

Masoneilan™ 10900 Series

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



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Features

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

The following chart indicates the combinations available to provide the desired function.

For temperatures over the rating of the diaphragm material, the regulator must be mounted with the actuator below the centerline of the regulator body. The

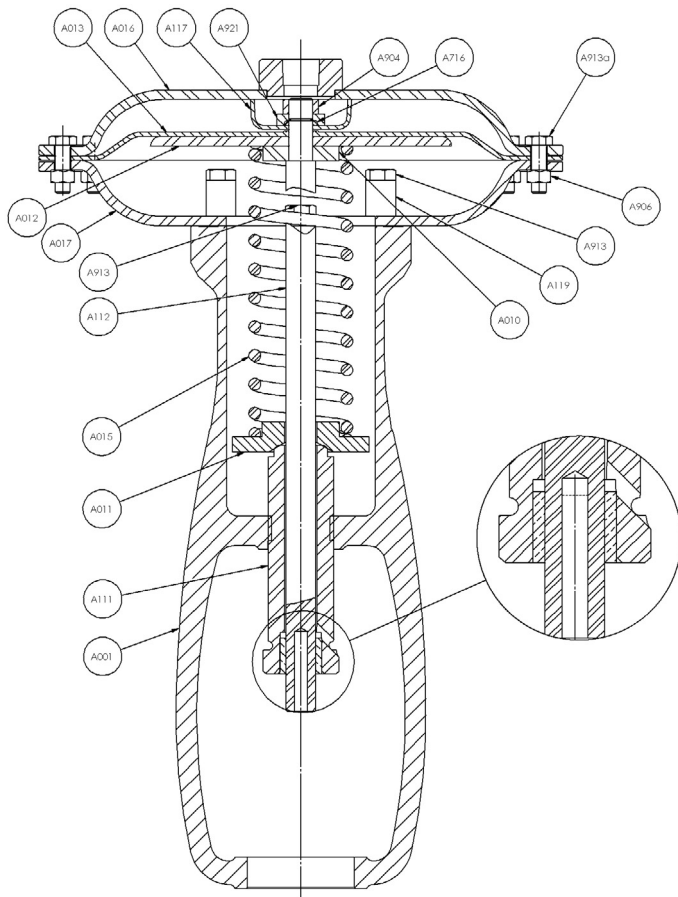
diaphragm will be protected from the high temperature by a condensate barrier in the sensing line and actuator diaphragm case. If installed otherwise, an adequate condensate barrier must be incorporated. Consult factory for more information.

PTFE diaphragm protectors are available for applications where the process fluid and standard diaphragm are not compatible.

Function	Actuator	Regulator
Reducing	Spring Diaphragm	525, 535H, 535V
Back Pressure	Spring Diaphragm	526, 536H
Differential, Reducing	Differential	525-50, 535H-50, 535V-50
Differential, Back Pressure	Differential	526-50, 536H-50

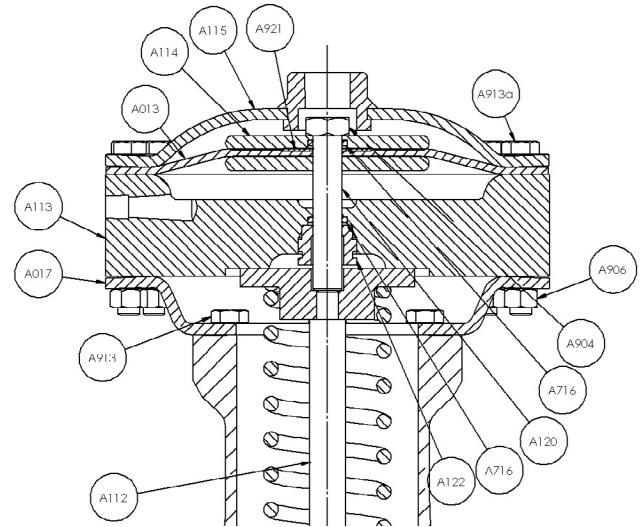
Materials of Construction

Actuator 10900 Standard Construction Spring Diaphragm Actuators

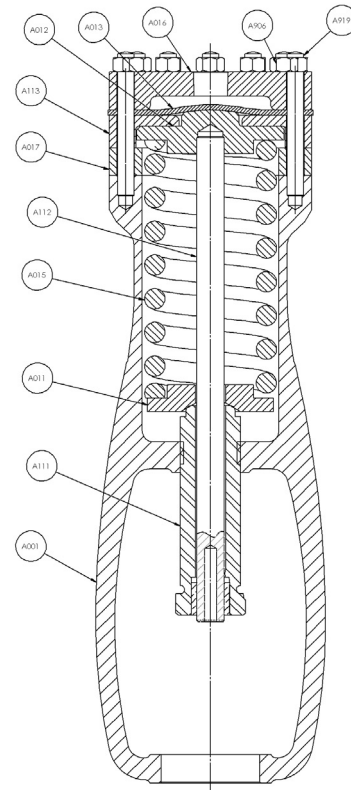


Design for the 0.5-3, 2-10, 6-20 and 15-40 psi
(0.03-0.21, 0.14-0.69, 0.41-1.38 and 1.03-2.76 bar) ranges

