

DANIEL LIQUID TURBINE METER REMOTE MOUNTING BOX

OPERATING AND MAINTENANCE INSTRUCTIONS

**DANIEL MEASUREMENT AND CONTROL, INC.
AN EMERSON PROCESS MANAGEMENT COMPANY
HOUSTON, TEXAS**

**Part Number 3-9008-506
Revision B**

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IMPORTANT INSTRUCTIONS

Daniel Measurement and Control, Inc. (Daniel) designs, manufactures and tests its products to meet many national and international standards. Because these instruments are sophisticated technical products, you must properly install, use and maintain them to ensure they continue to operate within their normal specifications. The following instructions must be adhered to and integrated into your safety program when installing, using and maintaining Daniel products.

- **Read all instructions prior to installing, operating and servicing the product.** If this instruction manual is not the correct manual, call 1-713-827-6314 (24-hour response number for both Service and Sales Support) and the requested manual will be provided. Save this instruction manual for future reference.
- If you do not understand any of the instructions, contact your Daniel representative for clarification.
- Follow all warnings, cautions and instructions marked on and supplied with the product.
- Inform and educate your personnel in the proper installation, operation and maintenance of the product.
- Install your equipment as specified in the installation instructions of the appropriate instruction manual and per applicable local and national codes. Connect all products to the proper electrical and pressure sources.
- To ensure proper performance, use qualified personnel to install, operate, update, program and maintain the product.
- When replacement parts are required, ensure that qualified people use replacement parts specified by the manufacturer. Unauthorized parts and procedures can affect the product's performance and place the safe operation of your process at risk. Look-alike substitutions may result in fire, electrical hazards or improper operation.
- Ensure that all equipment doors are closed and protective covers are in place, except when maintenance is being performed by qualified persons, to prevent personal injury.
- **ALWAYS READ AND FOLLOW THE DANIEL REMOTE MOUNTING BOX MANUAL AND ALL PRODUCT WARNINGS AND INSTRUCTIONS.**
- Use of this equipment for any purpose other than its intended purpose may result in property damage and/or serious personal injury or death.
- Before opening the flameproof enclosure in a flammable atmosphere, the electrical circuits must be interrupted.
- The ATEX approval applies to equipment without cable glands or conduit seals. When mounting the flameproof enclosure in a hazardous area, only flameproof cable glands and conduit seals certified to EN 60079-1 must be used.

CAUTION

DAMAGE TO ELECTRONIC COMPONENTS

Proper handling procedures must be observed during the removal, installation or other handling of internal circuit boards or devices.

Failure to properly handle the instrument can damage electronic components that are susceptible to static electricity.

Handling Procedure:

1. Power to the unit must be removed.
2. Personnel must be grounded, via a wrist strap or other safe, suitable means before any printed circuit card or other internal device is installed, removed or adjusted.
3. Printed circuit cards must be transported in a conductive bag or other conductive container. Boards must not be removed from protective enclosure until immediately before installation. Removed boards must immediately be placed in a protective container for transport, storage or return to the factory.

CAUTION

DAMAGE TO ELECTRONIC COMPONENTS

This instrument is not unique in its content of ESD (electrostatic discharge) sensitive components. Most modern electronic designs contain components that utilize metal oxide technology (NMOS, CMOS, etc.).

Failure to properly handle the instrument can damage or destroy electronic components that are susceptible to even small amounts of static electricity. The components will exhibit early failure even though they appear to function properly.

**DANIEL MEASUREMENT AND CONTROL, INC.
DANIEL LIQUID TURBINE METER REMOTE MOUNTING BOX
OPERATING AND MAINTENANCE INSTRUCTIONS**

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HOUSTON, TEXAS, U.S.A.

