 9” nominal, depending upon cell constant.

Wetted Parts: Immersed parts are: Polyethersulfone (PES), Viton A, 316 SS, and Nickel or Platinum electrodes. Mounting materials are 316 Stainless Steel.

Electrical Connections: Two leads without integral automatic temperature compensator. Three leads with integral automatic temperature compensator. Four leads with integral automatic temperature compensator Table III=333, Section 1.3.

Leadwire: Tefzel covered, 18-gage cable, 7’ or 20’ long, as specified. If more than 20’ required, use Universal Head Cast Aluminum (1/2” NPT) Junction Box or 31316274 Junction Box and appropriate length of cable. See Table 3-3 for options. Junction boxes and Universal Heads are cast aluminum with 1/2” NPT, female conduit connection and terminals to accommodate cell and automatic temperature compensator connections.

Weight: 20 lb. (9.1 kg).

Table 1-1. Specific Conductance of Sample Solutions for Corresponding Measured Resistance Values

Cell Constant	100 Ohms	10000 Ohms	50000 Ohms
0.01	100 µmho/cm	1 µmho/cm	0.2 µmho/cm
0.1	1000 µmho/cm	10 µmho/cm	2 µmho/cm
1.0	10000 µmho/cm	100 µmho/cm	20 µmho/cm
5	50000 µmho/cm	500 µmho/cm	100 µmho/cm
10	100000 µmho/cm	1000 µmho/cm	200 µmho/cm
10	250000 µmho/cm	2500 µmho/cm	500 µmho/cm
25 50	500000 µmho/cm	5000 µmho/cm	1000 µmho/cm

Note: Table 1-1 has been provided for reference only.

1.3 Model Selection Guide

KEY NUMBER			Selection	Availability	
Description					
04909 Complete Conductivity Cell Assembly	**(Note 2)**	**(Note 3)**	04909	↓	
04908 Replacement Cell Only	**(Note 1)**	**(Note 3)**	04908		↓

TABLE I

Cell Constant	0.01	001	•	•
	0.1	X01	•	•
	1	XX1	•	•
	5	XX5	**g**	**g**
	10	X10	•	•
	20	X20	**g**	**g**
	25	X25	•	•
	50	X50	•	•

TABLE II

Electrode Material	Nickel	33	•	•
	Platinum	44	•	•

TABLE III

Automatic Temperature Compensator (ATC)			
No Temperature Compensator	000	•	•
Available for 9782 and 7082 Only	333	**f**	**f**
Available for 7079C Transmitter or already withdrawn analytical instrumentation. (Refer to Tables 1 and 6 under Steps to Selecting Appropriate Conductivity Instrumentation & Cells for available Temp. Compensator/Conductivity range.)	009	•	•
	013	•	•
	014	•	•
	071	•	•
	072	•	•
	073	•	•
	074	•	•
	088	•	•
	090	•	•
	091	•	•
	093	•	•
	113	•	•
	114	•	•
	160	•	•
	164	•	•
	168	•	•

TABLE IV		Selection	049 09	049 08
Leadwire Length	'7 ft. Leadwire	X7	•	•
	20 ft. Leadwire	20	•	•
	Junction Head (Aluminum)	X1	•	•

TABLE V

Valve/Cell Material	Material			
4909 Stainless Steel (SS) Valve Assembly	Includes SS Valve assembly and Standard insertion cell	02	**c**	
4908 PES Replacement Cell for 4909 SS Valve Assembly	Standard insertion cell only	02		**c**
4909 CPVC Valve Assembly	Includes CPVC assembly and standard CPVC Support tube (15 3/8") and cell	03	**d**	
4908 PES Replacement Cell for CPVC Valve Assembly	Cell only	03		**d**

TABLE VI

Special Mounting Options - select one option per unit				
None		000	•	•
SS support tube for 4909 SS Valve assemblies only. Use Table V Option = 02		930	**e**	
4908 replacement cells for 4909 SS Valve Assembly containing SS Support tube. Use Table V Option = 02		930		**e**
Special insertion lengths for new/ replacement cells for 4909 SS Valve Assemblies. Only available for Table V Option = 02	Uses special insertion cell to increase standard insertion cell depth by 4.4"	910	**h**	**h**
	Uses special insertion cell to increase standard insertion cell depth by 8.8" **(Note 4)**	920		
	Uses special insertion cell to increase standard insertion cell depth by 13.2" **(Note 4)**	925		
	Uses special insertion cell to decrease standard insertion cell depth by 4.4"	940	**h**	**h**
Extended Length CPVC Support tube. Only available for Table V Option = 03	Supplies special CPVC support tube (21 3/8") to increase cell insertion depth by 6.0" in a new CPVC Valve Assembly. Note: Allow additional 6.0" for cell removal	950	**j**	

TABLE VII - OPTIONS

			049	
Tagging	None	0_	•	•
	Linen	L_	•	•
	Stainless Steel	S_	•	•
Certificate of Calibration	No	_ 0	•	•
	Yes	_ 1	•	•

Notes:

1. Replacement cells only, caution look at Restrictions for insertion depth dimensions based on valve assembly type.
2. When converting from 4806 to 4909, order 4908 directly.
3. Replacement 4908 cells for existing 4908's and 4909's manufactured before 8/85 must specify Table V = 02.
4. This option is application sensitive. You must contact Analytical Instruments Marketing for approval.

RESTRICTIONS

Restriction Letter	Available Only With		Not Available With	
	Table	Selection	Table	Selection
c	V	Standard insertion cell for SS valve assemblies consists of a conductivity cell of variable length based on the cell constant and a 13.2" PES tube molded to the cell. The conductivity cell insertion depth is listed below: 001, X01, XX1 = 7.5" XX5 = 6.5" X10 = 7.7" X20 = 8.0" X25, X50 = 8.8"		
d	V	Standard conductivity cell insertion depth dimensions according to cell constants for CPVC assemblies is listed below: 001, X01, XX1 = 5.5" XX5 = 4.5" X10 = 5.7" X20 = 6.0" X25, X50 = 6.8"		
e	V	02	I	X25, X50
f	III	For 9782 and 7082 Analyzers only		
g			I	Not for 9782 and 7082 Analyzers
h	V	02		
j	V	03		

2. Installation

2.1 Requirements

To insure that a representative sample is being measured at all times, the solution must move through the cell channels or guard tube. If the measurement is made in a rapidly moving liquid, the existing circulation of the solution can be utilized by mounting the assembly as described in the next section so that the flow of the solution forces liquid through the cell. However, when measurements are to be made in quiescent solutions, means must be provided for forcing the solution through the conductivity cell or care taken to place the cell in a position to "see" the true value of the solution.