**Figure 1 — Spring-Diaphragm Actuators for
500, 500H and 535V Model Regulators**



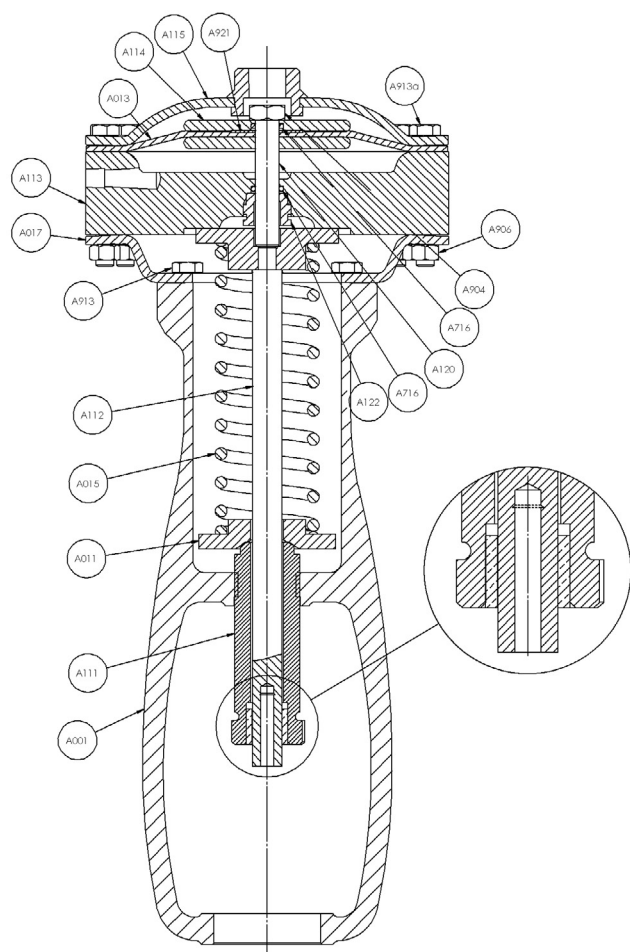
Design for the 30-75, 60-125 and 80-250 psi
(2.07-5.17, 4.14-8.62 and 5.52-17.24 bar) ranges



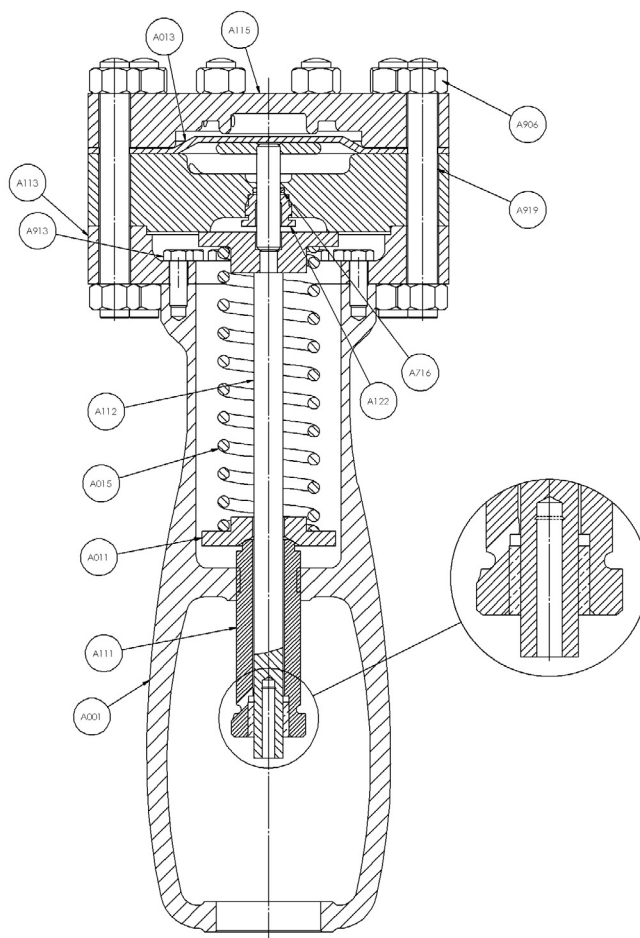
Design for the 150-300, 150-450 & 400-750 psi
(10.34-20.68, 10.34-31.03 & 27.58-51.71 bar) ranges

