10900 Series
Masoneilan* Spring Diaphragm and Differential Pressure Actuators for use with 500 Series Regulators

Instruction Manual
THESE INSTRUCTIONS PROVIDE THE CUSTOMER/OPERATOR WITH IMPORTANT PROJECT-SPECIFIC REFERENCE INFORMATION IN ADDITION TO THE CUSTOMER/OPERATOR'S NORMAL OPERATION AND MAINTENANCE PROCEDURES. SINCE OPERATION AND MAINTENANCE PHILOSOPHIES VARY, GE (GENERAL ELECTRIC COMPANY AND ITS SUBSIDIARIES AND AFFILIATES) DOES NOT ATTEMPT TO DICTATE SPECIFIC PROCEDURES, BUT TO PROVIDE BASIC LIMITATIONS AND REQUIREMENTS CREATED BY THE TYPE OF EQUIPMENT PROVIDED.

THESE INSTRUCTIONS ASSUME THAT OPERATORS ALREADY HAVE A GENERAL UNDERSTANDING OF THE REQUIREMENTS FOR SAFE OPERATION OF MECHANICAL AND ELECTRICAL EQUIPMENT IN POTENTIALLY HAZARDOUS ENVIRONMENTS. THEREFORE, THESE INSTRUCTIONS SHOULD BE INTERPRETED AND APPLIED IN CONJUNCTION WITH THE SAFETY RULES AND REGULATIONS APPLICABLE AT THE SITE AND THE PARTICULAR REQUIREMENTS FOR OPERATION OF OTHER EQUIPMENT AT THE SITE.

THESE INSTRUCTIONS DO NOT PURPORT TO COVER ALL DETAILS OR VARIATIONS IN EQUIPMENT NOR TO PROVIDE FOR EVERY POSSIBLE CONTINGENCY TO BE MET IN CONNECTION WITH INSTALLATION, OPERATION OR MAINTENANCE. SHOULD FURTHER INFORMATION BE DESIRED OR SHOULD PARTICULAR PROBLEMS ARISE WHICH ARE NOT COVERED SUFFICIENTLY FOR THE CUSTOMER/OPERATOR'S PURPOSES THE MATTER SHOULD BE REFERRED TO GE.

THE RIGHTS, OBLIGATIONS AND LIABILITIES OF GE AND THE CUSTOMER/OPERATOR ARE STRICTLY LIMITED TO THOSE EXPRESSLY PROVIDED IN THE CONTRACT RELATING TO THE SUPPLY OF THE EQUIPMENT. NO ADDITIONAL REPRESENTATIONS OR WARRANTIES BY GE REGARDING THE EQUIPMENT OR ITS USE ARE GIVEN OR IMPLIED BY THE ISSUE OF THESE INSTRUCTIONS.

THESE INSTRUCTIONS ARE FURNISHED TO THE CUSTOMER/OPERATOR SOLELY TO ASSIST IN THE INSTALLATION, TESTING, OPERATION, AND/OR MAINTENANCE OF THE EQUIPMENT DESCRIBED. THIS DOCUMENT SHALL NOT BE REPRODUCED IN WHOLE OR IN PART TO ANY THIRD PARTY WITHOUT THE WRITTEN APPROVAL OF GE.
Safety Information

Important - Please Read Before Installation

Masoneilan 10900 Series actuator instructions contain DANGER, WARNING, and CAUTION labels, where necessary, to alert you to safety related or other important information. Read the instructions carefully before installing and maintaining your control valve. DANGER and WARNING hazards are related to personal injury. CAUTION hazards involve equipment or property damage. Operation of damaged equipment can, under certain operational conditions, result in degraded process system performance that can lead to injury or death. Total compliance with all DANGER, WARNING, and CAUTION notices is required for safe operation.

This is the safety alert symbol. It alerts you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠️ DANGER

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠️ WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in serious injury.

⚠️ CAUTION

Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

⚠️ CAUTION

When used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, could result in property damage.

Note: Indicates important facts and conditions.

About this Manual

- The information in this manual is subject to change without prior notice.
- The information contained in this manual, in whole or part, shall not be transcribed or copied without GE's written permission.
- Please report any errors or questions about the information in this manual to your local supplier.
- These instructions are written specifically for the Masoneilan 10900 Series actuators, and do not apply to other equipment outside of this product line.

