

OPERATION MANUAL

M16

Pneumatic Precision Vacuum Regulator



*** VERSION 1.0 ***

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GENERAL INFORMATION

- Precision Regulator for Vacuum and Overpressure
- Pressure Control Ranges from -0,9 to 10,0 bar
- Response Sensitivity better 0,9 % F.S.
- Input Pressure Dependency better 0,1 % F.S./bar
- Open Pressure Regulator with Relief Valve

TECHNICAL DESCRIPTION

The M16 precision pressure regulator is a direct acting proportional regulator for vacuum and overpressure with regulation range limits from -0,9 bar and +0,15 up to +10,0 bar. It can be used for both operation modes: inline to regulate mixed pressures out of vacuum and overpressure and by-pass operation as pure vacuum regulator versus atmosphere.

Between the spring-diaphragm-system and the counteracting output pressure arises a force balance, which keeps the outlet pressure almost constant for large input pressure changes. This is supported by the continuous bleeding of a small amount of air through a relief valve, which prevents the regulator from friction caused pausing. In addition to small pressure dependency the regulator therefore shows high control sensitivity and fast response behaviour.

SPECIFICATIONS

Pressure Control Ranges

Upper Limits of Output or Set Point Pressure: -0,9 to +0,15 / 0,7 / 2,0 / 7,0 / 10,0 bar

Input or Primary Pressure: > 150 % F.S. (max. 17 bar)

Response Behaviour

Response Sensitivity: < 0,9 % F.S.

Input Pressure Dependency: < 0,1 % F.S./bar

Operating Conditions

Input Pressure: -0,9 bar vacuum and up to 17 bar overpressure

Temperature: -40 ... +93 °C

Humidity: 0 ... 90 % r.H. (non-condensing)

Media Compatibility

Clean, dry, oil-free air; humidity non-condensing.

Flow Behaviour

Air Mass Flow at 7 bar Primary Pressure and 1100 NI/min

1,4 bar Set Point Pressure:

Air Mass Flow for By-pass Operation, 70 NI/min

Atmosphere versus Vacuum:

Air Mass Flow for Inline Operation, 1 NI/min

Atmosphere versus Vacuum:

Air Consumption (Constant Bleed): < 5,5 NI/min

Approximated flows with fully opened valve for standard conditions (1013 mbar abs., 0 °C, 0 % r.H.).

Enclosure

Dimensions Regard page 6 "Dimensions"

Material Housing: Aluminium, anodised

Control Knob: Plastic

Valve Assembly: Stainless steel, brass and zinc-plated steel

Diaphragm: Nitrile on Dacron

Weight Total: ≈ 940 g

Process Connections

Pressure Standard: 1/4"f NPT (3 x)

Optional: 3/8"f NPT (3 x)

Manometer: Standard: 1/4"f NPT (2 x)

Optional: 1/4"f BSPT (2 x)

Options:

c,d,e **Respectively single chooseable options**

A Silicone elastomers

H BSPP (Parallel) instead of NPT thread inline

I Tamper proof

J Fluorocarbon elastomers

L Controller with low flow

U BSPT (Tapered) instead of NPT thread inline

INSTALLATION

Clean pipe lines to remove dirt and scale before installation is made. Apply minimum amount of pipe compound to male threads of air line to avoid possibility of getting compound into regulator. Install regulator in air line, body is fitted with a 1/4" or 3/8" NPT for inlet and outlet connections. Regulator can be mounted in any position without affecting its operation. Inlet and outlet connections are labeled (look for arrows denoting direction of flow on underside of unit) and should be tightened securely. Avoid undersized fittings that will limit flow through the regulator and cause pressure drop downstream. The use of a filter to remove dirt and entrained liquid in the air line ahead of the regulator is recommended for best performance. If an air line lubricator is used , it should be located downstream beyond the regulator in order to avoid interference with the regulator performance.

NOTICE

The presence of certain diester oils in the airlines may hasten deterioration of the elastomers and thus decrease the useful life of this unit.

ADJUSTMENTS

No field adjustments are necessary.

OPERATION

Relieve pressure on range spring before putting regulator into service for the first time. When operating at pressure above atmospheric, turn the adjusting screw slowly in a clockwise direction until required downstream pressure is obtained. For pressure below atmospheric, turn the adjusting screw counterclockwise until the desired setting is obtained. Turned in a clockwise direction, the screw compresses the range spring causing increased output pressure. For decreased output pressure, or set a lower vacuum setting, turn the screw counterclockwise.

MAINTENANCE

The Regulator is easily disassembled for the occasional cleaning or removal of foreign matter. Before this is done, however, shut off valve upstream of the regulator to prevent escape of air when regulator is disassembled. Also shut off the controlled vacuum to avoid pressurizing the system. There is no need to remove the regulator from the pipe line, remove the two No.10 - 32 screws on the bottom of the unit and pull out the inner valve assembly. Wash inner valve assembly with solvent exercising care to avoid damaging diaphragms and valve facings. Replace assembly carefully. The vent hole in the bonnet should be kept clear. The adjusting screw should be lubricated with Molycote type "G" grease.