Materials of Construction

Actuator 10900 Standard Construction Differential Pressure Actuators



Low Pressure Case Design for 3-12, 10-30, 30-75, 60-125 psi
(0.21-0.83, 0.69-2.07, 2.07-5.17,
4.14-8.62 bar) ranges



High Pressure Case Design for 3-15, 30-85, 5-30, 10-60,
10-30, 75-185, 100-330 psi (0.21-1.03, 2.07-5.86, 0.34-2.07,
0.69-4.14, 0.69-2.07, 5.17-12.76, 6.89-22-75 bar) ranges

Figure 2 - Differential Pressure Actuators for 500-50, 500H-50 and 535V-50 Models Regulators

Materials of Construction

Actuator Material 10900 Series

Tag No.	Temperature Range	-20°F	180°F	300°F	400°F	650°F
	Description	Materials				
A001	Yoke	ASTM A126 CLASS B				
A006	Actuator Stem ⁽¹⁾	CARBON STEEL (1010 to 1030) HRC 22 MAX DICHROMATE ZINC PLATED				
A007	Adjusting Screw	ASTM A36 ZINC DICHROMATE COATING				
A008	Bushing (included in the Spring Adjuster sub-assembly)	ASTM B438 GRADE 1 TYPE II				
A010	Spring Seat (Upper) ^{(3) (5)}	ASTM A36 ZINC DICHROMATE COATING				
A011	Spring Seat (Lower)	ASTM A36 ZINC DICHROMATE COATING				
A012	Diaphragm Plate	ASTM A36 ZINC DICHROMATE COATING				
A012	Diaphragm Plate ⁽⁴⁾	ASTM A668 CLASS BH (CES-1031), CARBON STEEL FORGING				
A012_FRG	Diaphragm Plate Forging ⁽⁴⁾	ASTM A668 CLASS BH (CES-1031), CARBON STEEL FORGING				
A013	Diaphragm	CHLOROPRENE (NEOPRENE) WITH POLYAMIDE INSERT (NYLON) PER CMS-8010	SILICON RUBBER WITH DACRON FABRIC PER CMS-8010	VITON WITH DACRON FABRIC PER CMS-8010	Consult Factory	
A015	Actuator Spring	ASTM A229				
A016	Upper Diaphragm Case	ASTM A36				
A017	Diaphragm Case (Lower)	ASTM A36				
A022	Spacer Ring	ASTM A36 ZINC DICHROMATE COATING				
A060	Adapter (4,5 HP Differential)	ASTM A234 GRADE WPB HRC 22 MAXIMUM				
A111	Spring Adjuster	GENERAL SUB-ASSEMBLIES				
A113	Diaphragm Chamber ⁽²⁾	ASTM A36				
A114	Upper Diaphragm Plate (4 and 5 Low Pressure Differential)	ASTM A108 GRADE 1211 THRU 1215				
A115	Upper Diaphragm Case S/A Weldment	GENERAL SUB-ASSEMBLIES				
A117	Stop Cup (3½,4,5)	ASTM A36 ZINC DICHROMATE COATING				
A118	Reducing Ring	ASTM A36, Zinc Dichromate Coating				
A119	Stop spacer (9 Spring Diaphragm)	ASTM A36 Zinc Dichromate Coating				
A120	Plunger Subassembly ⁽⁴⁾	GENERAL SUB-ASSEMBLIES				
A121	Plunger ⁽⁴⁾	SOLUTION ANNEALED 316 STAINLESS STEEL HRC 22 MAXIMUM. HARDNESS COMPLIANCE WITH NACE MR0103 & MR0175 SHALL BE CERTIFIED				
A122	O-Ring Retainer	BRASS ANY TYPE				
A716	O-Ring	NITRILE ASTM D1418 CLASS 1 NBR	SILICONE RUBBER - GENERAL	VITON-A 65-75 SHORE A	Consult Factory	
A716	O-ring ⁽⁴⁾	NITRILE ASTM D1418 CLASS 1 NBR	SILICONE RUBBER - GENERAL	VITON-A 65-75 SHORE A	Consult Factory	
A904	Locknut (4,5 LP Differential)	AUSTENITIC STAINLESS STEEL				
A906	Nut	DICHROMATE ZINC PLATE PER CES 1041 CARBON STEEL CLASS 8.8				
A909	Lock Nut ⁽⁶⁾	AUSTENITIC STAINLESS STEEL				
A913	Cap screw	DICHROMATE ZINC PLATE PER CES 1041 CARBON STEEL CLASS 8.8				
A913a	Cap screw	DICHROMATE ZINC PLATE PER CES 1041 CARBON STEEL CLASS 8.8				
A913b	Diaphragm Screw ⁽³⁾	ASTM A194 GR 8. HARDNESS COMPLIANCE WITH NACE MR0103 & MR0175 SHALL BE CERTIFIED				
A915	Cap Screw (Yoke Screw) ⁽⁶⁾	316L STAINLESS STEEL GENERAL SERVICE SOLUTION ANNEALED				
A919	Stud (3½,4,5 High Pressure Differential)	ASTM A193 GRADE B7 DICHROMATED ZINC PLATED				
A921	Diaphragm Washer	CARBON STEEL (1010 TO 1030) HRC 22 MAX DICHROMATE ZINC PLATED				
A922	Washer Washer ⁽⁶⁾	AUSTENITIC STAINLESS STEEL				
A926	Dyna seal Washer	NEOPRENE, BONDED TO METAL				
Tag No.	Temperature Range	-29°C	82°C	149°C	204°C	343°C

