LP-Gas Equipment Buyers Guide LP-31

The Industry Leader for Durability and Quality

EMERSON™
Process Management

Fisher® LP-Gas Equipment

Global Technology Leadership

Our commitment to providing customers with customized solutions, dependable products, along with uncompromising quality standards and exceptional service is a tradition dating back to our beginnings in 1880, when William Fisher invented the first regulator. Today, Fisher LP-Gas Equipment is a part of Emerson Process Management's Regulator Technologies Division, the World Leader in valve and regulator design and manufacturing. Emerson, a $20.9 billion company, invests over $400 million in research and development annually. Being a part of Emerson provides Fisher LP-Gas Equipment with the resources of a Global Technology Leader.

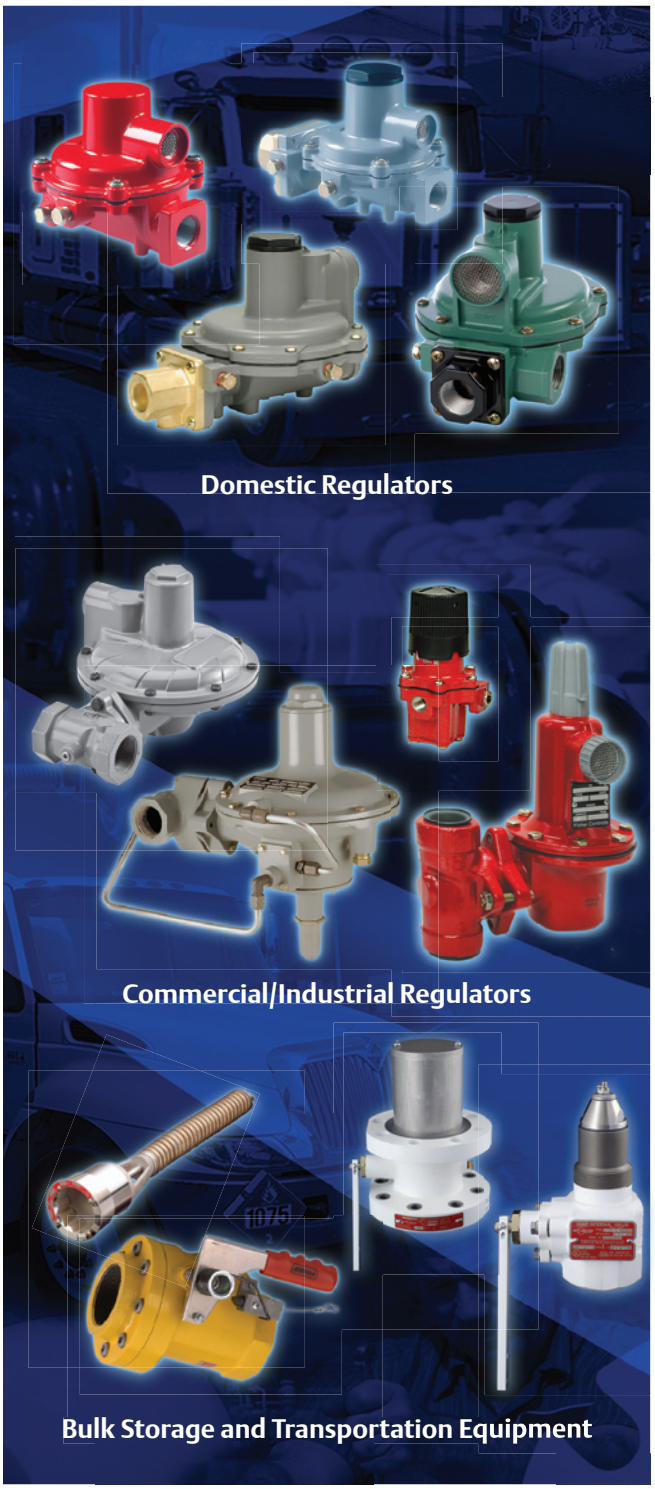
Laboratory Tests Simulate Field Conditions

Commitment to the LP-Gas Industry

With a focus on Safety and Reliability, Fisher LP-Gas Equipment continues a tradition of delivering innovative, high performance products utilizing the latest technologies. From the development of the first rubber diaphragm for regulators by Fisher in 1928 to the development of the first true internal valve in 1959, we proudly continue this tradition by introducing our new line of Jet Bleed Internal™ Valves, as well as our expanded line of commercial service regulators, providing the broadest line of regulator products offered in the LP-Gas industry today.

Commitment to our Customers

In addition to continually developing improved products for our customers, we are active in promoting and supporting the industry. Through our role in world and national organizations, we continue to promote increased safety throughout the entire industry.



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Where applicable, Fisher® brand products presented in this catalog are listed by Underwriters Laboratories (UL). Use of these products may provide compliance with standards developed by the National Fire Protection Association's Pamphlets 54 and 58. They may also assist in meeting guidelines established by the Department of Transportation, ASME, and other third party agencies. Contact your Fisher brand LP-Gas Regulators and Equipment Distributor for assistance in determining product applications.