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WARRANTY

1. LIMITED WARRANTY: Subject to the limitations contained in Section 2 herein and except as otherwise expressly provided herein, Daniel Measurement and Control, Inc. ("Daniel") warrants that the firmware will execute the programming instructions provided by Daniel, and that the Goods manufactured or Services provided by Daniel will be free from defects in materials or workmanship under normal use and care until the expiration of the applicable warranty period. Goods are warranted for twelve (12) months from the date of initial installation or eighteen (18) months from the date of shipment by Daniel, whichever period expires first. Consumables and Services are warranted for a period of 90 days from the date of shipment or completion of the Services. Products purchased by Daniel from a third party for resale to Buyer ("Resale Products") shall carry only the warranty extended by the original manufacturer. Buyer agrees that Daniel has no liability for Resale Products beyond making a reasonable commercial effort to arrange for procurement and shipping of the Resale Products. If Buyer discovers any warranty defects and notifies Daniel thereof in writing during the applicable warranty period, Daniel shall, at its option, promptly correct any errors that are found by Daniel in the firmware or Services, or repair or replace F.O.B. point of manufacture that portion of the Goods or firmware found by Daniel to be defective, or refund the purchase price of the defective portion of the Goods/Services. All replacements or repairs necessitated by inadequate maintenance, normal wear and usage, unsuitable power sources, unsuitable environmental conditions, accident, misuse, improper installation, modification, repair, storage or handling, or any other cause not the fault of Daniel are not covered by this limited warranty, and shall be at Buyer's expense. Daniel shall not be obligated to pay any costs or charges incurred by Buyer or any other party except as may be agreed upon in writing in advance by an authorized Daniel representative. All costs of dismantling, reinstallation and freight and the time and expenses of Daniel's personnel for site travel and diagnosis under this warranty clause shall be borne by Buyer unless accepted in writing by Daniel. Goods repaired and parts replaced during the warranty period shall be in warranty for the remainder of the original warranty period or ninety (90) days, whichever is longer. This limited warranty is the only warranty made by Daniel and can be amended only in a writing signed by an authorized representative of Daniel. Except as otherwise expressly provided in the Agreement, THERE ARE NO REPRESENTATIONS OR WARRANTIES OF ANY KIND, EXPRESSED OR IMPLIED, AS TO MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE, OR ANY OTHER MATTER WITH RESPECT TO ANY OF THE GOODS OR SERVICES. **Buyer acknowledges and agrees that corrosion or erosion of materials is not covered by this warranty.**

2. LIMITATION OF REMEDY AND LIABILITY: DANIEL SHALL NOT BE LIABLE FOR DAMAGES CAUSED BY DELAY IN PERFORMANCE. THE SOLE AND EXCLUSIVE REMEDY FOR BREACH OF WARRANTY HEREUNDER SHALL BE LIMITED TO REPAIR, CORRECTION, REPLACEMENT OR REFUND OF PURCHASE PRICE UNDER THE LIMITED WARRANTY CLAUSE IN SECTION 1 HEREIN. IN NO EVENT, REGARDLESS OF THE FORM OF THE CLAIM OR CAUSE OF ACTION (WHETHER BASED IN CONTRACT, INFRINGEMENT, NEGLIGENCE, STRICT LIABILITY, OTHER TORT OR OTHERWISE), SHALL DANIEL'S LIABILITY TO BUYER AND/OR ITS CUSTOMERS EXCEED THE PRICE TO BUYER OF THE SPECIFIC GOODS MANUFACTURED OR SERVICES PROVIDED BY DANIEL GIVING RISE TO THE CLAIM OR CAUSE OF ACTION. BUYER AGREES THAT IN NO EVENT SHALL DANIEL'S LIABILITY TO BUYER AND/OR ITS CUSTOMERS EXTEND TO INCLUDE INCIDENTAL, CONSEQUENTIAL OR PUNITIVE DAMAGES. THE TERM "CONSEQUENTIAL DAMAGES" SHALL INCLUDE, BUT NOT BE LIMITED TO, LOSS OF ANTICIPATED PROFITS, REVENUE OR USE, AND COSTS INCURRED INCLUDING WITHOUT LIMITATION FOR CAPITAL, FUEL AND POWER, AND CLAIMS OF BUYER'S CUSTOMERS.

TABLE OF CONTENTS

1.0 INTRODUCTION 1-1
1.1 General 1-1
1.2 Description 1-1

2.0 SPECIFICATIONS 2-1

3.0 INSTALLATION 3-1
3.1 General 3-1
3.2 Installation and Equipment 3-1
3.3 Electrical Connections 3-2

4.0 OPERATION 4-1
4.1 General 4-1
4.2 Pre-start Checks 4-1

5.0 MAINTENANCE 5-1
5.1 General 5-1
5.2 Maintenance Considerations 5-1
5.3 Field Replacement of Preamplifier Board 5-1

6.0 TROUBLESHOOTING 6-1
6.1 General 6-1
6.2 Conditions 6-1

7.0 PARTS LIST 7-1

Figures

1-1 Pipe-Mount Configuration 1-1
1-2 Wall-Mount Configuration 1-2
3-1 Typical Installation 3-1
3-2 RMB Wiring 3-3
7-1 RMB Assembly 7-2

Tables

6-1 Troubleshooting 6-1
7-1 RMB Assembly 7-3

1.0 INTRODUCTION

1.1 General

This manual is designed to assist in the installation and operation of the Remote Mounting Box (RMB). To assure proper installation and startup it is important to read this manual in its entirety.

1.2 Description

The Remote Mounting Box is an electric transmitting device used primarily in the petroleum industry for remote installation of liquid turbine meter electronics. The RMB is specifically designed for high temperature applications.