(1) For Differential Pressure cases Free Cutting Steel Stem & Plate, Welded Stem Zinc Dichromate Plated

(2) Precaution for the regulator installation is necessary from 212°F (100°C) to 650°F (343°C) to avoid reaching usable temperature limits of diaphragm (see 10900 IOM ref. 31593).
Diaphragm limits:

Neoprene reinforced with Nylon Fabric -32°C to 82°C (-25°F to 180°F)
Silicone reinforced with Dacron Fabric -73°C to 177°C (-100°F to 350°F)
Viton Reinforced with Dacron Fabric -29°C to 204°C (-20°F to 400°F)

For temperatures ranges exceeding 204° [400°F], consult factory.

(3) Spring diaphragm Case (5) Included in Ref.

(4) Differential Pressure Cases (6) Tags are only applicable for 535V 10900 actuators.

Additional Options

Option Number	Option
OP1	Carbon Steel Yoke
OP2	Nace Compliance – Exposed or Non-Exposed Bolting
OP3	Corrosive atmosphere
OP4	Upper Cover stockbar
OP5	Stainless Steel Bolting

Tag No.	Description	OP1	OP2	OP3	OP4	OP5
A001	Yoke	x				
A001	Spring Seat (Lower)					
A006	Actuator Stem			x		(x)
A007	Adjusting Screw			x		
A008	Bushing (included in the Spring Adjuster sub-assembly)			x		
A010	Spring Seat (Upper) ⁽⁵⁾					
A012	Diaphragm Plate					
A012	Diaphragm Plate		x			
A012_FRG	Diaphragm Plate Forging		x			
A013	Diaphragm					
A015	Actuator Spring					
A016	Upper Diaphragm Case		x		x	
A017	Diaphragm Case (Lower)					
A022	Spacer Ring					
A060	Adapter (4,5 HP Differential)					
A111	Spring Adjuster			x		
A113	Diaphragm Chamber ⁽²⁾		x		x	
A114	Upper Diaphragm Plate (4 and 5 LP Differential)		x			
A115	Upper Diaphragm Case S/A Weldment		x		x	
A117	Stop Cup (3½,4,5)		x			
A118	Reducing Ring					
A119	Stop spacer (9 Spring Diaphragm)					
A120	Plunger Subassembly ⁽⁴⁾		x			
A121	Plunger		x			
A122	O-Ring Retainer					
A716	O-ring ⁽⁴⁾					
A716	O-Ring					
A904	Locknut (4,5 LP Differential)					
A906	Nut					
A913	Cap screw					
A913	Stop Screw (9 Spring Diaphragm)					(x)
A913a	Cap Screw		(x)			x
A913b	Diaphragm Screw		x			(x)
A919	Stud (3½,4,5 High Pressure Differential)		(x)			x
A921	Diaphragm Washer		x			
Tag No.	Description	OP1	OP2	OP3	OP4	OP5

x

See next Material of Construction tables: OP1 / OP2 / OP3 / OP4 / OP5 for details.

(x)

See next Material of Construction tables: OP1 / OP2 / OP3 / OP4 / OP5 for details, only under conditions

(2) Precaution for the regulator installation is necessary from 212°F (100°C) to 650°F (343°C) to avoid reaching usable temperature limits of diaphragm (see 10900 IOM ref. 31593).
Diaphragm limits:

Neoprene reinforced with Nylon Fabric -32°C to 82°C (-25°F to 180°F)
Silicone reinforced with Dacron Fabric -73°C to 177°C (-100°F to 350°F)
Viton Reinforced with Dacron Fabric -29°C to 204°C (-20°F to 400°F)

For temperatures ranges exceeding 204° [400°F] consult factory.

