Type EZL Relief Valve or Backpressure Regulator

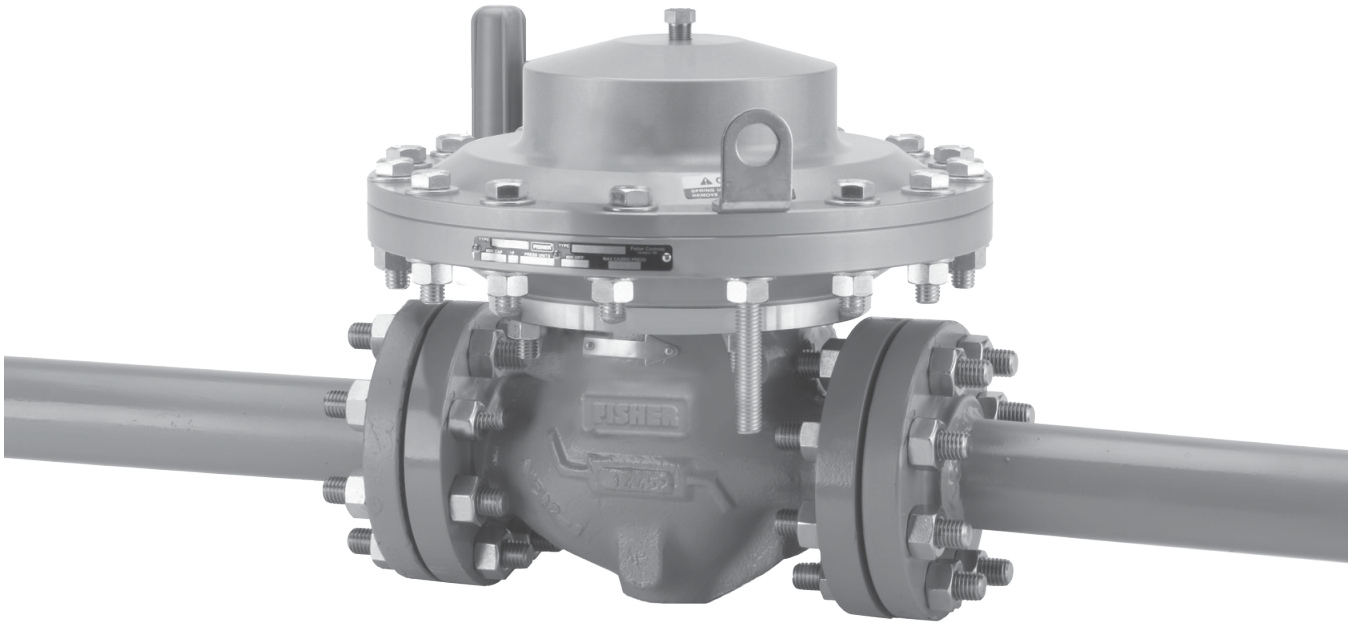

Figure 1. *Type EZL Relief Valve or Backpressure Regulator*

Features

Low Differential Applications—Can accurately control at pressure differentials as low as 2.9 psid / 0.2 bar d.

Bubble—Tight Shutoff-A knife-edged metal plug and soft seat provide bubble tight shutoff

Easy In-Line Maintenance—The light-weight top entry design enables trim parts to be inspected, cleaned and replaced without removing the body from pipeline.

Precise Pressure Control— Provides stable and accurate pressure control.

High Corrosion Resistance—Anodized casings provide excellent corrosion resistance even in below grade installations.

Common Body Platform—The Type EZL uses the same standard Fisher™ E-Body as the Types EZH and EZR pressure reducing regulators and Types EZ, ES, ED and ET pressure reducing control valves. This allows easy conversion from one product to another without the need to remove the E-Body from the pipeline.

Full Usable Capacity—Fisher regulators are laboratory tested. 100% of the published flow capacity can be used with confidence.

Specifications

The Specifications section lists the specifications for Type EZL relief valve or backpressure regulator. Factory specifications for specific regulator constructions are stamped on the nameplate fastened to either the main actuator or the pilot spring case.

Body Sizes, End Connection Styles and Pressure Ratings(1)
See Table 1

Maximum Inlet and Outlet (Casing) Pressures(1)
290 psig / 20.0 bar

Maximum Emergency (Design Casing Pressure)(1)
290 psig / 20.0 bar

Maximum Operating Differential Pressure(1)
290 psid / 20.0 bar d

Minimum Differential Pressure(1)
2.9 psid / 0.2 bar d

Relief Set Pressure Ranges
See Table 2

Flow Capacities
See Figures 3 through 11

Pressure Registration
External

Temperature Capabilities(1)
Nitrile (NBR) Version: -20 to 180°F / -29 to 82°C
Fluorocarbon (FKM) Version: 0 to 180°F / -18 to 82°C

Options

- Travel Indicator

Construction Materials
Type EZL Main Valve
Main Body: Cast iron or WCC Steel
Intermediate Flange and Inlet and Outlet Plates: Steel
Actuator Casings: Anodized Forged Aluminum
Diaphragm: Nitrile (NBR) with Polyvinyl Chloride PVC coating
O-ring and Seat: Nitrile (NBR) or Fluorocarbon (FKM)
6358 Series Pilots
Body and Spring Case: CF8M Stainless steel
Body Plug: 303 Stainless steel
Valve Plug: Nitrile (NBR) or Fluorocarbon (FKM) plug with stainless steel stem
Spring, Spring Seat and Adjusting Screw: Zinc-plated steel
Diaphragm and O-rings: Nitrile (NBR) or Fluorocarbon (FKM)
Stem Guide: Stainless steel
Lower Spring Seat: Thermoplastic (Types 6358B only)
Diaphragm Limiter: Stainless steel (Type 6358EB only)

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

Introduction

Type EZL relief valves and backpressure regulators are accurate pilot-operated, pressure balanced and soft seated regulators. They are designed for use in natural gas distribution applications such as district regulating stations and commercial/industrial meter sets. They provide low differential, smooth, reliable operation, tight shutoff and long life.