Do not use the cells in solutions which will attack the fittings used or the cell materials. The PES and platinum or nickel of the electrode, the stainless-steel retainer, and the Viton A retainer O-ring are the cell materials with which the solution will come into contact. The removal device is 316 stainless steel.

Do not use the cell in a solution having temperatures greater than 140°C. The maximum limit set by the temperature compensator range must be observed.

For cells having a constant of .01, .1, or 1, make certain that the guard is in place and is not loose on the cell body. The guard tube must be hand-tightened only. There is a 1/16 inch space between the guard tube and the cell body.

Although the cell has excellent shock resistance characteristics, never subject it to mechanical abuse.

2.2 Location and Position

The cross-channel in the high constant cells or the guard tube holes in the low constant cells must be covered by the solution during measurements.

Vertical insertion (from above) or horizontal insertion can be used. Make certain the tank or pipe line is full under all process conditions. If a pipe line is not always full, use a vertical mounting as in Figure 2-1 and insert the cell far enough into the vertical pipe that the cross-channel is below the horizontal exit pipe which may empty out. Make certain an air bubble in the pipe does not prevent the cell from filling properly. (If the cell becomes dry after use, it may require cleaning in accordance with Section 3.2 before again being placed in service.)

For best results, whether vertical or horizontal mounting is used, position the cell so that the sample will flow through the channels or guard tube towards the mounting end of the cell, exiting through the cross-channel or guard-tube holes. In applications where vertical mounting is required, avoid a position with the cell channels pointed up, as this will permit solution to flow down into the open end of the cell and may result in clogging by solids settling in the cell channels.

Allow for a total insertion depth of about ten inches from the outside wall of the mounting surface as indicated by the dimensions in Figure 2-4.

Allow at least one-half inch clearance beyond the end of the cell and 1/8 to 3/16 inch radius clearance surrounding the cell to permit circulation of the solution.

If not part of the cell assembly, place the temperature compensator close enough to the cell to eliminate a significant temperature difference in the liquid between the two points. If necessary, lag the pipe between the two points to prevent rapid cooling. Avoid locations where excessive temperature changes may occur.

Allow at least 30 inches clearance behind the stuffing box to permit removal.

Locate the insertion assembly on the pressure side of pumps; not the vacuum side.

Avoid locations where the operator must take an awkward position to perform the cell insertion or removal operation.

Figure 2-1 illustrates recommendations for locating and mounting both the cell assembly and the temperature compensator. Refer to Figures 2-2, 2-3, or 2-4 for mounting dimensions.

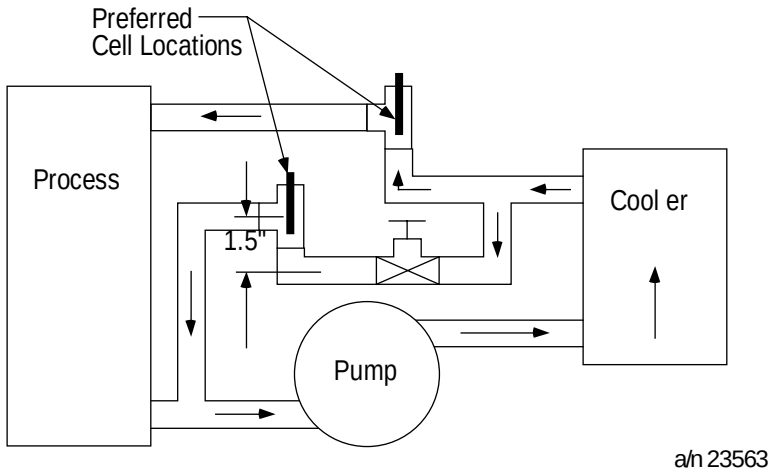


Figure 2-1. Recommended Locations for Mounting a Conductivity Cell

2.3 Preparing Insertion Tube Assembly

1. Take out the forward screw (valve end) of the stuffing box and unscrew the box from the valve nipple.
2. Slide the insertion tube into the smaller opening in the stuffing box, while holding in the washer, gland ring, and compression seal.
3. Roll the O-ring over the end of the insertion tube and into the concentric groove. Use a small screwdriver or pointed object to pry out a side of the O-ring and stretch it about one inch from the tube to reduce its cross section. Insert the U-shaped retaining ring in the slot. Figure 2-2 illustrates this operation. With the grooved side of the retainer against the O-ring, press the retainer in on one side while pulling on the O-ring from the opposite side as shown. Rotate the retainer back and forth until all of the stretched slack is taken back into the slot. Make certain the retainer is pushed all the way in.

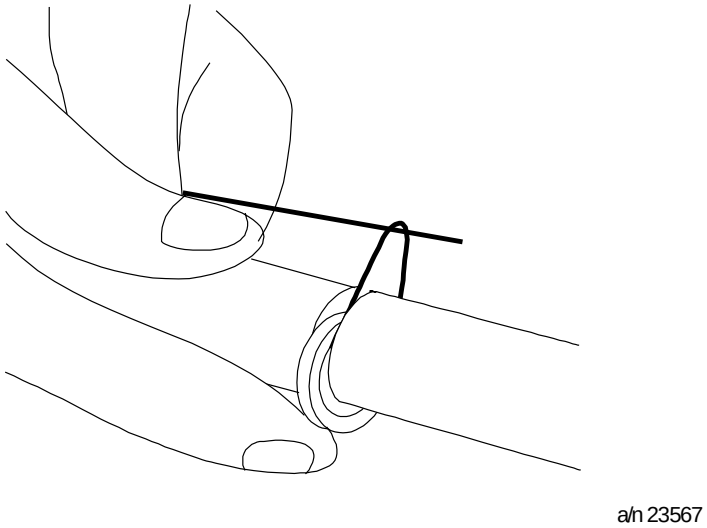


Figure 2-2. Mounting the Retainer on Mounting Tube

2.4 Installation Procedure

ATTENTION

Before making the initial installation, remove the stuffing box, slide the mounting tube through the unthreaded end of the box and slide the retaining ring in place on the tube in accordance with the procedure outlined below.

Insertion

1. Remove both knurled screws from the stuffing box and slide the insertion tube into the valve nipple.
2. Screw the stuffing box onto the nipple and tighten the forward knurled screw all the way down. Hand tighten the stuffing box so that the tube slides stiffly when pushed.
3. Reduce process pressure to 50 psig or less. Open the valve.
4. Push the insertion tube all the way in and tighten the back knurled screw on the stuffing box all the way down. Note that the shoulder on the tube must be sealed in the stuffing box before the lock screw is tightened.
5. Hand tighten the stuffing box and return the process to normal operating pressure.

