Model 8601 Pressure Regulator
Installation & Operation Manual

BROOKS®
INSTRUMENT
Beyond Measure

Model 8601 Pressure Regulator

Essential Instructions
Read before proceeding!

Brooks Instrument designs, manufactures and tests its products to meet many national and international standards. These products must be properly installed, operated and maintained 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, operating and maintaining Brooks Instrument products.

- To ensure proper performance, use qualified personnel to install, operate, update, program and maintain the product.
- Read all instructions prior to installing, operating and servicing the product. If this instruction manual is not the correct manual, please see back cover for local sales office contact information. Save this instruction manual for future reference.

⚠ **WARNING: Do not operate this instrument in excess of the specifications listed in the Instruction and Operation Manual. Failure to heed this warning can result in serious personal injury and / or damage to the equipment.**

- If you do not understand any of the instructions, contact your Brooks Instrument representative for clarification.
- Follow all warnings, cautions and instructions marked on and supplied with the product.

⚠ **WARNING: Prior to installation ensure this instrument has the required approval ratings to meet local and national codes. Failure to heed this warning can result in serious personal injury and / or damage to the equipment.**

- 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.
- Operation: (1) Slowly initiate flow into the system. Open process valves slowly to avoid flow surges. (2) Check for leaks around the flow meter inlet and outlet connections. If no leaks are present, bring the system up to the operating pressure.
- Please make sure that the process line pressure is removed prior to service. When replacement parts are required, ensure that qualified people use replacement parts specified by Brooks Instrument. 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 to prevent electrical shock and personal injury, except when maintenance is being performed by qualified persons.

⚠ **WARNING: For liquid flow devices, if the inlet and outlet valves adjacent to the devices are to be closed for any reason, the devices must be completely drained. Failure to do so may result in thermal expansion of the liquid that can rupture the device and may cause personal injury.**

European Pressure Equipment Directive (PED)

All pressure equipment with an internal pressure greater than 0.5 bar (g) and a size larger than 25mm or 1" (inch) falls under the Pressure Equipment Directive (PED).

- The Specifications Section of this manual contains instructions related to the PED directive.
- Products described in this manual are in compliance with EN directive 2014/34/EU.
- All Brooks Instrument Flowmeters fall under fluid group 1.
- Products larger than 25mm or 1" (inch) are in compliance with PED category I, II or III.
- Products of 25mm or 1" (inch) or smaller are Sound Engineering Practice (SEP).

European Electromagnetic Compatibility (EMC)

The Brooks Instrument (electric/electronic) equipment bearing the CE mark has been successfully tested to the regulations of the Electro Magnetic Compatibility (EMC directive 2014/30/EU).
Special attention however is required when selecting the signal cable to be used with CE marked equipment.

Quality of the signal cable, cable glands and connectors:

Brooks Instrument supplies high quality cable(s) which meets the specifications for CE certification.
If you provide your own signal cable you should use a cable which is overall completely screened with a 100% shield.
"D" or "Circular" type connectors used should be shielded with a metal shield. If applicable, metal cable glands must be used providing cable screen clamping.
The cable screen should be connected to the metal shell or gland and shielded at both ends over 360 Degrees.
The shield should be terminated to an earth ground.
Card Edge Connectors are standard non-metallic. The cables used must be screened with 100% shield to comply with CE certification.
The shield should be terminated to an earth ground.
For pin configuration : Please refer to the enclosed Instruction Manual.

ESD (Electrostatic Discharge)

⚠ **CAUTION: This instrument contains electronic components that are susceptible to damage by static electricity. Proper handling procedures must be observed during the removal, installation or other handling of internal circuit boards or devices.**

Handling Procedure:

1. Power to 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 container. Boards must not be removed from protective enclosure until immediately before installation. Removed boards must immediately be placed in protective container for transport, storage or return to factory.

Comments

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, SMOS, etc.). Experience has proven that even small amounts of static electricity can damage or destroy these devices. Damaged components, even though they appear to function properly, exhibit early failure.

FIGURES

TABLES

Model 8601 Pressure Regulator

General

This section contains the procedures for the receipt and installation of the instrument. Do not attempt to start the system until the instrument has been permanently installed. It is extremely important that the start-up procedures be followed in the exact sequence presented.