Principle of Operation

A pressure relief valve is a throttling pressure control device that opens and closes to ensure the downstream pressure does not rise above a predetermined pressure. Fisher™ relief valves cannot be used as ASME safety relief valves. A backpressure regulator is a device that controls and responds to changes in the upstream pressure. It functions the same as a relief valve in that it opens on increasing upstream pressure.

As long as the inlet pressure is below the set pressure, the pilot control spring keeps the pilot valve plug closed. Inlet pressure passes through the restrictor and registers as loading pressure on the main valve diaphragm chamber. Force from the main spring, in addition to pilot loading pressure, provide loading pressure to keep the main valve diaphragm and plug assembly tightly shut off. When the inlet pressure rises above the set pressure, the pressure on the pilot diaphragm overcomes the pilot control spring and opens the pilot valve plug. The pilot then exhausts

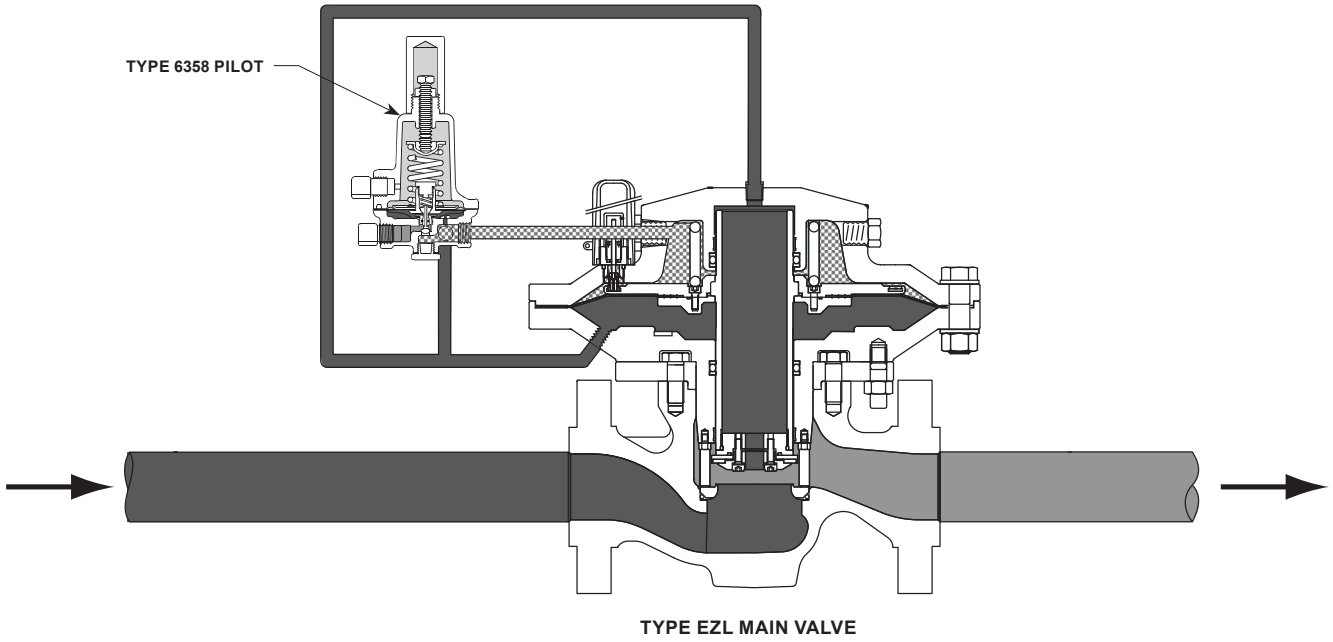

Figure 2. *Type EZL Reliief Valve or Backpressure Regulator*

Table 1. *Main Valve Body Sizes, End Connection Style and Pressure Ratings*

MAIN VALVE BODY SIZE	MAIN VALVE BODY MATERIAL	END CONNECTION STYLE	PRESSURE RATING	
			psig	bar
2, 3 and 4 in. / DN 50, 80 and 100	WCC Steel	NPT(2) or SWE(2)	1500	103
		CL150 RF	290	20.0
		CL300 RF	750	51.7
		CL600 RF or BWE	1500	103
	Cast Iron	NPT(2)	400	27.6
		CL125B FF	200	13.8
		CL250B RF	500	34.5

1. Structural design rating is the rating for the main valve body. The Type EZL complete assembly is limited to 285 psig / 19.7 bar.
2. Availability only on 2 in. / DN 50 body.

Table 2. *Relief Set Pressure Ranges*

PILOT TYPE	RELIEF SET PRESSURE RANGE(1)		SPRING PART NUMBER	SPRING COLOR	SPRING WIRE DIAMETER		SPRING FREE LENGTH	
	psig	bar			In.	mm	In.	mm
6358B	3 to 18	0.21 to 1.2	1B986027212	Green	0.120	3.05	2.12	53.6
	15 to 40	1.0 to 2.8	1E392527022	Yellow	0.148	3.76	2.00	50.8
	35 to 125	2.4 to 8.6	1K748527202	Red	0.187	4.75	2.19	55.6
6358EB	85 to 140	5.9 to 9.6	17B1261X012	Green	0.225	5.72	3.70	94.0
	130 to 200	9.0 to 13.8	17B1263X012	Blue	0.262	6.65	3.85	97.8
	180 to 350	12.4 to 24.1	17B1264X012	Red	0.294	7.47	4.22	107

1. See the Main Valve Body Sizes, End Connections, Structural Design Ratings tables and the Main Valve Diaphragm and Spring Pressure Ratings table for additional pressure ratings.