NFPA®

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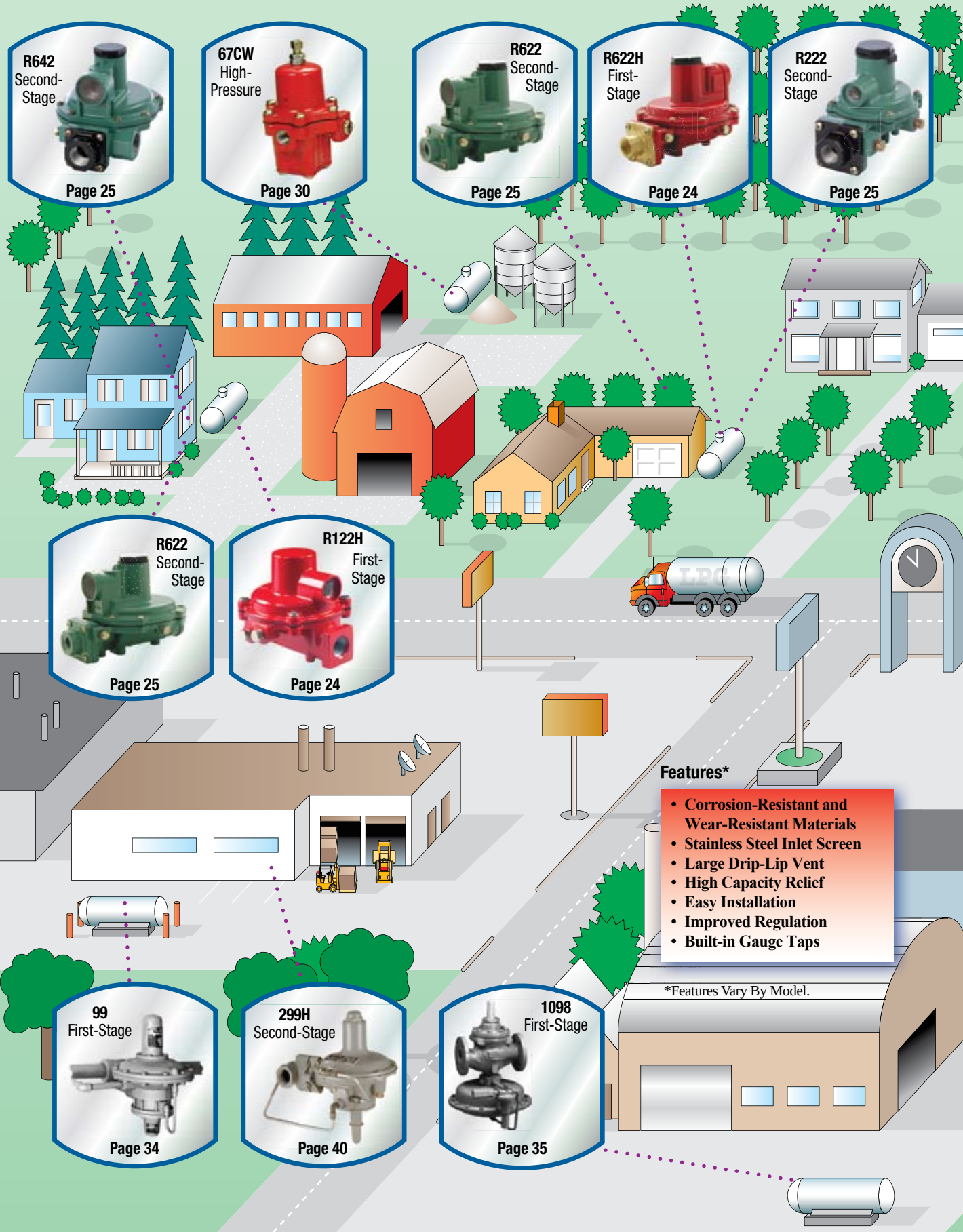
UL LISTED

FISHER *Application:* Regulators

Introduction

The regulator truly is the heart of an LP-Gas installation. It must compensate for variations in tank pressure from 8 to 250 psig / 0,55 to



Features*

- Corrosion-Resistant and Wear-Resistant Materials
- Stainless Steel Inlet Screen
- Large Drip-Lip Vent
- High Capacity Relief
- Easy Installation
- Improved Regulation
- Built-in Gauge Taps

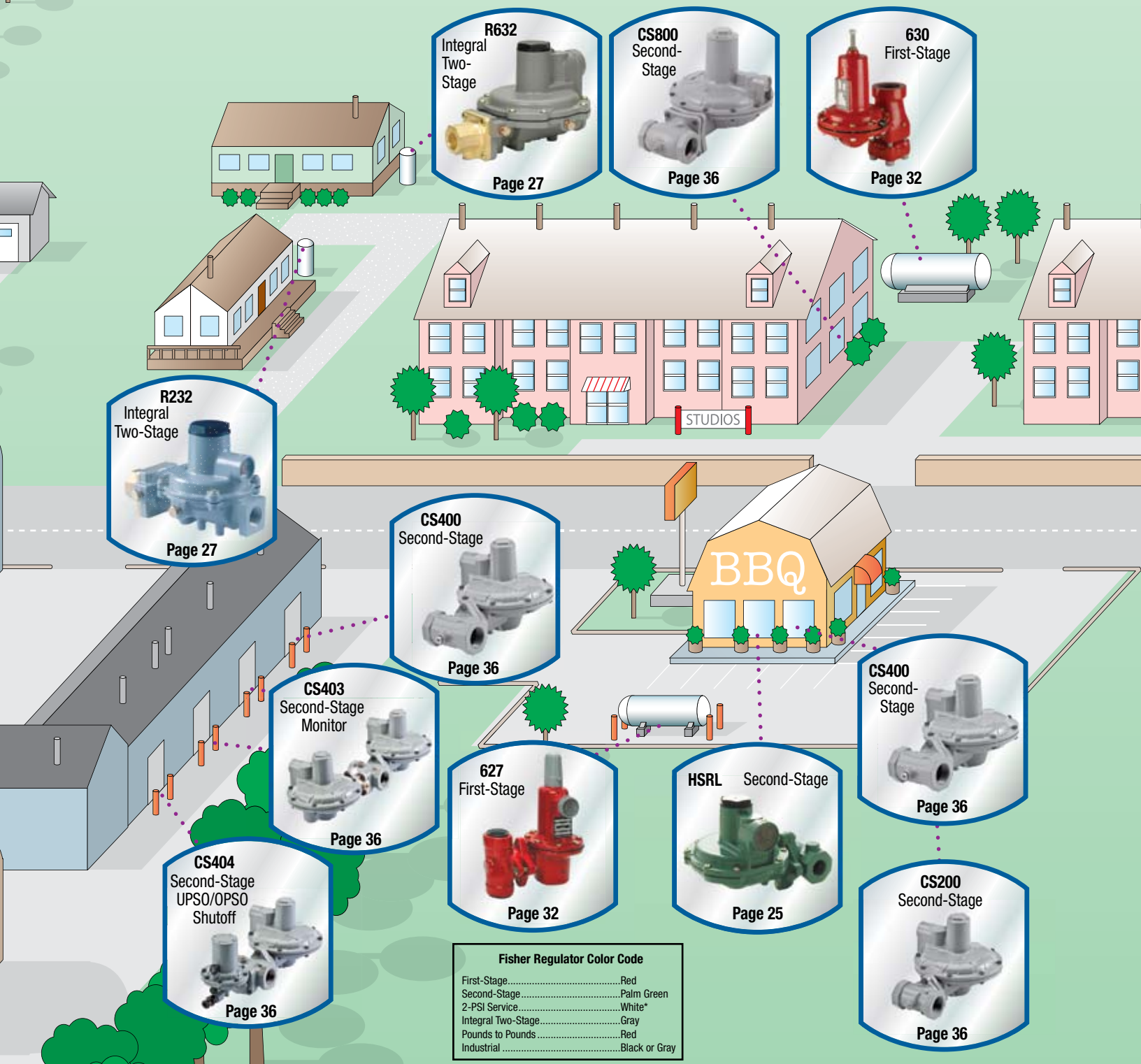
*Features Vary By Model.