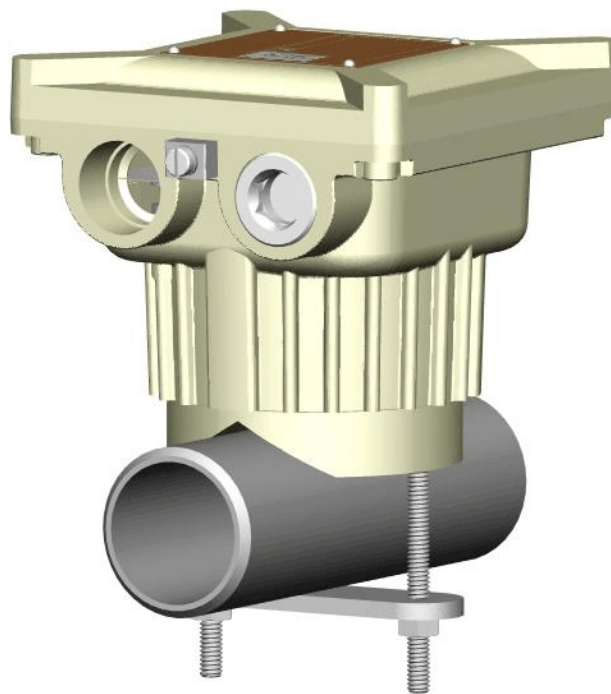


Figure 1-1. Pipe-Mount Configuration

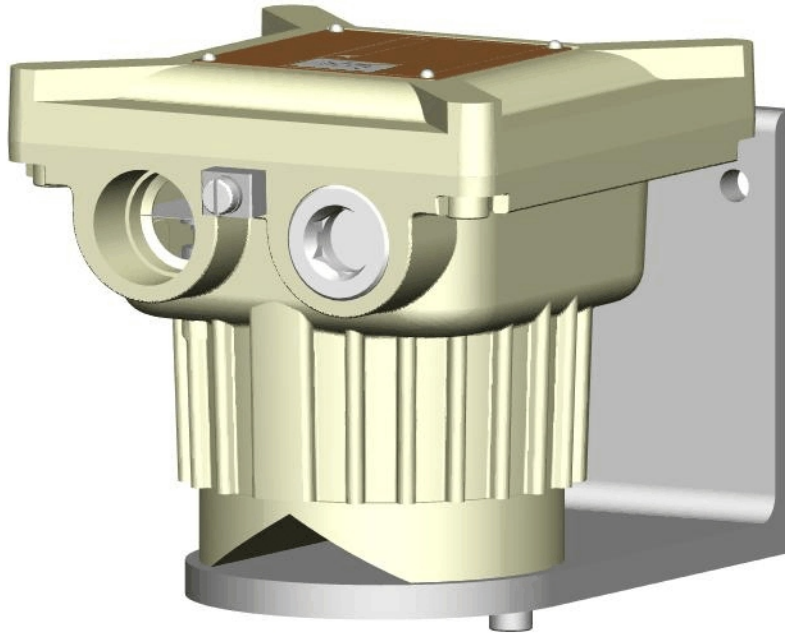


Figure 1-2. Wall-Mount Configuration

2.0 SPECIFICATIONS



PERSONAL INJURY AND/OR EQUIPMENT DAMAGE

Do not exceed specifications listed below.

Failure to heed this warning could result in serious injury and/or damage to the equipment.

Preamplifier Type

Dual Channel preamplifier
Single or dual remote sensors

Preamplifier Performance

Inputs

Supply voltage: 10-30 Vdc
Type: Sine Wave
Amplitude: 40 mV peak to peak minimum

Outputs

Powered Pulse Output
Type: Square Wave
Frequency Range: 0 to 5 kHz
Amplitude: 0 to 5 V
1000 Ohm internal pull-ups, 20 mA, max.

Variable Voltage Output
Type: Square Wave
Frequency Range: 0 to 5 kHz
Amplitude: 0 to Supply Voltage
1000 Ohm internal pull-ups, 70 mA, max.

Open Collector Output (Per Channel)

Type: Square Wave
Frequency Range: 0 to 5 kHz
Max. Voltage: 30 Vdc
Max. Current: 125 mA
Max. Power: 0.5 Watts

Transmission Distance

Meter pickoff to RMB 20 ft. (6.1 meters) max. from RMB dual channel
Preamplifier to receiver: 3,000 ft. (914 meters) max.