Table 3. *IEC Sizing Coefficients*

MAIN VALVE BODY SIZE		LINE SIZE EQUALS BODY SIZE		2:1 LINE SIZE TO BODY SIZE PIPING		F_L
In.	DN	X_T	F_D	X_T	F_D	
2	50	0.829	0.61	0.766	0.60	0.89
3	80	0.710	0.61	0.660	0.60	
4	100	0.672	0.72	0.714	0.70	

Table 4. *Type EZL Main Valve Regulating Flow Coefficients*

MAIN VALVE BODY SIZE		LINE SIZE EQUALS BODY SIZE			2:1 LINE SIZE TO BODY SIZE PIPING		
In.	DN	C_g	C_v	C_1	C_g	C_v	C_1
2	50	2290	63.2	36.2	2140	61.5	34.8
3	80	4800	144	33.5	4580	142	32.3
4	100	6560	200	32.6	6440	192	33.6

the loading pressure from the main valve diaphragm chamber. The pilot continuously exhausts gas when the inlet pressure is above the set pressure. The inlet pressure unbalance overcomes the main spring force and opens the diaphragm and plug assembly.

As the inlet pressure drops below the set pressure, the pilot control spring closes the pilot valve plug and the exhaust to atmosphere stops. Force from the main spring, along with pilot loading pressure, pushes the diaphragm and plug assembly onto the knife-edged seat, producing tight shutoff.

Capacity Information

Note

Type EZL flow capacities are laboratory verified; therefore, they may be sized for 100% flow using capacities as shown in Figures 3 through 11. It is not necessary to reduce published capacities.

Figures 3 through 11 show the natural gas regulating capacities of the Type EZL at select set pressures. Flows are in thousands of SCFH at 60°F and 14.7 psia (and in thousands of Nm^3/h at 0°C and 1.01325 bar) of 0.6 specific gravity natural gas. To determine equivalent capacities for air, propane, butane or nitrogen, multiply the capacity by the following appropriate conversion factor: 0.775 for air, 0.628 for propane, 0.548 for butane or 0.789 for nitrogen.

For gases of other specific gravities, multiply the given capacity by 0.775 and divide by the square root of the appropriate specific gravity. Then, if capacity is desired in Nm^3/h at 0˚C and 1.01325 bar, multiply SCFH by 0.0268.

Critical Pressure Drops

For critical pressure drops (absolute outlet pressure equal to or less than one-half of absolute inlet pressure), use the following formula:

$$Q = (P_1 + \text{Build-up})_{abs}\ C_g \sqrt{\frac{520}{GT}}$$

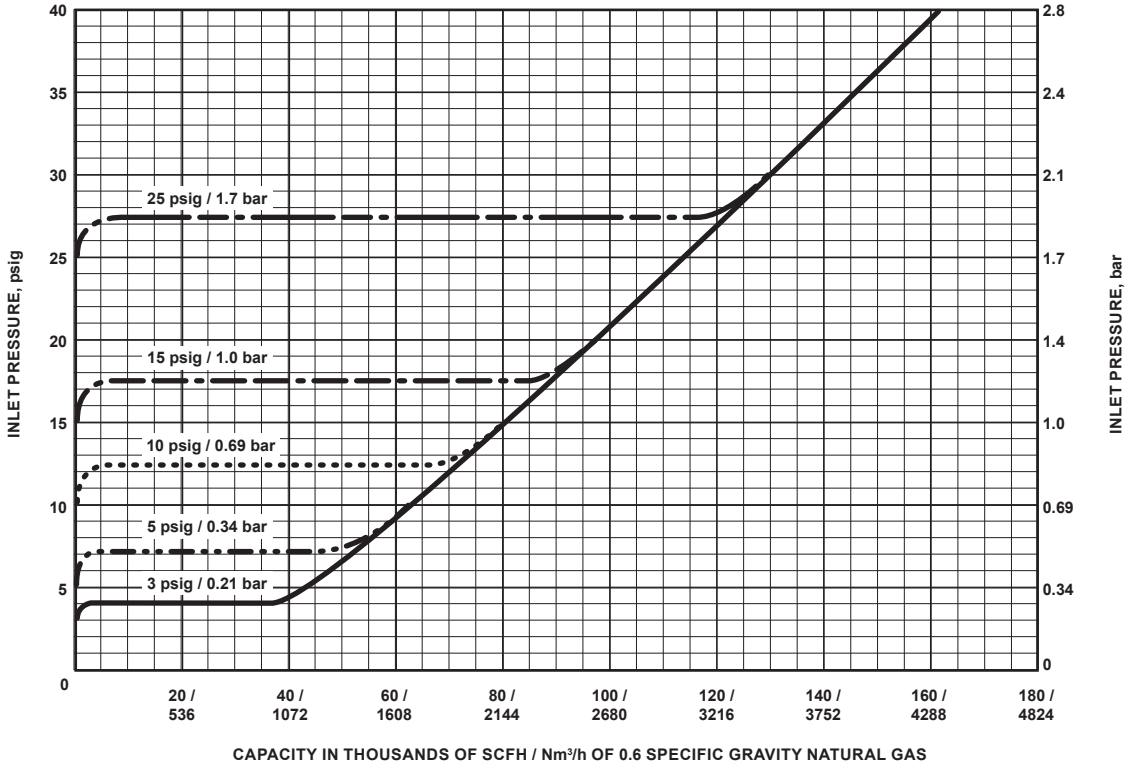

Figure 3. *Type EZL Capacity Curves with 2 in. / DN 50 Body Size at Low Pressure Application*

Non-Critical Pressure Drops

For pressure drops lower than critical (absolute outlet pressure greater than one-half of absolute inlet pressure), use the following formula:

$$Q = \sqrt{\frac{520}{GT}}\, C_g (P_1 + \text{Build-up})_{abs}\, \text{SIN} \left(\frac{3417}{C_1} \sqrt{\frac{\triangle P}{P_1 + \text{Build-up}}} \right) \text{Deg}$$

where,

Q	=	flow capacity in SCFH
G	=	specific gravity of gas
T	=	absolute temperature of gas at inlet in degrees Rankine
C_g	=	gas sizing coefficient from Table 9
P_{1abs}	=	absolute inlet pressure in psia (P_1 gauge + 14.7)
C_1	=	C_g/C_v from Table 9
$\triangle P$	=	pressure drop across the valve in psi

