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CSB700 Series Commercial / Industrial Pressure Reducing Regulators

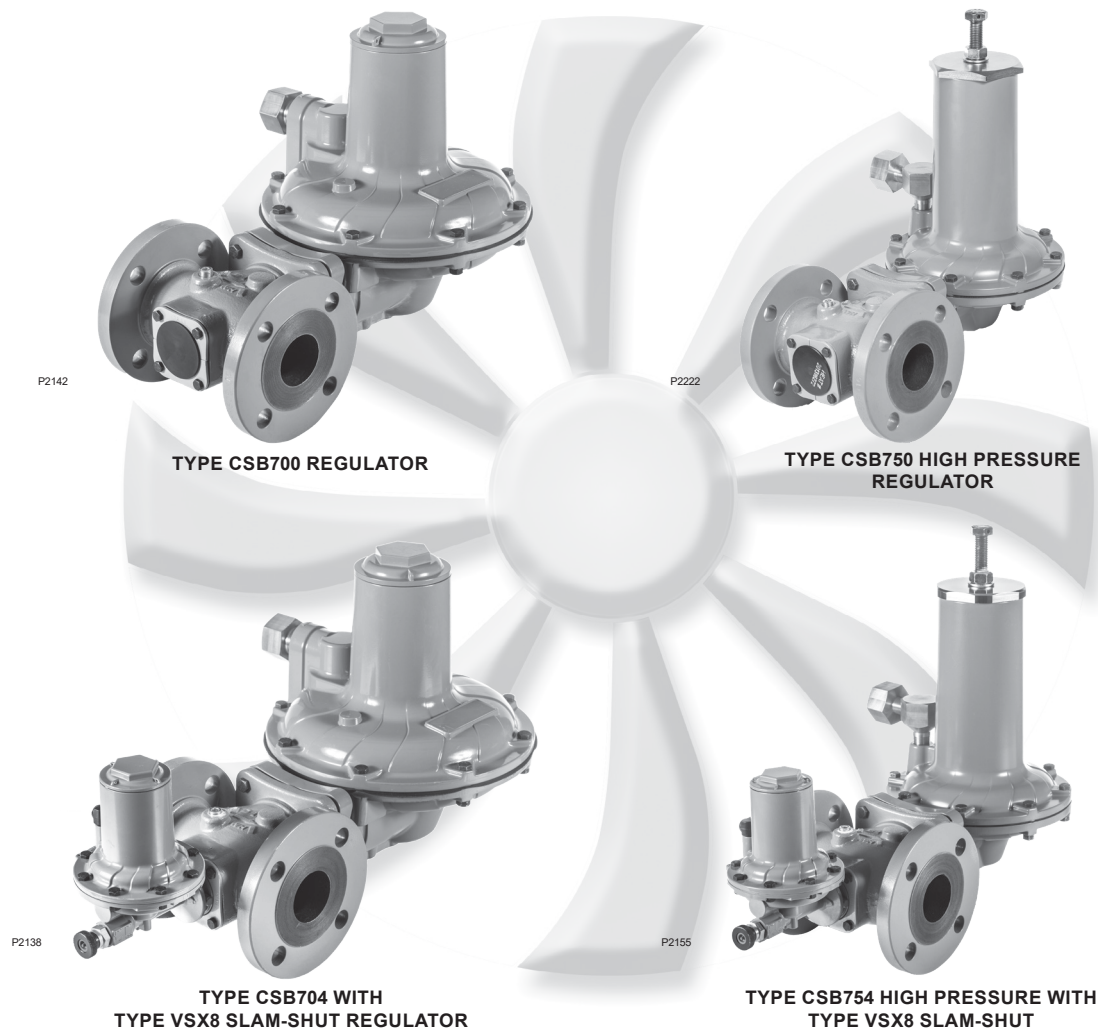


Figure 1. CSB700 Series Pressure Reducing Regulators

Table of Contents

Introduction	1
Specifications	2
Principle of Operation	9
Installation and Overpressure Protection	9
Startup	13
Adjustment	13
Shutdown	14
Maintenance and Inspection	14
Parts Ordering	15
Parts List	16

Introduction

Scope of the Manual

This Instruction Manual provides installation and maintenance instructions and parts list information for CSB700 Series regulators. Instructions and parts lists for other equipment mentioned in this instruction manual are found in separate manuals.

CSB700 Series

Specifications

The Specifications section lists the specifications for the CSB700 Series regulators. The following information is stamped on the nameplate of CSB700 Series: Type and Class, Maximum Outlet Pressure and Spring Range.

Available Configurations

See Table 1

Regulator Type

Differential Strength (DS)

Accuracy Class

Up to AC5 (depending on Outlet Pressure)

Lockup Class

Up to SG10 (depending on Outlet Pressure)

Failure Mode per EN334

Fail Open (FO)

Integral Strength (IS) Pressure Ratings⁽¹⁾

See Table 4

Differential Strength (DS) Pressure Ratings⁽¹⁾

See Table 5

Body Sizes, Materials, End Connections and Pressure Ratings⁽¹⁾

See Table 6

Operating Pressure Range⁽¹⁾

Regulator: See Table 7

Slam-Shut Module:

See Tables 8a, 8b, 8c and 8d

Maximum Outlet Pressure⁽¹⁾

Emergency Casing:

Type CSB700/CSB700F/CSB720/CSB720F:

4.0 bar / 58.0 psig

Type CSB750: 5.0 bar / 72.5 psig

To Avoid Internal Metallic Parts Damage:

Type CSB700/CSB700F/CSB720/CSB720F:

0.34 bar / 5.0 psig over set pressure

Type CSB750: 1.5 bar / 21.8 psig — not to exceed maximum emergency outlet

Operating Casing:

Type CSB700/CSB720: 1.1 bar / 16 psig

Type CSB750: 5.0 bar / 72.5 psig

Outlet Pressure Ranges⁽¹⁾

9.0 mbar to 4.0 bar / 0.13 to 58.0 psig

See Table 7

Orifice Size:

35 mm / 1-3/8 in.

Flow and IEC Sizing Coefficients:

See Table 5

Pressure Registration

External

Temperature Capabilities⁽¹⁾⁽²⁾⁽³⁾

According to PED Standards:

-20 to 66°C / -4 to 151°F

Non-PED:

-30 to 66°C / -22 to 151°F

Spring Case Vent Connection

1 NPT: Types CSB700 and CSB720

1/2 NPT: Type CSB750

Type VSX8 Slam-Shut Device Maximum Inlet

Pressure (P_{umax})⁽¹⁾:

Differential Strength (DS): 16 bar / 232 psig

Integral Strength (IS): 6.0 bar / 87 psig

Approximate Weights

with Threaded body

Type CSB700/CSB720: 13 kg / 29 lbs

Type CSB750: 14 kg / 31 lbs

Type CSB704/CSB724: 14 kg / 31 lbs

Type CSB754: 15 kg / 33 lbs

with Flanged body

Add 5.2 kg / 11 lbs to weights listed

Designed, Tested and Evaluated Consistent With:

ANSI B16, ASME BPVC Sec. VIII Div. I, ASTM B117 (Corrosion Resistance), EN334 and EN14382

PED Conformity Statement and Information

The CSB700 Product Series is in conformity with the Pressure Equipment Directive PED 2014/68/EU. Pressure regulator does not require any supplementary upstream safety accessory for protection against overpressure compared with its design pressure PS, when upstream reducing station is sized for a max downstream incidental MIPd $\leq$ 1.1 PS.

PED Related Information

See Table 2

1. The pressure/temperature limits in this Instruction Manual or any applicable standard limitation should not be exceeded.

2. Standard token relief set values listed in Tables 8a, 8b, 8c and 8d are based on -20 to 60°C / -4 to 140°F.

3. Product has passed Emerson Process Management Regulator Technologies, Inc. (Emerson) testing for lockup, relief start-to-discharge and reseal down to -40°.

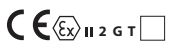
Table 1. Available Configurations

TYPE NUMBER								OPTION	
C	S	B	7						
								PRESSURE CONSTRUCTION	
				0				Low Pressure Applications (Outlet Pressure: 9.0 to 110 mbar / 3.6 in. w.c. to 1.6 psig) ⁽²⁾	
				2				Medium Pressure Applications (Outlet Pressure: 61 to 780 mbar / 0.9 to 11.3 psig) ⁽²⁾	
				5				High Pressure Applications (Outlet Pressure: 0.70 to 4.0 bar / 10.2 to 58.0 psig) ⁽²⁾	
								OVERPRESSURE PROTECTION	
				0				Without Overpressure Protection Module	
				0F				Without Overpressure Protection Module (Outlet Pressure: 9.0 to 110 mbar / 3.6 in. w.c. to 1.6 psig and 270 to 325 mbar / 3.9 to 4.7 psig only) ⁽²⁾	
				4				With Type VSX8 Slam-shut Module ⁽¹⁾	
				4F				With Type VSX8 Slam-shut Module ⁽¹⁾ (Outlet Pressure: 9.0 to 110 mbar / 3.6 in. w.c. to 1.6 psig and 270 to 325 mbar / 3.9 to 4.7 psig only) ⁽²⁾	
								PRESSURE REGISTRATION	
				E				External	
								RELIEF	
				N				None	
				T				Token Internal Relief ⁽³⁾	
Example: Type number CSB724ET: Type CSB700 regulator constructed for medium pressure applications, with Type VSX8 Slam-shut Module, with External pressure registration and with Token relief.									
1. Reference Instruction Manual D103127X012 for information regarding the Type VSX8 Slam-shut Module.									
2. The pressure/temperature limits in this Instruction Manual and any applicable standard or code limitation should not be exceeded.									
3. Token relief not available for outlet pressure above 500 mbar / 8 psig.									

Table 2. PED Information

TYPE	DESCRIPTION	PED CATEGORY	FLUID GROUP
CSB700, CSB700F, CSB720, CSB720F and CSB750	Base regulator	I	Groups 1 and 2 according to PED 2014/68/EU, 1st and 2nd family gas according to EN437 or other gases (compressed air, nitrogen). The gas must be non-corrosive, clean (filtration on inlet side necessary) and dry.
CSB704, CSB704F, CSB724, CSB724F and CSB754	Regulator with Slam-shut Module	IV	
European EN Reference Standards		EN334, EN14382	

Table 3. Directive ATEX Information

TYPE	CLASSIFICATION	ATEX ASSEMBLIES	ATEX LABELLING
CSB704, CSB704F, CSB724, CSB724F, CSB754 version with VSX8	Non-electrical equipment	Not falling under the ATEX Directive 2014/34/EU	No
CSB704, CSB704F, CSB724, CSB724F and CSB754 with limit switch	Non-electric equipment equipped with an electrical device falling under the scope of the ATEX Directive 2014/34/EU	Constitutes an assembly according to the ATEX Directive 2014/34/EU	



WARNING

Failure to follow these instructions or to properly install and maintain this equipment could result in an explosion and/or fire causing property damage and personal injury or death.

Fisher™ regulators must be installed, operated and maintained in accordance with federal, state and local codes, rules and regulations and Emerson instructions.

If the regulator vents gas or a leak develops in the system, service to the unit may be required. Failure to correct trouble could result in a hazardous condition.

Call a gas service person to service the unit. Only a qualified person must install or service the regulator.

CSB700 Series

 PATENT PENDING 0062	REGULATOR		SLAMSHUT		SERIAL NO.	
	TS	TEMP CLASS		DOM		
	PS	FLUID GROUP	CAT	LOC		
	DN	SEAT		BODY	MATL	
PN		Ø				

Std: EN334 REGULATOR PED mfg: Chartres France	TYPE	PDS
	Pumax	Pmax
	Wds	Mat: Case
	Type	Failure Mode

REGULATOR NAMEPLATES

Std: EN14382 SLAM SHUT PED mfg: Chartres France	VSX8L VSX8H	
	RELAIS RELAY	Pu max Max IN
	MATL CASE	P max Max OUT
	TYPE	PSD
	Wdsu OP range over UP	Wdsu UP range
		IS 6.0 bar DS 16.0 bar LP 1.5 bar HP 5.5 bar
		A Min, Min and Max Installation B Max Installation Only
IS PS 6.0 bar P _{umax} 6.0 bar PSD 6.0 bar DS PS 20.0 bar P _{umax} 16.0 bar PSD 6.0 bar		Pressure range following service condition

FRANCEL SAS Chartres FRANCE		
TYPE		
No de Série SERIAL No.		An YEAR
Utilisation INTENDED USE		

SLAM-SHUT NAMEPLATE

NAMEPLATE FOR EXPLOSIVE ATMOSPHERE IF ATEX ASSEMBLED

Figure 2. CSB700 Series Regulator and Slam-shut Nameplates and Labels

Table 4. Integral Strength (IS) Pressure Ratings⁽¹⁾

TYPE	MAXIMUM ALLOWABLE PRESSURE / MAXIMUM EMERGENCY INLET PRESSURE		MAXIMUM OPERATING INLET PRESSURE ⁽²⁾	
	P _s		P _{UMAX}	
	bar	psig	bar	psig
CSB700 and CSB704	4.0	58.0	4.0	58.0
CSB700F and CSB704F				
CSB720 and CSB724				
CSB720F and CSB724F				
CSB750 and CSB754	5.0	72.5	5.0	72.5

1. Applicable only to applications where the inlet rating cannot exceed the outlet rating.
 2. For the Integral Strength (IS version), the maximum value of P_s and P_{umax} should be similar to the PSD used for the Differential Strength (DS) version.

Table 5. Differential Strength (DS) Pressure Ratings and Flow and Sizing Coefficients

TYPE	SPECIFIC MAXIMUM ALLOWABLE PRESSURE / MAXIMUM EMERGENCY OUTLET PRESSURE ⁽¹⁾		MAXIMUM ALLOWABLE PRESSURE / MAXIMUM EMERGENCY INLET PRESSURE ⁽¹⁾		MAXIMUM OPERATING INLET PRESSURE ⁽¹⁾		ORIFICE SIZE		WIDE-OPEN FLOW COEFFICIENT			IEC SIZING COEFFICIENT		
	P _{SD}		P _s		P _{UMAX}									
	bar	psig	bar	psig	bar	psig	mm	In.	C _g	C _v	C ₁	X _T	F _D	F _L
CSB700 and CSB704	4.0	58.0	12.0	174	10	145	35	1-3/8	1080	27.7	39	0.96	0.89	0.66
CSB700F and CSB704F					6	87								
CSB720F and CSB724F					16	232								
CSB720 and CSB724			20.0	290	16	232								
CSB750 and CSB754	5.0	72.5	20.0	290	16	232								

1. The pressure/temperature limits in this Instruction Manual and any applicable standard or code limitation should not be exceeded.