17,2 bar and deliver a constant outlet pressure of LP-Gas typically at 11-inches w.c. / 27 mbar to consuming appliances. The regulator must deliver this pressure despite the intermittent use of the appliances.

In propane service, NFPA 58 requires Two-Stage regulation on all fixed piping systems that serve 14-inches w.c. / 35 mbar appliance systems (normally operated at 11-inches w.c. / 27 mbar pressure). Two-Stage regulation produces a nearly constant pressure to the appliance and can result in a more efficient LP-Gas operation for the dealer resulting in less maintenance and fewer installation call-backs.

With properly selected regulators, the internal relief valve provides 2 psig / 0,14 bar overpressure protection as required by NFPA 58.

Emerson Process Management Regulator Technologies Inc. (Regulator Technologies) is a leading international supplier of cost-effective products, services, and solutions used in the propane industry. Around the world, Regulator Technologies and its distributors offer quality products as well as applications engineering, education programs, and after sales service. For any of the products described in this catalog, contact the Fisher® LP-Gas Equipment distributor near you.



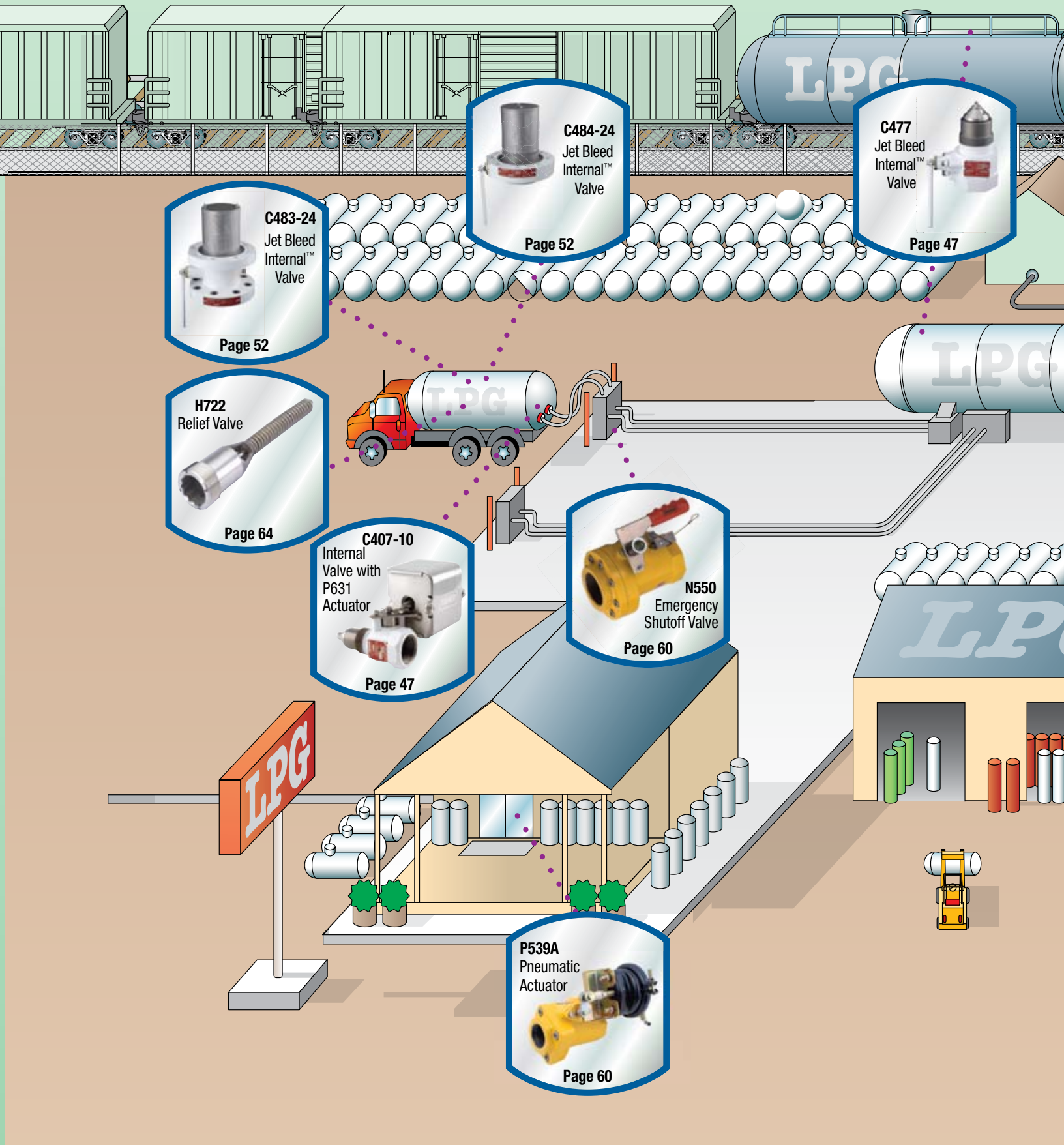
Fisher Regulator Color Code

First-Stage	Red
Second-Stage	Palm Green
2-PSI Service	White*
Integral Two-Stage	Gray
Pounds to Pounds	Red
Industrial	Black or Gray