Life Period

The current estimated useful life period for the Masoneilan 10900 Series Actuators is 25+ years. To maximize the useful life of the product it is essential to conduct annual inspections, routine maintenance and ensure proper installation to avoid any unintended stresses on the product. The specific operating conditions will also impact the useful life of the product. Consult the factory for guidance on specific applications if required prior to installation.

Warranty

Items sold by General Electric are warranted to be free from defects in materials and workmanship for a period of one year from the date of shipment provided said items are used according to GE recommended usages. GE reserves the right to discontinue manufacture of any product or change product materials, design or specifications without notice.

This instruction manual applies to the Masoneilan 10900 Series actuators.

Note:

- The actuator MUST BE installed, put into service and maintained by qualified and competent professionals who have undergone suitable training.
- Under certain operating conditions, the use of damaged equipment could cause a degradation of the performance of the system which may lead to personal injury or death.
- Changes to specifications, structure, and components used may not lead to the revision of this manual unless such changes affect the function and performance of the product.
- All surrounding pipe lines must be thoroughly flushed to ensure all entrained debris has been removed from the system.
General

These adjustment and maintenance instructions apply to the 10900 Series Actuators used with the Masonian 500 Series Pressure Regulators. They include a parts reference list including recommended spare parts.

For installation, operation, adjustment and maintenance of the 500 Series Regulators body S/A refer to instructions numbers indicated by the following table.

<table>
<thead>
<tr>
<th>Regulator Model No</th>
<th>Body S/A Instruction No</th>
</tr>
</thead>
<tbody>
<tr>
<td>525; 525-50</td>
<td>GEA30557A</td>
</tr>
<tr>
<td>526; 526-50</td>
<td></td>
</tr>
<tr>
<td>535H; 535H-50</td>
<td>GEA31597</td>
</tr>
<tr>
<td>536H; 536H-50</td>
<td></td>
</tr>
<tr>
<td>535V; 535V-50</td>
<td>176419E</td>
</tr>
</tbody>
</table>

Spare parts

When performing maintenance always use GE replacement parts. Masonian Parts are obtainable through your local GE Representative or Masonian Spare Parts Department. When ordering parts, always include Masonian Model and Serial Numbers shown on serial plate.

After sales Department

GE has a highly skilled After Sales Department available for start-up, maintenance and repair of our regulators and components parts. Contact the nearest GE Sales Office or Representative.

Training

GE Masonian regularly holds training seminars for technicians. In order to participate in one of these training seminars you should contact our local GE Masonian Representative or our Training Department.

The following instructions should be thoroughly reviewed and understood prior to installing operating or performing maintenance on this equipment. Only qualified personnel to service this equipment. Non-compliance with safety rules and caution notes of this instruction may bring about malfunction of the device or damage it seriously. In addition, such negligence might expose personnel present in the field to grave hazards.

Description-Operation

The 10900 Actuator is a simple powerful mechanical device. It is Air-to-Extend Stem type. The nominal range of an actuator is the pressure range in pounds per square inch (psi) in which the pressure setting can be obtained by adjustment.

Conformation of the diaphragm (11) to the diaphram plate (10) serves as a flexible upper guide for the actuator stem (6). Nylon reinforced neoprene diaphragms permit smooth, sensitive operation. The lower guide is an oil impregnated bronze bushing (3) located in the spring adjuster (2).

Note: On request, for special services, the nylon reinforced neoprene diaphragm may be provided with a PTFE coating. Other materials are optional and available to suit the fluids involved.

The 10900 Series Actuators are designed for use with the 500 Series Regulators for reducing, back pressure and differential pressure applications.

![Function]  
<table>
<thead>
<tr>
<th>Function</th>
<th>Regulator Model No</th>
<th>Actuator Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>REDUCING</td>
<td>525</td>
<td>Spring Diaphragm</td>
</tr>
<tr>
<td>535H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>535V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BACK PRESSURE</td>
<td>526</td>
<td>Differential</td>
</tr>
<tr>
<td>536H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DIFFERENTIAL REDUCING</td>
<td>525-50</td>
<td></td>
</tr>
<tr>
<td>535H-50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>535V-50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DIFFERENTIAL BACK PRESSURE</td>
<td>526-50</td>
<td></td>
</tr>
<tr>
<td>536H-50</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The opposite chart indicates the combinations available to provide the desired function. The 10900 Series Actuators are designated by the nominal range (psi). See the following chart.