(4) Differential Pressure Cases

(5) Included in Ref.

OP1

Carbon Steel Yoke

Tag No.	Description	Materials
A001	Yoke (can be used until ambient temperature -46°C [-51°F])	ASTM A352 GR LCC Hrc 22 MAXIMUM CMS-1040

OP2

Nace Compliance – Exposed or Non-Exposed Bolting

Tag No.	Description	Materials
A012	Diaphragm Plate	SOLUTION ANNEALED 316 STAINLESS STEEL Hrc 22 MAXIMUM
A016	Upper Diaphragm Case	ASTM A105 / 1.0481 EN 10273 CMS-1042
A113	Diaphragm Chamber ⁽²⁾	ASTM A105 / 1.0481 EN 10273 CMS-1042
A114	Upper Diaphragm Plate (4 and 5 LP Differential)	ASTM A105 / 1.0481 EN 10273 CMS-1042
A115	Upper Diaphragm Case S/A Weldment ⁽⁵⁾	GENERAL SUB-ASSEMBLIES
A117	Stop Cup (3½,4,5)	SOLUTION ANNEALED 316 STAINLESS STEEL Hrc 22 MAXIMUM
A120	Plunger Subassembly ⁽⁴⁾	SOLUTION ANNEALED 316 STAINLESS STEEL Hrc 22 MAXIMUM
A121	Plunger	SOLUTION ANNEALED 316 STAINLESS STEEL Hrc 22 MAXIMUM
A906	Nut ⁽³⁾	CARBON STEEL ASTM A194 GR 7M CARBON STEEL ASTM A320 GR L7M
A913a	Cap Screw ⁽³⁾	STAINLESS STEEL ASTM A193 GRADE B8M CLASS 2 STAINLESS STEEL ASTM A194 GRADE 8M
A913b	Diaphragm Screw	ASTM A193 GRADE B8M CLASS 2 CARBON STEEL ASTM A320 GR L7M
A919	Stud (3½,4,5 High Pressure Differential) ⁽³⁾	STAINLESS STEEL ASTM A193 GRADE B8M CLASS 2
A921	Diaphragm Washer	SOLUTION ANNEALED 316 STAINLESS STEEL HRC 22 MAXIMUM

(2) Precaution for the regulator installation is necessary from 212°F (100°C) to 650°F (343°C) to avoid reaching usable temperature limits of diaphragm (see 10900 IOM ref. 31593).

Diaphragm limits:

Neoprene reinforced with Nylon Fabric	-32°C to 82°C (-25°F to 180°F)
Silicone reinforced with Dacron Fabric	-73°C to 177°C (-100°F to 350°F)
Viton Reinforced with Dacron Fabric	-29°C to 204°C (-20°F to 400°F)

For temperatures ranges exceeding 204° [400°F] consult factory.

(3) Applicable only in case of Nace Compliance – Exposed Bolting. If not applicable, keep the standard materials.

(4) Differential Pressure Cases

(5) In case of requirement, Upper Diaphragm Case and Diaphragm Chamber (in case of Differential Pressure only) CM 3.1 or Stainless Steel Diaphragm Case may be supplied. In case of other Diaphragm Case material requested (Duplex, etc.), please consult Engineering.

For Size 9", use the Upper Diaphragm Case instead of Upper Diaphragm Case S/A Weldment.

For Size 5"/4"/3.5", use the Upper Diaphragm Case instead of Upper Diaphragm Case S/A Weldment.

OP3

Corrosive atmosphere

Tag No.	Description	Materials
A006	Actuator Stem	SOLUTION ANNEALED 316 STAINLESS STEEL Hrc 22 MAXIMUM
A007	Adjusting Screw	316 SOLUTION ANNEALED AUSTENITIC ST ST 22 Hrc MAX HARD ELECTROLESS NICKEL PLATING
A008	Bushing (included in the Spring Adjuster sub-assembly)	PTFE GLASS REINFORCED
A111	Spring Adjuster	GENERAL SUB-ASSEMBLIES

OP4

Upper Cover stockbar

Tag No.	Description	Materials
A016	Upper Diaphragm Case ⁽⁵⁾	SOLUTION ANNEALED 316 STAINLESS STEEL HRc 22 MAXIMUM or ASTM A105
A113	Diaphragm Chamber ⁽²⁾	SOLUTION ANNEALED 316 STAINLESS STEEL HRc 22 MAXIMUM or ASTM A105
A115	Upper Diaphragm Case S/A Weldment ⁽⁵⁾	Replaced by Tag No. A016 (5)

(2) Precaution for the regulator installation is necessary from 212°F (100°C) to 650°F (343°C) to avoid reaching usable temperature limits of diaphragm (see 10900 IOM ref. 31593).