Removal

1. Reduce process pressure to 50 psig or less.
2. Remove the back knurled screw on the stuffing box. (If the tube moves back, apply slight force to let it slide out slowly.)
3. Allow the tube assembly to be forced out to its stop and close the valve. (If necessary, turn the stuffing box very slightly.)
4. Remove the other knurled screw and unscrew the stuffing box to remove it.

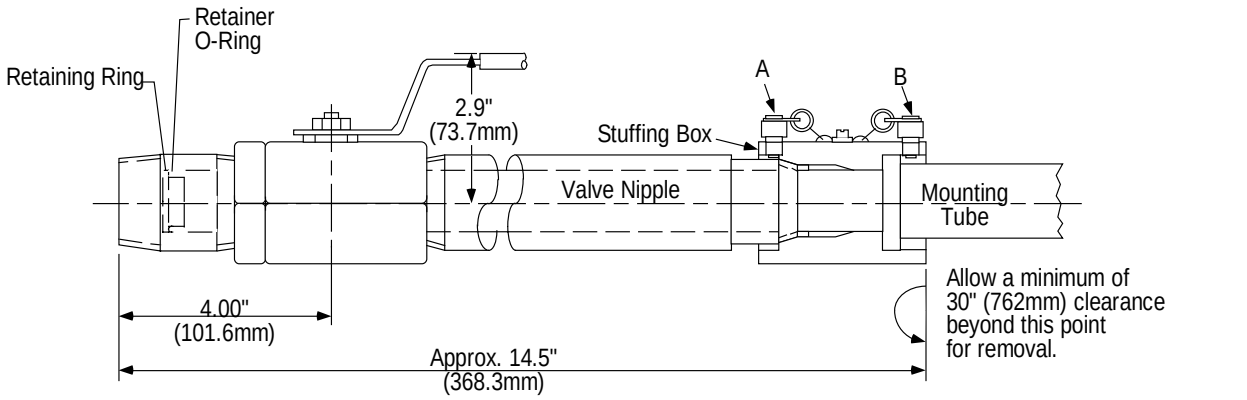


Figure 2-3. Cell Assembly Dimensions and Installation Procedures

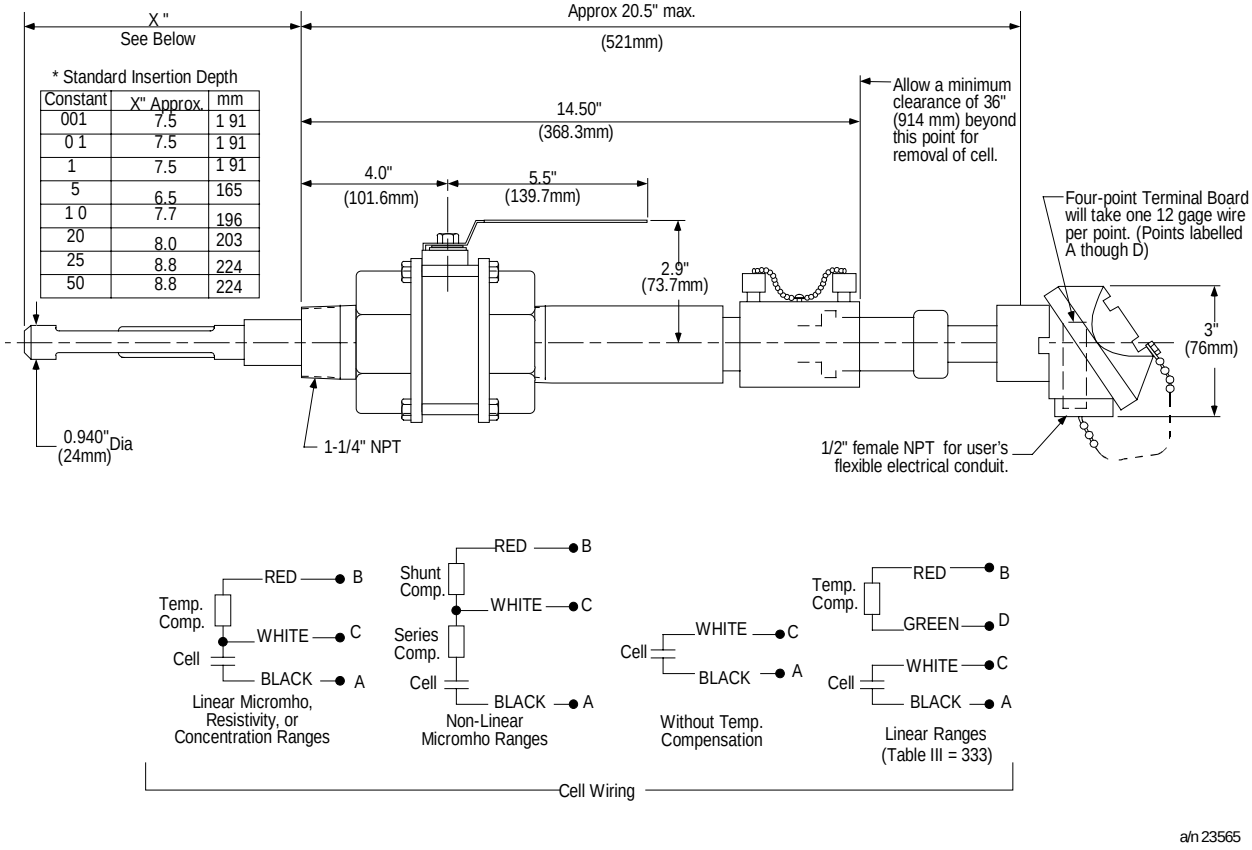


Figure 2-4. Outline and Dimension Drawing for Insertion/Removal Mounting and Cell with Universal Head