Receipt of Equipment

When the equipment is received, the outside packing case should be checked for damage incurred during shipment. If the packing case is damaged, the local carrier should be notified at once regarding his liability. A report should be submitted to the nearest Brooks Instrument location listed on the Global Service Network page on our website: BrooksInstrument.com/GlobalSupportCenters

Remove the envelope containing the packing list. Carefully remove the instrument from the packing case. Make sure spare parts are not discarded with the packing materials. Inspect for damaged or missing parts.

Recommended Storage Practice

If intermediate or long-term storage of equipment is required, it is recommended that the equipment be stored in accordance with the following:

a. Within the original shipping container.
b. Stored in a sheltered area, preferably a warm, dry, heated warehouse.
c. 32°C (90°F)maximum,45°F (7°C) minimum.
d. Relative humidity 45% nominal, 60% maximum, 25% minimum. Upon removal from storage a visual inspection should be conducted to verify the condition of equipment is "as received".

Return Shipment

Prior to returning any instrument to the factory for any reason, visit our website for instructions on how to obtain a Return Materials Authorization Number (RMA #) and complete a Decontamination Statement to accompany it: BrooksInstrument.com/Service. All instruments returned to Brooks also require a Material Safety Data Sheet (MSDS) for the fluid(s) used in the instrument. Failure to provide this information will delay processing of the instrument.
Instrument must have been purged in accordance with the following:

⚠ WARNING

Before returning the device, purge thoroughly with a dry inert gas such as Nitrogen before disconnecting process connections. Failure to correctly purge the instrument could result in fire, explosion or death. Corrosion or contamination may occur upon exposure to air.

Description

Brooks 8601 Regulators are high precision supply pressure regulators which are direct acting, non-relieving units that provide bubble tight shut-off on helium at 100 psi.

Compact and economical, these units are assembled in a “clean room” environment and are tested under simulated operating conditions.

Specifications

⚠ WARNING

Do not operate this instrument in excess of the specifications listed in this manual. Failure to heed this warning can result in serious personal injury and/or damage to the equipment.

⚠ CAUTION

It is the user’s responsibility to select and approve all materials of construction. Careful attention to metallurgy, engineered materials and elastomeric materials is critical to safe operation.

Table 1-1 Specifications

Specifications	8601
Capacity	The pressure regulator is ideal for use at up to a maximum of 1,000 sccm air
Max. Inlet Supply Pressure	150 psi (1,034 kPa)
Max. Working Temperature	Standard: 140°F (60°C), Optional: 350°F (177°C)
Total Pressue Drop	Minimum: 10 psi, Maximum: 150 psi
Connections	Standard: 1/8” NPT; Optional 1/4” NPT, 1/8” or 1/4” compression fitting, 1/4” ID hose adaptors
Standard Seals & Fittings	Brass w/Buna-N, Stainless Steel w/Viton fluoroelastomer
Fittings	1/8” FNPT or 1/4” FNPT
Dimensions	See Dimensions Figure
Maximum Temperature	250°F/121°C
Typical Characteristics	Helium 60 psig supply, 50 psig output
Drift	Less than 1% in first fifteen minutes to total of no more than 1.5% long term
Supply Pressure Effect	10 psi increase in supply will not change output more than 0.07 psi
Flow Regulation	From 3 sccm to 70 sccm helium, output pressure will not decrease more than: 0.08 psig (0-10, 0-30 psi Regulators) 0.10 psig (0-60 psi Regulators) 0.125 psig (0-100 psi Regulators) 0.15 psig (0-150 psi Regulators) 0.175 psig (0-200 psi Regulators)
Ambient Temperature Effect	Standard 60 psi range, 0.020 psi/°F
Base Line Oscillation	.0025 psi
Valve Adjustment & Oper. Range	Fifteen turns for 0-10, 0-30, 0-60, 0-100, 0-150 psig output range
Materials of Construction	
Body	Standard: Aluminum; Optional: 316 Stainless Steel
Bonnet	Aluminum
Valve Seat	Standard: Brass; Optional 316 Stainless Steel
Valve Stem	316 Stainless Steel
Diaphragm	Reinforced Buna-N, Viton-Â fluoroelastomers
Range Spring	Music Wire, zinc plated
Filter	40 micron, 316L Sintered Stainless Steel with Viton fluoroelastomer or Buna retainer sleeve
Compatible Brooks Equipment	Model 1390 Filter and Model 1391 Filter

