



## VAREC SERIES 187 DOWNSTREAM CONTROL DOUBLE PORT REGULATOR

### INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

Before installation these instructions must be read fully and understood

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#### DISCLAIMER OF WARRANTIES

The contract between the seller and the buyer states the entire obligation of the seller. The contents of this instruction manual shall not become part of or modify any prior or existing agreement, commitment or relationship between the seller and buyer. There are no express or implied warranties set out in this instruction manual. The only warranties that apply are those in the existing contract between the seller and buyer.

The Varec Series 187 double port reducing or repressuring regulators have not been tested under all possible operational conditions and Emerson does not have all the data relative to your application. The information in this instruction manual is not all inclusive and does not and cannot take into account all unique situations. Consequently, you should review this product literature in view of your application. If you have any further questions, please contact Emerson for assistance.

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Use of parts that are not manufactured or supplied by Emerson voids any Emerson warranty and relieves Emerson of any obligation to service the product under warranty. Emerson recommends the use of only Emerson manufactured or supplied parts to maintain or service Varec Series 187 double port reducing or repressuring regulator.

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#### SAFETY PRECAUTIONS

*Read and understand this instruction manual before installing, operating or performing maintenance on Varec Series 187 double port reducing or repressuring regulators. Follow all precautions and warnings noted herein when installing, operating or performing maintenance on this equipment.*

#### Safety precaution definitions:

##### CAUTION

*Damage to equipment may result if this precaution is disregarded.*

##### WARNING

*Direct injury to personnel or damage to equipment which can cause injury to personnel may result if this precaution is not followed.*

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#### GENERAL

Varec Series 187 reducing or repressuring regulators are diaphragm operated, weighted lever and spring controlled highly sensitive gas control valves. The regulators are designed for maintaining a constant downstream pressure automatically. They are used widely in anaerobic digester waste gas systems to 'throttle' gas flow to fuel burning devices and in vapor recovery systems and gas blanketing systems to maintain a slight positive pressure on the tanks.

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#### CONSTRUCTION

1. Standard materials of construction include a cast aluminum body and diaphragm housing, reinforced NBR rubber diaphragm and 304 stainless steel plugs, seats and other trim. Special materials such as cast iron or cast steel valve bodies or PTFE diaphragms are also available.
2. Connections are NPT threaded on sizes ½" through 1½". Connections are flanged, drilled to 125 PSI ANSI requirements on sizes 2" through 8". Aluminum or iron valve bodies are provided with flat face flanges, while steel bodies are provided with raised face flanges.

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### PRE-INSTALLATION REQUIREMENTS

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1. Particular care should be exercised in unboxing and handling regulators. Bending of control mechanism, strain to diaphragm or changing position of balance weights will result in unsatisfactory operation.
2. **When handling, grasp and support only by the valve body. Do not handle by grasping the diaphragm housing, linkage mechanism or weight arm.**
3. After unboxing, inspect to insure against presence of dirt or other foreign matter. Also, check valve seats and plugs for cleanliness and freedom of operation.

### INSTALLATION

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1. The Series 187 regulator must be installed in an upright position in a horizontal pipe run, as shown on the reference drawing. Flow through the valve must be in the direction indicated by the arrow on the valve body. The valve should be located free of contact with any adjacent equipment or pipelines.
2. **Connection piping should be fitted accurately to be gas tight without strain on the valve body or diaphragm housing.**
3. It is recommended that stop valves (by others) be installed in upstream and downstream piping and in the control line to the regulator to permit taking the regulator off the line for maintenance purposes. Regulators with NPT threaded connections should have all pipe lines fitted with ground joint unions located between the stop valves and the regulator.
4. Control line piping should be 1" size and should be connected to downstream piping as far downstream as possible, preferably to the location at which the pressure control is desired. Minimum distance should never be less than 10 feet from the regulator. Control piping should be fitted accurately to be gas tight without strain on the diaphragm housing and should be supported firmly.
5. All upstream, downstream and control pipe lines should be cleaned thoroughly prior to installing the regulator.

### OPERATION

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1. Line pressure as sensed through control line piping is applied to one side of the diaphragm. This pressure acts against a pre-set compression spring and balance weights to open and close (regulate) the plugs within the double ported valve body.
2. As line pressure downstream of the regulator begins to rise above or fall below the set point of the regulator, the valve will 'throttle' as required to maintain this set pressure.