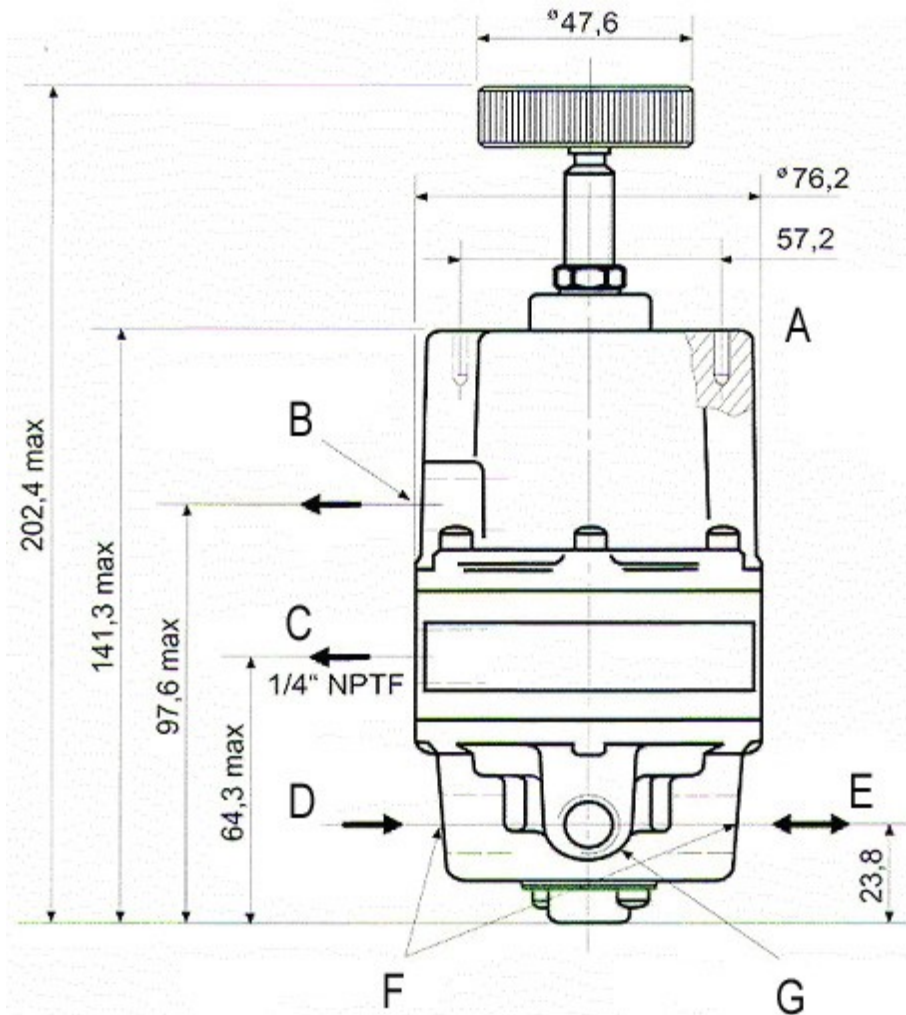
CAUTION

(Avoid such solvent as acetone, carbon tetrachloride, trichlorethylene)

TROUBLE SHOOTING

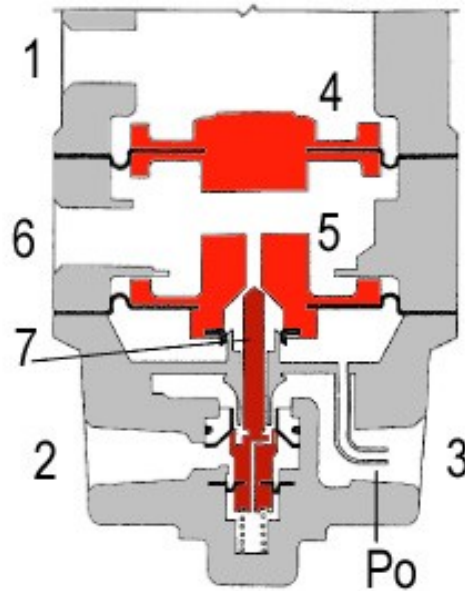
Problem	Check
Leakage	Body screw thightness Diapraghm
High Bleed	Relief pintle and relief seat for damage or contamination
Difficult to Adjust	Adjusting screw and ball Seal ring lubrication

DIMENSIONS



- A** Mounting threads for mounting brackets
- B** Vent keep clear
- C** Vacuum pump
- D** Max. Atmosphere or pressure supply
- E** Control system pressure
- F** 1/4" or 3/8" NPTF
- G** 1/4" NPT manometer connections on both sides