In Spring Diaphragm Actuators, three actuator cases are available: a case rated for 60 psi static pressure, a case rated for 250 psi static pressure and a case rated for 750 psi static pressure.

In Differential Pressure Actuators, two actuator cases are available: a low-pressure case rated for 250 psi static pressure, and a high-pressure case rated at 600, 1000 and 1500 psi static pressure.

<table>
<thead>
<tr>
<th>Actuator Type</th>
<th>Range (psi)</th>
<th>Max. Static Pressure (psi)</th>
<th>Case Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring Diaphragm</td>
<td>0 - 2</td>
<td>60</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>15 - 3</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>2 - 10</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 - 20</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>15 - 40</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>30 - 75</td>
<td>250</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>60 - 125</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>80 - 250</td>
<td></td>
<td>3 1/2</td>
</tr>
<tr>
<td></td>
<td>150 - 750</td>
<td>750</td>
<td>Special</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Low Pressure Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 - 12</td>
</tr>
<tr>
<td>10 - 35</td>
</tr>
<tr>
<td>30 - 75</td>
</tr>
<tr>
<td>60 - 125</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>High Pressure Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 - 15</td>
</tr>
<tr>
<td>30 - 85</td>
</tr>
<tr>
<td>5 - 30</td>
</tr>
<tr>
<td>10 - 60</td>
</tr>
<tr>
<td>75 - 185</td>
</tr>
<tr>
<td>100 - 330</td>
</tr>
</tbody>
</table>
### Design for the 0.5-2 ; 1.5-3 ; 2-10 ; 6-20 and 15-40 psi ranges

**Figure 1 — Spring-Diaphragm Actuators for 500, 500H and 500V Model Regulators**

**PARTS REFERENCE**

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Part Name</th>
<th>Ref.</th>
<th>Part Name</th>
<th>Ref.</th>
<th>Part Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yoke</td>
<td>9(1)</td>
<td>Diaphragm Chamber</td>
<td>18</td>
<td>Stop Cup</td>
</tr>
<tr>
<td>2</td>
<td>Spring Adjuster</td>
<td>10</td>
<td>Diaphragm Plate</td>
<td>21(1)</td>
<td>Reducing Ring</td>
</tr>
<tr>
<td>3</td>
<td>Bushing (Incl. Ref. 2)</td>
<td>11</td>
<td>Diaphragm •</td>
<td>22(1)</td>
<td>Stop Screw</td>
</tr>
<tr>
<td>4</td>
<td>Lower Spring Seat</td>
<td>13</td>
<td>Diaphragm Case (Upper)</td>
<td>23(1)</td>
<td>Stop Spacer</td>
</tr>
<tr>
<td>5</td>
<td>Actuator Spring</td>
<td>14(1)</td>
<td>Diaphragm Washer</td>
<td>27(1)</td>
<td>Upper Spring Washer</td>
</tr>
<tr>
<td>6</td>
<td>Actuator Stem</td>
<td>15</td>
<td>Cap Screw (Diaph. case)</td>
<td>28(1)</td>
<td>Locknut (Actuator stem)</td>
</tr>
<tr>
<td>7</td>
<td>Cap Screw (L. case to yoke)</td>
<td>16</td>
<td>Nut (Diaph. case)</td>
<td>30</td>
<td>Spacer Ring (size 3.5 only)</td>
</tr>
<tr>
<td>8</td>
<td>Diaphragm Case (Lower)</td>
<td>17(1)</td>
<td>Stud (Diaph. case)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Recommended spare parts**
- (1) Only on 0.5-2 ; 1.5-3 ; 2-10 ; 6-20 and 15-40 psi ranges
- (2) Only on 150-750 psi range
- (3) Only on 60-125 and 80-250 psi ranges
- (4) Only on 0.5-2 ; 1.5-3 ; 2-10 ; 6-20 and 15-40 psi ranges actuators mounted on types 526 and 536H regulators
Figure 2 — Differential Pressure Actuators for 500-50, 500H-50 and 500V-50 Models Regulators