Table 6. Body Sizes, Material, End Connections and Cold Working Pressure Ratings

BODY MATERIAL	BODY SIZE		END CONNECTION	FACE-TO-FACE DIMENSION		BODY PRESSURE RATING	
	DN	NPS		mm	In.	bar	psig
Ductile Iron	40	1-1/2	NPT	155	6.10	17.2	250
	50	2					
	40	1-1/2	Rp				
	50	2					
	50	2	CL125 FF/CL150 FF	191	7.52		
	50	2		254	10.0		
	50	2		267	10.5		
	50	2	CL150 RF	254	10.0		
	50	2	PN 10/16	191	7.52	16.0	232
	50	2		200	7.87		
	50	2		254	10.0		
	40	1-1/2	PN 16 Slip-On	222	8.74		
WCC Steel	40	1-1/2	NPT	155	6.10	20.0	290
	50	2					
	40	1-1/2	Rp				
	50	2					
	50	2	CL150 RF	254	20.0	16.0	232
	50	2	PN 10/16				
	50	2	PN 10/16				

Table 7. CSB700 Series Primary Regulator Outlet Pressure Ranges

TYPE	OPERATING PRESSURE RANGES, W _a		PART NUMBER	SPRING COLOR	SPRING WIRE DIAMETER		SPRING FREE LENGTH	
	mbar	psig			mm	In.	mm	In.
CSB700, CSB704, CSB700F and CSB704F	9 to 14	3.6 to 5.6 in.w.c.	GE30336X012	Silver	3.00	0.118	224	8.82
	13 to 24	5.2 to 9.6 in.w.c.	ERSA01138A0	Red	3.50	0.138	264	10.4
	22 to 39	8.8 to 15.7 in.w.c.	GE30338X012	Black Stripe	4.32	0.170	172	6.78
	32 to 50	12.8 to 20.1 in.w.c.	GE30339X012	Purple	4.34	0.171	187	7.35
	42 to 70	16.9 to 28.1 in.w.c.	GE30340X012	White Stripe	4.62	0.182	188	7.40
	61 to 110	0.9 to 1.6	ERSA03656A0	Dark Green	4.88	0.192	224	8.82
CSB720 and CSB724	61 to 110	0.9 to 1.6	ERSA03656A0	Dark Green	4.88	0.192	224	8.82
	105 to 220	1.5 to 3.2	ERSA03657A0	Blue	5.94	0.234	217	8.53
	210 to 380	3.1 to 5.5	GG06247X012	Black	8.00	0.315	206	8.13
	320 to 570	4.6 to 8.3	ERSA01582A0	Red with White Stripe	8.71	0.343	177	6.97
	510 to 780	7.4 to 11.3	ERSA05055A0	Blue with White Stripe	10	0.394	181	7.13
CSB720F and CSB724F	270 to 325	3.9 to 4.7	ERAA11747A0	Black with White Stripe	6.5	0.256	235	9.25
CSB750 and CSB754	0.7 to 1.19 bar	10.2 to 17.3	GE30345X012	Purple Stripe	9.00	0.354	225	8.87
	1.05 to 2.7 bar	15.2 to 39.2	GE30346X012	Brown	11.0	0.433	226	8.88
	2.3 to 3.25 bar	33.4 to 47.1	ERSA01125A0	Grey with Red Stripe	12.6	0.496	225	8.87
	3.1 to 4 bar	45 to 58	ERSA01126A0	Grey with Orange Stripe	13.7	0.539	226	8.89

Description

CSB700 Series regulators are typically installed on industrial and commercial applications. See Table 1 for Available Configurations. Types under CSB700 Series are utilized for high capacities. Low, Medium and High outlet pressure constructions are available via Types CSB700, CSB720 and CSB750 respectively, that provide outlet setpoints ranging from 9.0 mbar to 4.0 bar / 0.13 to 58.0 psig.

The Types CSB704, CSB724 and CSB754 are examples of CSB700 Series configurations that offer a slam-shut module that shuts off the flow of gas to the downstream system in the event of outlet pressure rising above or falling below the predefined levels due to a failure.

Optional token relief is available, which acts as a low capacity internal relief valve to relieve minor overpressure situations due to nicks or other minor damage to the orifice or disk or due to thermal expansion of the downstream system.

External outlet pressure registration requires an external control line/sense line.

CSB700 Series

Table 8a. North American Overpressure Shut-off OPSO Only Ranges

REGULATOR			SLAM SHUT DEVICE							
Type	Typical Setpoint	Spring Range	Type (Maximum Operating Inlet)	Token Relief Set	Relief Range Shown as a % of Regulator Setpoint		Required Difference Between Token Relief and OPSO	Over Pressure Shut-off (OPSO) Set Range	Factory Set	
	psig	psig		psig	min	max	psig	psig	OPSO	
CSB704F	7 in. w.c.	5.2 to 9.6 in. w.c.	VSX8L (125 psi)	12 in. w.c.	170	215	3.2 in. w.c.	12 to 24 in. w.c.	22 in. w.c.	
	11 in. w.c.	8.8 to 15.7 in. w.c.		17 in. w.c.	150	160	4 in. w.c.	16 in. w.c. to 1.6 psig	25 in. w.c.	
	14 in. w.c.	12.8 to 20.0 in. w.c.		21 in. w.c.	150	160	4 in. w.c.	24 in. w.c. to 2.8 psig	1.1	
	1	24 in. w.c. to 1.6 psig		1.4	140	150	6.4 in. w.c.	1.4 to 4.1	2	
CSB724F	2	1.5 to 3.2		2.6	130	140	0.6	2.0 to 7.3	3.5	
	3			3.8	125	140	0.6		5	
	5	3.1 to 5.5		6.2	125	140	0.7	3.2 to 11.0	7	
	10	7.4 to 11.3							5.8 to 13.3 ⁽¹⁾	12
CSB704	7 in. w.c.	5.2 to 9.6 in. w.c.	VSX8L (232 psi)	12 in. w.c.	170	215	3.2 in. w.c.	12 to 24 in. w.c.	22 in. w.c.	
	11 in. w.c.	8.8 to 15.7 in. w.c.		17 in. w.c.	150	160	4 in. w.c.	16 in. w.c. to 1.6 psig	25 in. w.c.	
	14 in. w.c.	12.8 to 20.0 in. w.c.		21 in. w.c.	150	160	4 in. w.c.	24 in. w.c. to 2.8 psig	1.1	
	1	24 in. w.c. to 1.6 psig		1.4	140	150	6.4 in. w.c.	1.4 to 4.1	2	
CSB724	2	1.5 to 3.2		2.6	130	140	0.6	2.0 to 7.3	3.5	
	3			3.8	125	140	0.6		5	
	5	3.1 to 5.5		6.2	125	140	0.7	3.2 to 11.0	7	
	10	7.4 to 11.3							5.8 to 13.3 ⁽¹⁾	12
CSB754	15	10.2 to 17.3	VSX8H (232 psi)						13.1 to 39.1 ⁽¹⁾	19
	20	15.2 to 39.2							13.1 to 43.5	25
	30									35
	40	33.4 to 47.1							23.2 to 72.5 ⁽¹⁾	45
Legend: Gray areas indicate that token relief is not available above 8 psig setpoint. 1. Max OPSO setpoint truncated to reflect maximum outlet pressure for spring range.										

Gray areas indicate that token relief is not available above 8 psig setpoint.
1. Max OPSO setpoint truncated to reflect maximum outlet pressure for spring range.

Table 8b. European Overpressure Shut-off OPSO Only Ranges

REGULATOR			SLAM SHUT DEVICE							
Type	Typical Setpoint	Spring Range	Type (Maximum Operating Inlet)	Token Relief Set	Relief Range Shown as a % of Regulator Setpoint		Required Difference Between Token Relief and OPSO	Over Pressure Shut-off (OPSO) Set Range	Factory Set	
	mbar	mbar		mbar	min	max	mbar	mbar	OPSO	
CSB704F	10	9 to 14	VSX8L (8.6 bar)	17	170	215	8	30 to 60	32	
	15	13 to 24		26	170	215	6		30 to 60	40
	20	13 to 24		34	170	215	6			30 to 60
	21			36	170	215	4	30 to 60		
	27	22 to 39		41	150	160	5		40 to 110	
	30			45	150	160	10			60 to 193
	35	22 to 39		53	150	160	10	60 to 193		
	50	42 to 70		70	140	158	16		60 to 193	
	60			84	140	158	16			60 to 193
75	61 to 110	98	130	140	20	60 to 193	130			
CSB704	10	9 to 14	VSX8L (16 bar)	17	170		215	8	30 to 60	
	15	13 to 24		26	170		215	10		30 to 60
	20	13 to 24		34	170	215	10	30 to 60		
	21			36	170	215	10		30 to 60	
	27	22 to 39		41	150	160	10			40 to 110
	30			45	150	160	10	60 to 193		
	35	22 to 39		53	150	160	10		60 to 193	
	50	42 to 70		70	140	158	16			60 to 193
	60			84	140	158	16	60 to 193		
75	61 to 110	98	130	140	20	60 to 193	130			
CSB724	100	61 to 110	VSX8L (16 bar)	130	130		140		20	60 to 193
	120	105 to 220		156	130		140	40	95 to 280	
	150			195	130	140	40	95 to 280		
	160	105 to 220		208	130	140	40			138 to 500
	200	105 to 220		250	125	140	50		138 to 500	
	300	210 to 380		375	125	140	50	221 to 760		
	500	320 to 570		625	125	140	60			221 to 760
	600	510 to 780							400 to 915 ⁽¹⁾	
	750							400 to 1100 ⁽¹⁾	1050	
CSB724F	300	270 to 325	VSX8L (8.6 bar)					138 to 500	450	
CSB754	1000	700 to 1190	VSX8H (16 bar)					400 to 1450	1320	
	1200	1050 to 2700						900 to 3000	1600	
	1500								1900	
	2000	1050 to 2700						1600 to 4000 ⁽¹⁾	2400	
	3000	2300 to 3250						1600 to 5000 ⁽¹⁾	3400	
4000	3100 to 4000	4400								

Gray areas indicate that token relief is not available above 500 mbar setpoint.
1. Max OPSO setpoint truncated to reflect maximum outlet pressure for spring range.

Table 8c. North American Overpressure and Underpressure Shut-off UPSO/OPSO Ranges

REGULATOR			SLAM SHUT DEVICE										
Type	Typical Setpoint	Spring Range	Type (Maximum Operating Inlet)	Token Relief Set	Relief Range Shown as a % of Regulator Setpoint		Required Difference Between Token Relief and OPSO	UPSO	OPSO	Factory Set			
	psig	psig		psig	min	max	psig	Set Range	Shut-off (OPSO) Set Range Over UPSO Setpoint	UPSO	Adjusted OPSO Range	OPSO	
				psig	min	max	psig	psig	psig	psig	psig	psig	
CSB704F	7 in. w.c.	5.2 to 9.6 in. w.c.	VSX8L (125 psi)	12 in. w.c.	170	215	3.2 in. w.c.	3 to 12 in. w.c.	16 to 29 in. w.c.	3 in. w.c.	19 in. w.c. to 1.2 psig	22 in. w.c.	
	11 in. w.c.	8.8 to 15.7 in. w.c.		17 in. w.c.	150	160	4 in. w.c.			6 in. w.c.	22 in. w.c. to 1.3 psig	25 in. w.c.	
	14 in. w.c.	12.8 to 20.0 in. w.c.		21 in. w.c.	150	160	4 in. w.c.			4 in. w.c. to 1.1 psig	20 in. w.c. to 1.8 psig	9 in. w.c.	1 to 2.1 psig
	1	24.0 in. w.c. to 1.6 psig		1.4	140	150	6.4 in. w.c.	10 in. w.c. to 2.3 psig	1.2 to 3.2	14 in. w.c.	1.7 to 3.7	2	
CSB724F	2	1.5 to 3.2		2.6	130	140	0.6	1.5 to 7.3	2.6 to 5.6	1	2.2 to 4.2	3.5	
	3			3.8	125	140	0.6			2	4.6 to 7.6	5	
	5	3.1 to 5.5		6.2	125	140	0.7			1.5 to 7.3	3.5 to 8.2	3	5.6 to 8.6
	10	7.4 to 11.3						1.5 to 7.3	3.5 to 8.2	5	8.5 to 13.2	12	
CSB704	7 in. w.c.	5.2 to 9.6 in. w.c.	VSX8L (232 psi)	12 in. w.c.	170	215	3.2 in. w.c.	3 to 12 in. w.c.	18 to 30 in. w.c.	3 in. w.c.	21 in. w.c. to 1.2 psig	22 in. w.c.	
	11 in. w.c.	8.8 to 15.7 in. w.c.		17 in. w.c.	150	160	4 in. w.c.			6 in. w.c.	24 in. w.c. to 1.3 psig	25 in. w.c.	
	14 in. w.c.	12.8 to 20.0 in. w.c.		21 in. w.c.	150	160	4 in. w.c.			4 in. w.c. to 1.1 psig	25 in. w.c. to 1.9 psig	9 in. w.c.	1.2 to 2.2
	1	24.0 in. w.c. to 1.6 psig		1.4	140	150	6.4 in. w.c.	10 in. w.c. to 2.3 psig	1.2 to 3.2	14 in. w.c.	1.7 to 3.7	2	
CSB724	2	1.5 to 3.2		2.6	130	140	0.6	1.5 to 7.3	2.6 to 5.6	1	2.2 to 4.2	3.5	
	3			3.8	125	140	0.6			2	4.6 to 7.6	5	
	5	3.1 to 5.5		6.2	125	140	0.7			1.5 to 7.3	2.6 to 5.6	3	5.6 to 8.6
	10	7.4 to 11.3						3.5 to 8.2	5			8.5 to 13.2	12
CSB754	15	10.2 to 17.3	VSX8H (232 psi)				1.5 to 10.9	6.7 to 13.5	7	13.7 to 20.5	19		
	20	15.2 to 39.2							7.3 to 29.0	15.2 to 22.8	10	25.2 to 32.8	25
	30										18.1 to 33.4	15	33.1 to 48.4
	40	33.4 to 55.1								20		38.1 to 53.4	45
Gray areas indicate that token relief is not available above 8 psig setpoint.													

Gray areas indicate that token relief is not available above 8 psig setpoint.