Materials of Construction

UMB Housing: Aluminum

Ratings

Ambient Temperature: -40 to 140°F (-40 to 60°C)

Approvals

Electrical: Class I, Division 1, Groups C & D, UL, and CUL
Environmental: NEMA 4

CE 0539  **II 2G**
DEMKO 03 ATEX 130946X
Ex d IIB T6

3.0 INSTALLATION

3.1 General

This section contains specific instructions for installation of the RMB.

3.2 Installation and Equipment

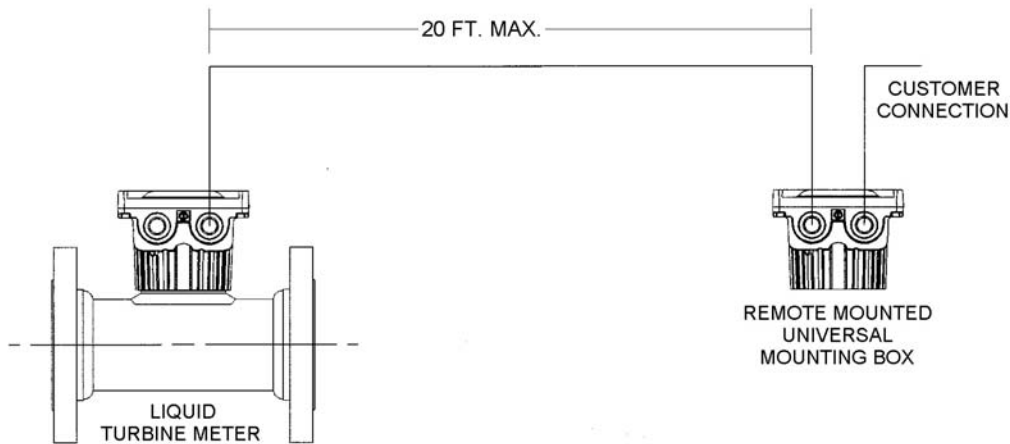


Figure 3-1. Typical Installation

The design of the Product has not been assessed for the effects of traffic, wind or earthquake loading.

It is the customer's responsibility to provide fire prevention measures and equipment per local regulations.

⚠ WARNING

PERSONAL INJURY AND/OR EQUIPMENT DAMAGE

Install and use the Universal Mounting Box only per noted instructions and specifications.

Use of this equipment for any purpose other than its intended purpose may result in property damage and/or serious personal injury or death.

When replacing the RMB screws, use only SOC. HD. CAP SCR., M6X16 MM length, 304 Stainless Steel, MIN. Tensile strength = 125 KSI.

3.3 Electrical Connections

A. Electrical Connections

Pickoff input signal connections are made at terminal strip connection TB2 for Channel A and TB3 for Channel B. Power supply and output signal connections are made at terminal strip TB1. Reference Figure 3-2.

B. Induced Interference

The RMB and liquid turbine meter should be located as far as possible from any electrical equipment such as motors, solenoids or relays which could induce an interference signal into the turbine meter sensor. High amplitude interference introduced into the preamplifier can result in interference with the flow signal.

Interference Check - Upon installation of the turbine meter and RMB, the presence of an interference signal can be detected by performing the following check.

1. Connect a suitable readout device to the preamp output terminal strip TB1 (number 3 for channel A or number 5 for channel B).
2. Apply +12 Vdc power to the preamp at terminal strip TB1 (number 1).
3. If an output is indicated on the readout at a no-flow condition, induced interference is present.
4. Duplicate the checking process if dual pickoffs are being used. Use output terminal strip TB1 number 3 or 5 as selected for pickoff output.

Interference may be reduced or eliminated by changing the location of the meter or by rotating the meter in the pipeline in progressive steps while simultaneously checking the output for the lowest possible signal reading.