PARTS REFERENCE

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Part Name</th>
<th>Ref.</th>
<th>Part Name</th>
<th>Ref.</th>
<th>Part Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yoke</td>
<td>9</td>
<td>Diaphragm Chamber</td>
<td>17(\textsuperscript{1})</td>
<td>Stud (Diaph. case)</td>
</tr>
<tr>
<td>2</td>
<td>Spring Adjuster</td>
<td>10</td>
<td>Diaphragm Plate (Incl. w. Ref. 24)</td>
<td>24</td>
<td>Plunger Sub-assembly</td>
</tr>
<tr>
<td>3</td>
<td>Bushing (Incl. Ref. 2)</td>
<td>11</td>
<td>Diaphragm •</td>
<td>25(\textsuperscript{1})</td>
<td>O-Ring •</td>
</tr>
<tr>
<td>4</td>
<td>Lower Spring Seat</td>
<td>12(\textsuperscript{1})</td>
<td>Upper Diaphragm Plate</td>
<td>26</td>
<td>O-Ring Retainer</td>
</tr>
<tr>
<td>5</td>
<td>Actuator Spring</td>
<td>13</td>
<td>Diaphragm Case (Upper)</td>
<td>27</td>
<td>Upper Spring Seat (Incl. w. Ref. 6)</td>
</tr>
<tr>
<td>6</td>
<td>Actuator Stem</td>
<td>14(\textsuperscript{1})</td>
<td>Diaphragm Washer</td>
<td>28(\textsuperscript{1})</td>
<td>Locknut</td>
</tr>
<tr>
<td>7</td>
<td>Cap Screw (L. case to yoke)</td>
<td>15(\textsuperscript{1})</td>
<td>Cap Screw (Diaph.case)</td>
<td>29(\textsuperscript{1})</td>
<td>Connection Adapter</td>
</tr>
<tr>
<td>8</td>
<td>Diaphragm Case (Lower)</td>
<td>16</td>
<td>Nut (Diaph.case)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(\textsuperscript{1}\) Only on Low Pressure Case Design
\(\textsuperscript{2}\) Only on High Pressure Case Design
\(\textsuperscript{3}\) Qty: 2 on Low Pressure Case Design
\(\textsuperscript{4}\) Qty: 1 on High Pressure Case Design

Installation

On steam service, the regulator should be installed with the actuator down so that the diaphragm will be protected by a condensate barrier. If installed otherwise, an adequate condensate barrier must be incorporated.

In the Spring Diaphragm Actuators, the 1/2” NPT pressure connection is located on the upper diaphragm case (13).

In the Differential Pressure Actuators, the 1/2” NPT high pressure connection is located on the upper diaphragm case (13) and the 1/2” NPT low pressure connection is located on the diaphragm chamber (9) or on the connection adapter (29).

Refer to Regulators Body S/A Instructions for installation according to the regulator function.
Adjustment

When pressure setting has been specified in order, the regulator is set accordingly at the factory for test. Then, the spring compression is fully removed to avoid unnecessary stress to parts (diaphragm, spring) during the stocking.

It is necessary to proceed with adjustment before servicing.

The regulator pressure range is engraved on the serial plate.

Proceed as follows:

• Open stop valve on the outlet side of the regulator and partially open stop valve on the inlet side, allowing pressure in the system to build up slowly.

• Open controlled pressure line valve(s) and check setting by means of the gauge(s). Set by means of the spring adjuster (2) of the actuator.

(To increase pressure setting or pressure differential, turn adjusting screw clockwise to compress the spring. To decrease the setting, turn adjusting screw counterclockwise to relieve spring compression).

• Fully open stop valve on the inlet side of the regulator.

Maintenance

CAUTION

Regulator must be isolated and pressure vented before disassembly.

Replacing diaphragm

On Spring Diaphragm Actuators
(500 Series Regulators - Figure 1)

• Remove the controlled pressure line from the diaphragm case (13) and relieve all spring compression by unscrewing spring adjuster (2).

WARNING

• Remove upper diaphragm case (13), [nuts (16) and screws (15)], [not screws (15) on 150-750 psi range].

a) On 0.5-2 / 1.5-3 / 2-10 / 6-20 / 15-40 / 30-75 / 60-125 and 80-250 psi ranges:

Remove locknut (28), diaphragm washer (14) and diaphragm (11).

b) On 150-750 psi range:

Remove diaphragm (11).

Note: By means of a wrench applied on the plug stem nuts, hold the actuator stem during this operation.

On Differential Actuators
(500-50 Series Regulators - Figure 2)

a. On low pressure case design:

• Remove the high and low pressure lines from the diaphragm case (13) and the diaphragm chamber (9).

• Relieve all spring compression by unscrewing spring adjuster (2).

WARNING

• Remove nuts (16) and cap screws (15). Remove upper diaphragm case (13).