Diaphragm limits:

Neoprene reinforced with Nylon Fabric	-32°C to 82°C (-25°F to 180°F)
Silicone reinforced with Dacron Fabric	-73°C to 177°C (-100°F to 350°F)
Viton Reinforced with Dacron Fabric	-29°C to 204°C (-20°F to 400°F)

For temperatures ranges exceeding 204° [400°F] consult factory.

(5) In case of requirement, Upper Diaphragm Case and Diaphragm Chamber (in case of Differential Pressure only) CM 3.1 or Stainless Steel Diaphragm Case may be supplied. In case of other Diaphragm Case material requested (Duplex, etc.), please consult Engineering.

For Size 9", use the Upper Diaphragm Case instead of Upper Diaphragm Case S/A Weldment.

For Size 5"/4"/3.5", use the Upper Diaphragm Case instead of Upper Diaphragm Case S/A Weldment.

OP5

Stainless Steel Bolting ⁽⁷⁾

Tag No.	Description	Materials
A006	Actuator Stem ⁽⁸⁾	SOLUTION ANNEALED 316 STAINLESS STEEL HRc 22 MAXIMUM
A906	Nut	A4-80 (ISO 3506) 316L or ASTM A194 GRADE 8 or equivalent
A913	Cap screw ⁽⁸⁾	A4-80 (ISO 3506) 316L or ASTM A193 GRADE B8 CLASS 1 or equivalent
A913	Stop Screw (9 Spring Diaphragm) ⁽⁸⁾	A4-80 (ISO 3506) 316L or ASTM A193 GRADE B8 CLASS 1 or equivalent
A913a	Cap Screw	A4-80 (ISO 3506) 316L or ASTM A193 GRADE B8 CLASS 1 or equivalent
A913b	Diaphragm Screw ^{(3) (8)}	A4-80 (ISO 3506) 316L or ASTM A193 GRADE B8 CLASS 1 or equivalent
A919	Stud (3½,4,5 High Pressure Differential)	A4-80 (ISO 3506) 316L or ASTM A193 GRADE B8 CLASS 2 or equivalent

(3) Applicable only in case of Nace Compliance – Exposed Bolting. If not applicable, keep the standard materials.

(7) Construction defined in this option applies also to coastal/marine environment (Offshore environment).

(8) Applicable only in case of coastal/marine environment (offshore environment).

Pressure Ranges

Spring Diaphragm Actuators for Models 500 Series Regulators

Actuator Size	Travel		Range		Maximum Static Allowable Pressure for Actuator	
(inches)	(inches)	(mm)	(psi)	(bar)	(psi)	(bar)
9	0.375	9.5	0.5-3	0.03-0.21	60	4.1
9	0.375	9.5	2-10	0.14-0.69	60	4.1
9	0.375	9.5	6-20	0.41-1.38	60	4.1
9	0.375	9.5	15-40	1.03-2.76	60	4.1
5	0.375	9.5	30-75	2.07-5.17	250	17.2
4	0.375	9.5	60-125	4.14-8.62	250	17.2
3.5	0.375	9.5	80-250	5.51-17.24	250	17.2
3.5	0.125	3.18	150-300	10.34-20.68	750	52.0
			150-450	10.34-31.02		
			400-750	27.58-51.71		

Differential Pressure Actuator for Models 525-50, 535H-50, 526-50 and 536H-50 Differential Pressure Regulators

Low Pressure Application

Actuator Size	Range		Maximum Static Allowable Pressure for Actuator	
(inches)	(psi)	(bar)	(psi)	(bar)
9	15-40	1.03-2.76	60	4.1
5	3-12	0.21-0.83	250	17.2
5	10-35	0.69-2.41	250	17.2
5	30-75	2.07-5.17	250	17.2
4	60-125	4.14-8.62	250	17.2

High Pressure Application

Actuator Size	Range		Maximum Static Allowable Pressure for Actuator	
(inches)	(psi)	(bar)	(psi)	(bar)
5	3-15	0.21-1.03	600	41.4
5	30-85	2.07-5.86	600	41.4
4	5-30	0.34-2.07	1000	69
4	10-60	0.69-4.14	1000	69
3.5	10-30	0.69-2.07	1500	103.4
3.5	75-185	5.17-12.76	1500	103.4
3.5	100-330	6.89-22.75	1500	103.4