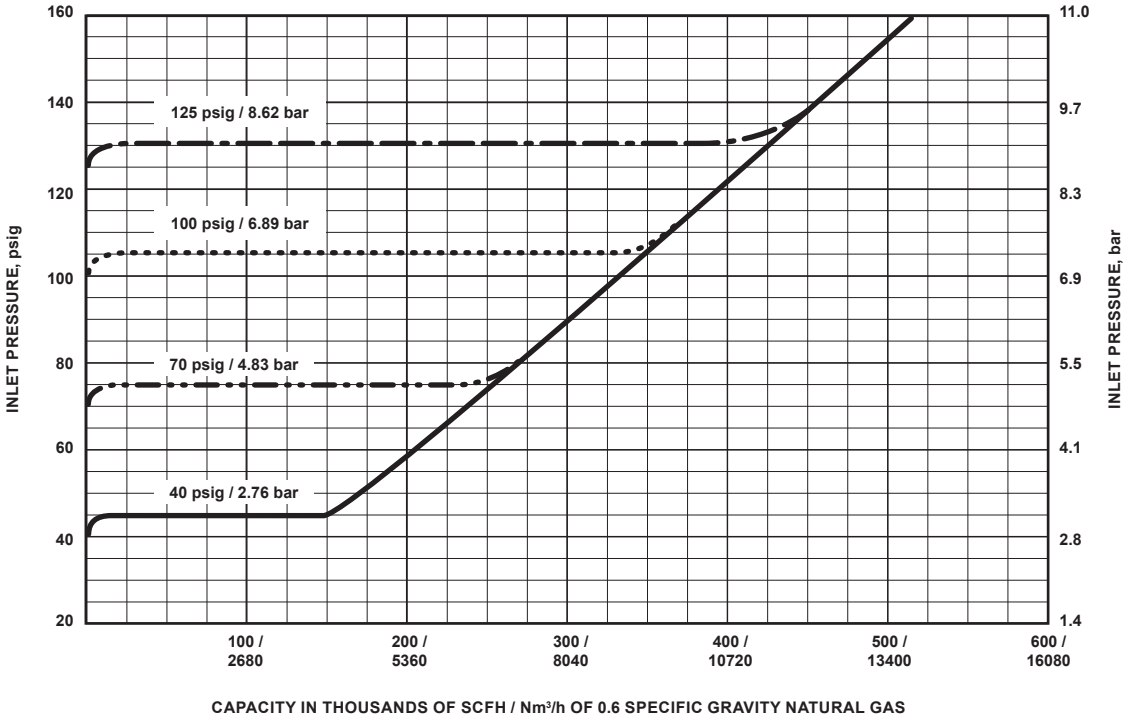

Figure 4. *Type EZL Capacity Curves with 2 in. / DN 50 Body Size at Medium Pressure Application*

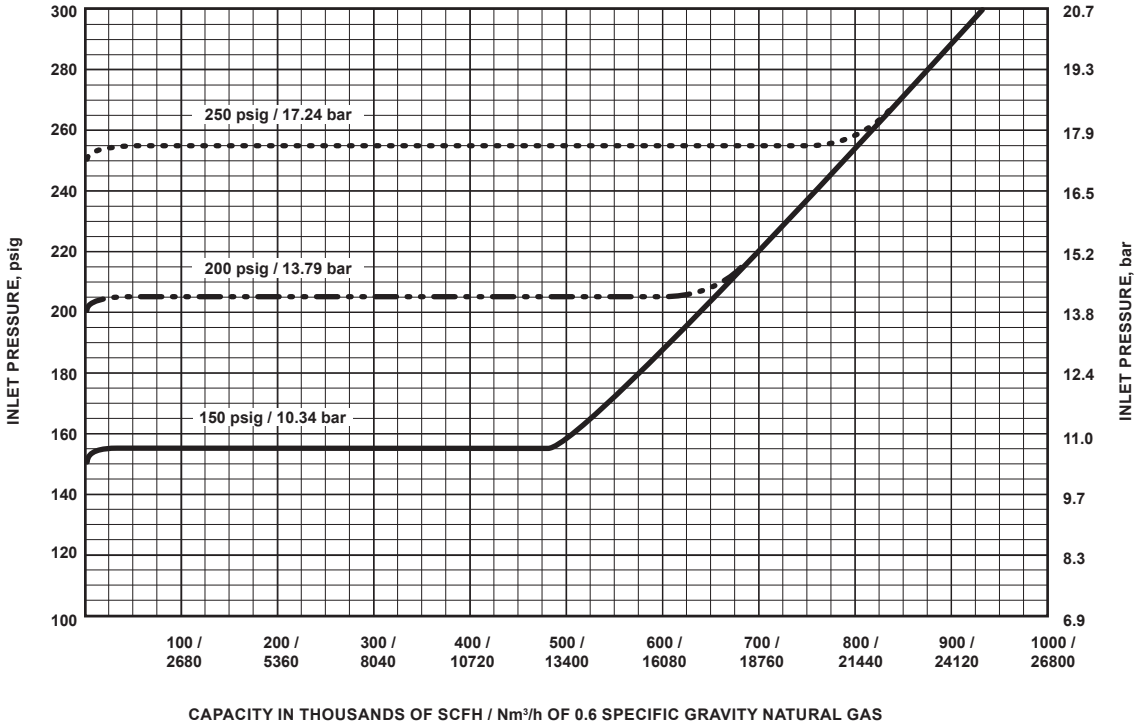

Figure 5. *Type EZL Capacity Curves with 2 in. / DN 50 Body Size at High Pressure Application*