Table 8d. European Overpressure and Underpressure Shut-off UPSO/OPSO Ranges

REGULATOR			SLAM SHUT DEVICE										
Type	Typical Setpoint	Spring Range	Type (Maximum Operating Inlet)	Token Relief Set	Relief Range Shown as a % of Regulator Setpoint		Required Difference Between Token Relief and OPSO	UPSO	OPSO	Factory Set			
	mbar	mbar						Set Range	Shut-off (OPSO) Set Range Over UPSO Setpoint	UPSO	Adjusted OPSO Range	OPSO	
CSB704F	15	13 to 24	VSX8L (8.6 bar)	mbar	min	max	mbar	mbar	mbar	mbar	mbar	mbar	
	20	13 to 24		26	170	215	6	7 to 11	30 to 44	8	38 to 52	40	
	21	13 to 24		34	170	215	6	7 to 11	30 to 44	10	40 to 54	40	
	27	22 to 39		36	170	215	4	7 to 11	30 to 44	10	40 to 54	40	
	30	22 to 39		41	150	160	5	7 to 15	32 to 44	14	46 to 58	46	
	35	22 to 39		45	150	160	10	7 to 30	40 to 72	15	55 to 87	60	
	50	42 to 70		53	150	160	10	7 to 30	40 to 72	18	58 to 90	70	
	60	42 to 70		70	140	158	16	10 to 75	48 to 74	25	73 to 99	90	
	75	61 to 110		84	140	158	16	10 to 75	48 to 74	30	78 to 104	100	
CSB704	15	13 to 24	VSX8L (16 bar)	26	170	215	6	7 to 30	40 to 55	8	48 to 63	50	
	20	13 to 24		34	170	215	6	7 to 30	40 to 55	10	50 to 65	55	
	21	13 to 24		36	170	215	4	7 to 30	40 to 55	10	50 to 65	55	
	27	22 to 39		41	150	160	5	7 to 30	40 to 55	14	54 to 69	55	
	30			45	150	160	10	7 to 30	45 to 76	15	60 to 91	60	
	35			53	150	160	10	7 to 30	45 to 76	18	63 to 94	70	
	50	42 to 70		70	140	158	16	10 to 75	50 to 80	25	75 to 105	90	
	60			84	140	158	16		50 to 80	30	80 to 110	100	
	75			98	130	140	20		50 to 80	38	121 to 259	130	
CSB724	100	61 to 110	VSX8L (16 bar)	130	130	140	20	25 to 160	83 to 221	50	133 to 271	170	
	120	105 to 220		156	130	140	40			60	143 to 281	205	
	150			195	130	140	40			75	158 to 296	250	
	160			208	130	140	40			80	163 to 301	265	
	200			250	125	140	50	100	214 to 361	330			
	300	210 to 380		375	125	140	50	100 to 500	114 to 261	150	329 to 536	450	
	500	320 to 570		625	125	140	60			241 to 565	250	491 to 815	700
	600	510 to 780								100 to 500	241 to 565	300	541 to 865
	750							100 to 750	460 to 932	375	835 to 1120 ⁽¹⁾	1050	
	CSB724F	300		270 to 325	VSX8L (8.6 bar)					100 to 500	179 to 386	200	379 to 586
CSB754 GrDF	1 bar	0.7 to 1.19 bar	VSX8L (16 bar)					100 to 500	460 to 932	750	1210 to 1682	1210	
CSB754	1 bar	0.7 to 1.19 bar	VSX8H (16 bar)					100 to 500	460 to 932	500	960 to 1432	1320	
	1.2 bar	1.05 to 2.7 bar						500 to 2000	1050 to 1570	600	1650 to 2170	1650	
	1.5 bar									750	1800 to 2320	1900	
	2 bar									1000	2250 to 3300	2400	
	3 bar	2.3 to 3.25 bar						500 to 2800	1250 to 2300	1500	2750 to 3800	3400	
4 bar	3.1 to 4 bar					2000	4100 to 5000 ⁽¹⁾			4400			
- Gray areas indicate that token relief is not available above 500 mbar setpoint. 1. Max OPSO setpoint truncated to reflect maximum outlet pressure for spring range.													

Gray areas indicate that token relief is not available above 500 mbar setpoint.

1. Max OPSO setpoint truncated to reflect maximum outlet pressure for spring range.

Example: If a non-standard setpoint is needed, see the following example for the proper use of Tables 8a, 8b, 8c and 8d. In this example, the non-standard regulator setpoint is 140 mbar / 2.0 psig. The minimum factory token relief set pressure is 130% of the non-standard setpoint. The resulting token relief set pressure is 183 mbar / 2.6 psig. The minimum factory OPSO and UPSO set pressures are 165% and 50% of the non-standard setpoint, respectively. The resulting minimum settings are: OPSO = 231 mbar / 3.4 psig and UPSO = 70 mbar / 1.0 psig.

CSB700 Series

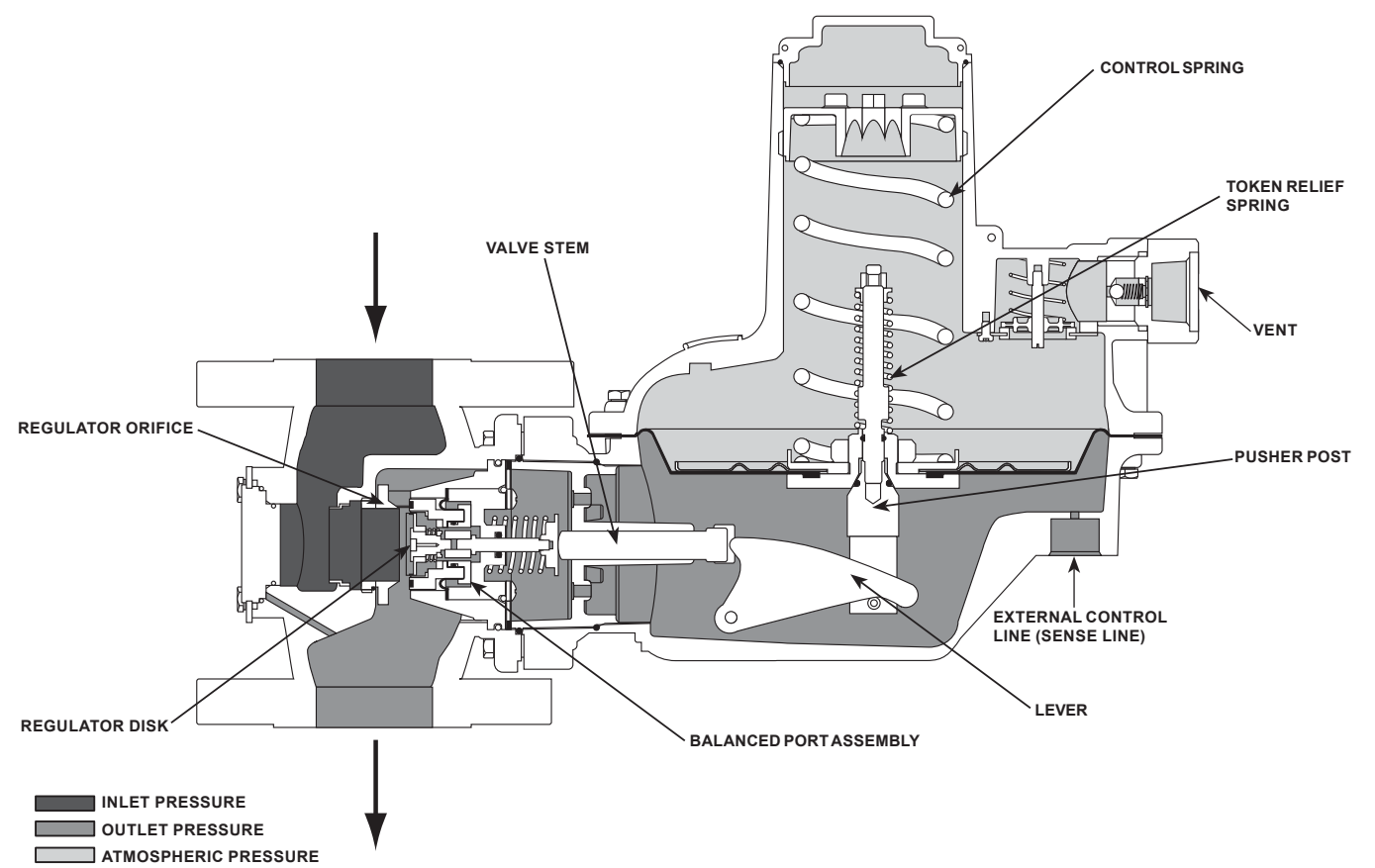


Figure 3. CSB700 Series with External Registration Operational Schematics

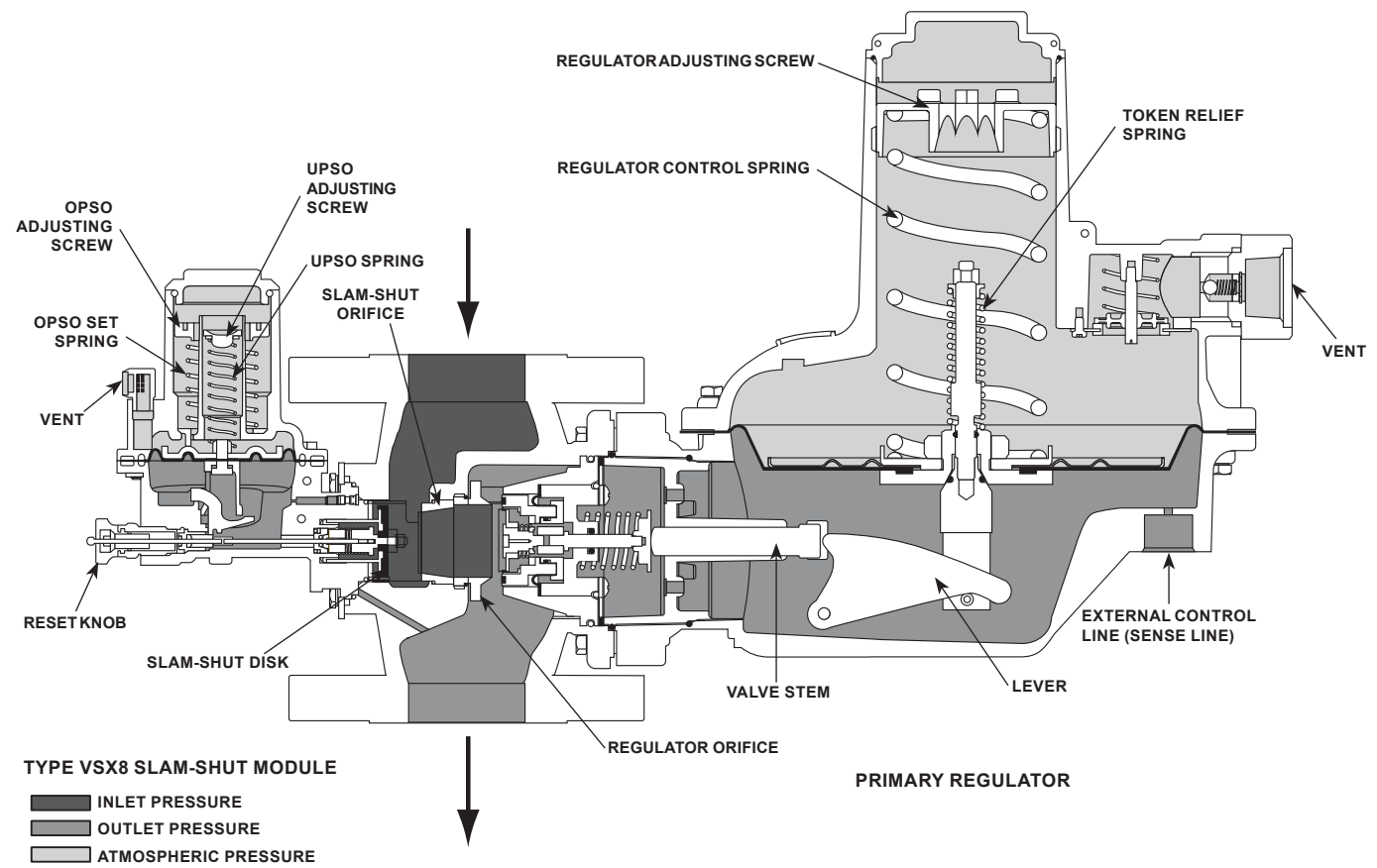


Figure 4. Type CSB704ET, Externally Registered Regulator and Slam-Shut Operational Schematic

Principle of Operation

Type CSB700 Base Regulator Operation

Refer to Figure 3. When downstream demand decreases, the pressure under the regulator diaphragm increases. This pressure overcomes the regulator setting which is set by the regulator control spring. The action of the pusher post assembly, lever, and valve stem moves the balanced port assembly closer to the orifice and reduces gas flow. If downstream demand increases, pressure under the regulator diaphragm decreases. Spring force pushes the pusher post assembly downward, the balanced port assembly moves away from the orifice and the gas flow increases downstream as the regulator opens in response to the decreased pressure underneath the regulator diaphragm.

Type numbers with a “T”, for example Type CSB700ET, provide a token or low capacity relief. The token relief provides relief from minor overpressure caused by nicks or dents on the orifice or by thermal expansion of gas in the downstream line. Token relief also provides a token or signal, in the form of odor, that indicates an overpressure situation is occurring.

Type CSB704/CSB704F/CSB724/CSB724F/CSB754 Slam-Shut Operation

The Type VSX8 slam-shut module on the Type CSB704 regulator is a fast-acting shutoff device that provides overpressure (OPSO) or over and underpressure (OPSO/UPSO) protection by completely shutting off the flow of gas to the downstream system. See Table 8 for guidance regarding the typical setpoints of the regulator and associated slam-shut module OPSO and combined OPSO and UPSO setpoints. The Type VSX8's actions are independent of the Type CSB704 regulator and of variations to the inlet pressure. The Type VSX8 comes standard with external downstream pressure registration. External registration requires a downstream sensing line. See Figure 6 for guidance regarding installation of the downstream control line.

The Type VSX8 shutoff disk is normally in the open (reset) position, see Figure 4. If the downstream pressure below the slam-shut diaphragm increases (or decreases) until it reaches the slam-shut setpoint, this diaphragm moves upward (or downward) to release the trip mechanism which allows the spring force on the stem to push the disk against the seat, shutting off all gas flow. To reset the slam-shut after gas flow has been shut off, refer to the Type VSX8 Instruction Manual for additional details D103127X012.