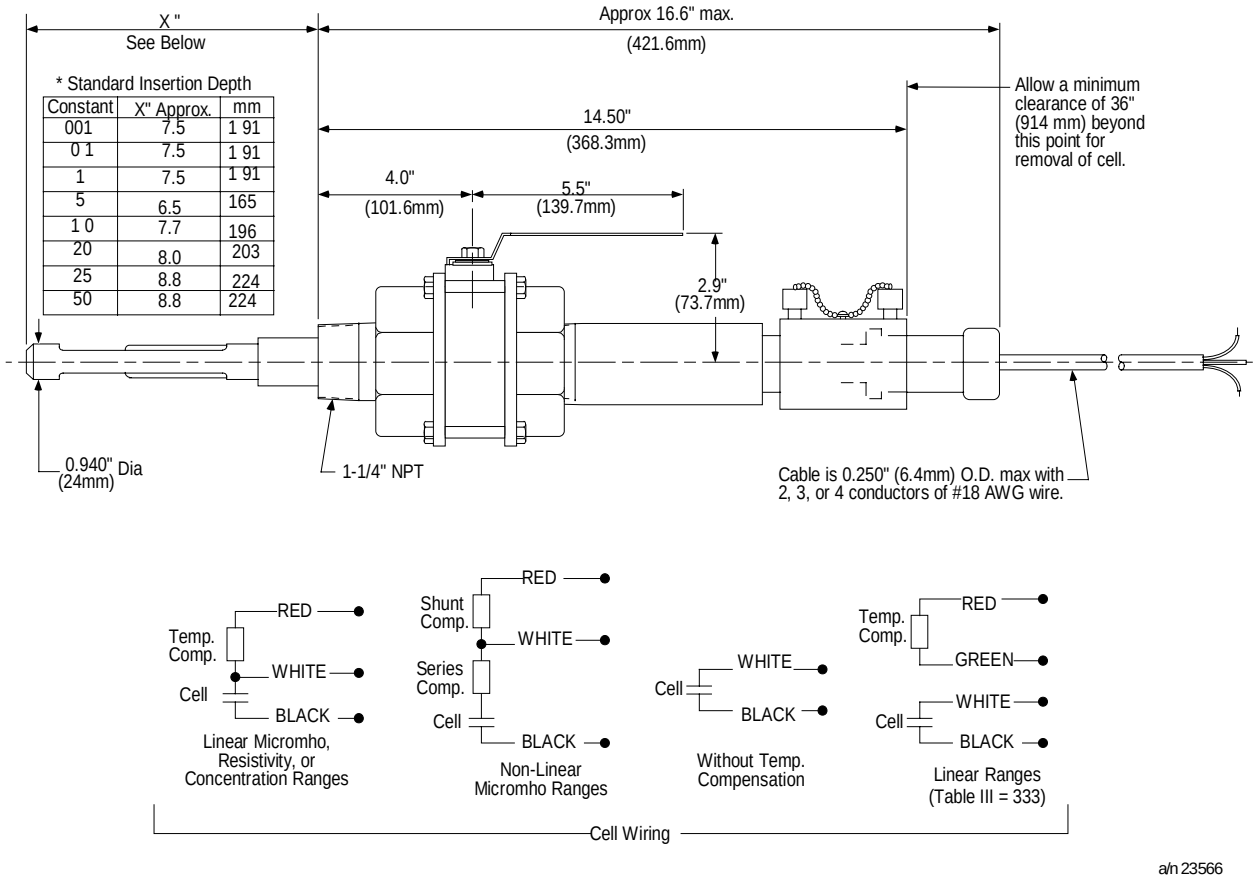


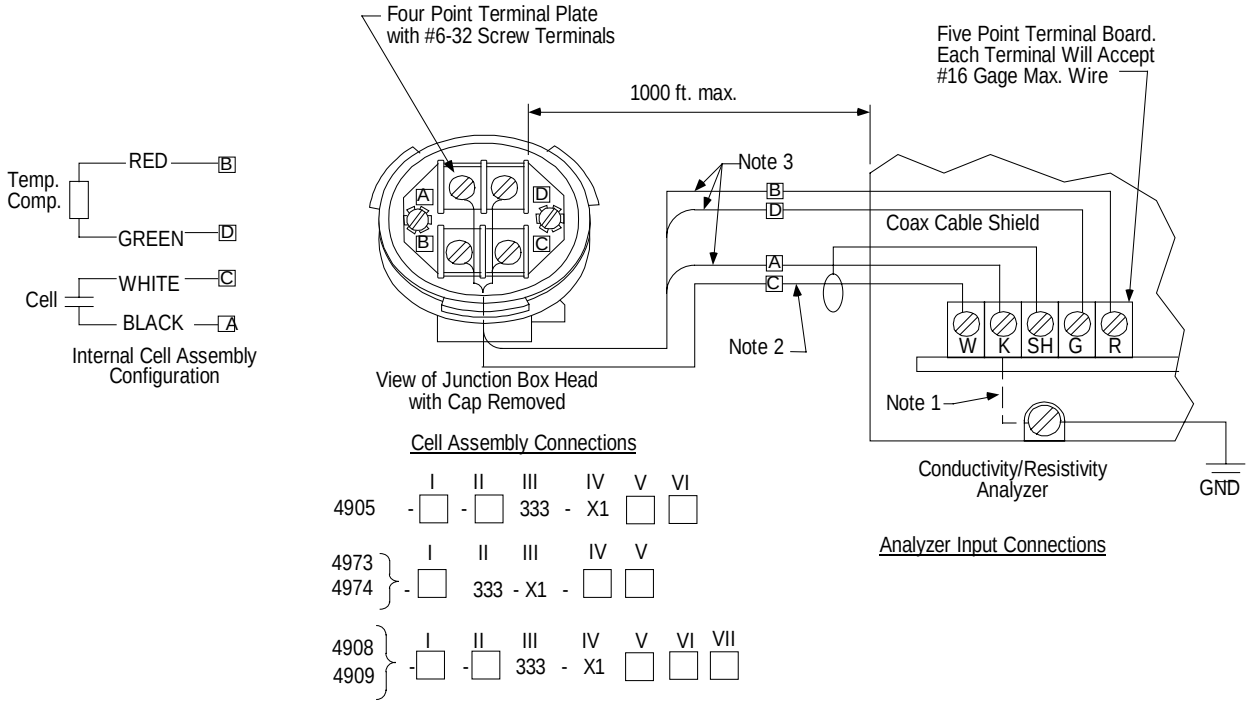
Figure 2-5. Outline and Dimension Drawing for Insertion/Removal Mounting and Cell

2.5 Electrical Connections

The terminal-board connections for recorder or analyzer are given in the appropriate directions furnished with the measuring instrument.

When the cell assembly includes a built-in temperature compensator, all leads are used. The cell is connected between black and white and the compensator is between red and white. When Table III= 333, the compensator is between red and green. See Figures 2-6 and 2-7

To avoid the possibility of ac pick-up in the cell leads, separate them from all ac line-voltage wiring or run them in a separate grounded conduit. Do not use shielded cable for cell leads unless Table III=333. Leadwire length restrictions are given in the measuring instrument manual and Figures 2-6, 2-7, 2-8 and 2-9.



NOTES:

1. For pure water samples in non-conductive (plastic, glass, etc.) piping, ground the black cell electrode lead near the cell. Alternatively, connect to the 7082 ground screw as shown dotted. Do not ground 10, 25, or 50 constant cells.

2. 7082-16, 17, 18, 19 (only)
   Use 22 gage minimum coaxial cable type RG59/U connecting shield to terminal "SH" only.

