

# 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.

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# 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.



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



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



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



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 Masoneilan 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.

Regulator Model No	Body S/A Instruction No
525; 525-50 526; 526-50	GEA30557A
535H; 535H-50 536H; 536H-50	GEA31597
535V; 535V-50	176419E

## Spare parts

When performing maintenance always use GE replacement parts. Masoneilan Parts are obtainable through your local GE Representative or Masoneilan Spare Parts Department. When ordering parts, always include Masoneilan 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 Masoneilan regularly holds training seminars for technicians. In order to participate in one of these training seminars you should contact our local GE Masoneilan 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 diaphragm 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	Regulator Model No	Actuator Type
REDUCING	525 535H 535V	Spring Diaphragm
BACK PRESSURE	526 536H	
DIFFERENTIAL REDUCING	525-50 535H-50 535V-50	Differential
DIFFERENTIAL BACK PRESSURE	526-50 536H-50	

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.

Actuator Type	Range (psi)	Max. Static Pressure (psi)	Case Size
Spring Diaphragm	0.5 - 2	60	11
	1.5 - 3		9
	2 - 10		
	6 - 20		
	15 - 40	250	5
	30 - 75		4
	60 - 125		3 1/2
80 - 250	750	Special	
150 - 750			
Differential	<b>Low Pressure Case</b>		
	3 - 12	250	5
	10 - 35		
	30 - 75		
	60 - 125		
	<b>High Pressure Case</b>		
	3 - 15	600	5
	30 - 85		
	5 - 30	1000	4
	10 - 60		
75 - 185	1500	3 1/2	
100 - 330			

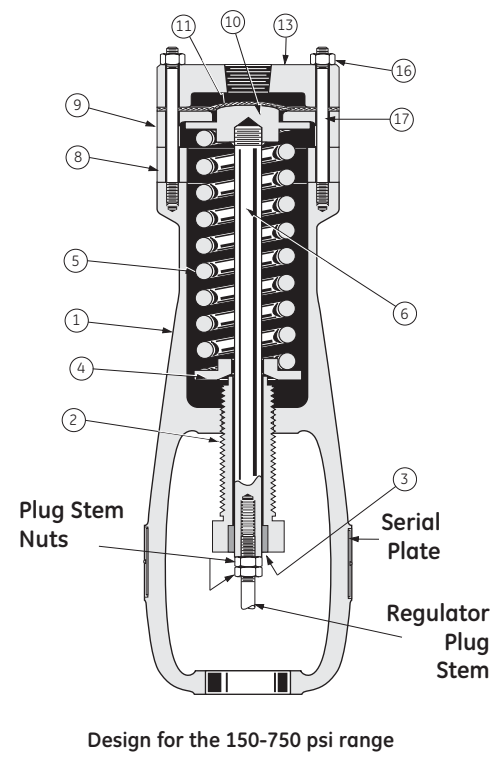
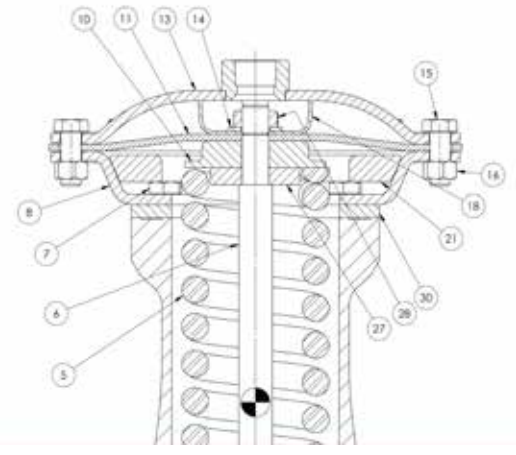
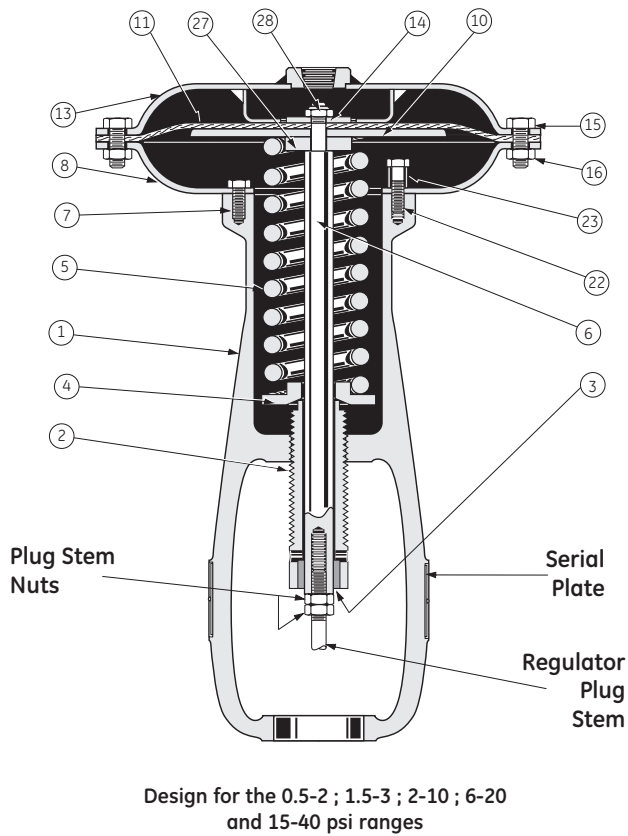