*R622E and R652E are green with white closing caps

FISHER

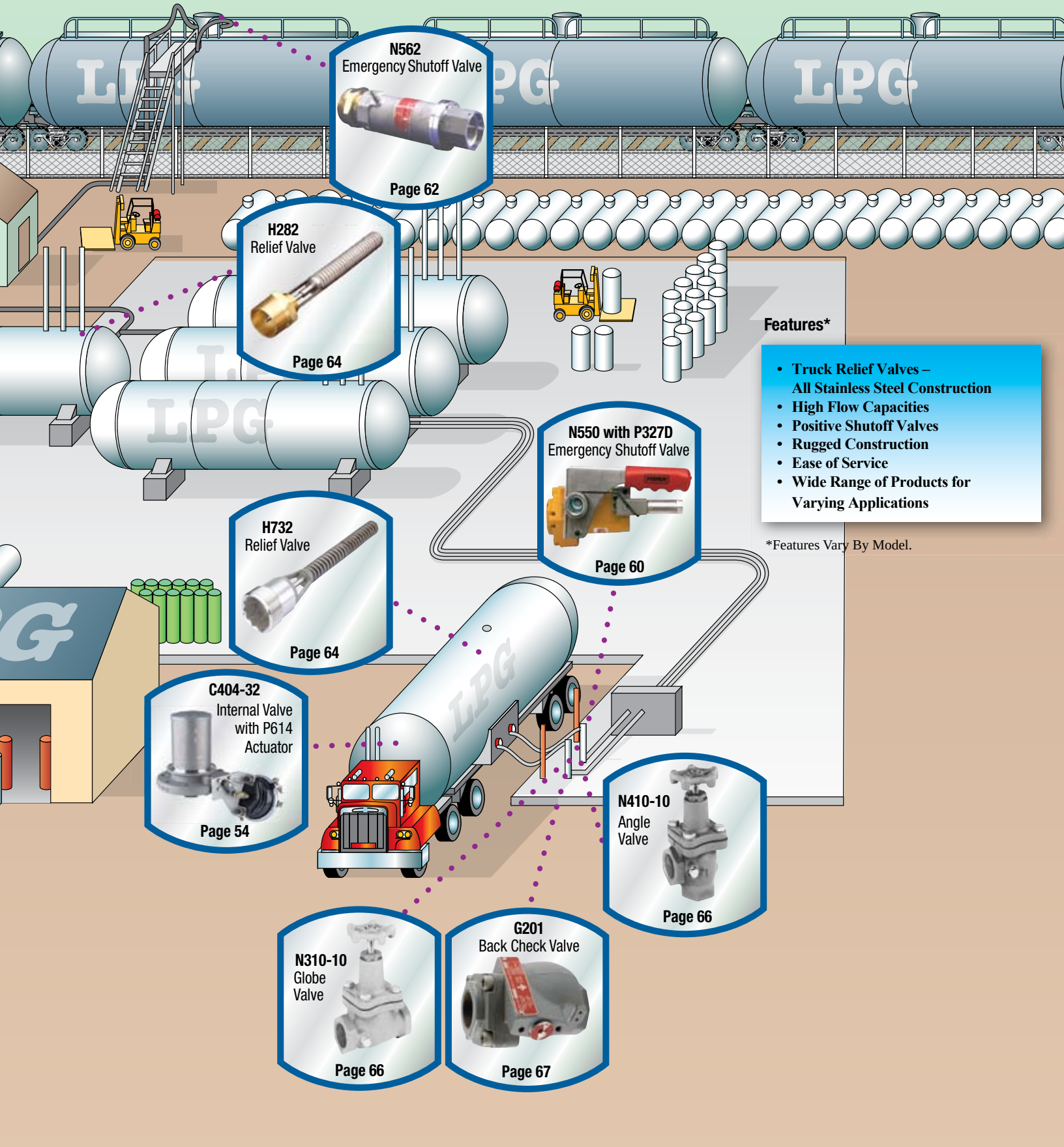
Application: Valves and Relief Valves



Introduction

Fisher® brand internal valves, relief valves, emergency shutoff valves, and globe and angle valves are installed in the inlets and outlets (liquid or vapor) of pressure vessels and in piping systems to control the flow of LP-Gas and NH_3 (anhydrous ammonia). These valves are frequently used on bobtails, transport truck tanks, large stationary storage tanks, and in-line installations.

The valves provide a means of withdrawing and filling product with or without pumps and compressors. These valves may be used as primary shutoff valves, excess flow valves, and back check valves. No one offers a more complete line of LP-Gas Equipment to match your job specification.



Features*

- **Truck Relief Valves – All Stainless Steel Construction**
- **High Flow Capacities**
- **Positive Shutoff Valves**
- **Rugged Construction**
- **Ease of Service**
- **Wide Range of Products for Varying Applications**

*Features Vary By Model.

Regulators Quick Selection Guide

	Maximum Inlet Pressure	Outlet Pressure Range	Rated Capacity*(1)	Type Number
Commercial/ Industrial High Pressure Regulators	250 psig / 17,2 bar	3 to 120 psig / 0,21 to 8,3 bar	1.2M BTU per hour / 13,5 SCMH	**67C Series** Page 30
	250 psig / 17,2 bar	3 to 100 psig / 0,21 to 6,9 bar	5.25M BTU per hour / 59,1 SCMH	**64 Series** Page 31
	250 psig / 17,2 bar	5 to 40 psig / 0,35 to 2,8 bar	20.95M BTU per hour / 235 SCMH	**627 Series** Page 32
	250 psig / 17,2 bar	8 to 20 psig / 0,55 to 1,4 bar	14M BTU per hour / 158 SCMH	**630 Series** Page 32
	6000 psig / 414 bar	10 to 75 psig / 0,69 to 5,2 bar	3.8M BTU per hour / 43,0 SCMH(2)	**Type 1301F** Page 32
	300 psig / 20,7 bar	7-inches w.c. to 65 psig / 17 mbar to 4,5 bar	74.3M BTU per hour / 836 SCMH	**99 Series** Page 34
	400 psig / 27,6 bar	3 to 100 psig / 0,21 to 6,9 bar	1.2B BTU per hour / 13481 SCMH	**1098 Series** Page 35

*See capacity tables in the following sections for expanded rating information.
1. Based on inlet pressure 20 psig / 1,4 bar greater than outlet with 20% droop, unless otherwise noted.
2. Based on 2000 psig / 138 bar inlet pressure setting.