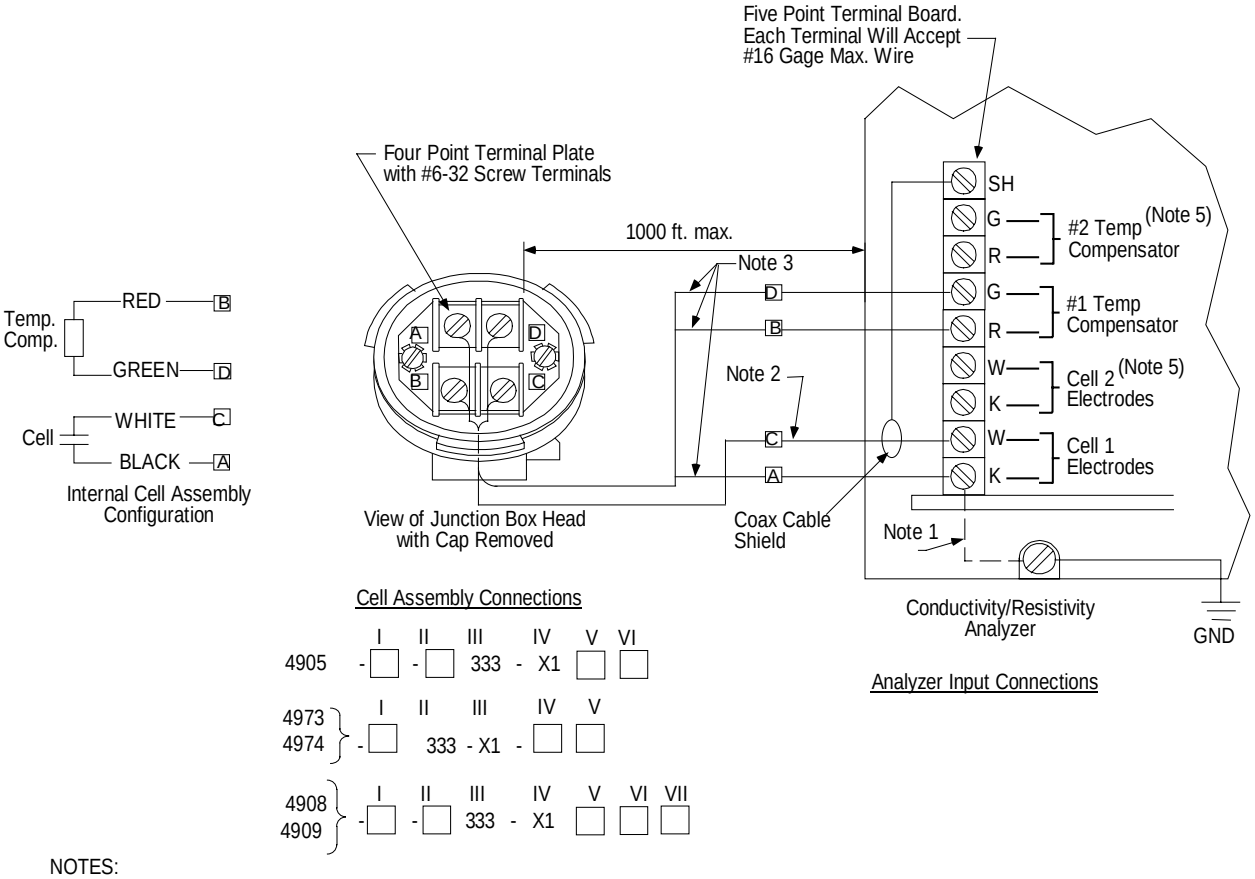
3. 7082-16, 17, 18, 19
   For cable runs of up to 500 ft., use: 18 gage minimum, three conductor cable.
   For cbale runs of 500 - 1000 ft., use: 16 gage minimum, three conductor cable.

   7082-13, 14, 15 [coax and shield (SH) not used]
   For cable runs of up to 500 ft., use: 18 gage minimum, four conductor cable.
   For cable runs of 500 - 1000 ft., use: 16 gage minimum, four conductor cable.

4. Cell to analyzer cables are considered low level. Run seperate from high level wiring.

a/n 23345

Figure 2-6. Installation Diagram for Catalog 4909 Cells, Table III =333, with Junction Box Head Connected to 7082 Cond/Res Analyzer



NOTES:

1. For pure water samples in non-conductive (plastic, glass, etc.) piping, ground the black cell electrode lead near the cell. Alternatively, connect to the 9782 ground screw as shown dotted. Do not ground 10, 25, or 50 constant cells.

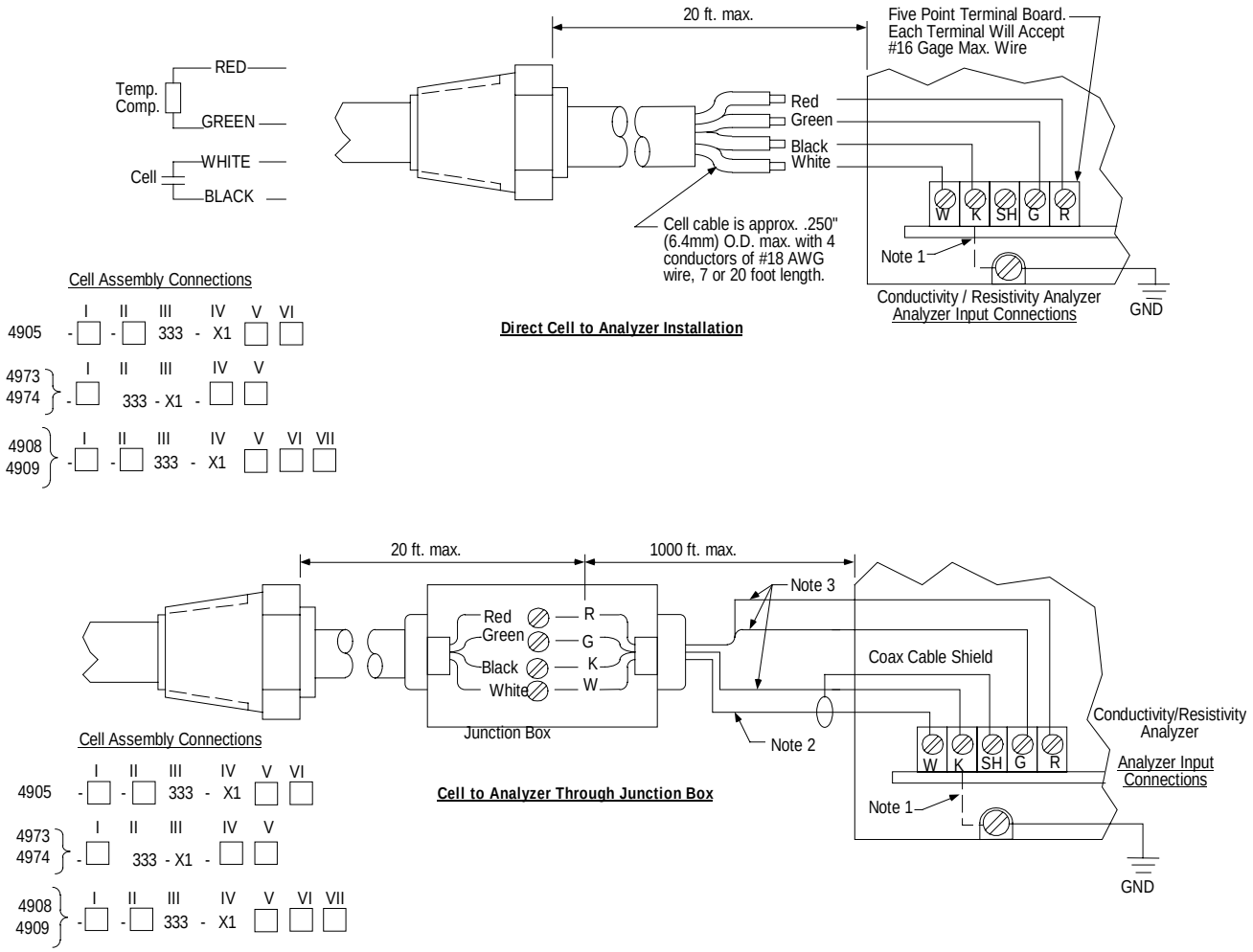
2. 9782C-S0 (only)
   Use 22 gage minimum coaxial cable type RG59/U connecting shield to terminal "SH" only.