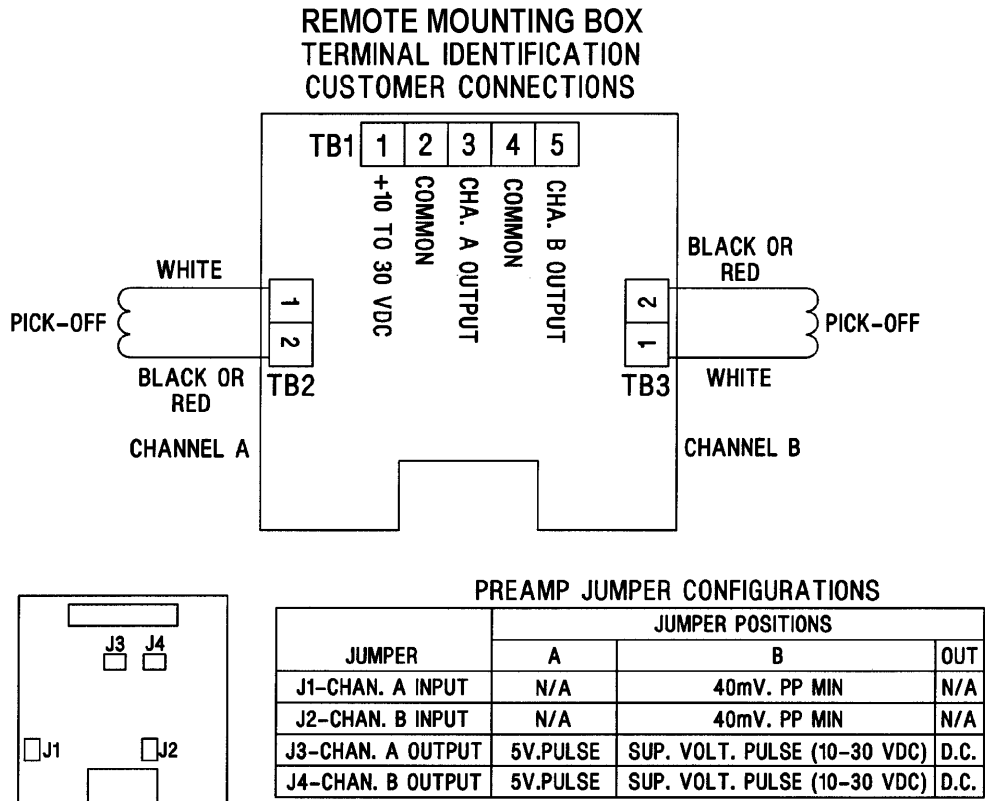


Figure 3-2. RMB Wiring

C. Accessory Hookup

General considerations: It is important that the appropriate service manual be referenced before attempting to use accessories or instrumentation with the RMB. If service manuals for instrumentation were not received at the time of purchase or delivery, please contact the factory or nearest Daniel Measurement and Control Sales and Service Office.

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4.0 OPERATION**4.1 General**

This section contains the operating procedures for the Remote Mounting Box. The primary output is a single or dual high resolution signal that is amplified and shaped by an integral amplifier mounted within an explosion proof housing. This wave pulse can be fed directly to remote totalizing counters, digital readout devices, presets, or control instrumentation.

4.2 Pre-start Checks

Inspect all electrical connections to assure compliance to electrical codes and safety regulations.

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5.0 MAINTENANCE**NOTICE**

Item numbers reference actual engineering drawings and are not meant to be consecutively numbered.

5.1 General

The Remote Mounting Box is designed to operate for extended periods of time without evidence of wear or loss of precision. If it is found to be in need of repair, it is recommended the user contact the nearest Daniel Measurement and Control Sales or Service Office. It is important that servicing be performed by trained and qualified service personnel.

5.2 Maintenance Considerations

1. Label all parts or place parts in labeled containers during disassembly.
2. Use no metal clamping devices in direct contact with any RMB part or surface.

5.3 Field Replacement of Preamplifier Board

Reference Figure 7-1 Exploded Parts Drawing.

In the event that a preamplifier board needs to be replaced, the following procedure is recommended.

1. Disconnect all power to the meter.

**PERSONAL INJURY AND/OR EQUIPMENT DAMAGE****Disconnect power to the meter.**

Failure to disconnect power to the meter could result in serious personal injury and/or damage to the equipment.

2. Remove retaining screws (item 7) and cover (item 3) of the UMB housing assembly.
3. Disconnect terminal connects at TB1, TB2, and TB3.
4. Loosen retaining screws of preamplifier board (item 6) and lift out.
5. Mount the replacement preamplifier board in its original position and secure using spring loaded retaining screws.
6. Attach electrical output wiring from both pickoffs to terminal connection TB2 and TB3.
7. Attach electrical output wiring from electrical accessories (conduit wiring) to terminal connection TB1, number 3 for channel A, and number 5 for channel B.
8. Secure all electrical wiring.
9. Return UMB cover and secure using original retaining screws. Torque screws to 55 in. lbs., min.

6.0 TROUBLESHOOTING**6.1 General**

This information has been provided as an aid in basic troubleshooting. If the Remote Mounting Box is found to be in need of repair, it is recommended the user contact the nearest Daniel Measurement and Control Sales or Service Office. It is important that servicing be performed by trained and qualified service personnel.

6.2 Conditions

Table 6-1. Troubleshooting

Condition	Probable Cause	Correction
No output pulses from amplifier module	Input voltage to amplifier below minimum required for operation	Apply 10-30 Vdc to preamplifier
	Damaged or shorted sensor	Replace sensor
	Damaged amplifier module	Replace amplifier module
	Receiver unit not operating	Refer to instruction manual on defective unit

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7.0 PARTS LIST

This section contains the necessary parts required to make up any standard unit covered in this manual. Recommended spare or replacement parts have been denoted by an asterisk.