WARNING

In order for the Underpressure Shutoff (UPSO) of any slam-shut to be triggered, the downstream pipe pressure must drop below the UPSO setpoint. In the case of a downstream line break, numerous factors can prevent the downstream pipe pressure from decreasing below the slam-shut UPSO setpoint. These factors include the distance of pipe to the break, the diameter of the pipe, size of the break and the number of restrictions, such as valves, elbows and bends, downstream of the regulator and/or slam-shut device. Due to these factors additional protections should be installed to stop flow in the event of a line break.

Installation and Overpressure Protection

Install in accordance with provisions of EN12186 / EN12279.



WARNING

Personal injury or system damage may result if this regulator is installed, without appropriate overpressure protection, where service conditions could exceed the limits given in the Specifications section and/or regulator nameplate. Regulator and equipment installation should be adequately protected from physical damage.

All vents should be kept open to permit free flow of gas to the atmosphere. Protect openings against entrance of rain, snow, insects or any other foreign material that may plug the vent or vent line. On outdoor installations, point the spring case vent downward, see Figures 5 through 6. This minimizes the possibility of freezing and of water or other foreign materials entering the vent and interfering with proper operation.

For Type CSB704/CSB704F/CSB724/CSB724F/CSB754 with Slam-shut, point the vents of both the primary regulator and slam-shut downward to resist collection of precipitation and moisture. From the factory, the slam-shut vent will always point in the same direction as that of the primary regulator.

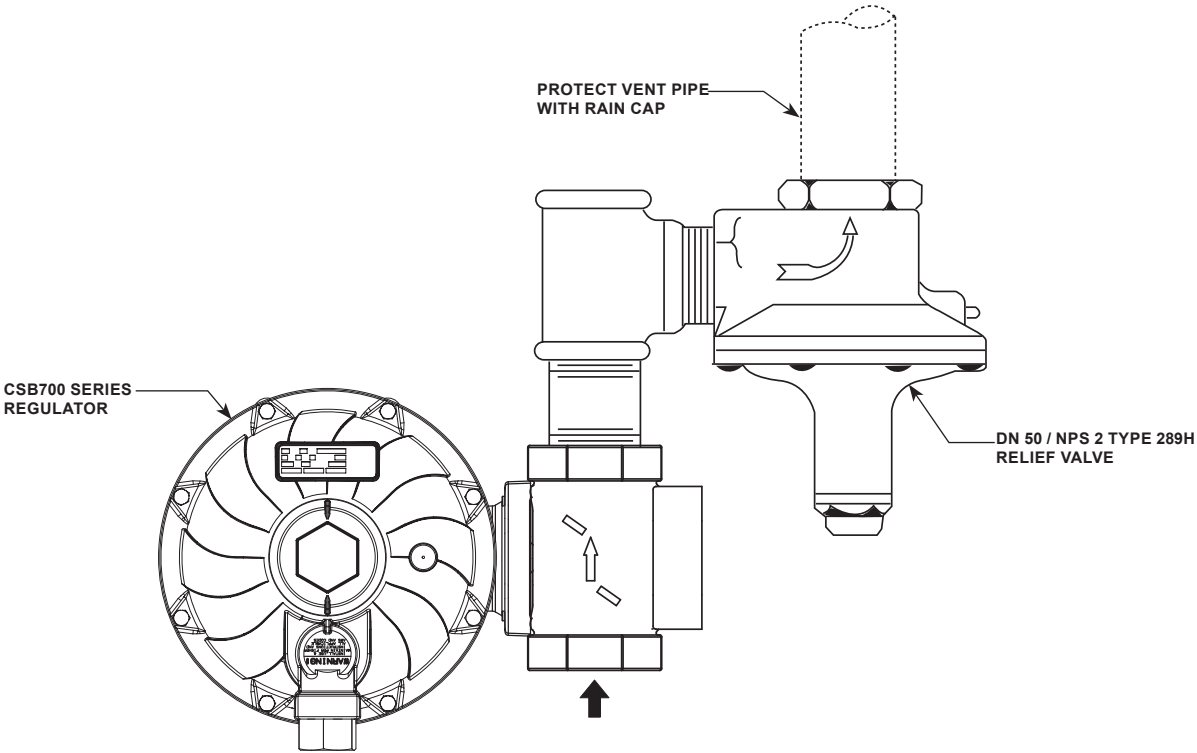


Figure 5. CSB700 Series Regulator Installed with the Vent Pointed Downward and with a Type 289H Relief Valve for High Capacity Relief

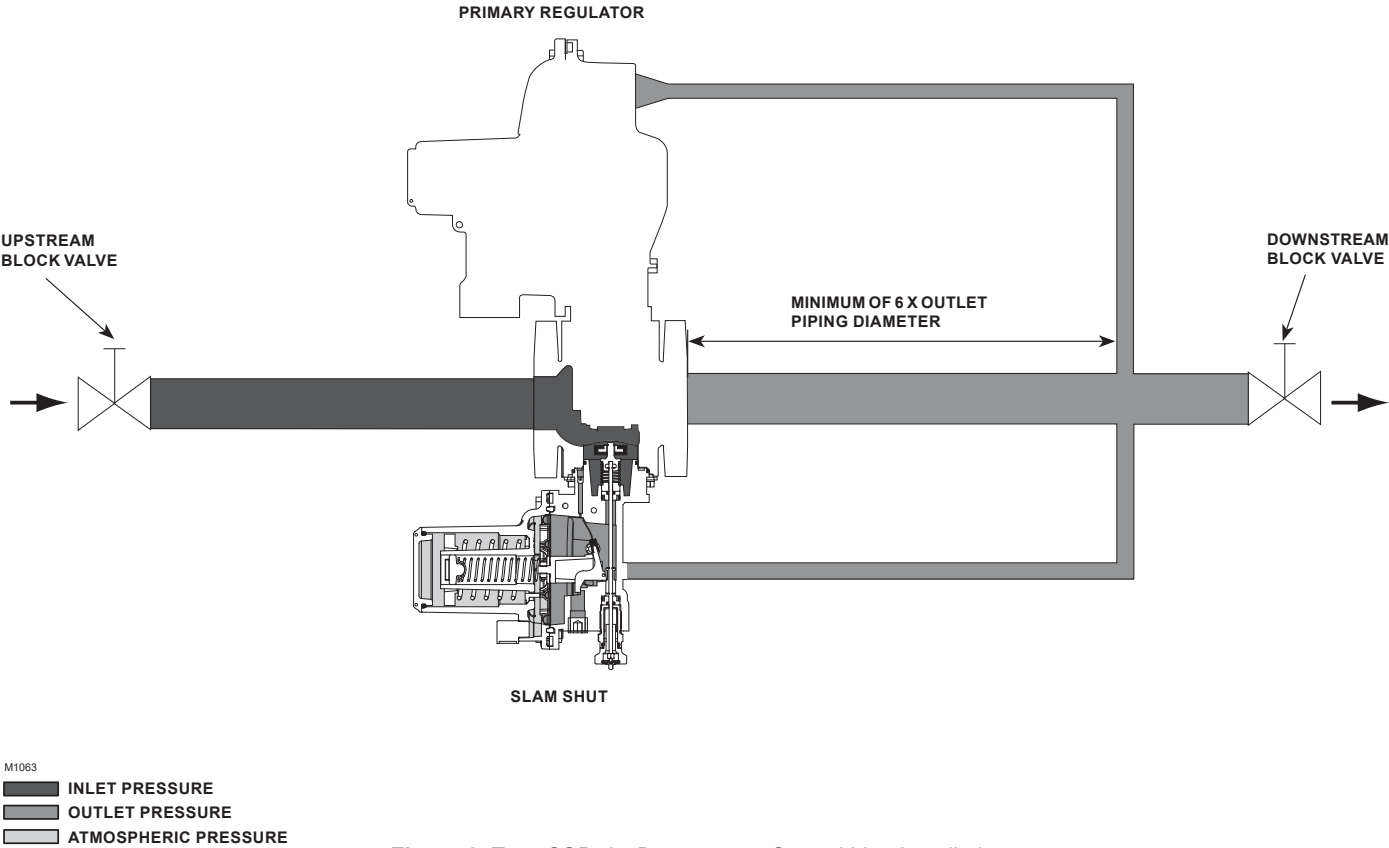


Figure 6. Type CSB704 Downstream Control Line Installation

Under enclosed conditions or indoors, escaping gas may accumulate and be an explosion hazard. In these cases, the vent should be piped away from the regulator to the outdoors. See Vent Line Installation section for the recommended venting practice.



CAUTION

CSB700 Series regulators have an outlet pressure rating lower than their inlet pressure rating. If actual inlet pressure can exceed the outlet pressure rating, outlet overpressure protection is necessary. However, overpressuring any portion of the regulators beyond the limits in the Specifications section may cause leakage, damage to regulator parts or personal injury due to bursting of pressure-containing parts.

Some type of external overpressure protection should be provided to the CSB700 Series if inlet pressure will be high enough to damage downstream equipment. Common methods of external overpressure protection include relief valves, monitoring regulators, shutoff devices and series regulation.

If the regulator is exposed to an overpressure condition, it should be inspected for any damage that may have occurred. Regulator operation below the limits specified in the Specifications section and regulator nameplate does not preclude the possibility of damage from external sources or from debris in the pipeline.



WARNING

The usage of an assembly incorporating an electrical accessory in an explosive atmosphere the Type CSB704 regulators equipped with an electrical accessory (proxy, microswitch) are:

- are classified “assembly” in conformity with the ATEX Directive 2014/34/EU (ref CEN/SFG-I Guidance sheet-February 2015)
- can be installed in any type of classified zones according to the Directive 1999/92/EC dated 16 December 1999, according to the following conditions:
 - a.) the equipment is connected to a suitable and certified intrinsically safe apparatus/electric circuit (zener barrier)

b.) the equipment is used according to the appropriate instruction manual issued by the manufacturer and/or available on our website

c.) when the equipment is used in a natural gas pressure reducing and/or metering station in compliance with the following European standards: EN 12186, EN 12279 and EN 1776.

General Installation Instructions

Before installing the regulator:

- Check for damage, which might have occurred during shipment.
- Check for and remove any dirt or foreign material, which may have accumulated in the regulator body.
- Blow out any debris, dirt or copper sulfate in the copper tubing and the pipeline.
- Apply pipe compound to the external threads of the pipe before installing the regulator.
- Make sure gas flow through the regulator is in the same direction as the arrow on the body.
- Verify that:
 - Equipment limits of utilization (PS, TS) correspond to the desired operating conditions.
 - The inlet is protected by an appropriate device(s) to avoid exceeding the allowable limits (PS, TS).
- When designing a pressure reducing station, make an analysis if it is necessary to take into account the effect of wind, snow and temperature to avoid unnecessary load and movement to the flanges of the equipment.
- If needed, a support may be used under the piping and regulator/slam-shut body to avoid excessive pressure force on the regulator/slam-shut.

Installation Location

- The installed regulator should be adequately protected from vehicular traffic and damage from other external sources.
- Install the regulator with the vent pointed vertically down, see Figures 5 through 6. If the vent cannot be installed in a vertically down position, the regulator must be installed under a separate protective cover. Installing the regulator with the vent down allows condensation to drain, minimizes the entry of water or other debris from entering the vent and minimizes vent blockage from freezing precipitation.

CSB700 Series

- Do not install the regulator in a location where there can be excessive water accumulation or ice formation, such as directly beneath a downspout, gutter or roof line of building. Even a protective hood may not provide adequate protection in these instances.
- Install the regulator so that any gas discharge through the vent or vent assembly is over 0.91 m / 3 ft away from any building opening.

Regulators Subjected to Heavy Snow Conditions

Some installations, such as in areas with heavy snowfall, may require a hood or enclosure to protect the regulator from snow load and vent freeze over.

Downstream Control Line Installation



WARNING

Failure to install a downstream control line could result in a hazardous condition. Install downstream control line(s) to the slam-shut device when construction uses external pressure registration. The regulator and slam-shut device will not control pressure or shut off if a downstream control line is not installed on those constructions where external pressure registration is required.

CSB700 Series regulators with an “ET” or “EN” in the type number use external pressure registration. To communicate the downstream pressure to the regulator, connect a downstream control line tubing to the 3/4 NPT control line tapping in the lower diaphragm casing and connect the other end of the tubing downstream of the regulator outlet with a minimum distance of 6 times the outlet pipe diameter.

For all types with external control lines, use tubing with an inner diameter of 16 mm / 0.63 in. or larger.

Downstream Control Line Installation with Slam-Shut Device

Refer to Figure 6. When installing the Types CSB704ET, CSB704FET, CSB704FEN, CSB704EN, CSB724ET, CSB724EN, CSB724FET, CSB724FEN and CSB754EN regulators, connect downstream control line tubing to the lower casing of the regulator and run the tubing downstream of the regulator outlet with a minimum distance of 6 times the outlet pipe diameter. Connect a second, separate downstream control line tubing to the lower casing of the slam-shut and run the tubing downstream of the regulator outlet a minimum distance of 6 times the outlet pipe diameter.

For all types with external control lines, use tubing with an inner diameter of 16 mm / 0.63 in. or larger for the primary regulator and 6.4 mm / 0.25 in. or larger for the slam-shut.

Installation with External Overpressure Protection

If the regulator is used in conjunction with a Type 289H relief valve, it should be installed as shown in Figure 5. The outside end of the vent line should be protected with a rainproof assembly. The Type 289H is typically set 25 mbar / 10 in. w.c. higher than the outlet pressure setting of the regulator, up to 75 mbar / 30 in. w.c. outlet pressure. For pressure greater than this, set the Type 289H 0.05 bar / 0.73 psi higher than the outlet pressure setting of the regulator. Refer to the 289 Series Instruction Manual (D100280X012) for more information.

Vent Line Installation

CSB700 Series regulators have a 1 NPT screened vent opening in the spring case. If necessary to vent escaping gas away from the regulator, install a remote vent line in the spring case tapping. Vent piping should be as short and direct as possible with a minimum number of bends and elbows. The remote vent line should have the largest practical diameter. Vent piping on regulators with token relief must be large enough to vent all relief valve discharge to atmosphere without excessive backpressure and resulting excessive pressure in the regulator.

For types with optional token relief, this low capacity relief is located in the spring case of the primary regulator. If necessary to vent escaping gas away, install a remote vent line in the spring case tapping of the primary regulator as described above. Periodically check all vent openings to be sure that they are not plugged or obstructed.

For Types CSB700/CSB700F/CSB720/CSB720F, outlet pressure higher than 0.34 bar / 5.0 psig above the setpoint may damage internal metallic parts. For Type CSB750, outlet pressure higher than 1.5 bar / 21.8 psig above the setpoint may damage internal metallic parts. **The maximum emergency (casing) outlet pressure for all types is 4.0 bar / 58 psig except for Type CSB750 which is 5.0 bar / 72.5 psig.**

Startup



CAUTION

Pressure gauges must always be used to monitor downstream pressure during startup.