3. 9782C-S0
   For cable runs of up to 500 ft., use: 18 gage minimum, three conductor cable.
   For cbale runs of 500 - 1000 ft., use: 16 gage minimum, three conductor cable.

   9782C-W0 [coax and shield (SH) not used]
   For cable runs of up to 500 ft., use: 18 gage minimum, four conductor cable.
   For cable runs of 500 - 1000 ft., use: 16 gage minimum, four conductor cable.

4. Cell to analyzer cables are considered low level. Run seperate from high level wiring.
5. If 2 Cells are to be appplied, the same wiring guidelines are applied to Cell 2 as are followed for Cell 1.

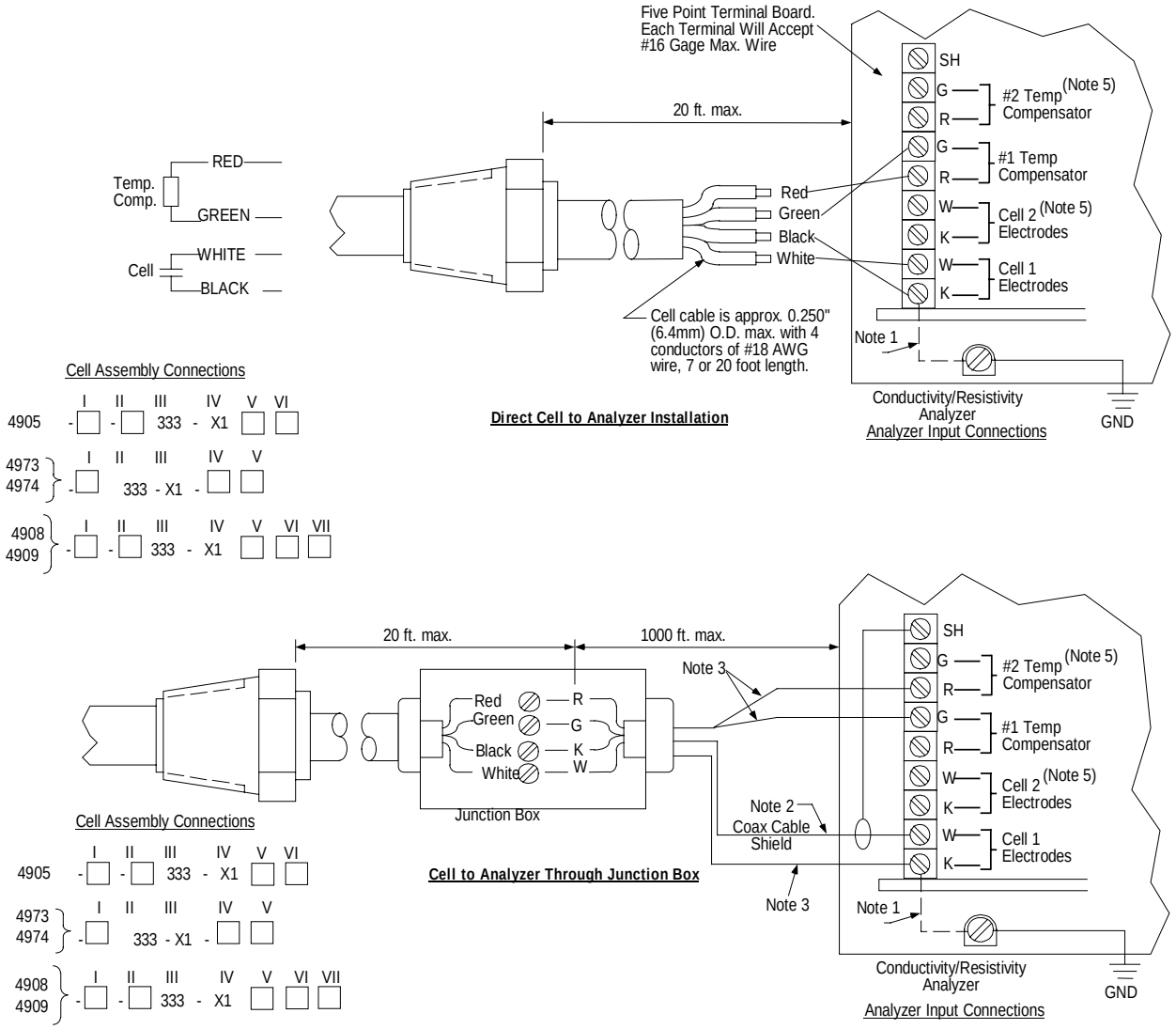
Figure 2-7. Installation Diagram for Catalog 4909 Cells, Table III =333, with Junction Box Head Connected to 9782 Cond/Res Analyzer