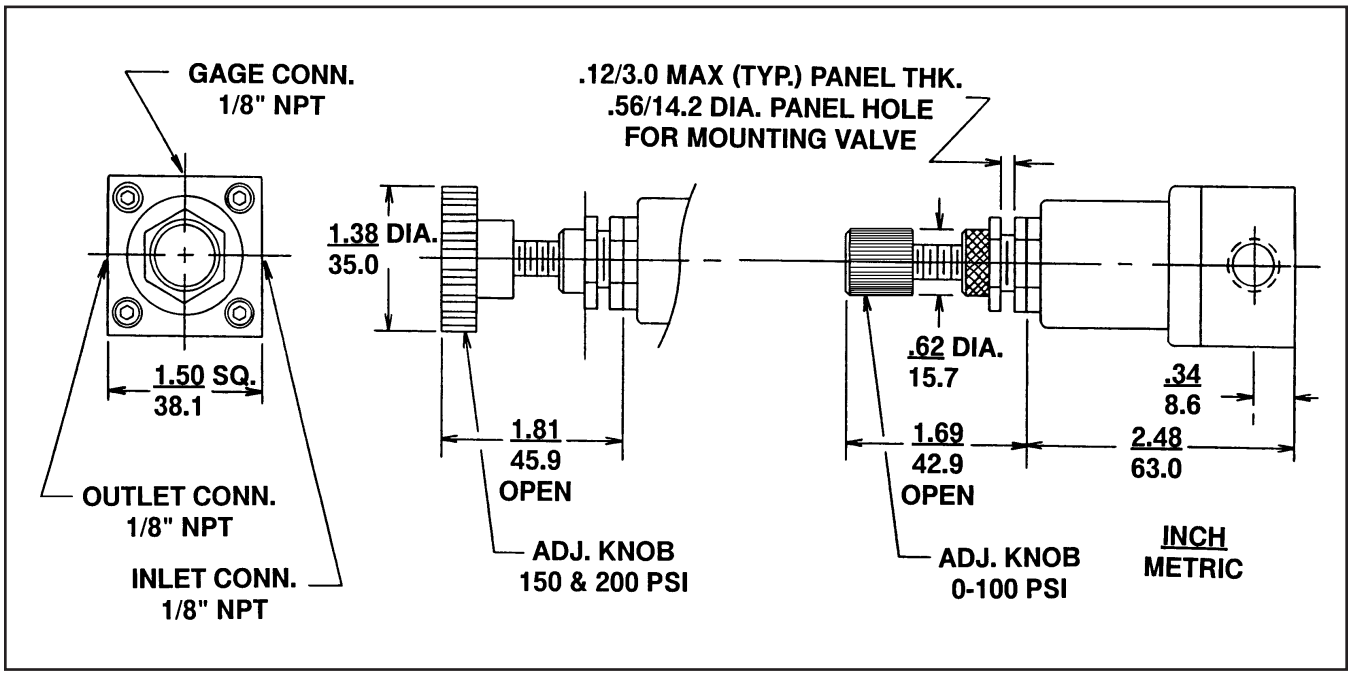

Figure 1-1 Dimensions

Transit Precautions

To safeguard against damage during transit, transport the instrument to the installation site in the same container used for transportation from the factory if circumstances permit.

Removal from Storage

Upon removal from storage, a visual inspection should be conducted to verify the condition of the equipment is “as received.” If the equipment has been in storage in conditions in excess of those recommended (See Section 2-3), the device should be subjected to a pneumatic pressure test in accordance with applicable vessel codes.

Installation

The regulator may be installed in any attitude. Inlet and outlet connection piping should be rigidly supported to prevent undue strain on the regulator body. A good quality sealant that is compatible with the gases involved should be used on NPT connections.

