

DANIEL
MODEL 1760
BACK PRESSURE PILOT

OPERATING AND MAINTENANCE MANUAL

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

**Part Number 3-9008-576
Revision A**

MARCH 2007



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 MODEL 1760 BACK PRESSURE PILOT OPERATING AND MAINTENANCE 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.

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**DANIEL MEASUREMENT AND CONTROL, INC.
DANIEL MODEL 1760 PILOT
OPERATING AND MAINTENANCE MANUAL**

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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.

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1.0 MAINTENANCE

All pilots and their parts should be inspected and cleaned at regularly scheduled intervals. All O-rings should be checked for nicks, cuts and wear. Any defective or doubtful O-rings should be replaced.



Figure 1-1. Daniel Model 1760 Back Pressure Pilot

1.1 PILOT DISASSEMBLY (See Figure 2-1)

1. Turn pressure adjustment screw (Item 31) counter-clockwise until tension is relieved on the spring. Push in on the pilot cover (Item 2) and remove by extracting the Spirolox retaining ring (Item 30).
2. Disengage the poppet shaft (Item 19) from the sensing piston (Item 24) by holding the shaft and removing the nut (Item 26) and lockwasher (Item 25).
3. Remove sensing piston (Item 24).
4. Remove poppet shaft (Item 19) and cage (Item 14) as a unit after removing retainer ring (Item 20). Remove poppet shaft and guide bushing (Item 16) after removing retainer ring (Item 17). Remove poppet shaft from the guide bushing.
5. Using a 3/32" punch, drive pin (Item 8) from poppet shaft, remove the retainer sleeve (Item 10) and O-ring (Item 11) from the shaft.

CAUTION**POSSIBLE INJURY OR EQUIPMENT DAMAGE**

Be careful to avoid bending the shaft when using the punch.

The shaft can be easily bent when using the punch incorrectly.

6. Remove and inspect all O-rings.

1.2 PILOT REASSEMBLY

1. For pilots used on crude oil, gasoline, diesel fuel or other general liquid hydrocarbon service, apply a light oil or general purpose grease to all O-rings to prevent cutting and to facilitate assembly. Use a light oil only for Butane and Propane service.
2. Reassemble by reversing disassembly order. Be careful not to cut O-rings when assembling parts and assemblies. Be sure spring (Item 21) under the sensing piston is in place.

Table 1-1. Complete Pilot Assemblies

Model 1760
453200-52x 0 - 40
453200-53x 30 - 80
453200-54x 70 - 18x
456100-53x 150 - 350
456100-54x 350 - 650

“X” defines O-ring material

- 1 = Viton® dynamic / Buna static
- 2 = all Viton®
- 3 = Neoprene™
- 4 = Nitrile
- 5 = Kalrez®

For other materials contact factory

Trademarks:

- | | |
|-----------|--|
| Daniel | Daniel Measurement and Control, Emerson Process Management |
| Neoprene™ | E. I. du Pont de Nemours and Company |
| Rosemount | Rosemount, Inc. |
| Viton® -A | E. I. du Pont de Nemours and Company |
| Kalrez® | E. I. du Pont de Nemours and Company |

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2.0 PARTS LIST (See Figure 2-1)

Item	Description	Part Number	Required
1	Pilot Body (Steel)	453301-500	1
	Cover (Steel, 0-180 psi)	460006-600	1
	Cover (Steel, 150-650 psi)	463006-600	1
3	O-ring**	152064	1
8	Roll Pin	153511	1
9	Orifice Screw	460108	1
10	Retainer Sleeve	460112	1
11*	O-ring**	152067	1
12*	O-ring**	157009	1
13*	O-ring**	157010	1
14	Pilot Cage	460007	1
15*	O-ring**	152090	1
16	Guide Bushing	460008	1
17	Retainer Ring	156467	1
18*	O-ring**	152066	1
19	Poppet Shaft	460111	1
20	Retainer Ring	156466	1
21	Spring	460021	1
22	Thrust Washer	460013	1
23	O-ring (Steel, 0 - 180 psi)	152073	1
	O-ring (Bronze & Steel 150 - 650 psi)	152091	1
24	Piston (Steel, 0 - 180 psi)	460116	1
	Piston (Bronze & Steel, 150 - 650 psi)	463016	1

DANIEL MODEL 1760 BACK PRESSURE PILOT

Item	Description	Part Number	Required
25	Lockwasher	152267	1
26	Nut	151543-019	2
27	Spring, 0 - 40 lbs.	460022	1
	Spring, 30 - 80 lbs.	460023	1
	Spring, 70 - 180 lbs.	460024	1
	Spring, 150 - 350 lbs.	460023	1
	Spring, 350 - 650 lbs.	460024	1
28	Spring Guide	460017	1
30	Retainer Ring	156465	1
31	Screw	150687-024	1
32*	O-ring**	157011	1
33	Vent Pipe Plug (Steel)	460015-500	1
34	Poppet Shaft Assembly	460110	1