With the downstream system depressurized, use the following procedure to start up the regulator.

1. Check to see that all appliances are turned off.
2. Slowly open the upstream shutoff valve.
3. Check inlet and outlet pressure for correct values.
4. Check all connections for leaks.
5. Turn on utilization equipment and recheck the pressures.

Adjustment

Note

For types that include the slam-shut module, refer to the instruction manual for Type VSX8 slam-shut (D103127X012) for adjustment and maintenance of the slam-shut.

The range of allowable pressure settings for the primary regulator is printed or stamped on the nameplate. If the required setting is not within this range, substitute the correct spring (as shown in Table 7). If the spring is changed, change the nameplate to indicate the new pressure range.

A pressure gauge must always be used to monitor downstream pressure while adjustments are being made.

For Types CSB700, CSB700F, CSB720F and CSB720



WARNING

During setpoint adjustment, do not mistake the Token Relief Spring Nut (key 46) for the main spring adjusting screw. Turning the Token Relief Spring Nut will change the token relief setting and if rotated counterclockwise could result in gas discharge and possible personal injury.

1. Remove the closing cap (key 60, Figure 12).
2. To increase the outlet setting, turn the adjusting screw (key 65) clockwise. To decrease the outlet setting, turn the adjusting screw counterclockwise.
3. Replace the closing cap (key 60).

For Type CSB750

1. Loosen the hex nut (key 67, Figure 12).
2. To increase the outlet setting, turn the adjusting bolt (key 64) clockwise. To decrease the outlet setting, turn the adjusting bolt counterclockwise.
3. Tighten the hex nut (key 67).

CSB700 Series with Slam-Shut

When adjusting the primary regulator and slam-shut for operation, reference Table 8 for the OPSO setpoints and combined OPSO and UPSO setpoints of the slam-shut module for the given regulator spring ranges.

Resetting Type VSX8 Slam-Shut after Overpressure/Underpressure



CAUTION

Internal regulator parts and installed downstream equipment can be damaged if the following procedure in resetting the Type VSX8 controller is not followed.

If the regulator is exposed to an overpressure condition, it should be tested for lockup or shut-off after resetting the slamshut to verify the regulator is not damaged. Regulator operation below the limits specified in the Specifications section and regulator nameplate does not preclude the possibility of damage from external sources or from debris in the pipeline.

1. Slowly pull the reset button (refer to Type VSX8 Instruction Manual D103127X012) away from the controller. This slow movement allows for a slow bleed of the pressure across the controller's disk and seat area. The operator should be able to hear the pressure bleeding through the system.
2. When the pressure has equalized and the air bleeding sound has dissipated, the reset button (refer to Type VSX8 Instruction Manual D103127X012) should be pulled completely away from the controller by hand until the internal shut-off mechanism has been re-latched.
3. Once the operator feels the click of the re-latch occurring, the reset button (refer to Type VSX8 Instruction Manual D103127X012) should be pushed completely back into its original position.
4. It is recommended to test the regulator for lockup or shut-off after resetting the slam-shut.

Shutdown

Installation arrangements may vary, but in any installation it is important that the valves be opened or closed slowly and that the outlet pressure be vented before venting inlet pressure to prevent damage caused by reverse pressurization of the regulator. The steps below apply to the typical installation as indicated.

1. Slowly close the upstream shutoff valve
2. Open vent valves downstream of the regulator.
3. Inlet pressure should automatically be released downstream as the regulator opens in response to the lowered pressure under the diaphragm.
4. Close outlet shutoff valve.

Maintenance and Inspection



WARNING

To avoid personal injury or equipment damage, do not attempt any maintenance or disassembly without first isolating the regulator from system pressure and relieving all internal pressure as described in “Shutdown” section.

Regulators that have been disassembled for repair must be tested for proper operation before being returned to service. Only parts manufactured by Emerson should be used for repairing Fisher™ regulators. Restart gas utilization equipment according to normal startup procedures.

Due to normal wear or damage that may occur from external sources, this regulator should be inspected and maintained periodically. The frequency of inspection and replacement depends on the severity of service conditions or the requirement of local, state and federal rules and regulations.

In accordance with the applicable National or Industry codes, standards and regulations/recommendations, all hazards covered by specific tests after final assembly and before applying the CE marking, shall be covered also after every subsequent reassembly at installation site, in order to ensure that the equipment will be safe throughout its intended life.

Periodic inspection must be performed on the CSB700 Series that include the slam-shut overpressure protection module to ensure protection of the downstream system in the event the primary regulator loses pressure control. This inspection must test that slam-shut functions as intended.

Main Diaphragm Maintenance



CAUTION

For version with token relief measure the distance before disassembly and note for reassembly (see Figure 10).

Failure to follow the instructions regarding measurement could impact the token relief's set-point

Perform the following steps to disassemble, inspect and replace the main diaphragm:

1. Remove the closing cap (key 60, Figure 12) or loosen hex nut (key 67). Turn the adjusting screw (key 65) or adjusting bolt (key 64) counterclockwise to ease spring compression.

Note

When disassembling a CSB700 Series regulator, support the adjusting screw (key 65) to prevent damage or contamination due to falling.

2. Remove the adjusting screw (key 65) or the adjusting bolt (key 64), then the bonnet (key 61), upper spring seat (key 63) and sealing washer (key 113). Check the sealing washer and replace if damaged. Remove the spring (key 38).
3. Remove hex nuts (key 16, Figure 7 or 8) and bolt (key 15). Separate the upper spring case (key 1) from the lower casing assembly (key 9).

Note

When disassembling a CSB700 Series regulator, lift the upper spring case (key 1, Figure 7 or 8) straight up in order to avoid hitting the stem (key 44).

4. Slide the diaphragm assembly (key 55, Figure 10) away from the body (key 70) to unhook the pusher post from the lever (key 10). Lift out the diaphragm assembly (key 55) and its attached parts like pusher post (key 50) and relief valve seat (key 51).
- 5a. For non-relieving units such as Type CSB700EN, see Figure 10 — Non-relief assembly. Remove the screw (key 45) and nut (key 40) to separate relief valve spring seat (key 43), diaphragm assembly (key 55) and pusher post (key 50). Check the diaphragm (key 55A) for damage and replace if necessary.

- 5b. For units with token relief such as Type CSB700ET, see Figure 10 — Token Relief Assembly. Remove token relief nut (key 46), spring retainer (key 42), relief spring (key 41), nut (key 40) and relief valve spring seat (key 43). Unscrew the stem (key 44) to separate diaphragm assembly (key 55) and pusher post (key 50). Check the diaphragm (key 55A) for damage and replace if necessary.

Note

The diaphragm assembly (key 55) and the upper spring case and lower casing must be reassembled in a level, horizontal orientation to ensure the relief stem is centered in the upper spring case during use.

6. Reassemble the diaphragm assembly (key 55) unit in the reverse order of the above steps. Assembly torques for the diaphragm assembly are provided in Figure 10. Before tightening the screw (key 45, for non-relief) or stem (key 44, for token relief) into the pusher post (key 50), place the loosely-assembled diaphragm assembly (key 55) into position in the lower casing (key 9, Figure 7 or 8), being sure that the pusher post is hooked on the lever (key 10, Figure 7 or 8). Rotate the diaphragm so that the diaphragm and lower casing holes are aligned. Tighten the stem or screw using the proper torque values (see Figure 10).
7. Reassemble the remaining parts by following steps 1 to 3 in reverse order. Tighten the hex nuts (key 16) and bolts (key 15) in a crisscross pattern and tighten to the proper torque value (see Figure 7 or 8).
5. Grasp the spring retainer (key 36B) and slide the housing (key 36F) away to expose the diaphragm (key 36E) and disk (key 36J). Still grasping the spring retainer, insert a 5 mm / 0.20 in. Allen wrench into the disk screw (key 36D) and unscrew.
6. Remove the disk (key 36J), discard and replace if damaged. Slide the diaphragm O-ring (key 36N) off the stem (key 36A) along with the diaphragm (key 36E). Slide the new diaphragm over the stem in the same manner that it was removed, make sure that it completely contacts the surface of the diaphragm retainer (key 36H).
7. Reassemble the balanced port assembly in reverse order of the above. Ensure Dow Corning® 33 or comparable extreme low temperature lubricant completely coats the O-rings (keys 36N and 36P), stem (key 36A) and the center bore of the brass cap (key 36G). Assemble with proper torques provided in Figure 9.
8. Examine the seating edge of the orifice (key 25, Figure 7 or 8). If it is nicked or rough, replace the orifice and O-ring (key 82). The orifice installation torque range is provided in Figure 7 or 8. If a slam-shut is installed on the backside of the body, reference the Type VSX8's Instruction Manual for inspection and removal of the overpressure protection orifice (key 26, see Figure 13) and O-ring (key 27).
9. Reassemble the regulator in reverse order of the above steps. Tighten the bolts (key 71) using the proper torque values (see Figure 7 or 8).

Valve Disk, Balanced Port Assembly Diaphragm and Regulator Orifice Maintenance

Perform the following steps to disassemble, inspect and replace the Valve Disk, Balanced Port Assembly Diaphragm and Regulator Orifice:

1. Remove the cap screw (key 71, Figure 7 or 8) which hold the lower spring casing (key 9) to the body (key 70). Separate the lower spring casing from the body.
2. Check the body O-ring (key 19 or key 21) for wear replace if damaged.
3. Remove the balanced port assembly (key 36, Figure 7 or 8) from the body (key 70).
4. Examine the valve disk (key 36J, Figure 9) for nicks or other damage. If damage is present, replace both the disk and the balanced port diaphragm (key 36E) and associated diaphragm O-ring (key 36N), that comes into direct contact with the inner flange of the balanced port diaphragm. Start the process of replacing the disk by disassembling the balanced port assembly (key 36). Remove the four cap screws (key 36R) and then the retainer plate (key 36S).

Regulator Reassembly

As indicated by the square callouts in Figures 7 to 13, it is recommended that a good quality low temperature pipe thread sealant be applied to pressure connections and fittings and a good quality low temperature lubricant be applied to O-rings. Also apply an anti-seize compound to the adjusting screw threads and other noted areas as needed. Tighten bolts, screws and stem using proper torque (see Figures 7 to 12).

Parts Ordering

The type number, orifice size, spring range and date of manufacture are stamped on the nameplate. Always provide this information in any correspondence with your local Sales Office regarding replacement parts or technical assistance.

When ordering replacement parts, reference the key number of each needed part as found in the following parts list. Separate kit containing all recommended spare parts is available.

CSB700 Series

Parts List

Key	Description	Part Number	Key	Description	Part Number
1	Spring Case, Aluminum For Type CSB700/CSB720 For Type CSB750	GE26100X012 ERSA01009A0	36D	Screw, steel External registration Type CSB700/CSB704/CSB700F/CSB704F Type CSB720/CSB724/CSB720F/ CSB724F/CSB750/CSB754	ERSA03894A0 GE27015X012
4	Stabilizer Guide, Stainless steel For Type CSB700/CSB720	GE27061X012	36E	Diaphragm, Nitrile (NBR) and Polyester Fabric	GE30431X012
5	Stabilizer, Lustran® 648 For Type CSB700/CSB720	GE27063X012	36F	Housing With External Registration	GG05166X012 GE27007X012
6	Spring, Stainless steel For Type CSB700/CSB720	GE35010X012	36G	Cap, Brass	GE27007X012
7	Retainer Ring, Zinc-plated Carbon Steel For Type CSB700/CSB720	GE27024X012	36H	Diaphragm Retainer, Zinc-plated steel Type CSB700/CSB704/CSB720/CSB724/ CSB720F/CSB724F/CSB750/CSB754	GE27009X012 ERSA00989A0
8	Stabilizer Screw, Zinc-plated Steel (3 required) For Type CSB700/CSB720	GE29724X012	36J	Disk, Nitrile (NBR) Type CSB700F/CSB704F Type CSB700/CSB704/CSB720/CSB724/ CSB720F/CSB724F/CSB750/CSB754	GE27010X012 ERSA02796A0
9	Lower Casing, Aluminum For Type CSB700/CSB720 For Type CSB750	GE26103X012 ERSA01010A0	36K	Disk Retainer Type CSB700/CSB704/CSB700F/CSB704F Type CSB720/CSB724/CSB720F/ CSB724F/CSB750/CSB754	ERSA03893A0 GE27011X012
10	Lever, BP Steel For Type CSB700/CSB700F/CSB704/ CSB704F/CSB720/CSB724/ CSB720F/CSB724F (Lever Ratio 2:1) For Type CSB750/CSB754 (Lever Ratio 1:1)	GE27409X012 ERSA01012A0	36L*	O-ring, Nitrile (NBR)	GE32673X012
11	Stem, BP, Aluminum For Type CSB700/CSB700F/CSB704/ CSB704F/CSB720/CSB724/ CSB720F/CSB724F For Type CSB750/CSB754	GE27485X012 ERSA01025A0	36M*	O-ring, Nitrile (NBR)	GE32966X012
13	Lever Pin, Carbon Steel	GE29701X012	36N*	O-ring, Nitrile (NBR)	GE32702X012
14	Lever Screw, Plated-Carbon Steel (2 required)	GE30039X012	36P*	O-ring, Nitrile (NBR)	GE32676X012
15	Bolt, Steel (8 required)	GE29974X012	36R	Screw, Zinc-plated Steel (4 required)	GE34243X012
16	Nut, Steel (6 required for low and medium pressure, 8 required for high pressure)	ERAA21202A0	36S	Retainer Plate	GE27253X012
17	Union Ring, Aluminum	GE26416X012	36V	Stabilizer, Type CSB700/CSB704/CSB700F/CSB704F (External Registration)	ERSA03550A0
18	Snap Ring, Zinc-plated steel	GE27018X012	36W	Retaining Ring Type CSB700F/CSB704F only	ERSA00993A0
19*	O-ring, Nitrile (NBR)	GE29755X012	36X	Connector Type CSB700F/CSB704F only	ERSA00991A0
20	Stem Guide, Aluminum For low and medium pressure only	GE26107X012	36Z	Stabilizer Spring Type CSB700/CSB704/CSB700F/CSB704F (External Registration)	ERSA03549A0
21*	O-ring, Nitrile (NBR) For low and medium pressure only	GE29754X012	38	Spring, Music wire 9 to 14 mbar / 3.6 to 5.6 in.w.c., Silver 13 to 24 mbar / 5.2 to 9.6 in.w.c., Red 22 to 39 mbar / 8.8 to 15.7 in.w.c., Black Stripe 32 to 50 mbar / 12.8 to 20.1 in.w.c., Purple 42 to 70 mbar / 16.9 to 28.1 in.w.c., White Stripe 61 to 110 mbar / 0.9 to 1.6 psig, Dark Green 105 to 220 mbar / 1.5 to 3.2 psig, Blue 210 to 380 mbar / 3.1 to 5.5 psig, Black 270 to 325 mbar / 3.92 to 4.71 psig, Black with White Stripe 320 to 570 mbar / 4.6 to 8.3 psig, Red with White Stripe 510 to 780 mbar / 7.4 to 11.3 psig, Blue with White Stripe 0.7 to 1.19 bar / 10.2 to 17.3 psig, Purple Stripe 1.05 to 2.7 bar / 15.2 to 39.2 psig, Brown 2.3 to 3.25 bar / 33.4 to 47.1 psig, Grey with Red Stripe 3.1 to 4.0 bar / 45 to 58 psig, Grey with Orange Stripe	GE30336X012 ERSA01138A0 GE30338X012 GE30339X012 GE30340X012 ERSA03656A0 ERSA03657A0 GG06247X012 ERAA11747A0 ERSA01582A0 ERSA05055A0 GE30345X012 GE30346X012 ERSA01125A0 ERSA01126A0
25*	Orifice, Aluminum 35 mm / 1-3/8 in.	GE32085X012	40	Relief Valve Seat Nut, Zinc-plated steel	GE46959X012
26*	Orifice, Aluminum (with slam-shut module) 35 mm / 1-3/8 in.	GE32066X012	41	Token Relief Spring, Stainless steel Type CSB700/CSB700F/CSB704/CSB704F Type CSB720/CSB724/CSB720F/CSB724F Type CSB750/CSB754	GG06009X012 ERAA17935A0 ERSA01128A0
27*	O-ring, Nitrile (NBR) (with slam-shut module)	GE32723X012			
36*	Balanced Port Assembly Type CSB700/CSB704 With External Registration Type CSB700F/CSB704F With External Registration Type CSB720/CSB720F/CSB724F/ CSB750/CSB754 With External Registration	GG04073X012 ERSA00986A0 ERSA01429A0			
36A	Stem, Stainless steel Type CSB700/CSB704/CSB720/CSB724/ CSB720F/CSB724F/CSB750/CSB754 Type CSB700F/CSB704F	GE27012X012 ERSA00988A0			
36B	Spring Retainer, Zinc-plated steel Type CSB700/CSB704/CSB720/CSB724/ CSB720F/CSB724F/CSB750/CSB754 Type CSB700F/CSB704F	GG01431X012 ERSA01311A0			
36C	Spring, Stainless steel Type CSB700/CSB704/CSB700F/CSB704F Type CSB720/CSB724/CSB720F/CSB724F/ CSB750/CSB754	GE27014X012 ERSA00987A0			