Extreme care must be exercised to prevent any solids from entering the regulator. It is recommended that a Brooks Model 1391 Filter or equivalent be used on the regulator input to protect it from any foreign matter in the flow stream.

Panel Mounting

A single 9/16" diameter panel hole is required for panel mounting the regulator. For front panel mounting, remove the regulator knob, the knurled packing nut, and one panel nut. Insert the regulator stem in the panel opening. Replace and tighten the panel nut, packing nut, and knob. Do not over-tighten the knurled packing nut.

⚠WARNING

Do not apply pressure to the valve until the bonnet nut has been completely tightened. Failure to heed this warning can result in serious personal injury and/or damage to the equipment.

Operating Precaution

⚠WARNING

Do not operate the instrument in excess of temperature and pressure ratings. Serious injury and/or damage to the instrument could result.

⚠ CAUTION

Any sudden change in system pressure may cause mechanical damage to elastomer materials. Damage can occur when there is a rapid expansion of fluid that has permeated elastomer materials. The user must take the necessary precautions to avoid such conditions.

Operation

Before placing the regulator in operation, make sure all gas connections are tight. For initial start-up, the supply pressure should not exceed 75 psi and may afterward be increased to operating level. Supply pressure must never exceed 150 psi. If a flowmeter is desired for rate indication, it should be installed on the downstream side of the regulator.

Maintenance

⚠ WARNING

METER/CONTROLLER SEAL COMPATIBILITY

Products in this manual may contain metal or elastomeric seals, gaskets, O-rings or valve seats. It is the "user's" responsibility to select materials that are compatible with their process and process conditions. Using materials that are not compatible with the process or process conditions could result in the Meter or Controller leaking process fluid outside the pressure boundary of the device, resulting in personnel injury or death.

It is recommended that the user check the Meter or Controller on a regular schedule to ensure that it is leak free as both metal and elastomeric seals, gaskets, O-rings and valve seats may change with age, exposure to process fluid, temperature, and /or pressure.

The Brooks 8601 Regulator requires no maintenance when installed in a dirt-free flow line. Except for filter replacement, repair or disassembly of the regulator in the field is not recommended (see Filter Replacement). The regulator parts are ultrasonically cleaned and clean-room assembled for trouble-free operation. Do not attempt to clean the regulator by flushing with solvent or air.

Should the regulator become inoperative, it should be returned to the factory for repair or replacement. If the unit is disassembled in the field, the warranty is voided and no credit will be issued by the factory.

Filter Replacement

Filter Removal:
Using a thin screwdriver or a pair of tweezers, rotate the filter 180° by pushing on the edge (See Figure 4-1). Remove the filter and filter retainer.

Filter Installation:
Locate the filter element into the retainer as shown. Place the filter assembly into the inlet cavity of the regulator body. Use tool P/N 908-Z-060EAA or a 0.305 diameter rod to press the assembly completely into the body cavity, ensuring that the filter elements remains seated in the retainer.