REGULATORS QUICK SELECTION GUIDE

	MAXIMUM INLET PRESSURE	OUTLET PRESSURE RANGE	RATED CAPACITY*(1)	TYPE NUMBER
COMMERCIAL/ INDUSTRIAL LOW PRESSURE REGULATORS	125 psig / 8,6 bar	3.5-inches w.c. to 2 psig / 9 mbar to 0,14 bar	3.9M BTU per hour / 43,8 SCMH(3)	CS200 Series Page 36
	125 psig / 8,6 bar	3.5-inches w.c. to 5.5 psig / 9 mbar to 0,38 bar	8.9M BTU per hour / 100 SCMH(2)	CS400 Series Page 36
	125 psig / 8,6 bar	8-inches w.c to 5.5 psig / 20 mbar to 0,38 bar	20M BTU per hour / 224 SCMH	CS800 Series Page 36
	60 psig / 4,1 bar	1.5 to 3 psig / 0,10 to 0,21 bar	66.15M BTU per hour / 745 SCMH(2)	Type 133H Page 40
	60 psig / 4,1 bar	8.5 to 18-inches w.c. / 21 to 45 mbar	70.8M BTU per hour / 797 SCMH(3)	Type 133L Page 40
	150 psig / 10,3 bar	9-inches w.c. to 16 psig / 22 mbar to 1,1 bar	38M BTU per hour / 428 SCMH	299H Series Page 40
	150 psig / 10,3 bar	7-inches w.c. to 5 psig / 18 mbar to 0,35 bar	63.25M BTU per hour / 712 SCMH	99-500P Series Page 40
	250 psig / 17,2 bar	3-inches w.c. to 5 psig / 7 mbar to 0,35 bar	556 000 BTU per hour / 6,2 SCMH(4)	912 Series Page 43

*See capacity tables in the following sections for expanded rating information.
1. Based on inlet pressure 20 psig / 1,4 bar greater than outlet with 20% droop, unless otherwise noted.
2. Based on 10 psig / 0,69 bar inlet pressure setting and 20% droop.
3. Based on 10 psig / 0,69 bar inlet pressure setting and 2-inches w.c. / 5 mbar droop.
4. Types 912-101 and -104 rating at 30 psig / 2,1 bar inlet.

Regulators Quick Selection Guide

	Maximum Inlet Pressure	Outlet Pressure Setting/Setpoints	Rated Capacity*[1]	Type Number
First-Stage Regulators	250 psig / 17,2 bar	10 psig / 0,69 bar +/- 1 psig / 69 mbar nominal outlet setting (non-adjustable)	1.1M BTU per hour / 12,4 SCMH	**R122H Series** Page 24
	250 psig / 17,2 bar	5 or 10 psig / 0,35 or 0,69 bar standard setpoints	2.4M BTU per hour / 27,0 SCMH	**R622H Series** Page 25

	Maximum Inlet Pressure	Standard Setpoint	Rated Capacity*[2]	Type Number
Second-Stage Regulators[3]	10 psig / 0,69 bar	9 to 13-inches w.c. / 22 to 32 mbar	2.6M BTU per hour / 29,3 SCMH	**Type HSRL** Page 25
	10 psig / 0,69 bar	11-inches w.c. / 27 mbar	650 000 BTU per hour / 7,3 SCMH	**R222 Series** Page 25
	10 psig / 0,69 bar	11-inches w.c. / 27 mbar	1.4M BTU per hour / 15,8 SCMH	**R622 Series** Page 25
	10 psig / 0,69 bar	11-inches w.c. / 27 mbar	920 000 BTU per hour / 10,4 SCMH	**R642 Series** Page 25
	10 psig / 0,69 bar	11-inches w.c. / 27 mbar	1M BTU per hour / 11,2 SCMH	**R652 Series** Page 25

*See capacity tables in the following sections for expanded rating information.
1. Based on 30 psig / 2,1 bar inlet pressure and 20% droop.
2. Based on 10 psig / 0,69 bar inlet pressure setting.
3. Second-Stage regulators are UL rated.

REGULATORS QUICK SELECTION GUIDE

	MAXIMUM INLET PRESSURE	STANDARD SETPOINT	RATED CAPACITY*(1)	TYPE NUMBER
2-PSI SERVICE REGULATORS	10 psig / 0,69 bar	2 psi / 0,14 bar	1.68M BTU per hour / 18,9 SCMH	R622E Series Page 26
	10 psig / 0,69 bar	2 psi / 0,14 bar	1.5M BTU per hour / 16,9 SCMH	R652E Series Page 26

	MAXIMUM INLET PRESSURE	STANDARD SETPOINT	RATED CAPACITY*(2)	TYPE NUMBER
INTEGRAL TWO-STAGE REGULATORS	250 psig / 17,2 bar	**First-Stage:** Approximately 10 psig / 0,69 bar (non-adjustable) **Second-Stage:** 11-inches w.c. / 27 mbar	450 000 BTU per hour / 5,1 SCMH	R232 Series Page 27
	250 psig / 17,2 bar	**First-Stage:** Approximately 10 psig / 0,69 bar (non-adjustable) **Second-Stage:** 11-inches w.c. / 27 mbar	850 000 BTU per hour / 9,6 SCMH	R632 Series Page 27

*See capacity tables in the following sections for expanded rating information.
1. Based on 10 psig / 0,69 bar inlet pressure setting.
2. Based on 30 psig / 2,1 bar inlet pressure setting.