NOTES:
1. For pure water samples in non-conductive (plastic, glass, etc.) piping, ground the black cell electrode lead near the cell. Alternatively, connect to the 7082 ground screw as shown dotted. Do not ground 10, 25, or 50 constant cells.
2. 7082-16, 17, 18, 19 (only)
   Use 22 gage minimum coaxial cable type RG59/U connecting shield to terminal "SH" only.
3. 7082-16, 17, 18, 19
   For cable runs of up to 500 ft., use: 18 gage minimum, three conductor cable.
   For cbale runs of 500 - 1000 ft., use: 16 gage minimum, three conductor cable.
   7082-13, 14, 15 [coax and shield (SH) not used]
   For cable runs of up to 500 ft., use: 18 gage minimum, four conductor cable.
   For cable runs of 500 - 1000 ft., use: 16 gage minimum, four conductor cable.
4. Cell to analyzer cables are considered low level. Run seperate from high level wiring.

a/n 23346

Figure 2-8. Installation Diagram for Catalog 4909 Cells, Table III =333, with 7 or 20 foot Leads Directly Connected to 7082 Analyzer or Connected to Junction Box



NOTES:
1. For pure water samples in non-conductive (plastic, glass, etc.) piping, ground the black cell electrode lead near the cell. Alternatively, connect to the 9782 ground screw as shown dotted. Do not ground 10, 25, or 50 constant cells.
2. 9782C-S0 (only)
   Use 22 gage minimum coaxial cable type RG59/U connecting shield to terminal "SH" only.
3. 9782C-S0
   For cable runs of up to 500 ft., use: 18 gage minimum, three conductor cable.
   For cbale runs of 500 - 1000 ft., use: 16 gage minimum, three conductor cable.
   9782C-W0 [coax and shield (SH) not used]
   For cable runs of up to 500 ft., use: 18 gage minimum, four conductor cable.
   For cable runs of 500 - 1000 ft., use: 16 gage minimum, four conductor cable.
4. Cell to analyzer cables are considered low level. Run seperate from high level wiring.
5. If 2 Cells are to be applied, the same guidelines are applied to Cell 2 as wereused for Cell 1.

a/n 23346

Figure 2-9. Installation Diagram for Catalog 4909 Cells, Table III =333, with 7 or 20 foot Leads Directly Connected to 9782 Analyzer or Connected to Junction Box

3. Maintenance

3.1 General

If a series of below-normal readings occurs, this may indicate poor response because the cell is not filled with process solution. Check the cell installation. Note that a grayish dull surface on the cell plastic (normally glassy) can result from exposure to temperatures above 140°C.

The only maintenance which may be required is occasional cleaning in certain applications. The low constant electrodes are not platinized. To remove or replace the cell, refer to Section 2.

3.2 Cleaning the Cell

CAUTION

The cell housing is PES (polyethersulfone). Do not clean with acetone, chloroform, toluene, benzene, or any other chlorinated hydrocarbon.

The cell will require cleaning if sludge, slime, etc., accumulates in the flow channels. Since the materials of construction are chemically inert, chemical agents may be used and are recommended for cleaning the cells. The particular cleaning agent used must be selected according to the type of contamination to which the cell is exposed. In general, soap and hot water cleaning solution is effective. Immerse the plastic body of the cell in this solution. A 10 or 15 minute soaking period should be adequate. If necessary, a soft bristle brush of about 1/4 inch diameter may be used to clean out the tubular channels of the 10, 25 and 50 constant cells. Care must be taken not to scratch the electrode surfaces. Do not use a brush on the low (0.01, 0.1 and 1) constant cells and be especially careful not to bend the electrode plates of the 0.1 constant cell. Rinse the cell thoroughly in tap water and then in distilled water if available. To remove the platinum black from electrodes (5 to 50 constants only), refer to Section 3.3. Replatinizing after each cleaning (5 to 50 constant cells only) may not be necessary unless brushing was used.

3.3 Platinizing the Cell Electrodes

Only the electrodes having constants from 5 to 50 must be replatinized if the velvety-black deposit has been rubbed off the electrodes in service or in cleaning or if platinized electrodes are recommended and this black deposit is not present when the new cell is received. Always replatinize if a brush was used in cleaning the electrodes. The indication of a need for replatinization of the electrodes is loss in sensitivity (slow response of measuring instrument), erratic behavior of measuring instrument, or difficulty in balancing. The electrodes of the high constant cells are not visible since they are located near the middle of the flow channels. Therefore the need for platinization is only indicated by the effect on the measuring instrument. Do not platinize cells intended for high purity water measurements.

Before platinizing, clean the cell with detergent and brush as described in Section 3.2.

Support the cell in a cylindrical vessel with the end of the cell raised from the bottom. It is not necessary to remove the cell from the fittings for platinizing. However, the guard tube must be removed from the low constant cells. Pour in platinizing solution (Honeywell Part No. 315103011) to a level above the cross-channel.

To platinize the 5, 10, 20, 25 and 50 constant cells, immerse an auxiliary platinum electrode in the solution to a point about midway between the cross-channel or tube hole and the open end of the cell. (This third electrode should be chemically pure platinum. Its shape is unimportant. It may be one of the electrodes in

another conductivity cell or a platinum strip, sheet, rod, wire, etc.) Both electrodes of the cell are platinized simultaneously by connecting the negative terminal of the battery (see Table 3-1) to both leadwires of the cell. Connect the positive terminal of the battery to the auxiliary platinum electrode. Note the time lapse and continue the platinizing operation for the time in seconds listed in Table 3-1. Then disconnect the battery and remove the cell. Rinse the cell thoroughly in tap water and then rinse in distilled water. During the platinizing operation, move the cell up and down gently to keep the solution stirred.

CAUTION

The preceding procedure produces a barely visible coating of platinum black on the electrode surfaces. Do not attempt to darken electrodes by additional platinization since this will affect the cell performance adversely.

Pour the platinizing solution back into its container as it may be used a number of times.

If the cell is not to be installed immediately after platinizing, it should be kept submerged in distilled water until put into use, as platinum black is not stable when dry.

Table 3-1. Voltage and Time Limits for Platinizing Cells

Cell Constants								
DC Volts	.01	.1	1	5	10	20	25	50
1.5	----	160 sec.	150 sec.	----	----	----	----	-----
3.0	2 sec.	60 sec.	30 sec.	200 sec.	240 sec.	----	----	-----
6.0	----	----	----	80 sec.	100 sec.	180 sec.	200 sec.	300 sec.
12.0	----	----	----	----	----	120 sec.	150 sec.	240 sec.

3.4 Reference Solutions of Known Conductivity

To check the system comprising conductivity cell, leadwire, and measuring instrument, the user may desire to make a measurement in a reference solution of known conductivity. Table 3-2 defines the standard solutions and lists their conductivity. Control the temperature only within limits consistent with the desired accuracy. The 25°C temperature value is suggested. For cell constants less than 5 use a good known reference cell with a laboratory bridge.