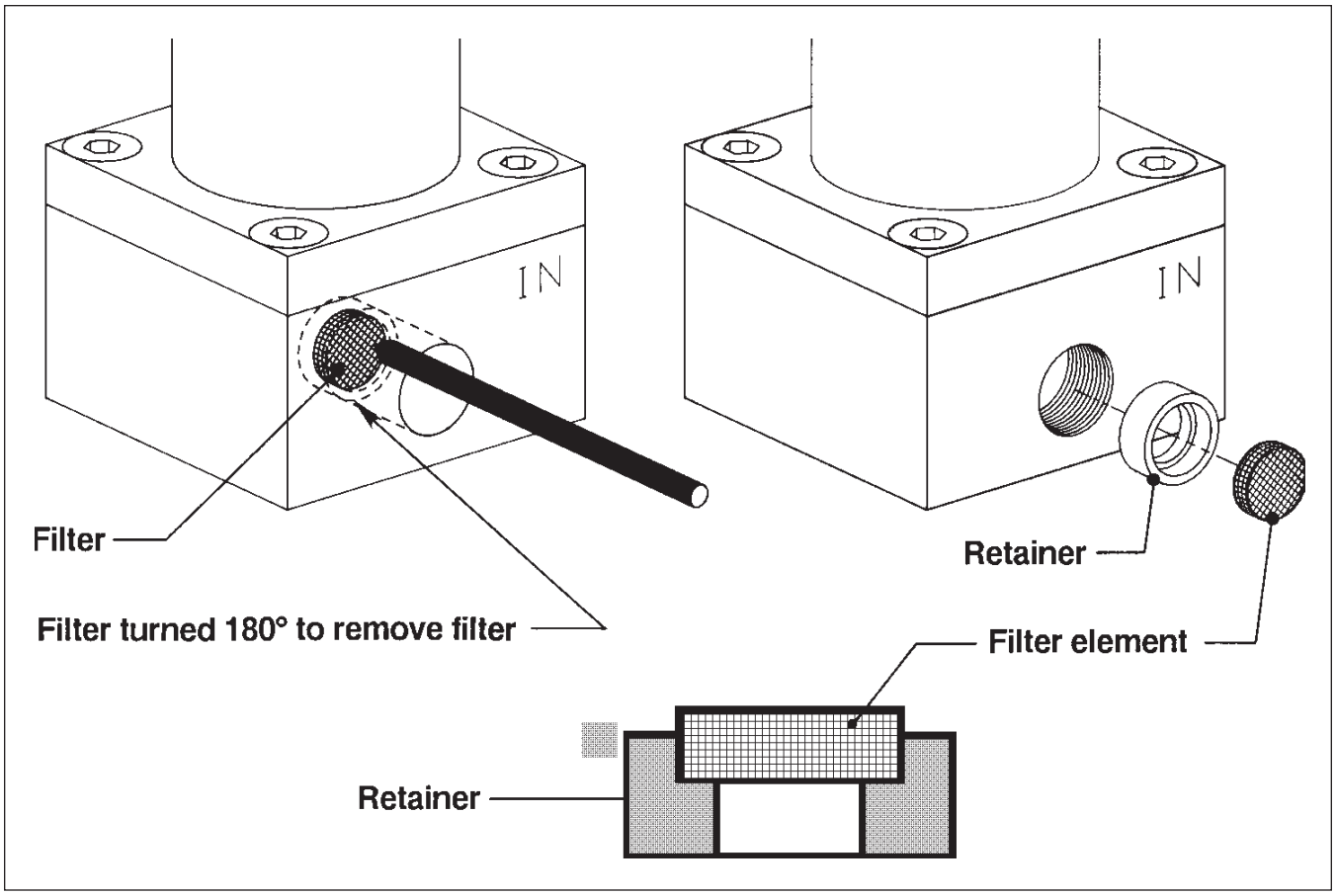

Figure 4-1 Filter Replacement

Table 4-1 Replacement Parts

Description	Part Number
Filter Element, 40 micron	306Z223BNA
Filter Retainer, Buna-N	715Z224SUA
Filter Retainer, Viton-A™	715Z224QTA
Installation Tool	908-Z-060-EAA

LIMITED WARRANTY

Visit www.BrooksInstrument.com for the terms and conditions of our limited warranty.

BROOKS SERVICE AND SUPPORT

Brooks is committed to assuring all of our customers receive the ideal flow solution for their application, along with outstanding service and support to back it up. We operate first class repair facilities located around the world to provide rapid response and support. Each location utilizes primary standard calibration equipment to ensure accuracy and reliability for repairs and recalibration and is certified by our local Weights and Measures Authorities and traceable to the relevant International Standards.

Visit www.BrooksInstrument.com to locate the service location nearest to you.

START-UP SERVICE AND IN-SITU CALIBRATION

Brooks Instrument can provide start-up service prior to operation when required.
For some process applications, where ISO-9001 Quality Certification is important, it is mandatory to verify and/or (re)calibrate the products periodically. In many cases this service can be provided under in-situ conditions, and the results will be traceable to the relevant international quality standards.

SEMINARS AND TRAINING

Brooks Instrument can provide seminars and dedicated training to engineers, end users and maintenance persons.

Please contact your nearest sales representative for more details.

Due to Brooks Instrument's commitment to continuous improvement of our products, all specifications are subject to change without notice.

ISO 9001 QUALITY SYSTEM

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