*Recommended spare part.
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CSB700 Series

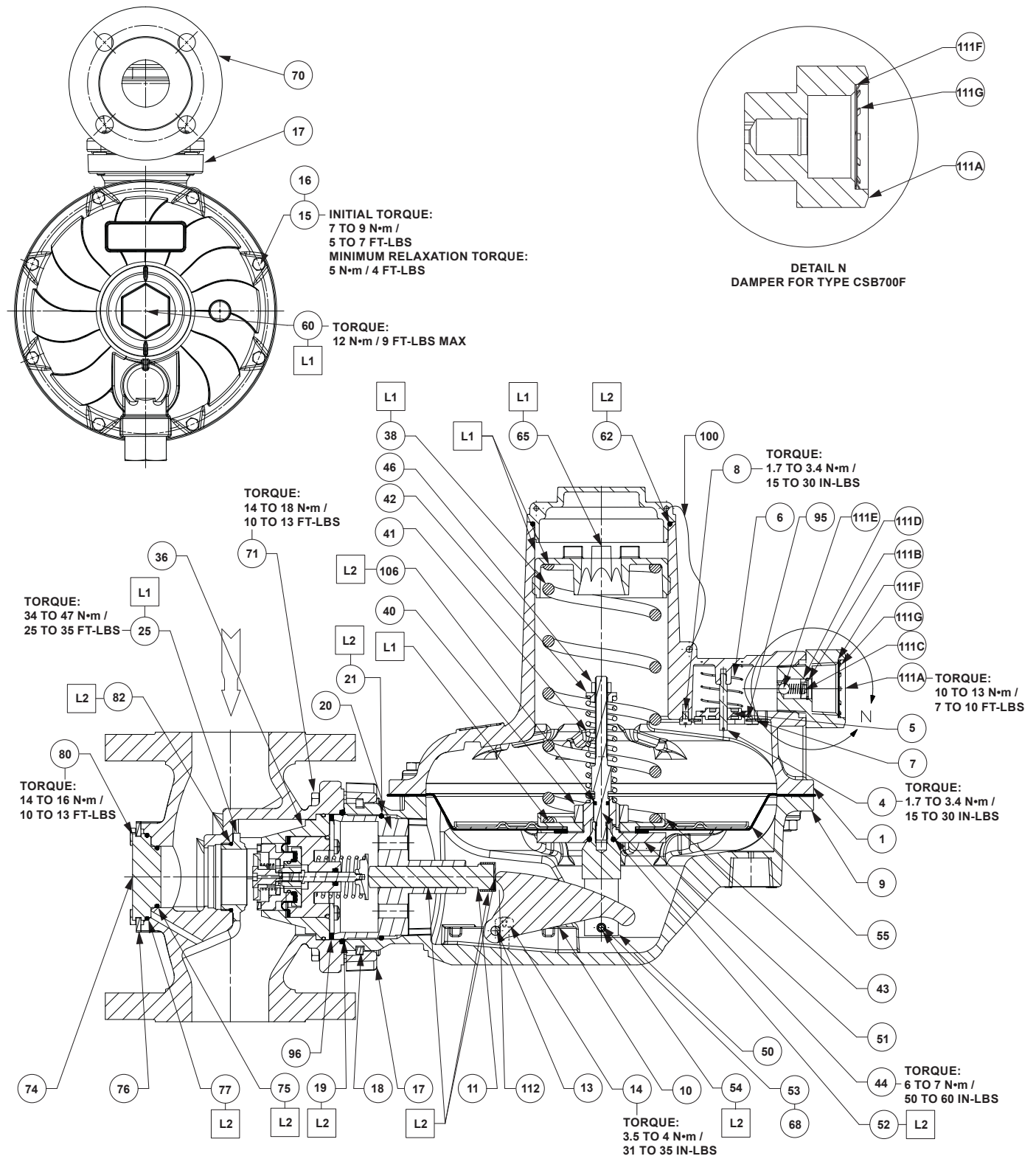
Key	Description	Part Number	Key	Description	Part Number
42	Spring Retainer, Zinc-plated steel (with token relief) Type CSB700/CSB704/CSB700F/CSB704F/ CSB720/CSB724/CSB720F/CSB724F Type CSB750/CSB754	GE46956X012 GG06010X012	70	Body (continued) WCC Steel 1-1/2 NPT 2 NPT Rp 1-1/2 Rp 2 DN 50 / NPS 2 CL150 RF PN 10/16 191 mm / 7.5 in. face-to-face dimension 254 mm / 10 in. face-to-face dimension	ERAA02453A2 ERAA02437A2 ERAA03878A2 ERAA02715A2 ERAA02720A2 GE48296X022 ERAA02719A2 GE29974X012
43	Spring Seat, Zinc-plated steel	GG06011X012	71	Cap Screw, Steel (4 required)	GE29974X012
44	Stem, Zinc-plated steel (with token relief)	ERAA00767A0	72	Pipe Plug, 1/4 NPT Steel Stainless Steel	1C333528992 1C3335X0012
45	Screw, Zinc-plated steel (without token relief)	ERSA01141A0	74*	Blanking Plug, Aluminum (without slam-shut module)	GE31255X012
46	Token Relief Nut, Steel	ERAA21202A0	75*	O-ring, Nitrile (NBR)	GF03442X012
50	Pusher Post, Aluminum For Types CSB700 and CSB720 For Type CSB750	GE27405X012 ERSA01139A0	76	Snap Ring Flange (2 required)	GF01942X012
51	Relief Valve Seat For all types except Type CSB720/724 (510 to 780 mbar / 7.4 to 11.3 psig), Aluminum For Type CSB720/724 (510 to 780 mbar / 7.4 to 11.3 psig)	GE46957X012 ERAA33372A0	77*	O-ring, Nitrile (NBR)	GF03443X012
52*	Pusher Post O-ring, Nitrile (NBR)	GE47389X012	80	Screw, Steel (4 required)	GE38176X012
53	Pin, Stainless steel	GE29761X012	82*	O-ring, Nitrile (NBR)	GE30397X012
54	Roller Pin, Brass	GE27060X012	90	Nameplate	-----
55*	Diaphragm Assembly For Types CSB700 and CSB720 (9 to 570 mbar / 3.6 in. w.c. to 8.3 psig) For Type CSB720 (510 to 780 mbar / 7.4 to 11.3 psig) For Type CSB750	GE30529X012 ERAA33533A0 ERSA01024A0	91	Warning Label	-----
60	Closing Cap, Aluminum All types except Types CSB750 and CSB754	GE26109X012	93	Label	-----
61	Bonnet, Zinc-plated steel For Types CSB750 and CSB754 only	GE26812X012	94	Overlay Label	-----
62*	O-ring, Nitrile (NBR)	GE29750X012	95	Grommet, Nitrile (NBR) (for low and medium pressure)	GE35358X012
63	Upper Spring Seat, Zinc-plated Carbon Steel For Types CSB750 and CSB754 only	GE26809X012	96	Rubber Washer, Nitrile (NBR)	ERSA01501A0
64	Adjusting Bolt, Steel For Types CSB750 and CSB754 0.7 to 2.7 bar / 10.2 to 39.2 psig 2.3 to 4 bar / 33.4 to 58.0 psig	ERSA01362A0 GE27026X012	100	Lockwire	-----
65*	Adjusting Screw, Aluminum All types except Types CSB750 and CSB754	GE26108X012	101 ⁽¹⁾	Hub, Zinc-Plated Steel (2 required)	GG05925X012
66	Ball, Stainless Steel For Types CSB750 and CSB754 only	GE33131X012	102 ⁽¹⁾	Sip-On Flange (2 required)	M0244690X12
67	Hex Nut, Stainless steel For Types CSB750 and CSB754 only	GE49038X012	103 ⁽¹⁾	O-ring, Nitrile (NBR) (2 required)	GE41121X012
68	Retainer Ring, Steel	GE33772X012	104 ⁽²⁾	Spacer	ERSA00992A0
70	Body Ductile iron 1-1/2 NPT 2 NPT Rp 1-1/2 Rp 2 DN 50 / NPS 2 CL125 FF/CL150 FF 191 mm / 7.5 in. face-to-face dimension 254 mm / 10 in. face-to-face dimension 267 mm / 10.5 in. face-to-face dimension CL150 RF PN 10/16 191 mm / 7.5 in. face-to-face dimension 200 mm / 7.87 in. face-to-face dimension 254 mm / 10 in. face-to-face dimension DN 40 / NPS 1-1/2 PN 16 Slip-On 222 mm / 8.74 in. face-to-face dimension	ERAA02453A1 ERAA02437A1 ERAA03878A1 ERAA02715A1 GE48292X012 ERAA02711A1 ERAA02718A1 ERAA02720A1 GE48296X012 GE48296X012 ERAA02719A1 ERAA03878A2	106	Diaphragm Stem O-ring, Nitrile (NBR) For types with token relief only	GE49041X012
			111	Damper Assembly (no damper on Type CSB700F/CSB704F) For Type CSB700/CSB704/CSB720/ CSB724/CSB720F/CSB724F For Type CSB750/CSB754	GG06048X012 GG06058X012
			111A	Connector (not on Type CSB700F/CSB704F) For Type CSB700/CSB704/CSB720/ CSB720F/CSB724/CSB724F For Type CSB750/CSB754	ERAA21077A0 ERAA21078A0
			111B	Retainer Ring (not on Type CSB700F/CSB704F external registration)	GG06054X012
			111C	Spring, Stainless steel (not on Type CSB700F/CSB704F external registration)	GG06055X012
			111D	Spring Retainer, Zinc-plated steel (not on Type CSB700F/CSB704F external registration)	GG06056X012
			111E	Plastics Ball, (not on Type CSB700F/CSB704F external registration)	GG06057X012
			111F	Vent Screen	T1121338982
			111G	Retaining Ring	T1120925072
			112	Stem Cap	ERAA18503A0
			113*	Sealing Washer, For Type CSB750/CSB754 only	11A9681X012
			114	Elbow (on Type CSB750/CSB754 only)	ERAA21079A0
			115	Thrust Washer Type CSB720/CSB724/ CSB720F/CSB724F only	GE47292X012 ERAA01884A0
			116	Drive Screw	
			117	Diaphragm Plate (For Type CSB720/724, 510 to 780 mbar / 7.4 to 11.3 psig only)	ERAA33373A0

*Recommended spare part.

1. 222 mm / 8.74 in. face-to-face dimension.

2. 200 mm / 7.74 in. face-to-face dimension.