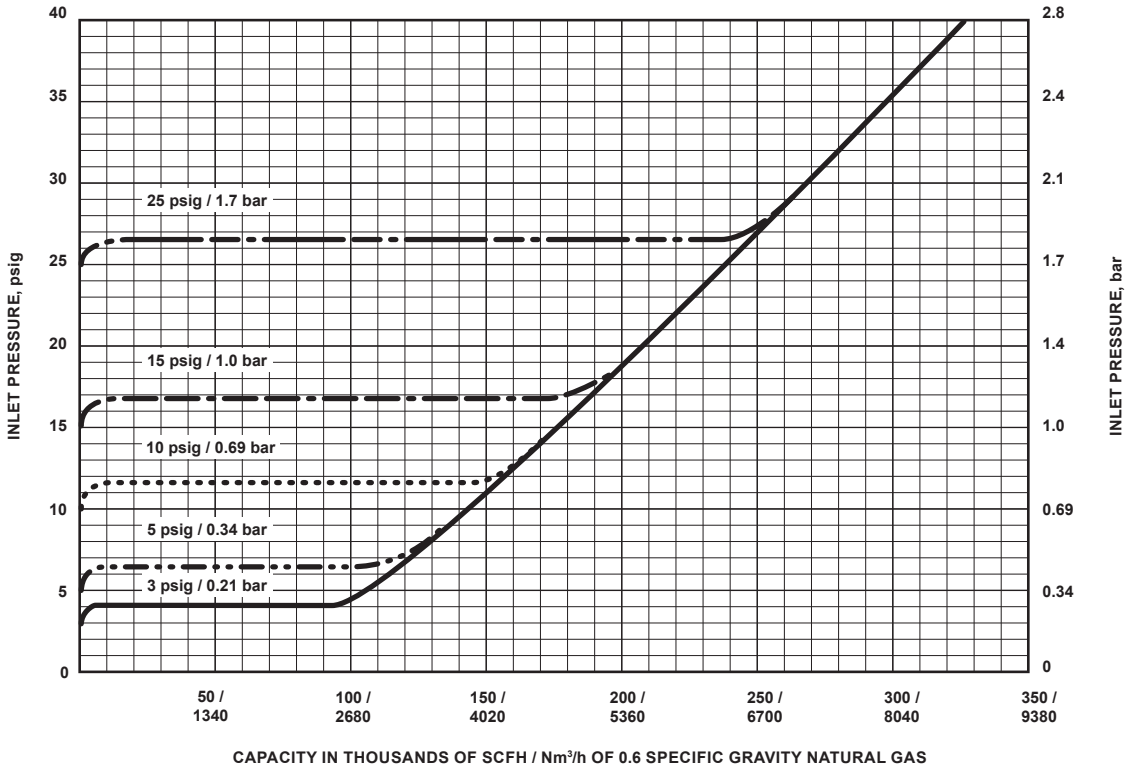

Figure 6. *Type EZL Capacity Curves with 3 in. / DN 80 Body Size at Low Pressure Application*

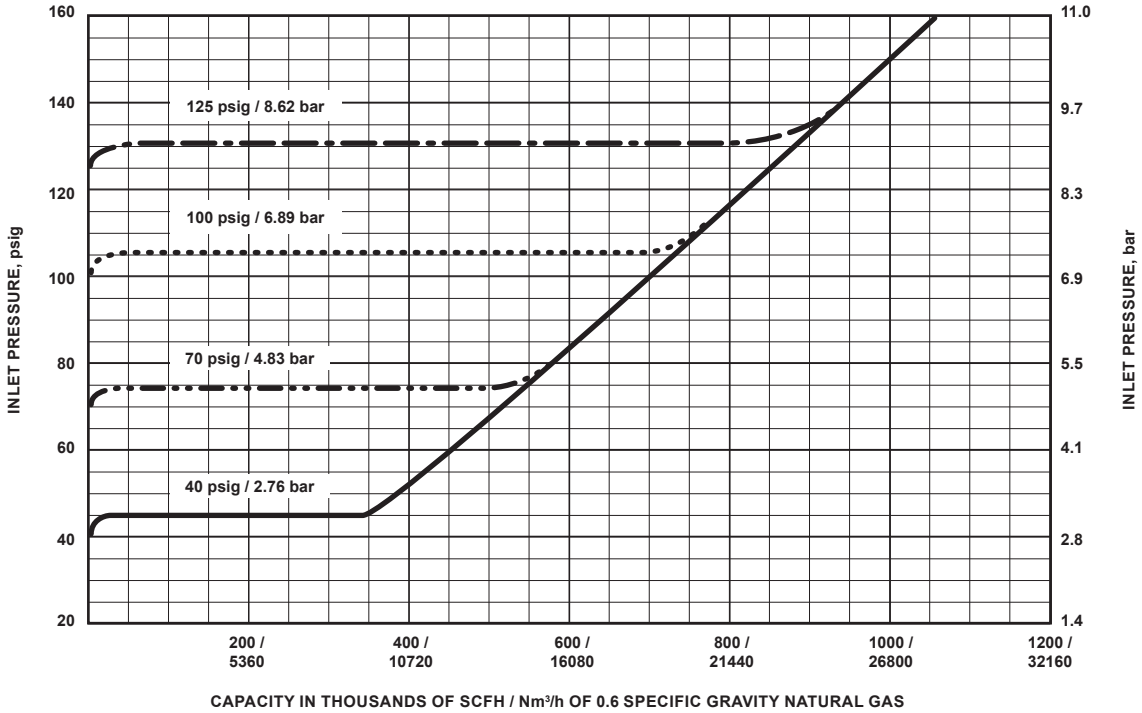

Figure 7. *Type EZL Capacity Curves with 3 in. / DN 80 Body Size at Medium Pressure Application*