NOTICE

Item numbers reference actual engineering drawings and are not meant to be consecutively numbered.

When ordering, the following information must be supplied.

- Serial number
- Part number
- Part description
- Quantity required

DANIEL LIQUID TURBINE METER REMOTE MOUNTING BOX

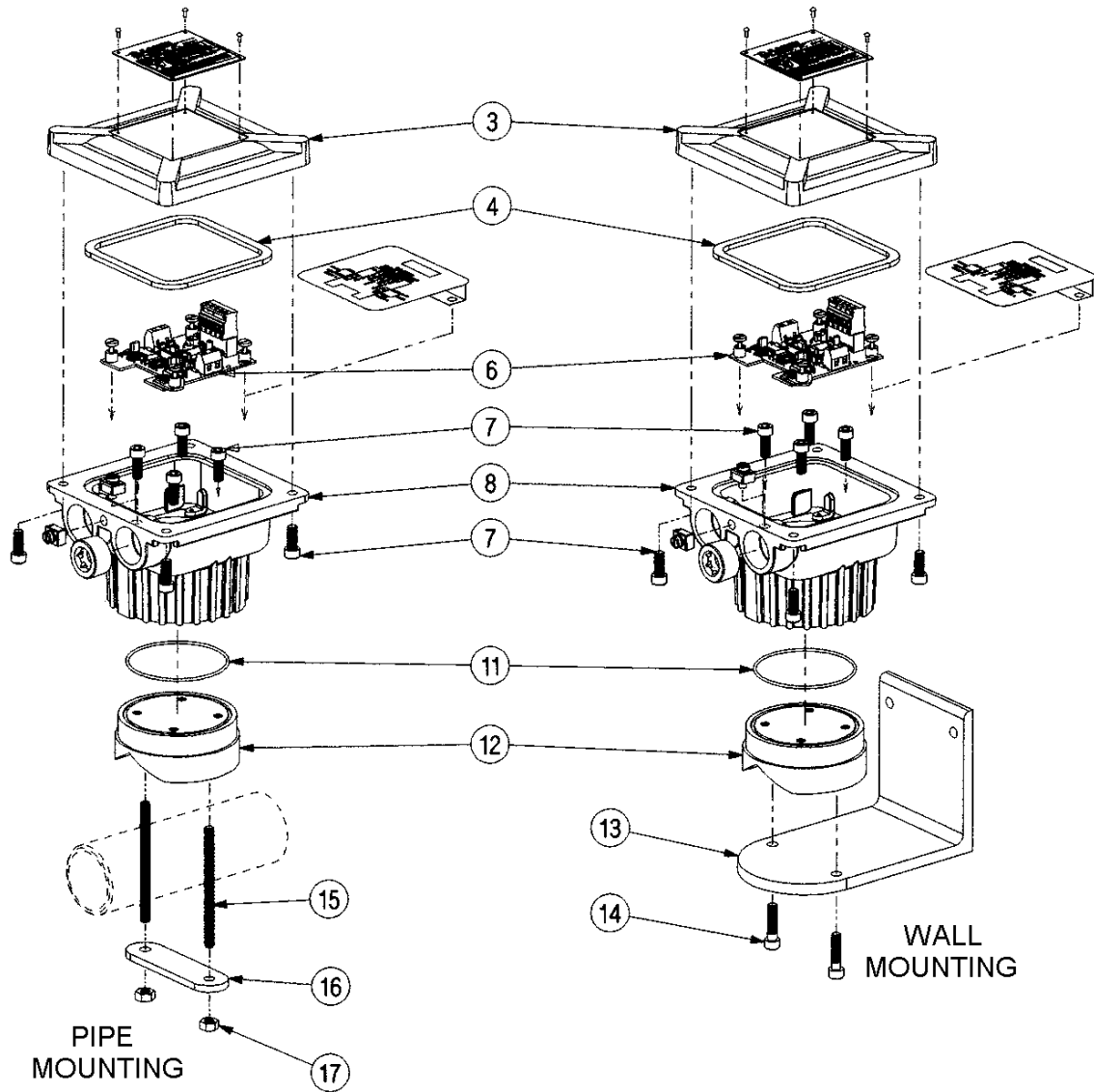


Figure 7-1. RMB Assembly

Table 7-1. RMB Assembly

Item Number	Description	Part Number	Quantity Required
3	UMB Cover	899-00-101-00	1
4*	Gasket	CA-375Z-259-XXA	1
6*	Dual Channel Preamp	230-00-300-00	1
7**	Screw (Hex Socket Head)	151496	9
8	UMB Housing	899-00-100-00	1
11*	O-Ring (Viton®-A)	1500093-022	1
12	RMB base	799-00-457-60M	1
13	Wall Mount Bracket	799-00-456-00	1
14	Wall Mount Screws	151497M	2
15	Pipe Mount Studs	799-00-453-00	2
16	Pipe Mount Plate	799-00-454-00	1
17	Pipe Mount Nuts	151544	2

* Recommended Spare Parts

** All item 16 - Torque 55 in. lbs., min.

Viton® is a registered trademark of E.I. du Pont de Nemours and Company.