CSB700 Series

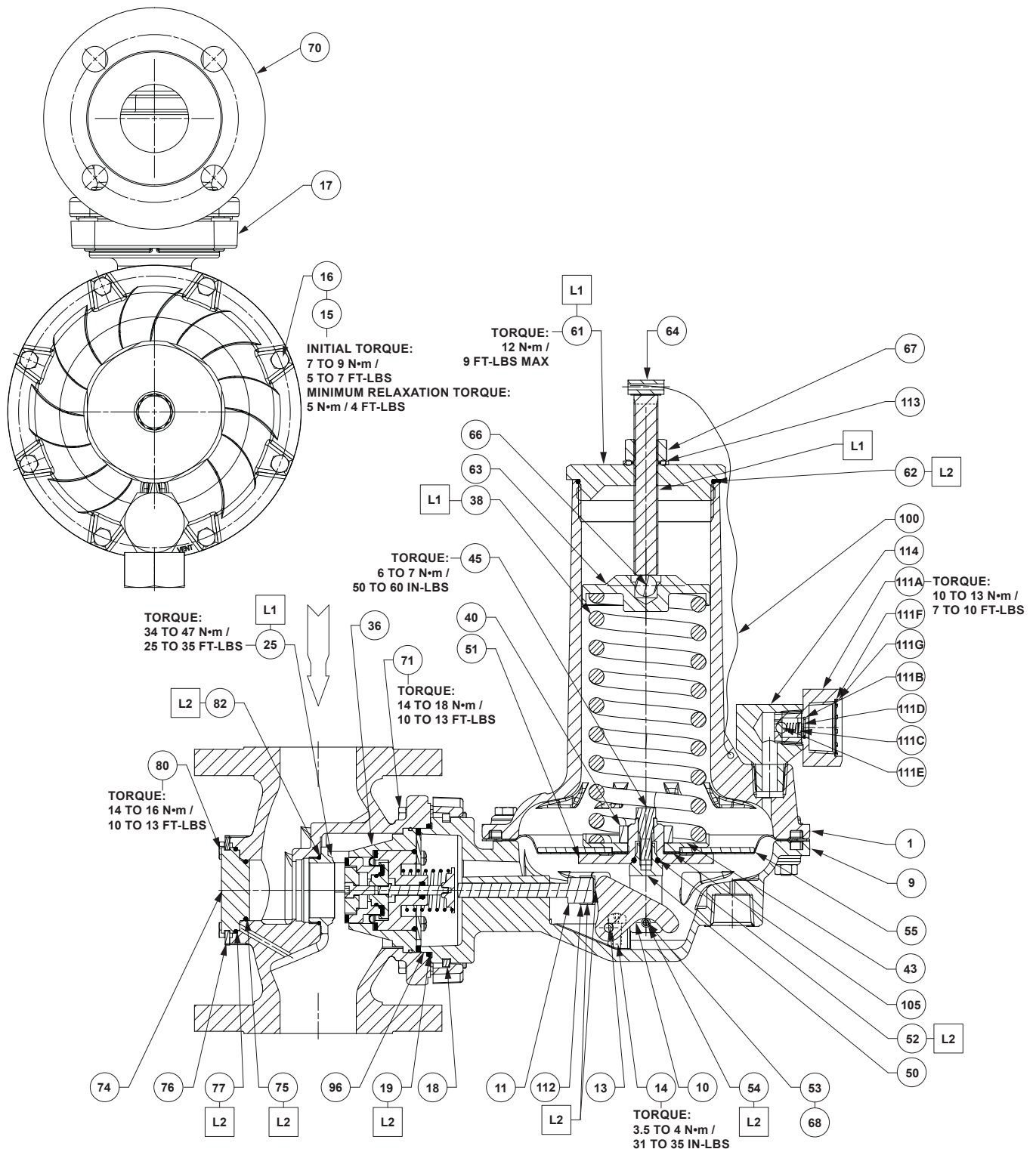


GE2791, DR

- ☐ **APPLY LUBRICANT⁽¹⁾**
L1 = ANTI-SEIZE LUBRICANT
L2 = EXTREME LOW-TEMPERATURE BEARING GREASE⁽²⁾

1. Lubricants must be selected such that they meet the temperature requirements.
2. No lubricant between main stem and stem guide for LP under 30 mbar / 0.44 psig.

Figure 7. CSB700 and CSB720 Series Regulator Assembly



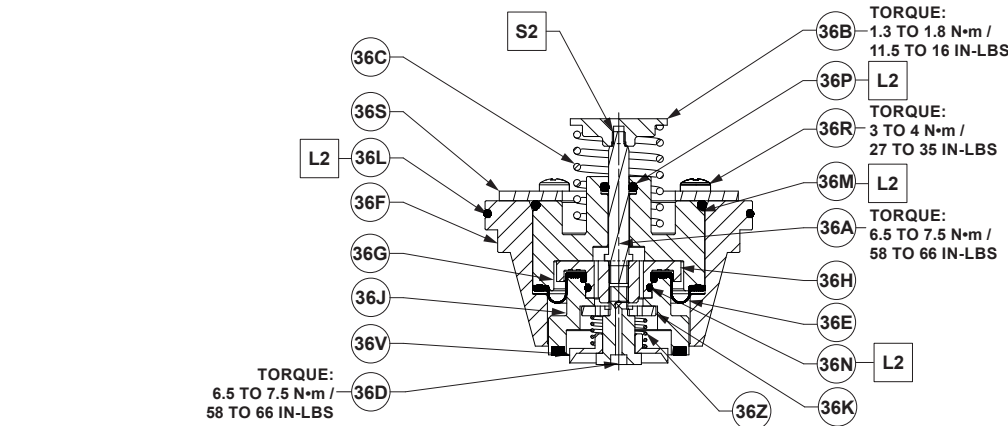
GE2791_DR

☐ **APPLY LUBRICANT⁽¹⁾**
L1 = ANTI-SEIZE LUBRICANT
L2 = EXTREME LOW-TEMPERATURE BEARING GREASE

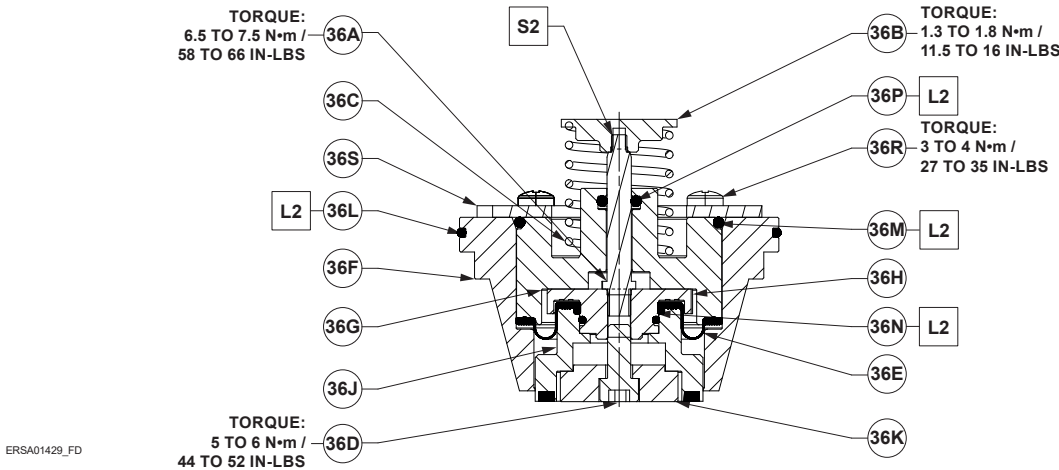
1. Lubricants must be selected such that they meet the temperature requirements.

Figure 8. CSB750 Series Regulator Assembly

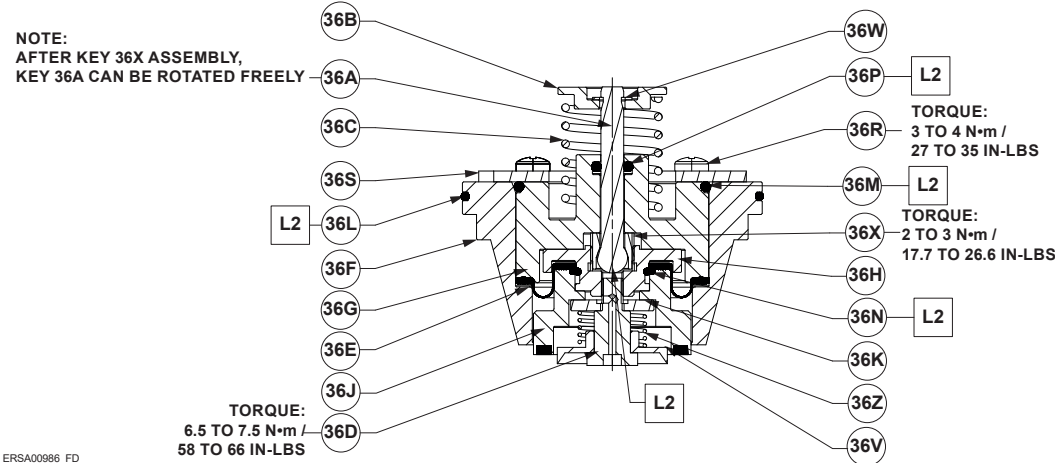
CSB700 Series



BALANCED PORT ASSEMBLY FOR TYPES CSB700EN, CSB700ET, CSB704EN AND CSB704ET



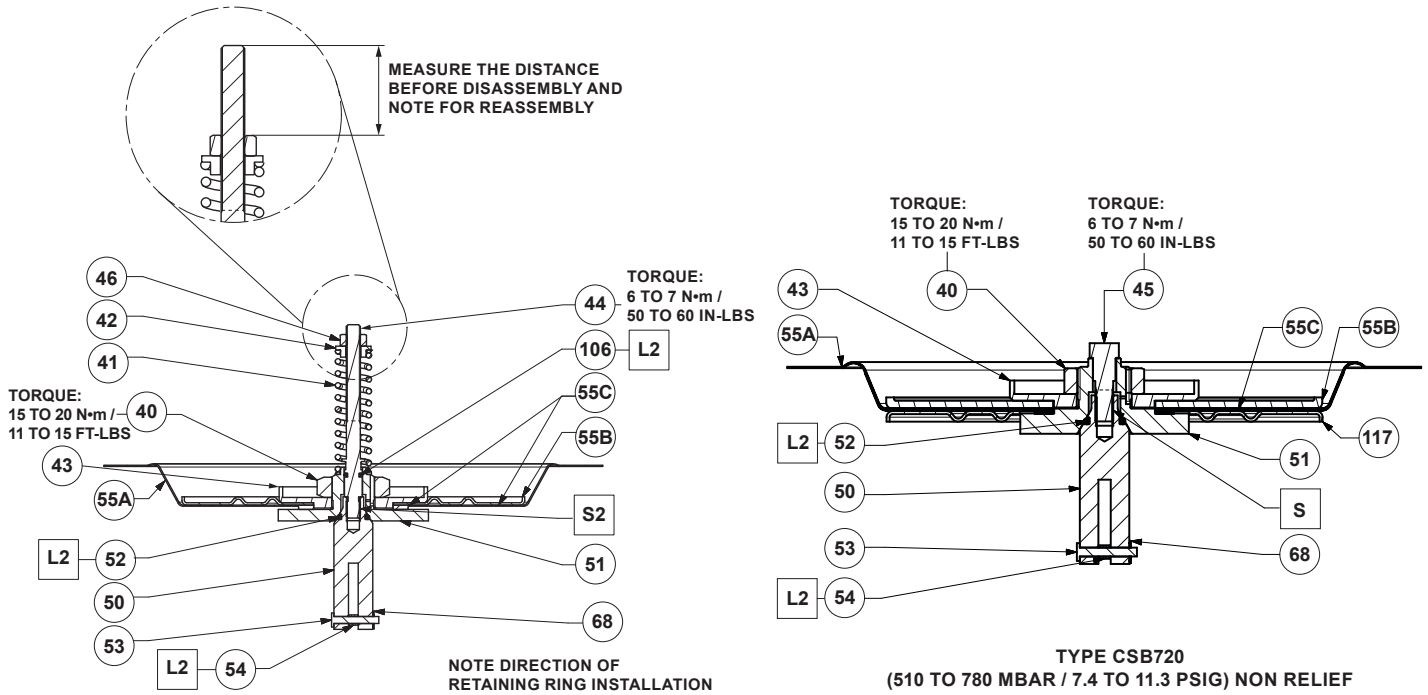
BALANCED PORT ASSEMBLY FOR TYPES CSB720EN, CSB720ET, CSB724EN, CSB724ET, CSB750EN, CSB754EN, CSB750ET AND CSB754ET



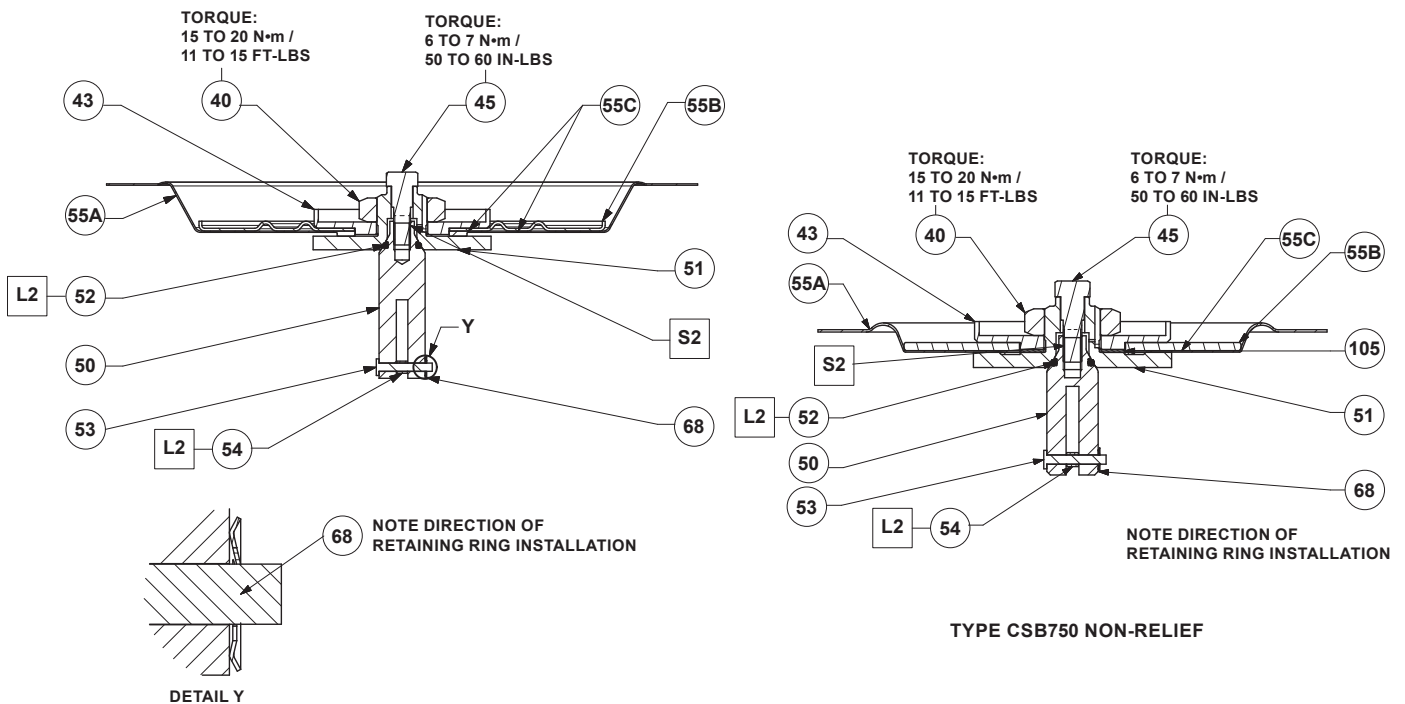
BALANCED PORT ASSEMBLY FOR TYPES CSB700FEN, CSB700FET, CSB704FEN AND CSB704FET

☐ APPLY LUBRICANT OR SEALANT⁽¹⁾
 L2 = EXTREME LOW-TEMPERATURE BEARING GREASE
 S2 = MEDIUM TO HIGH STRENGTH THREADLOCKER
 1. Lubricants and sealants must be selected such that they meet the temperature requirements.