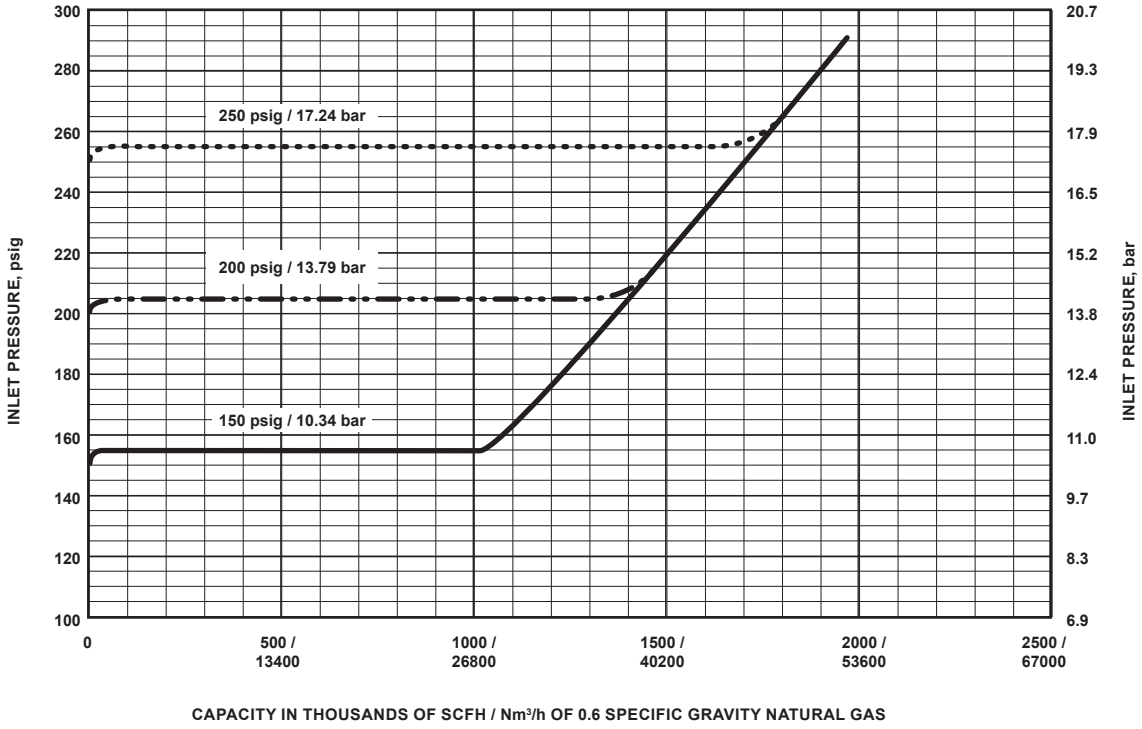

Figure 8. *Type EZL Capacity Curves with 3 in. / DN 80 Body Size at High Pressure Application*

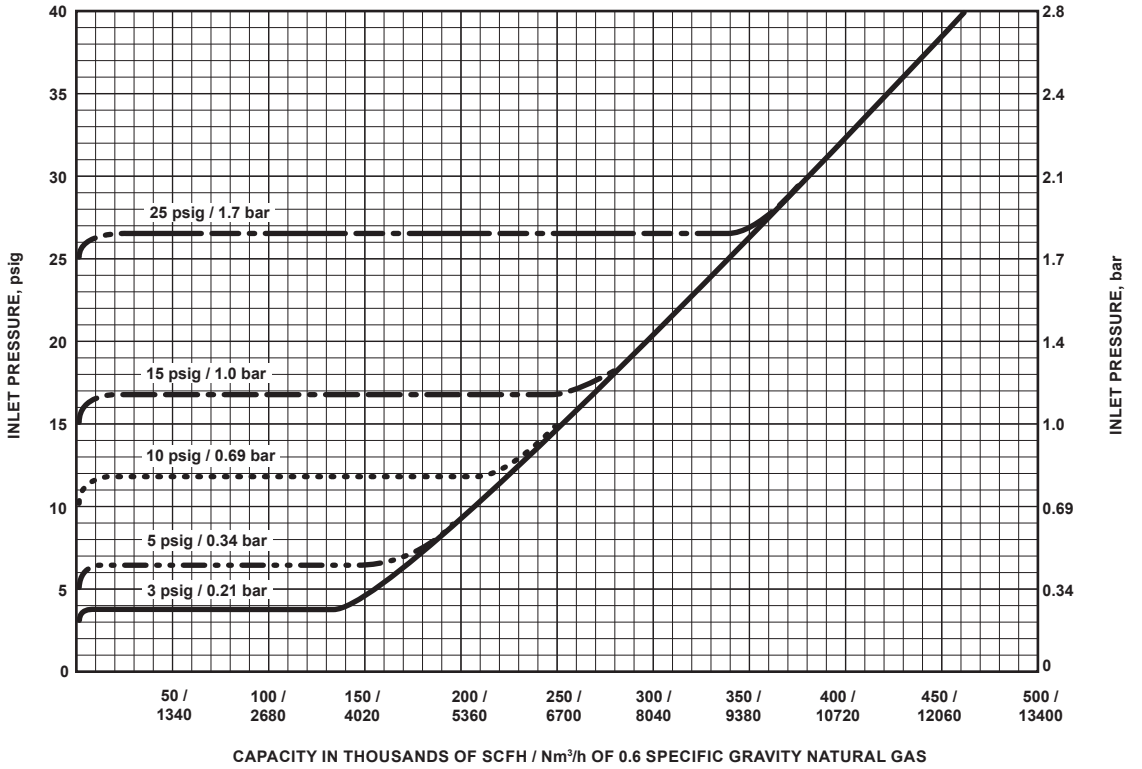

Figure 9. *Type EZL Capacity Curves with 4 in. / DN 100 Body Size at Low Pressure Application*