Figure 1 — Spring-Diaphragm Actuators for 500, 500H and 500V Model Regulators

### PARTS REFERENCE

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

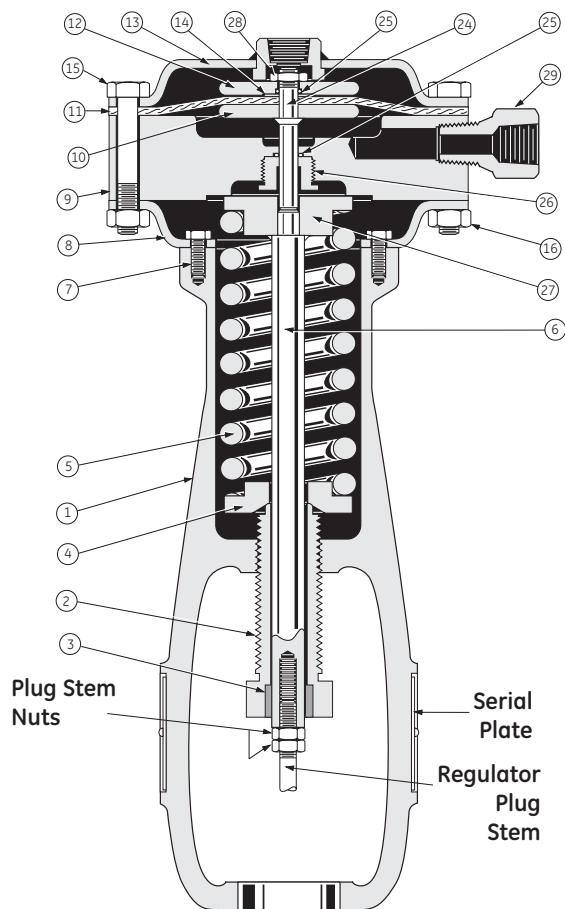
• Recommended spare parts

<sup>(1)</sup> Only on 0.5-2 ; 1.5-3 ; 2-10 ; 6-20 and 15-40 psi ranges

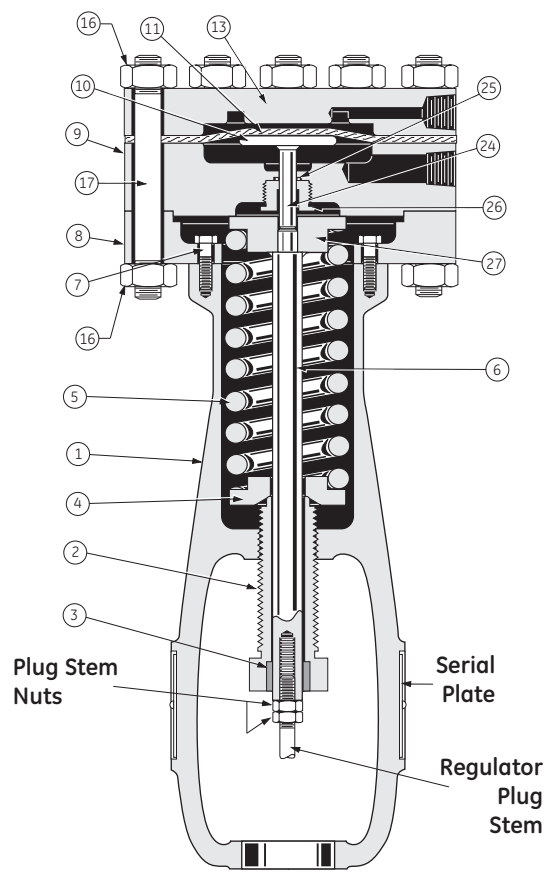
<sup>(2)</sup> Only on 150-750 psi range

<sup>(4)</sup> Only on 60-125 and 80-250 psi ranges

<sup>(5)</sup> 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



Low Pressure Case Design



High Pressure Case Design

Figure 2 — Differential Pressure Actuators for 500-50, 500H-50 and 500V-50 Models Regulators

## PARTS REFERENCE

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

• Recommended spare parts

<sup>(1)</sup> Only on Low Pressure Case Design

<sup>(2)</sup> Only on High Pressure Case Design

<sup>(3)</sup> Qty: 2 on Low Pressure Case Design  
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.

- Install new diaphragm and reassemble by reversing of the above description order.
- Readjust the spring compression (see above).

### 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: +86-10-5689-3800

## 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: +60-3-2163-6312

## 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



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