3.5 Leakage from Removal Device

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 corrected if the plastic washer is renewed See Figure 3-1. If not, the leakage may have been caused by slight distortion of the mating surfaces of the nipple and gland ring. If these surfaces are cleaned, the sliding fit will be improved; distortion and its resulting leaks will be prevented.

To clean the mating surfaces between the gland ring and the nipple, first remove the stuffing box and take out the gland ring. Clean the surfaces with a flat fine sandstone, changing the direction of stroke about 15 degrees per stroke to keep the surfaces parallel.

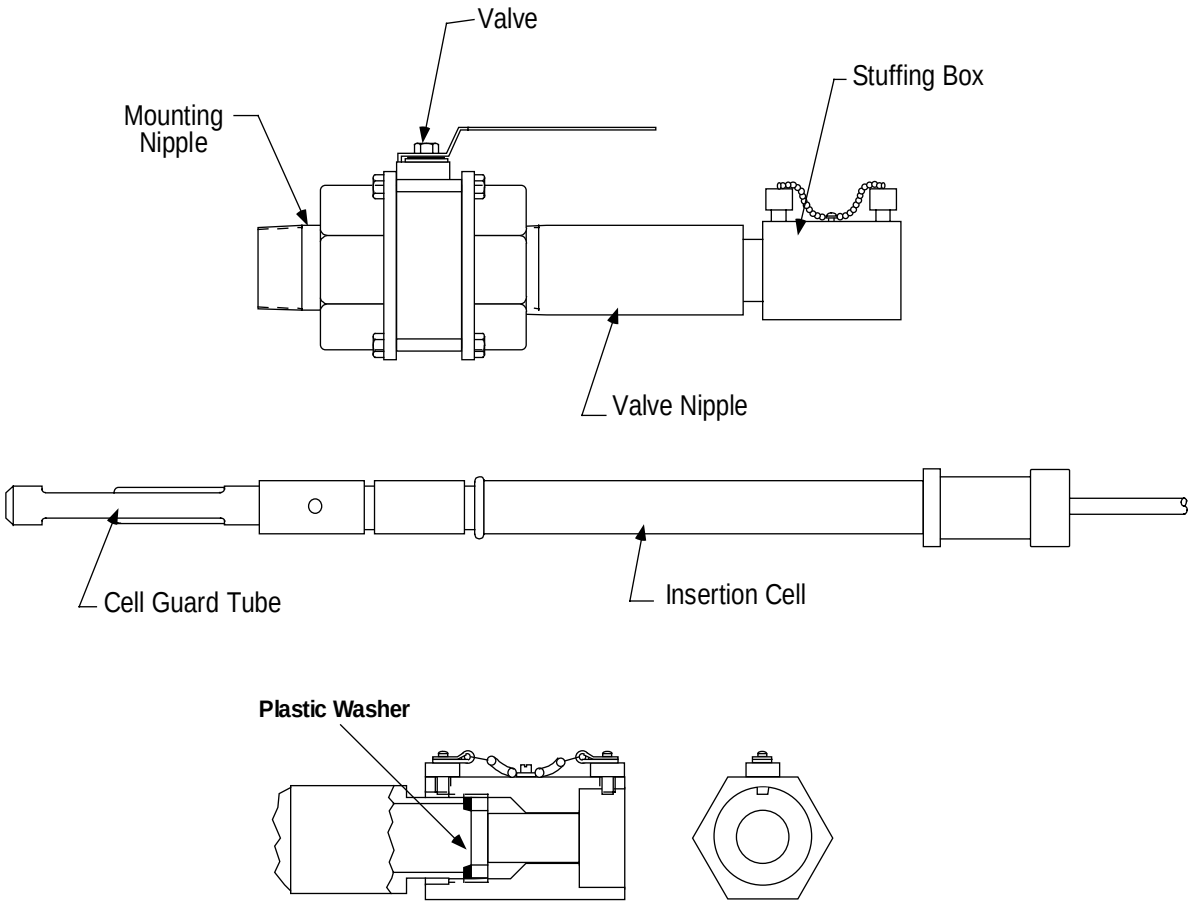


Figure 3-1 Details of Stuffing Box

Table 3-2. Standard Reference Solutions

Approximate Normality	Definition	Temp ^{O}C	Specific Conductance (micromhos/cm)	Nominal Constant of Cell to be Checked
1.0 N	71.1352 grams KCl per 1000 grams of solution	0 18 25	65,176 97,838 111,342	5, 10, 20, 25, 50

3.6 Replacement Parts and Accessories

Replacement parts and accessories are listed in Table 3-3.

Table 3-3. Replacement Parts and Accessories

Description	Part No.
Retainer Ring	31027158
Retainer O-Ring	31082053
Complete Removal Device 316 Stainless Steel without Cell Assembly	31741450
Cell Guard Tube (0.01, 0.1 and 1 Constants Only)	31065632
Short Mounting Nipple, 1-1/4” NPT 316 Stainless Steel	31020953
Ball Valve 316 Stainless Steel	31020868
Long Valve Nipple 316 Stainless Steel	31076635
316 Stainless Steel Stuffing Box (does not include following parts)	31500697
316 Stainless Steel Gland Ring (between packing and plastic washer)	31001215
304 Stainless Steel Stop Screw	31004205
304 Stainless Steel Washer (top of stop screw)	001216
Safety Chain Monel and Brass	31500464
Compression Seal (Viton)	31071494
Teflon Tape (260 inch roll)	31811069
Special Valve Nipple to adapt 4931 and 4939 Removal Devices to accept 4908 Insertion Cell	
Brass	076634
316 Stainless Steel	31076635
Viton Washer (covers gland ring)	31301277
Cell Extension Leadwire Table III other than 333	
Three-Conductor PVC (105°C max.), 18 gage	834059
Three-Conductor Tefzel (150°C max.), 18 gage	834086
Table III =333, 9782, 7082 Standard Ranges	
Up to 500 ft.	
Three-conductor, 18 gage cable (Belden 9493) and	834059
Coax Cable (Belden 9259)	835024
Up to 1000 ft.	
Four conductor (3 used), 16 gage cable (Belden 9494 or equivalent) and	834055
Coax Cable (Belden 9259)	835024
9782/7082-13 to -15 Wide Ranges	
Up to 500 ft - Four conductor, 18 gage	31834052
Up to 1000 ft - Four conductor, 16 gage	834055
Junction Box (Aluminum with 1/2” NPT female conduit connection for use with above cables	31316260
Platinizing Solution	31103011

Honeywell

Industrial Automation and Control
Honeywell, Inc.
1100 Virginia Drive
Fort Washington, Pennsylvania 19034

Helping You Control Your World