Spring Diaphragm Actuators for Models 535V Regulator

Actuator Size	Travel		Range		Maximum Static Allowable Pressure for Actuator	
(inches)	(inches)	(mm)	(psi)	(bar)	(psi)	(bar)
9	0.1	2.5	0.5 – 3	0.03 – 0.21	60	4.1
9	0.1	2.5	2 – 10	0.14 – 0.69	60	4.1
9	0.1	2.5	6 – 20	0.41 – 1.38	60	4.1
9	0.1	2.5	15 – 40	1.03 – 2.76	60	4.1
5	0.1	2.5	30 – 75	2.07 – 5.17	250	17.2
4	0.1	2.5	60 – 125	4.14 – 8.62	250	17.2
3.5	0.1	2.5	80 – 250	5.52 – 17.24	250	17.2
3.5	0.1	2.5	150 – 450	10.34 – 31.02	750	52.0
			400 – 750	27.58 – 51.71		
			400-750	27.58-51.71		

Differential Pressure Actuator for Model 535V Regulator

Low Pressure Application

Actuator Size	Bench Range		Maximum static allowable pressure for actuator	
(inches)	(psi)	(bar)	(psi)	(bar)
5	3 – 12	0.21 – 0.83	250	17.2
5	10 – 35	0.69 – 2.41	250	17.2
5	30 – 75	2.07 – 5.17	250	17.2
4	60 – 125	4.14 – 8.62	250	17.2
4	60-125	4.14-8.62	250	17.2

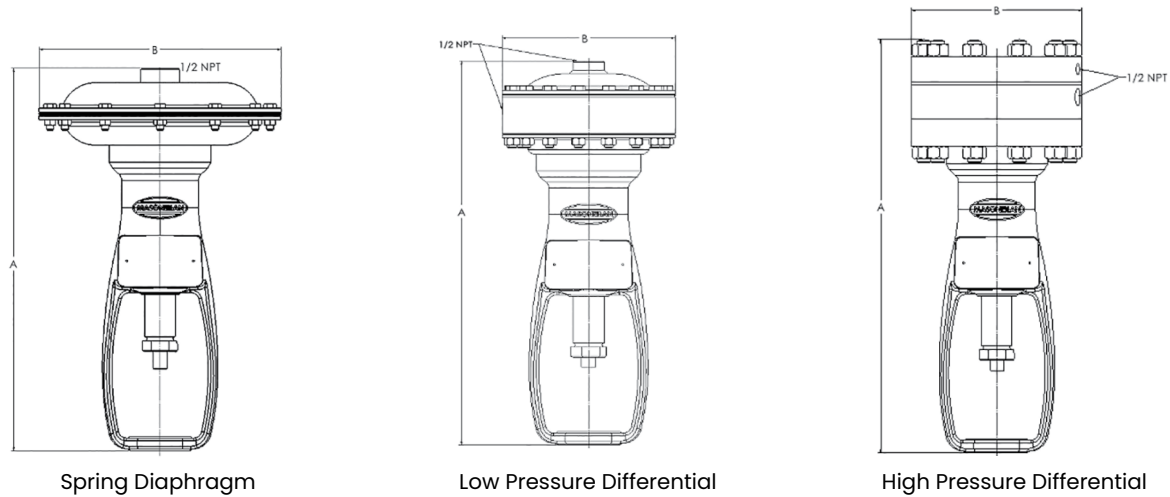
High Pressure Application

Actuator Size	Bench Range		Maximum Static Allowable Pressure for Actuator	
(inches)	(psi)	(bar)	(psi)	(bar)
5	3 – 15	0.21 – 1.03	600	41.4
5	30 – 85	2.07 – 5.86	600	41.4
4	5 – 30	0.34 – 2.07	1000	69
4	10 – 60	0.69 – 4.14	1000	69
3.5	10 – 30	0.69 – 2.07	1500	103.4
3.5	75 – 185	5.17 – 12.76	1500	103.4
3.5	100 – 330	6.89 – 22.75	1500	103.4

Diaphragms Options

Material	Temperature Range
Neoprene Reinforced with Nylon Fabric (Standard)	-25°F to +180°F (-32°C to +82°C)
Silicone Reinforced with Dacron Fabric (Optional)	-100°F to +350°F (-73°C to +177°C)
Viton Reinforced with Dacron Fabric (Optional)	+300°F to +400°F (+149°C to +240°C)