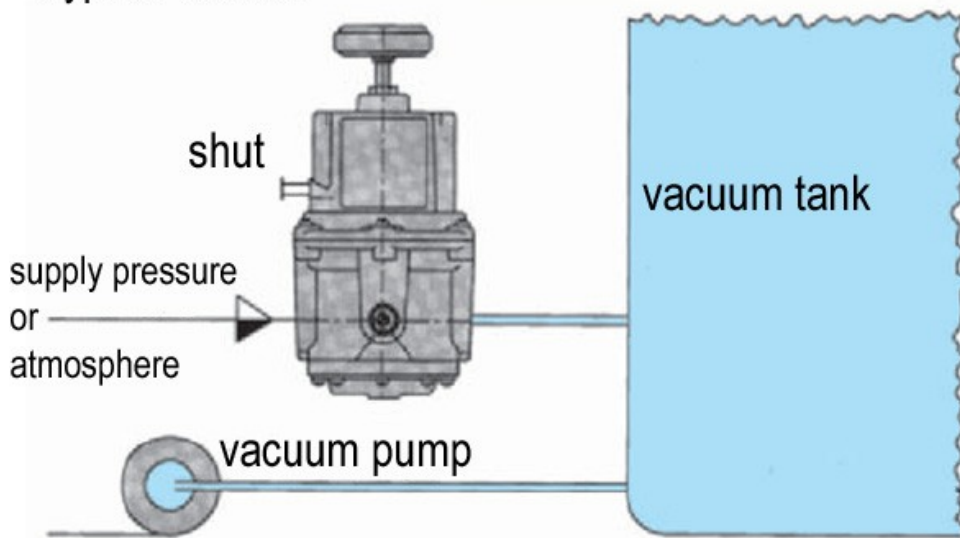
FUNCTIONAL DRAWING



- 1 Vent for Blow off (keep Clear)
- 2 Connection for Pressure Supply
- 3 Control System Pressure
- 4 Piston combined with diaphragm bedded springs bothsides (Signal diaphragm)
- 5 Piston combined with diaphragm bedded with spring on the top (Control diaphragm)
- 6 Connection for vacuum pump
- 7 Relief valve combined with diaphragm bedded with supply valve spring on the bottom
- Po Aspirator tube for controlling the actual pressure at operation

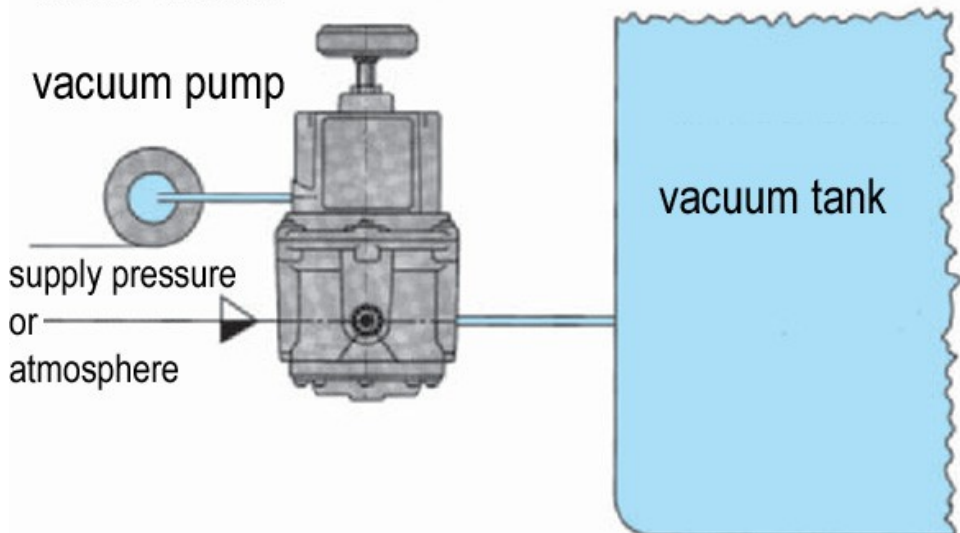
CONNECTION OPTIONS

Bypass-Control



Advantageous connection of the vacuum regulator, if the vacuum tank should be evacuated and controlled very quickly. In this case the vacuum pump operates directly to the vacuum tank and is not throttled through the regulator.

Inline-Control



Advantageous connection of the vacuum regulator, if the tank should be filled with overpressure in one case and should be evacuated in the other case. The supply pressure can be opened alternatively to atmosphere.

Notice: Connection side to atmosphere or supply pressure should be equipped with a pressure filter.

MOUNTING BRACKETS

Zinc plated steel (Accessory)
316 Stainless steel (Accessory)