• Remove locknut (28), upper diaphragm plate (12), upper O-Ring (25), washer (14) and diaphragm (11).

• Install new diaphragm and reassemble by reversing of the above description order. Replace upper O-Ring (25) if necessary.

• Readjust the spring compression (see above).

b. On high pressure case design:

• Remove the high and low pressure lines from the diaphragm case (13) and the diaphragm chamber (9).

WARNING

• Relieve all spring compression by unscrewing spring adjuster (2).

• Remove nuts (16), upper diaphragm case (13) and diaphragm (11).

• Install new diaphragm and reassemble by reversing of the above description order.

• Readjust the spring compression (see above).

Replacing O-ring(s) (25)
(low and high pressure case)

On differential actuators, (Figure 2)

• Disassemble the actuator head as described on the paragraph: “Replacing diaphragm”.

• Remove diaphragm chamber (9) with plunger S/A (24).

• With a wrench applied over O-Ring retainer (26), unscrew it out of diaphragm chamber (9).

• Remove O-Ring (25), being careful not to damage plunger. Install new O-Ring, replace and tighten O-Ring retainer (26).

• Reassemble and readjust spring compression.

CAUTION

Uniformly tighten all diaphragm case nuts (16) when reassembling.
DIRECT SALES OFFICE LOCATIONS

AUSTRALIA
Brisbane:
Phone: +61-7-3001-4319
Fax: +61-7-3001-4399
Perth:
Phone: +61-8-6595-7018
Fax: +61-8-6595-7299
Melbourne:
Phone: +61-3-8807-6002
Fax: +61-3-8807-6577

BELGIUM
Phone: +32-2-344-0970
Fax: +32-2-344-1123

BRAZIL
Phone: +55-11-2146-3600
Fax: +55-11-2146-3610

CHINA
Phone: +86-10-5689-3600
Fax: +86-10-5689-3600

FRANCE
Courbevoie:
Phone: +33-1-4904-9000
Fax: +33-1-4904-9010

GERMANY
Ratingen:
Phone: +49-2102-108-0
Fax: +49-2102-108-111

INDIA
Mumbai:
Phone: +91-22-8354790
Fax: +91-22-8354791
New Delhi:
Phone: +91-11-2-6164175
Fax: +91-11-5-1659635

ITALY
Phone: +39-081-7892-111
Fax: +39-081-7892-208

JAPAN
Chiba:
Phone: +81-43-297-9222
Fax: +81-43-299-1115

KOREA
Phone: +82-2-2274-0748
Fax: +82-2-2274-0794

MALAYSIA
Phone: +60-3-2161-0322
Fax: +60-3-2161-6312

MEXICO
Phone: +52-55-3640-5060

THE NETHERLANDS
Phone: +31-15-3808666
Fax: +31-18-1641438

RUSSIA
Veliky Novgorod:
Phone: +7-8162-55-7898
Fax: +7-8162-55-7921
Moscow:
Phone: +7-495-585-1276
Fax: +7-495-585-1279

SAUDI ARABIA
Phone: +966-3-341-0278
Fax: +966-3-341-7624

SINGAPORE
Phone: +65-6861-6100
Fax: +65-6861-7172

SOUTH AFRICA
Phone: +27-11-452-1550
Fax: +27-11-452-6542

SOUTH & CENTRAL AMERICA AND THE CARIBBEAN
Phone: +55-12-2134-1201
Fax: +55-12-2134-1238

SPAIN
Phone: +34-93-652-6430
Fax: +34-93-652-6444

UNITED ARAB EMIRATES
Phone: +971-4-8991-777
Fax: +971-4-8991-778

UNITED KINGDOM
Bracknell:
Phone: +44-1344-460-500
Fax: +44-1344-460-537
Skelmersdale:
Phone: +44-1695-526-00
Fax: +44-1695-526-01

UNITED STATES
Massachusetts:
Phone: +1-508-586-4600
Fax: +1-508-427-8971
Corpus Christi, Texas:
Phone: +1-361-881-8182
Fax: +1-361-881-8246

Deer Park, Texas:
Phone: +1-281-884-1000
Fax: +1-281-884-1010
Houston, Texas:
Phone: +1-281-671-1640
Fax: +1-281-671-1735

* Denotes a trademark of the General Electric Company.
Other company names and product names used in this document are the registered trademarks or trademarks of their respective owners.
© 2015 General Electric Company. All rights reserved.

GEA31593A 06/2015