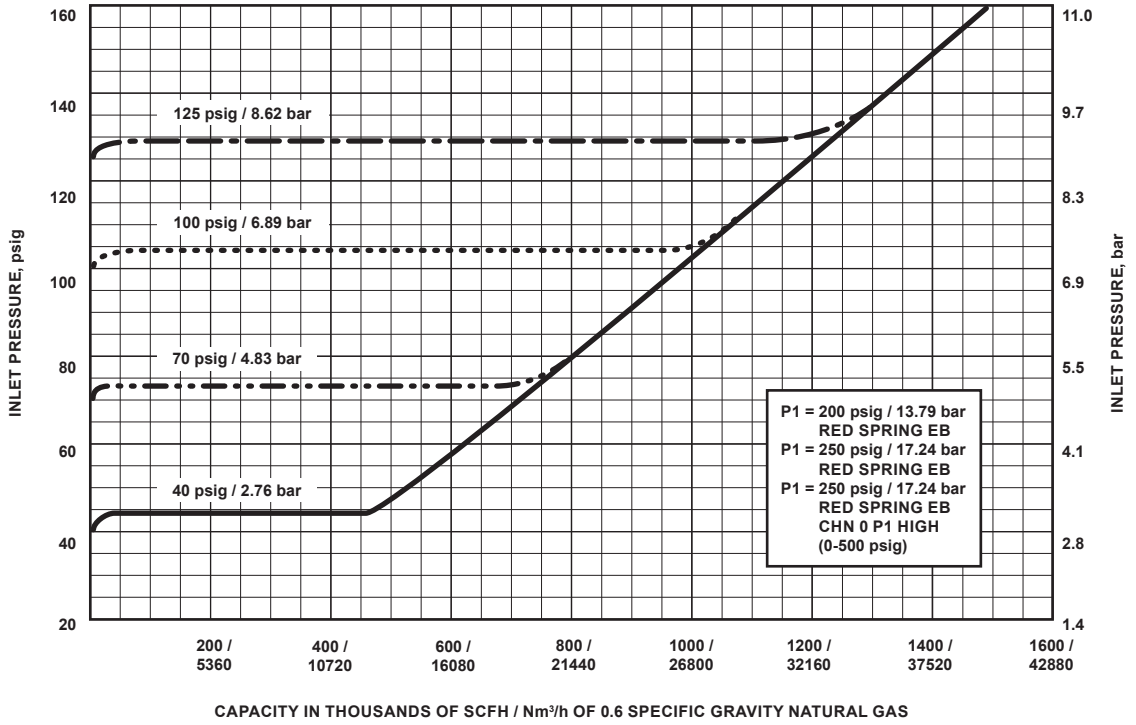

Figure 10. *Type EZL Capacity Curves with 4 in. / DN 100 Body Size at at Medium Pressure Application*

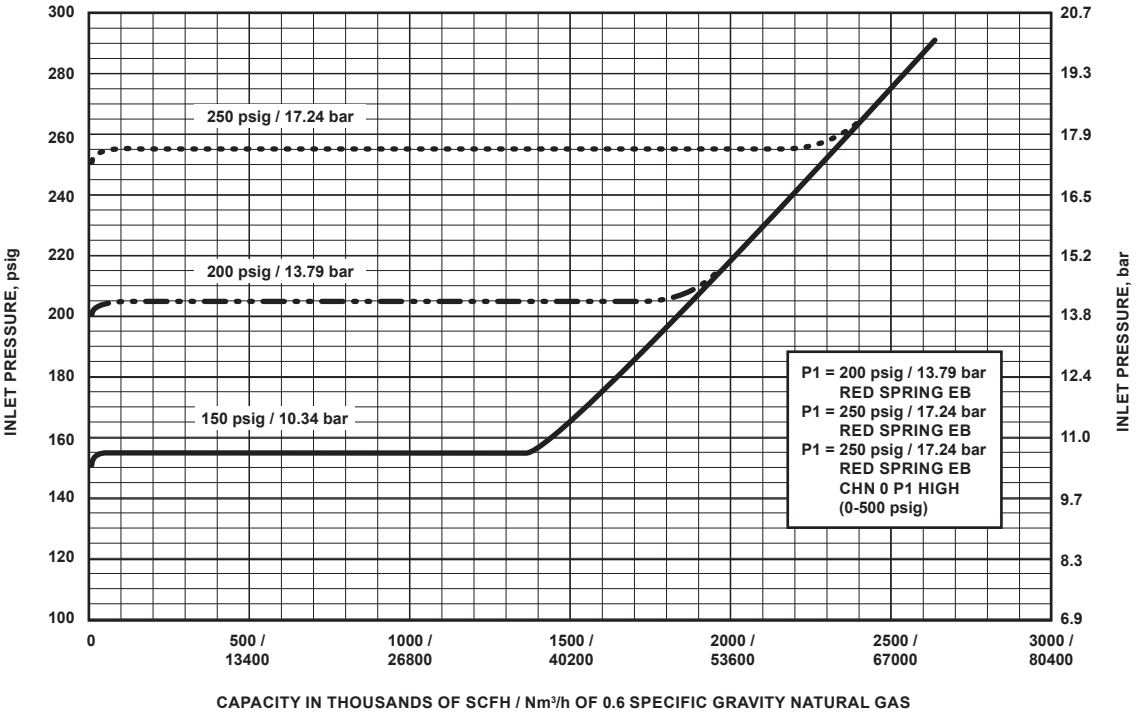

Figure 11. *Type EZL Capacity Curves with 4 in. / DN 100 Body Size at High Pressure Application*