ATEX REPAIR NOTE:

Special Conditions for Safe Use: The joint between the Universal Mounting Box cover and housing is a flat joint and has a flame path of 9.52mm in length and clearance of less than .0381mm. The joint between the Universal Mounting Box housing and Sensor housing is a spigot joint which has a radial length of 3.18mm, a axial length of 13.61mm and a clearance of .059mm.

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DANIEL MEASUREMENT AND CONTROL, INC.
RETURN POLICY FOR WARRANTY
AND NON-WARRANTY MATERIAL

Use the following procedure for returning equipment to the Daniel factory in the United States.

Step 1 Obtaining a RMA Number

A Return Material Authorization (RMA) number must be obtained prior to returning any equipment for any reason.

To obtain a RMA number, call the Customer Service Department at 713-827-5033 between 8:00 a.m. and 5:00 p.m. (Central Standard Time), Monday through Friday, except holidays or email daniel.support@emersonprocess.com.

NOTICE

No product returns will be accepted without a RMA number and will be returned at the customer's expense.

For warranty consideration, the product must be returned to Daniel within twelve (12) months of the date of original shipment or within eighteen (18) months of the date of original shipment of the product to destinations outside the United States. The Purchaser must prepay any shipping charges.

In addition, the Purchaser is responsible for insuring any product shipped for return, and assumes the risk of loss of the product during shipment.

- The following information is required at the time the RMA is issued:
- Customer name
- Contact name
- Billing address
- Contact Phone # and email address
- Daniel SO #, PO #, or Invoice #
- Item(s) to be returned
- Reason for return
- End user and final destination address
- Consignee's complete name, address, contact name and phone number

- A RMA number is required for each original order. (Example: Two fittings purchased on two separate orders now being returned require two RMA numbers.)

For product returns from locations outside the United States, Daniel Customer Service personnel will provide additional shipping requirements.

Step 2 Cleaning and Decontamination

Prior to shipment, thoroughly clean and decontaminate all equipment removing all foreign substances. This includes all substances used for cleaning the equipment. The cleaning and decontamination requirement applies to any part exposed to process fluids or cleaning substances.

Shipping equipment that has not been decontaminated may be in violation of U.S. Department of Transportation (DOT) regulations. For your reference, the requirements for packaging and labeling hazardous substances are listed in DOT regulations 49 CFR 172, 178, and 179.

If you suspect that a part has been contaminated, the part must be completely drained and flushed to remove contaminants.



MAY CAUSE DEATH OR SERIOUS INJURY TO PERSONNEL

Contents may be under pressure or materials may be hazardous

Follow appropriate handling instructions for accessing pressurized equipment. Avoid contact with hazardous materials or contaminated units and parts. Failure to do so may result in death or serious injury.

Decontamination/Cleaning Statement

A blank Decontamination/Cleaning Statement is provided on the “Returned Material Authorization Repair Form for Used Equipment”.

- A Decontamination/Cleaning Statement is required for each returned part.
- Fully complete each form and include a signature. If the decontamination statement is incomplete, the customer may be charged for decontamination and cleaning.

If the equipment has been exposed to a known hazardous substance with any characteristic that can be identified in the Code of Federal Regulations, 40 CFR 261.20 through 261.24, the chemical abstracts number and hazardous waste number/hazard code must be stated in the space provided on the form.

Two (2) copies of each Decontamination/Cleaning Statement must be provided:

- One (1) copy must be attached to the outside of the package.
- One (1) copy must be included inside the package.

Step 3 Material Safety Data Sheets (MSDS)

Provide a Material Safety Data Sheet (MSDS) with the returned equipment for each substance that has come in contact with the equipment being returned, including substances used for decontamination and cleaning.

A MSDS sheet is required by law to be available to people exposed to specific hazardous substances, with one exception: if the equipment has only been exposed to food-grade substances or potable water, or other substances for which an MSDS is not applicable, the Decontamination/Cleaning Statement form alone is acceptable.

Two (2) copies of each MSDS must be provided:

- One (1) copy must be attached to the outside of the package.
- One (1) copy must be provided inside the package.