Figure 9. CSB700 Series Balanced Port Assembly



TYPES CSB700 AND CSB720
(61 TO 570 mbar / 0.9 TO 8.3 psig) TOKEN RELIEF



TYPES CSB700 AND CSB720 (61 TO 570 mbar / 0.9 TO 8.3 psig) NON-RELIEF

GE2791_DM

- APPLY LUBRICANT OR SEALANT⁽¹⁾
 L2 = EXTREME LOW-TEMPERATURE BEARING GREASE
 S2 = MEDIUM TO HIGH STRENGTH THREADLOCKER

1. Lubricants and sealants must be selected such that they meet the temperature requirements.

Figure 10. CSB700 Series Diaphragm and Relief Assemblies

CSB700 Series

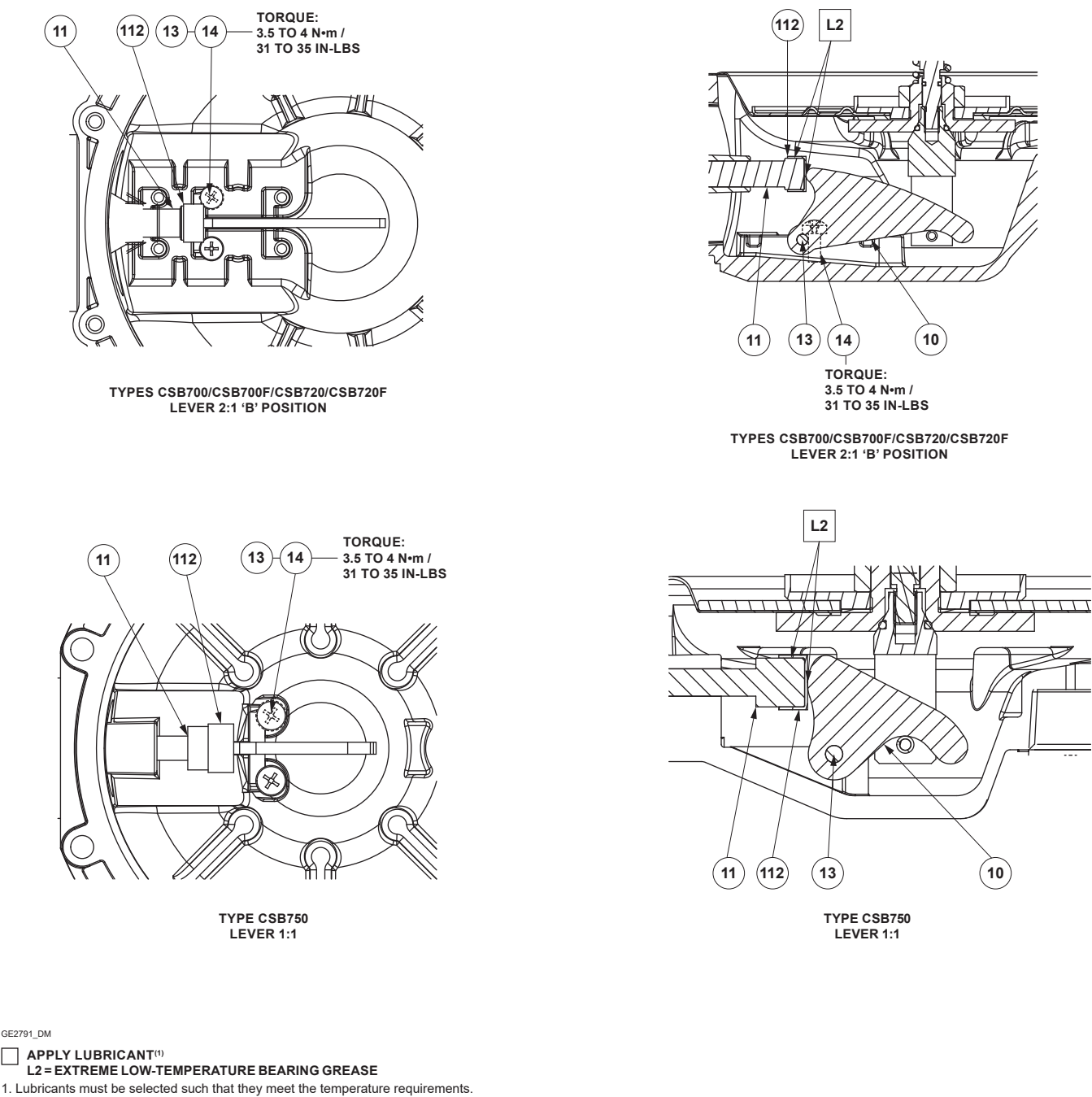
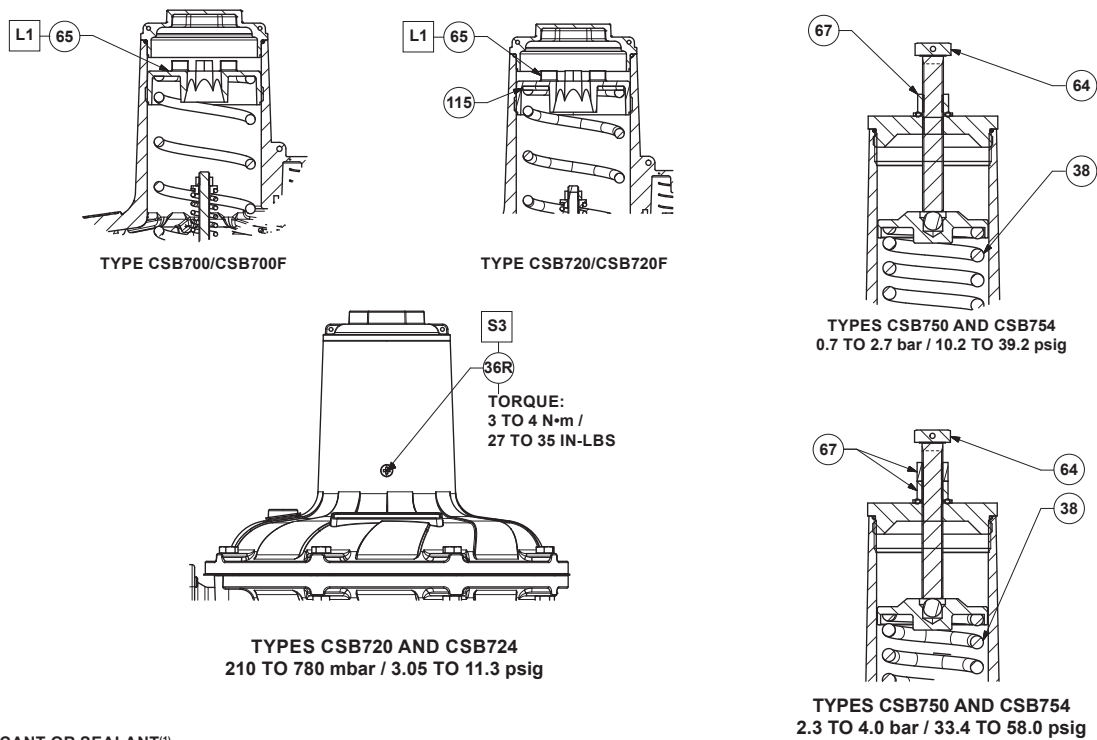


Figure 11. Lever Positions and Stem Configurations



GE2791_DM

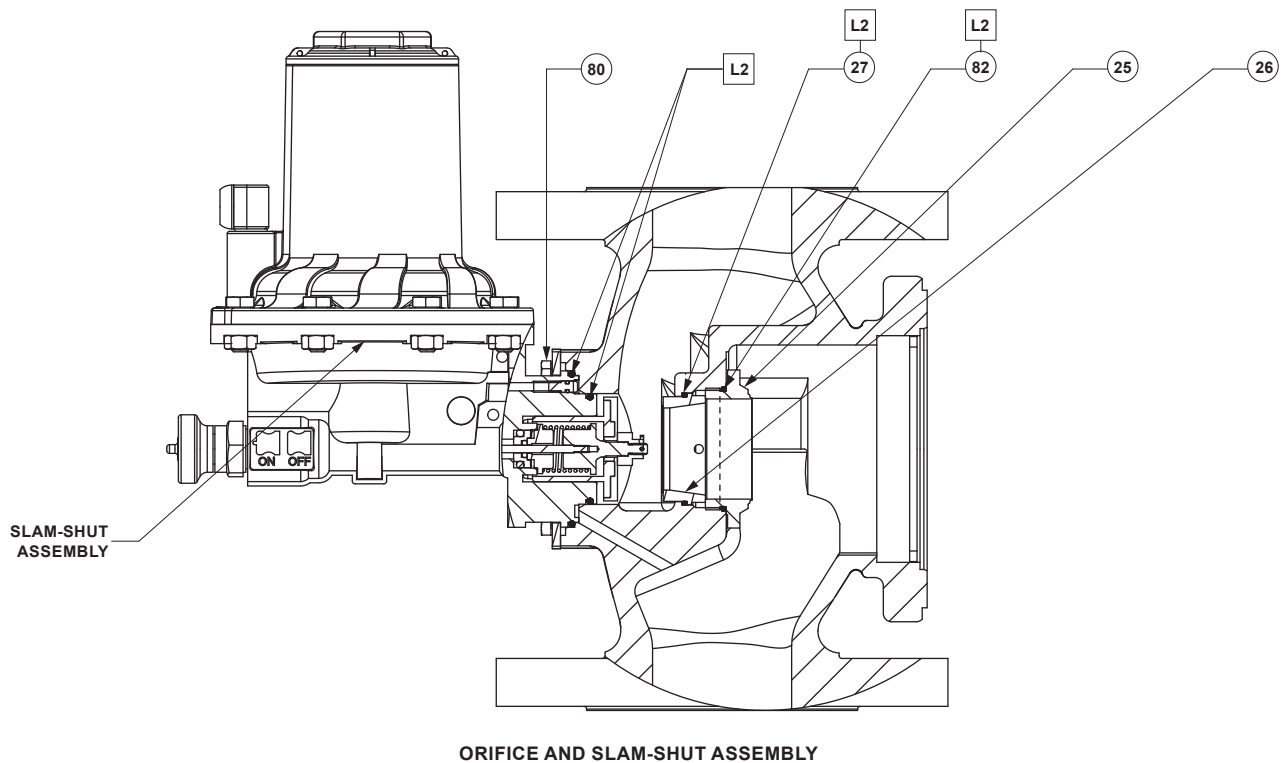
☐ APPLY LUBRICANT OR SEALANT⁽¹⁾

L1 = ANTI-SEIZE LUBRICANT

S3 = PERMANENT HIGH-STRENGTH THREADLOCKER

1. Lubricant and sealant must be selected such that they meet the temperature requirements.

Figure 12. CSB700 Series Control Spring Adjustment Assemblies



GE2791_DM

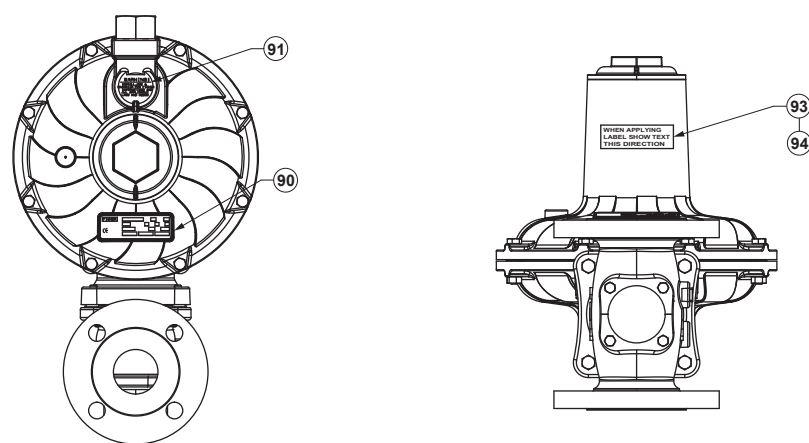
☐ APPLY LUBRICANT⁽¹⁾

L2 = EXTREME LOW-TEMPERATURE BEARING GREASE

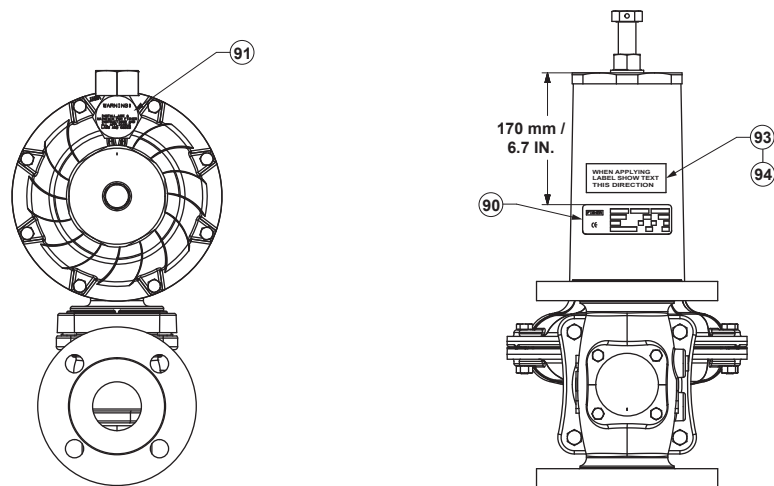
1. Lubricants must be selected such that they meet the temperature requirements.

Figure 13. CSB700 Series Slam-Shut Module

CSB700 Series



TYPES CSB700 AND CSB720 LOW AND MEDIUM PRESSURE ASSEMBLY



TYPE CSB750 HIGH PRESSURE ASSEMBLY

Figure 14. CSB700 Series Nameplate and Label


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Emerson Automation Solutions

Americas
 McKinney, Texas 75070 USA
 T +1 800 558 5853
 +1 972 548 3574

Asia Pacific
 Singapore 128461, Singapore
 T +65 6777 8211

Europe
 Bologna 40013, Italy
 T +39 051 419 0611

Middle East and Africa
 Dubai, United Arab Emirates
 T +971 4 811 8100

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