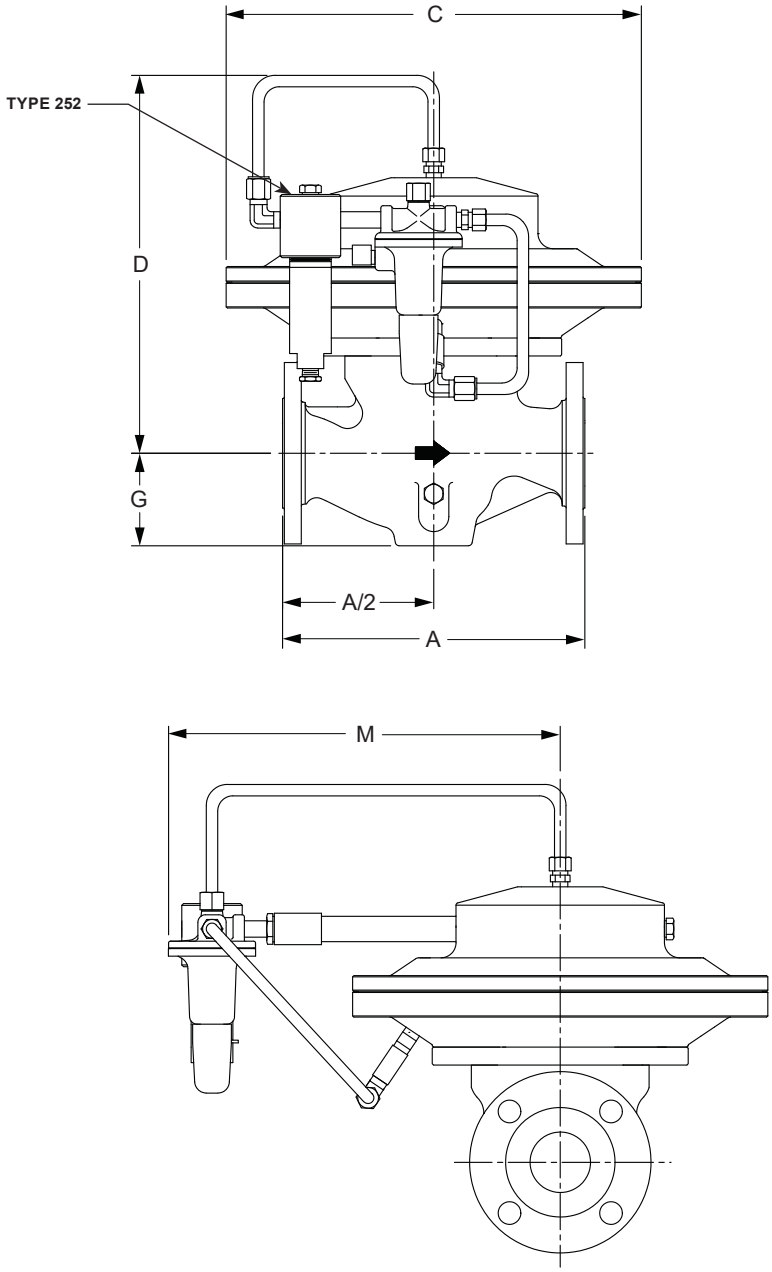

Figure 12. *Type EZL Dimensions*

Table 5. *Type EZL Dimensions*

BODY SIZE		DIMENSION													
		A						D		G		M		C	
		CL125 FF, CL150 RF		CL250 RF, CL300 RF		CL600 RF									
NPS	DN	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm
2	50	10.00	254	10.50	267	11.25	286	13.53	344	3.06	78	10.50	267	13.73	349
3	80	11.75	298	12.50	317	13.25	337	16.52	420	3.81	97	11.83	300	16.40	416
4	100	13.88	353	14.50	368	15.50	394	19.03	483	5.10	130	11.83	300	16.40	416

Table 6. *Approximate Shipping Weights*

BODY SIZE		APPROXIMATE SHIPPING WEIGHT													
		NPT		SWE		CL150 RF		CL300 RF		CL600 RF		SCH 40		Actuator Only	
In.	DN	Lbs	kg	Lbs	kg	Lbs	kg	Lbs	kg	Lbs	kg	Lbs	kg	Lbs	kg
2	50	90	41	90	41	97	44	107	49	111	50	90	41	45	20
3	80	- - - -		- - - -		172	78	182	83	186	84	- - - -		80	36
4	100	- - - -		- - - -		201	91	225	102	270	122	- - - -		85	39

Ordering Guide

Body Size (Select One)

- ☐ 2 in. / DN 50 Body***
- ☐ 3 in. / DN 80 Body***
- ☐ 4 in. / DN 100 Body***

Body Material and End Connection Style (Select One)

WCC Steel

- ☐ NPT (2 in. / DN 50 body size only)***
- ☐ CL150 RF***
- ☐ CL300 RF***
- ☐ CL600 RF***
- ☐ Sch 40 BWE**
- ☐ SWE (2 in. / DN 50 body size only)**

Cast Iron

- ☐ NPT (2 in. / DN 50 body size only)***
- ☐ CL125 FF***
- ☐ CL250 RF***

Main Valve Seat Material (Select One)

- ☐ Nitrile (NBR) **(standard)***
- ☐ Fluorocarbon (FKM)***

Outlet Pressure Range (Select One)

Type 6358B

- ☐ 20 to 40 psig / 1.4 to 2.8 bar, Yellow***
- ☐ 35 to 125 psig / 2.4 to 8.6 bar, Red***

Type 6358EB

- ☐ 75 to 140 psig / 5.2 to 9.7 bar, Green***
- ☐ 130 to 200 psig / 9.0 to 13.8 bar, Blue***
- ☐ 180 to 350 psig / 12.4 to 24.1 bar, Red[1]***

Pilot Elastomer Material (Select One)

- ☐ Nitrile (NBR) **(standard)***
- ☐ Fluorocarbon (FKM)***

Travel Indicator (Optional)

- ☐ Yes***
- ☐ No***

Main Valve Replacement Kit

- ☐ Yes, send one replacement parts kit to match this order.

Pilot Replacement Kit

- ☐ Yes, send one replacement parts kit to match this order

1. Operating range is limited maximum pressure.

Ordering Guide (continued)

Regulators Quick Order Guide	
* * *	Readily Available for Shipment
* *	Allow Additional Time for Shipment
*	Special Order, Constructed from Non-Stocked Parts. Consult your local Sales Office for Availability.
Availability of the product being ordered is determined by the component with the longest shipping time for the requested construction.	

Specification Worksheet

Application:
Specific Use _____
Line Size _____
Gas Type and Specific Gravity _____
Gas Temperature _____

Application:
Brand of upstream regulator? _____
Orifice size of the upstream regulator? _____
Wide-open coefficient of the upstream regulator? _____

Pressure:
Maximum Inlet Pressure (P_{1max}) _____
Minimum Inlet Pressure (P_{1min}) _____
Downstream Pressure Setting(s) (P_2) _____
Maximum Flow (Q_{max}) _____

Performance Required:
Accuracy Requirements? _____

Other Requirements: _____
_____

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