Dimensions and Weight

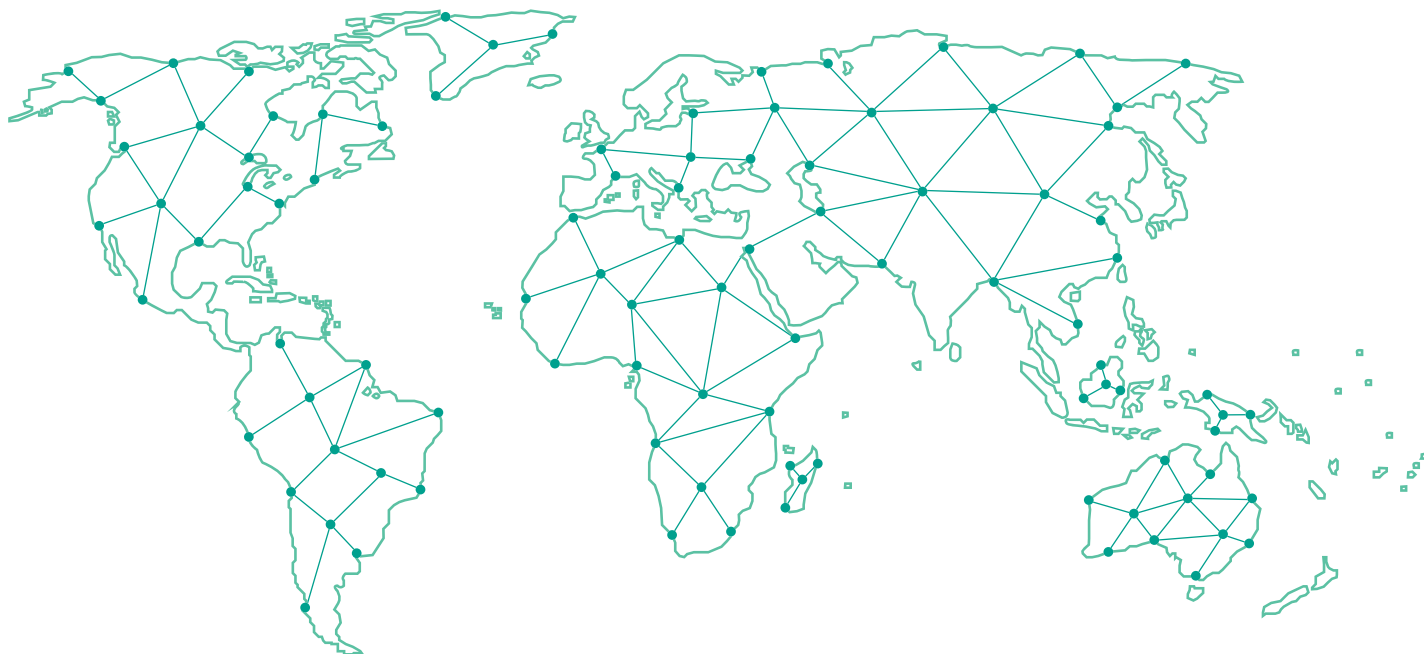


Case	10900		10900 with 535V	
	A in. (mm)	B in. (mm)	A in. (mm)	B in. (mm)
3.5 Spring Diaphragm	16.9 (428)	7.7 (195)	17.4 (441)	7.7 (195.3)
4 Spring Diaphragm			17.1 (435.3)	7.6 (193.5)
5 Spring Diaphragm				
9 Spring Diaphragm	17.4 (443)	11 (280)	17.9 (455.9)	11 (279.5)
Low Pressure Differential	18.4 (468)	7.6 (194)	18.9 (481)	7.6 (194)
High Pressure Differential	18.8 (477)	7.8 (197)	19.3 (490)	7.8 (197)

Spring Diaphragm				Low Pressure Differential				High Pressure Differential			
Range (psi)	Case	Weight		Range (psi)	Case	Weight		Range (psi)	Case	Weight	
		(lb)	(kg)			(lb)	(kg)			(lb)	(kg)
150-300	3.5	31	14	80-250	3.5	33	15	10-30	3.5	68	31
150-450	3.5	31	14	60-125	4	46	21	75-185	3.5	66	30
400-750	3.5	31	14	3-12	5	44	20	100-330	3.5	68	31
80-250	3.5	29	13	10-35	5	44	20	10-60	4	64	29
60-125	4	27	12	30-75	5	46	21	5-30	4	64	29
30-75	5	27	12	15-45	9	40	18	30-85	5	62	28
15-40	9	35	16	0.5-3	9	40	18	3-15	5	62	28
6-20	9	33	15	-	-	-	-	-	-	-	-
2-10	9	33	15	-	-	-	-	-	-	-	-
0.5-3	9	33	15	-	-	-	-	-	-	-	-

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