Regulators Quick Selection Guide

	Maximum Working Pressure	Relief Pressure Setting	Relief Capacity*	Type Number
Backpressure Regulators/ Relief Valves	300 psig / 20,7 bar	100 psig / 6,9 bar	93.1 GPM / 352 l/min Propane	**Type 98H** Page 42
	25 psig / 1,7 bar	15 psig / 1,0 bar	20 000 SCFH / 566 SCMH Propane	**Type 289H** Page 42
	150 psig / 10,3 bar	30 psig / 2,1 bar	12 000 SCFH / 340 SCMH Propane	**Type 1805** Page 42

*See capacity tables in the following sections for expanded rating information.

Valves and Relief Valves Quick Selection Guides

	Maximum Inlet Pressure (Body Rating)	Standard Setpoints	Capacity*	Type Number
Internal/External Relief Valves	480 psig / 33,1 bar	125 to 312 psig / 8,6 to 21,5 bar	**UL:** 12 220 SCFM / 20 764 SCMH Air **ASME:** 10 651 SCFM / 18 097 SCMH Air	H282 and H5112 Series Page 64
	480 psig / 33,1 bar	125 to 312 psig / 8,6 to 21,5 bar	**UL:** 11 736 SCFM / 19 940 SCMH Air **ASME:** 9669 SCFM / 16 400 SCMH Air	H722 and H732 Series Page 64
	420 psig / 29,0 bar	35 to 350 psig / 2,4 to 23,8 bar Fixed Setting	Up to 2456 SCFM / 4173 SCMH	H-100 Series Page 65

	Maximum Working Pressure	Differential / Relief Pressure Setting	Body Size and End Connection Style	Type Number
Bypass and Backpressure Valves	300 psig / 20,7 bar	50 psig / 0,83 bar or 100 psig / 6,9 bar Setting	1/2, 3/4, and 1-inch FNPT	98 Series Page 42
	400 psig / 27,6 bar	12 psig / 0,83 bar Setting	3/4 and 1-inch FNPT	N120 Series Page 70

*See capacity tables in the following sections for expanded rating information.

Valves and Relief Valves Quick Selection Guides

*See capacity tables in the following sections for expanded rating information.

VALVES AND RELIEF VALVES QUICK SELECTION GUIDES

	SEAT CONSTRUCTION	PRESSURE RATING	CAPACITY*	TYPE NUMBER
BACK CHECK VALVES	Soft Seat and Metal Seat	250 psi / 17,2 bar	254 GPM / 961 l/min Propane	G100 Series Page 67
	Soft Seat	400 psig / 27,6 bar WOG	800 GPM / 3028 l/min Propane	G200 Series Page 67

	BODY SIZES AND END CONNECTION STYLE	MAXIMUM INLET PRESSURE	CAPACITY*	TYPE NUMBER
EMERGENCY SHUTOFF VALVES	1-1/4, 2, or 3-inch FNPT	400 psig / 27,6 bar	275 GPM / 1041 l/min Propane	N550 Series Page 60
	2-inch FNPT	400 psig / 27,6 bar	200 GPM / 757 l/min Propane	N562 Series Page 62

*See capacity tables in the following sections for expanded rating information.

Valves and Relief Valves Quick Selection Guides

	SELECTION DESCRIPTION	MAXIMUM OPERATING PRESSURE	BODY SIZES AND END CONNECTION STYLES	TYPE NUMBER
GLOBE AND ANGLE VALVES	Globe Valve (Heavy Duty Version)	400 psig / 27,6 bar	1/2 to 3-inch FNPT and 3-inch / DN 80 CL300 RF Flange	N301, N310 Series Page 66
	Globe Valve (Economy Version)	400 psig / 27,6 bar	1/2 to 3/4-inch FNPT	N350 Series Page 66
	Angle Valve (Heavy Duty Version)	400 psig / 27,6 bar	1/2 to 3-inch FNPT and 3-inch / DN 80 CL300 RF Flanged	N401, N410 Series Page 66
	Angle Valve (Economy Version)	400 psig / 27,6 bar	1/2 to 3/4-inch FNPT	N450 Series Page 66

*See capacity tables in the following sections for expanded rating information.

VALVES AND RELIEF VALVES QUICK SELECTION GUIDES

	PRODUCT/ FUNCTION	SELECTION INFORMATION	TYPE NUMBER
VALVES	Excess Flow Valve	Brass or Steel body in a variety of Inlet and Outlet Connection Sizes and Styles; Up to 10.7 psi / 0,74 bar differential pressure	F Series Page 63
	Filler Valve	2-inch MNPT x 2-1/4-inch ACME or 3-inch MNPT x 3-1/4-inch ACME; Single or Double Back Check style; 275 GPM / 1041 l/min filling capacity	D Series Page 68
	Hose End Valve	1-3/4-inch ACME x 1-inch NPT; Ductile iron body	Type N480 Page 68
	Bypass Valves	1 through 2-1/2-inch FNPT; 25 to 150 psig / 1,7 to 10,3 bar Pressure range; 40 GPM / 151 l/min pumping capacity	N100 Series Page 69
	Cylinder Filling Valve	30 psig / 2,1 bar Recommended Supply Pressure; Aluminum Body	Type N201 Page 76

*See capacity tables in the following sections for expanded rating information.