### ADJUSTMENT

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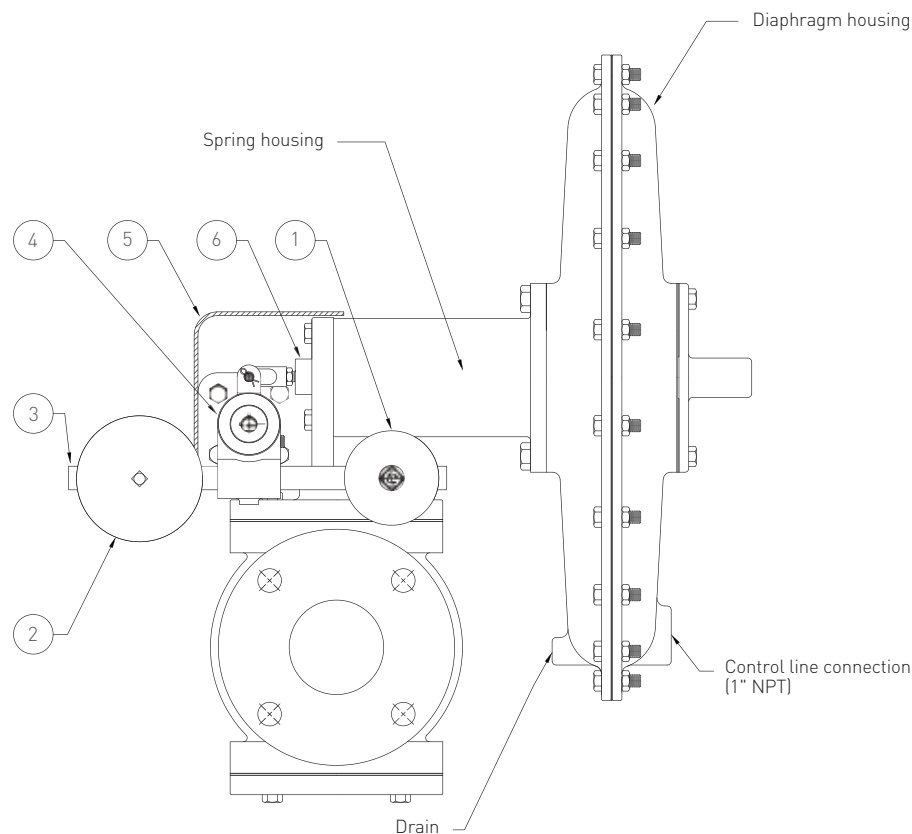
Varec Series 187 regulators are shipped from the factory fully assembled pre-set to operate at the customer's specified setting. Further adjustment should not be necessary. However, if it should become necessary to change the factory setting, the procedure detailed on page 3 should be followed.

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### NOTE

For identification of parts referenced, see figure below.  
Connect suitable manometer or pressure gauge to diaphragm control line.



- 1. Minor adjustments:** shifting position of weights (items 1 and 2) on weight arm (item 3) and position of weight arm on pivot clamp (item 4) will satisfy minor adjustments. The maximum minor adjustment is attained when both weights are positioned at the furthest possible position on the weight arm at the opposite side from the diaphragm and with the arm at its furthest position on the pivot clamp at the opposite side from the diaphragm. The arm must be kept free of contact with the diaphragm housing to permit full swing from closed to full open position of the regulator. As the weights and arm are shifted toward the diaphragm side of the pivot clamp, the setting is lowered.
- 2. Major adjustments:** in the event it is not possible to attain the desired setting by the method described above for minor adjustments, it becomes necessary to make further adjustments by means of a spring provided for that purpose. Prior to adjusting the spring, it is desirable to locate the weight arm and weights in a position as shown in the figure above to allow minor adjustment in either direction later if necessary.

Having positioned the weights and arm, remove cover (item 5) exposing adjustment nut (item 6). If the desired setting is lower than the factory setting, tighten up the spring adjustment nut (clockwise) until the resulting desired setting is attained. If the desired setting is higher than the factory setting, back-off on the spring adjustment nut. Having reached an approximate desired setting by means of the adjusting spring, make final close adjustment with the weights. Replace the cover.

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### MAINTENANCE

Varec Series 187 regulators require very little attention. Periodically, the cover over the linkage should be removed and the parts inspected for ease of operation by observing the action when the weight arm is moved manually. Performance of the regulator can be checked by observing the system pressure when in operation. Replace cover after inspection.

### REPLACEMENT PARTS

When ordering replacement parts specify regulator parts by model number and pipe size. Identify replacement parts by description and part number where possible (see Table below).

Item description	1/2" Size	1" Size	1 1/2" Size	2" Size	3" Size	4" Size	6" Size	8" Size
Upper and lower body gasket	B2194-046	B2194-046	B2194-046	B2194-046	B2244-046	B2222-046	D900-046	B11545-046
Bonnet gasket	B2195-046	B2195-046	B2195-046	B2195-046	B2195-046	B2195-046	B2195-046	B2195-046
Bonnet cover gasket	D3928-046	D3928-046	D3928-046	D3928-046	D3928-046	D3928-046	D3928-046	D3928-046
O-ring	P14-10	P14-10	P14-10	P14-10	P14-10	P14-10	P14-10	P14-10
Diaphragm								
PTFE	B13747-094	B13747-094	B13747-094	B13747-094	B13747-094	B13747-094	B13747-094	B13747-094
NBR	D4608-074	D4608-074	D4608-074	D4608-074	D4608-074	D4608-074	D4608-074	D4608-074
FKM	D4608-087	D4608-087	D4608-087	D4608-087	D4608-087	D4608-087	D4608-087	D4608-087