Step 4 Packaging

Shipping a Device With Possible Contamination

To meet DOT requirements for identifying hazardous substances, ship only one device per package.

Shipping a Device Without Any Potential Contamination

Devices being returned may be shipped together in one package, if there is no potential of foreign substance contamination.

Step 5 Shipping

Before returning used equipment:

- Mark each package clearly with a RMA number.
- Include a Decontamination/Cleaning Statement inside the package.
- Attach a duplicate Decontamination/Cleaning statement to the outside of the package.
- Include a MSDS for each substance that has come in contact with the equipment inside the package.
- Attach a duplicate MSDS to the outside of the package.

NOTICE

No product returns will be accepted without a RMA number and will be returned at the customer's expense.

For warranty consideration, the product must be returned to Daniel within twelve (12) months of the date of original shipment or within eighteen (18) months of the date of original shipment of the product to destinations outside the United States. The Purchaser must prepay any shipping charges.

Ship all * mechanical equipment to the following address:

Daniel Measurement and Control, Inc.
Attn: Service Dept.
5650 Brittmoore Rd.
Houston, TX 77041
Ref: RMA# _____

*Mechanical equipment includes: Orifice Fittings, Parts, Plates, Seal Rings, Turbine Meters, Control Valves, Provers, Strainers, Meter Tubes, Ultrasonic Meters, Flow Conditioners, etc.

Ship all * electronic equipment to the following address:

Daniel Measurement and Control, Inc.
Attn: Service Dept.
11100 Brittmoore Park Drive
Houston, TX 77041
Ref: RMA# _____

*Electronic equipment includes: Gas Chromatographs, Petrocount Presets, Danload Preset, Ultrasonic Meter Electronics (CPU boards, transducers, etc.), 2403 Totalizer, MRT 97 Indicator, Preamps, Pick Up Coils, Prover Interface Boards, and the following Flow Computer Models: 2230, 2239, 2270, 2460, 2470, S100, 2100, and 3000.

Daniel Measurement and Control, Inc.

Returned Material Authorization

Repair Form for Used Equipment Including Decontamination/Cleaning Statement

1. Return Material Authorization (RMA) Number _____
2. Equipment to be returned:
 Model Number _____ Serial Number _____
3. Reason for return: _____

Decontamination/Cleaning Fluids Process					
A. List each substance in which the equipment was exposed. Attach additional documents if necessary.					
Common Name	CAS# if available	Used for Hazardous Waste (20 CFR 261)		EPA Waste Code if used for hazardous waste	
		<input type="checkbox"/> Yes	<input type="checkbox"/> No		
		<input type="checkbox"/> Yes	<input type="checkbox"/> No		
		<input type="checkbox"/> Yes	<input type="checkbox"/> No		
		<input type="checkbox"/> Yes	<input type="checkbox"/> No		
		<input type="checkbox"/> Yes	<input type="checkbox"/> No		
B. Circle any hazards and/or process fluid types that apply:					
Infectious	Radioactive	Explosive	Pyrophoric	Poison Gas	
Cyanides	Sulfides	Corrosive	Oxidizer	Flammable	Poison
Carcinogen	Peroxide	Reactive-Air	Reactive-Water	Reactive-Other (list)	
Other hazard category (list):					
C. Describe decontamination/cleaning process. Include MSDS description for substances used in decontamination and cleaning processes. Attach additional documents if necessary.					

Shipping Requirements

Failure to comply with this procedure will result in the shipment being refused.

4. Write the RMA number on the shipping package.
5. Inside the package include one copy of this document and all required Material Safety Data Sheets (MSDS)
6. Outside of the package attach one copy of this document and all required Material Safety Data Sheets (MSDS).

THIS EQUIPMENT, BEING RETURNED "FOR REPAIR," HAS BEEN COMPLETELY DECONTAMINATED AND CLEANED. ALL FOREIGN SUBSTANCES HAVE BEEN DOCUMENTED ABOVE AND MSDS SHEETS ARE ATTACHED.

By:

(Signature)

(Print name)

Title:

Date:

Company:

Phone:

Fax:

NOTES

NOTES

The sales and service offices of Daniel Measurement and Control are located throughout the United States and in major countries overseas.

Please contact Daniel Measurement Services at 11100 Brittmoore Park Drive, Houston, Texas 77041, or phone (713) 827-6314 for the location of the sales or service office nearest you.

Daniel Measurement Services offers both on-call and contract maintenance service designed to provide single-source responsibility for all Daniel products.

Daniel Measurement and Control, Inc., and Daniel Measurement Services, Inc. Divisions of Emerson Process Management reserves the right to make changes to any of its products or services at any time without prior notification in order to improve that product or service and to supply the best product or service possible.
www.emersonprocess.com/daniel