LP-Gas Equipment and Accessories

	PRODUCT/ FUNCTION	SELECTION INFORMATION	TYPE NUMBER
REGULATOR ACCESSORIES	Screened Vents for Regulator	1/4-Inch FNPT to 1-Inch MNPT	Y602 Series Page 43
	Regulator Mounting Brackets	Triangular, Bowtie, or Strap Design	Type P100 Page 44
	Pressure Gauge Adaptor and Test Block	Male POL x Female POL, Test block with 0 to 300 psig / 0 to 20,7 bar gauge.	Type J600 Page 44
	Test Pressure Gauge for Appliance Line Pressure	1/4-Inch NPT or Female Hose	50 Series Page 45
	Pressure Gauge	1/4-Inch MNPT; 0 to 400 psi / 0 to 27,6 bar; Ranges in MPa, kg/cm^2, Bar	J500 Series Page 45
	Adjustable Orifice Reamer	Drill Size No. 80 through No. 50	Type P520L Page 76

	PRODUCT/ FUNCTION	SELECTION INFORMATION	TYPE NUMBER
BULK STORAGE TANK AND VALVE ACCESSORIES	Liquid Transfer Valve	3/4 by 3/4-Inch MNPT	Type M455 Page 68
	Rotary Level Gauge for Stational or Mobile Tank	68 to 140-Inch / 1727 to 3556 mm Lengths	Type J31 Page 71
	Liquid Level Vent Valves	3/4-Inch MNPT for FNPT Connection; with or without Pressure Gauge	J400 Series Page 71
	Container (Tank) Thermometer	1/2-Inch MNPT; -40° to 120°F / -40° to 49°C	J700 Series Page 71
	Male ACME Adaptor	1-1/4 by 1-1/4-Inch through 4-1/4 by 4-1/4-Inch Male ACME	Types M270, M536 Page 72
	Female ACME Filler Couplings	1-3/4-Inch Female ACME by 1/2-Inch MNPT through 4-1/4-Inch Female ACME by 3-Inch MNPT	Type M631 Page 72
	Female ACME Vapor Return Couplings	1-3/4-Inch Female ACME by 3/4-Inch MNPT through 2-1/4-Inch Female ACME by 1-1/4-Inch MNPT	Types M151, M160 Page 72

	PRODUCT/ FUNCTION	SELECTION INFORMATION	TYPE NUMBER
BULK STORAGE TANK AND VALVE ACCESSORIES	Male ACME By Female NPT Adaptors	1-3/4 through 4-1/4-Inch Male ACME by 1/4 through 3-Inch FNPT	Type M529 Page 72
	Male ACME by Male NPT Adaptors	1-1/4 through 4-1/4-Inch Male ACME by 1/2 through 3-Inch FNPT	Type M520 Page 73
	O-Ring for Male Adaptors	For 2-1/4 or 3-1/4-Inch Adaptors to Give a Better Seal than Washers	T12655T0012 / 1H291706562 Page 73
	Adaptor Caps	2-1/4 through 4-1/4-Inch Female ACME by 1-3/4 through 3-1/4-Inch Male ACME	Type M611 Page 73
	POL Filler Coupling	Soft-Nose Male POL by 1/4-Inch MNPT	Type M390 Page 73
	Filler Valve Adaptor	For Filler Valves with 1-3/4-Inch Male ACME Filler Connection and a 3/4-Inch FNPT Outlet	Type M450A Page 74

	PRODUCT/ FUNCTION	SELECTION INFORMATION	TYPE NUMBER
BULK STORAGE TANK AND VALVE ACCESSORIES	Swivel POL Adaptor with Metal Seats	Straight or Angle Male POL by 1/4-Inch MNPT	**Type M318**
	Auxiliary Remote Cable Release for Internal Valves	With 25 or 50-Feet / 7,6 or 15,2 m Cable or without Cable	**Type P163A** Page 58
	Handle- or Cable-Operated Latch/Remote Release for Internal Valves	Built-In Fusible Link to Close Valve in Case of Fire	**Type P313** Page 58
	Primary Cable Control for Internal Valves	4, 5, or 6-Inch / 102, 137, or 152 mm Travel	**Type P650** Page 58
	Cable Control, Release Mechanism, and Cable Assembly for Internal Valves	For 1-1/4, 2, 3, and 4-Inch / DN 32, 50, 80, and 100 Internal Valves	**Type P314** Page 59
	Relief Valve Pipeaway Adaptors for DOT	For Use with Types H282, H5112, H125, H150, H148, and H173 Valves	**Types P104-24, P174** Page 74
	Filler Hose Adaptor with Back Check Valve	1-3/4-Inch Female ACME by 1-3/4-Inch Male ACME	**Type M570** Page 74

	PRODUCT/ FUNCTION	SELECTION INFORMATION	TYPE NUMBER
BULK STORAGE TANK AND VALVE ACCESSORIES	Pneumatic Actuator	For Use with C407-10 Series Only	Type P389 Page 59
	Pneumatic Actuator	For C407-10 Series 1-1/4-Inch NPT Internal Valves	Type P631 Page 59
	Pneumatic Actuator	For Type C484-24 Jet Bleed Internal™ Valve	Type P613 Page 59
	Pneumatic Actuator	For Type C483-24 Jet Bleed Internal™ Valve	Type P623 Page 59
	Pneumatic Actuator	For Types C471 and C477 Jet Bleed Internal™ Valves (2 and 3-Inch NPT Sizes)	Type P639 Page 59
	Pneumatic Actuator	For Types C404-32 4-Inch / DN 100 Single Flanged Valve	Type P614 Page 59
	Pneumatic Actuator	For Closing and Opening of N550 Series Snappy Joe™ Emergency Shutoff Valves (ESVs)	Type P539A Page 60

	PRODUCT/ FUNCTION	SELECTION INFORMATION	TYPE NUMBER
BULK STORAGE TANK AND VALVE ACCESSORIES	Fuse Plug	208º to 220ºF / 98º to 104ºC Melting Temperature, Available in 1/8 and 1/4-inch MNPT Sizes	T1140399982/ T1033699982 Page 59
	Protective Caps for Relief Valves	For Types H110 through H174 Valves	Type P206 Page 65
	Seals and Plugs for Female ACME Threads	1-1/4 to 4-1/4-Inch Male ACME	Types M178, M535-34 Page 74
	Female ACME Caps	Hand or Wrench Installation	Type M108 Page 75
	Clamp Hose Couplings	Swivel or Standard: 1/2-Inch MNPT through 4-1/4-Inch Female ACME for 1/2 through 3-Inch Hose	Type M3162 Page 75
	Spanner Wrench for Large Female ACME Caps and Couplings	For Use with 2-1/4 through 4-1/4-Inch ACME Threads	Type P120B Page 76
	Ring and Chain Assemblies	For 1-1/4 through 4-1/4-Inch ACME Caps or Dust Seals	Types P147, P167, and P183 Page 76