* Recommended spare parts

** Part numbers listed for O-rings are Buna-N. For other O-ring materials, add suffix as follows:

EPR (use in place of Butyl)	-005
Lo-Swell Nitrile	-120
Viton® -A*	-022
Neoprene™	-116
Kalrez®	-075

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

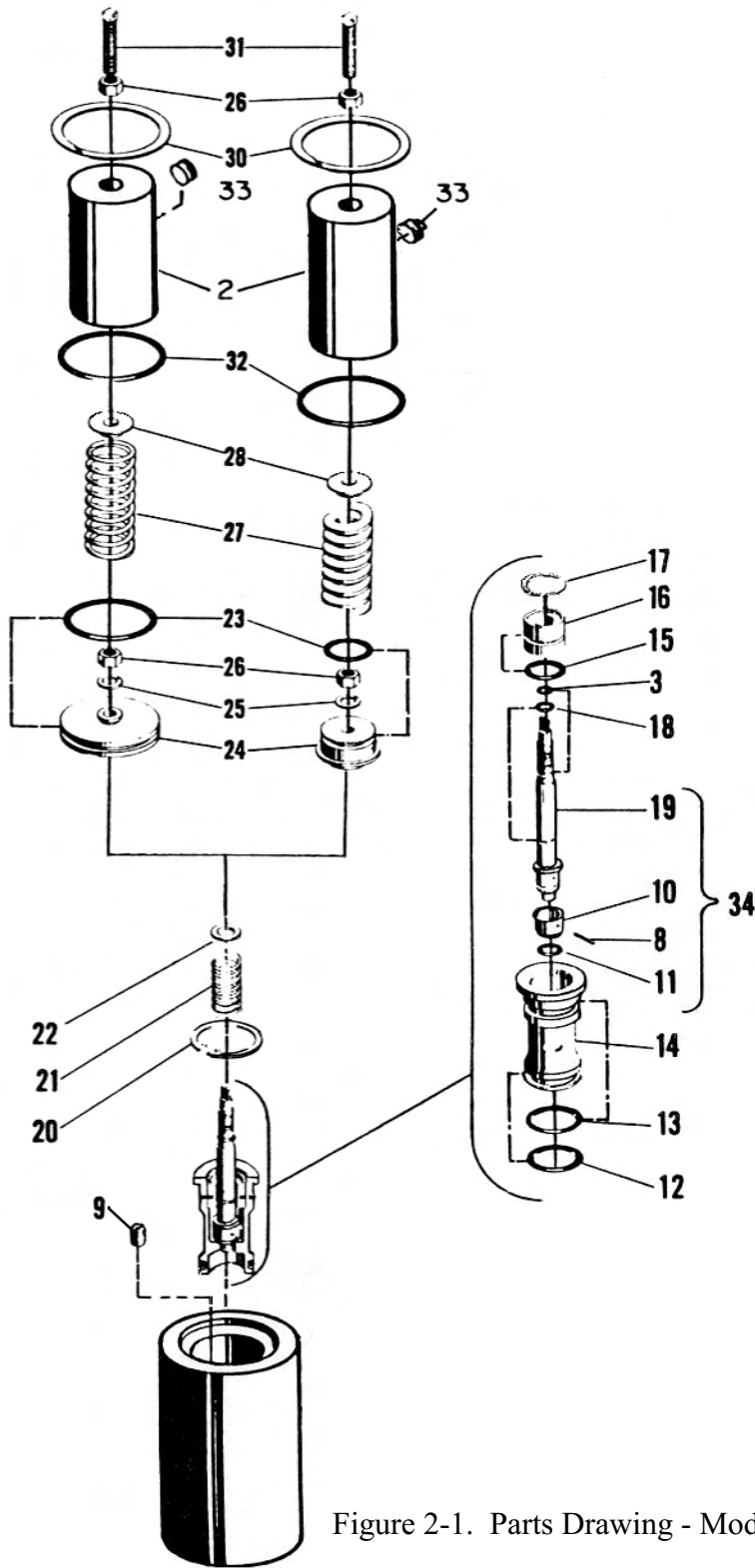


Figure 2-1. Parts Drawing - Model 1760

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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
		[] Yes [] No	
		[] Yes [] No	
		[] Yes [] No	
		[] Yes [] No	
		[] Yes [] No	
		[] Yes [] 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:

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.

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