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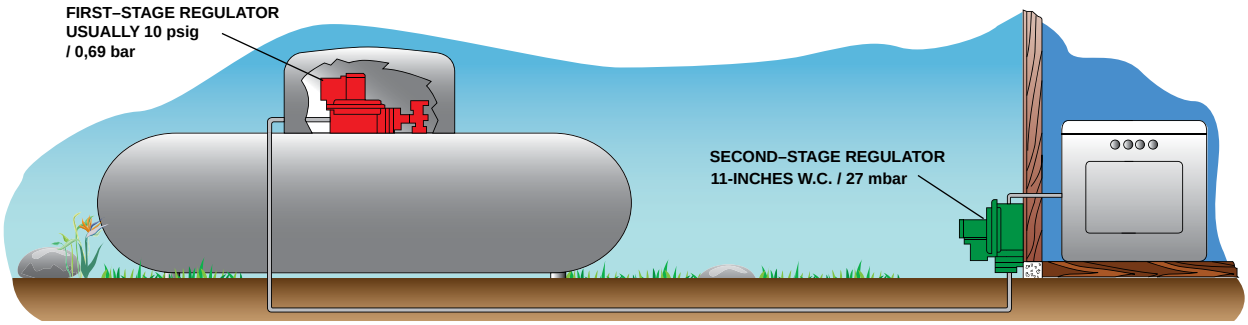


Figure 1. *Two-Stage Regulation, One at Tank and One at Building, Reduce Pressure Down to Burner Pressure (11-inches w.c. / 27 mbar)*

Two-Stage Systems

Regulator Technologies Fisher® brand makes the LP-Gas industry's largest variety of First and Second-Stage regulators for domestic and commercial/industrial applications.

A Two-Stage system (Figure 1) uses two regulators to cut the supply pressure from the storage tank to the appliance. The Two-Stage system supplies a constant outlet pressure to the appliance. With more uniform pressure, appliances work better. Single-Stage regulators should be replaced with Two-Stage or Integral Two-Stage systems to comply with code requirements such as NFPA 58.

With a Two-Stage system, a First-Stage regulator supplies a nearly constant inlet pressure around 8 to 10 psig / 0,55 to 0,69 bar to a Second-Stage regulator. This means the Second-Stage unit does not have to attempt to compensate for widely varying inlet pressures. Second-Stage pressure can be adjusted at the building as desired.

First-Stage Regulators

First-Stage regulators reduce tank pressure to a lower pressure (usually 10 psig / 0,69 bar) for a Second-Stage regulator. Fisher brand First-Stage regulators are painted red for easy identification. Vents are screened with standard orientation over the outlet.

Two-PSI Service Regulators

Two-PSI Service regulators serve as an intermediate regulator after the First-Stage regulator. These regulators are designed for 2 psig / 0,14 bar LP-Gas regulator systems. Fisher brand 2-PSI regulators are painted white or are green with white closing caps for easy identification.

Second-Stage Regulators

Second-Stage regulators reduce the pressure from a First-Stage unit to 11-inches w.c. / 27 mbar in domestic installations. Vents are screened with standard orientation over the inlet; however, other vent orientations are available. Fisher brand Second-Stage regulators are normally painted palm green for easy identification.

Integral Two-Stage Regulators

Integral Two-Stage units combine a First-Stage regulator and Second-Stage regulator into one compact unit and are recommended for installations where piping distance between the building being served and the tank is short. Integral Two-Stage regulators provide all the advantages of Two-Stage regulation. These units are color coded gray for easy identification. Vents are screened with standard orientation over the outlet.

Five Reasons to Two-Stage

1. **Compliance with Code Requirements such as NFPA 58**

2. **Fewer Trouble Calls**

With a Two-Stage system, one can expect fewer customer trouble calls due to regulator freeze-ups from too much water in the gas. A Two-Stage regulator reduces these possibilities in two ways:

a) a larger orifice can be used, making it more difficult for ice to build up and block the orifice, and
b) more heat can be transferred through the walls of two regulators than one.

3. **Smaller Pipe or Tubing**

Due to the higher pressure between the First and Second-Stage units, smaller pipe or tubing can be used on a Two-Stage system. These savings can make a Two-Stage system more economical to install than a Single-Stage.

4. **Constant Appliance Pressure**

With a Two-Stage system, a First-Stage regulator supplies a nearly constant inlet pressure of 8 to 10 psig / 0,55 bar to 0,69 bar to a Second-Stage regulator. This means that the Second-Stage regulator does not have to attempt to compensate for widely varying inlet pressures. With more uniform pressure, appliances work better, and customers are less likely to experience problems that result in service calls.

5. **Keep Downstream Pressure Below 2 psig / 0,14 bar**

Second-Stage and Integral Two-Stage regulators have internal pressure relief valves, which limit the outlet pressure to 2 psig / 0,14 bar when the seat disc is removed and the inlet pressure is 10 psig / 0,69 bar or less as specified in *UL 144, STANDARD FOR LP-GAS REGULATORS.*

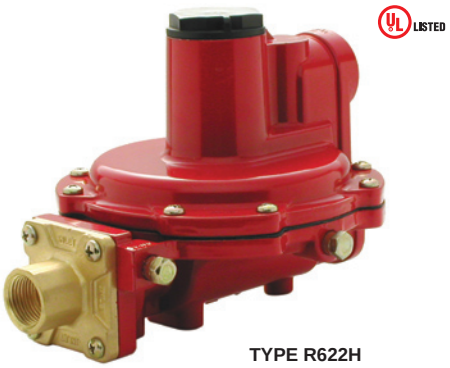
When to Two-Stage

Two-Stage systems whenever the following conditions exist:

1. Compliance with regulation codes.
2. There is a possibility of moisture in the LP-Gas.
3. Wide fluctuations in gas demand exist.
4. Winter and summer temperatures vary greatly.

First-Stage Regulators

TYPE R122H



TYPE R622H

Types R122H and R622H First-Stage Regulators are Underwriters Laboratories (UL) listed regulators designed for Two-Stage LP-Gas Regulator systems. These First-Stage regulators reduce tank pressure to a lower pressure (usually 10 psig / 0,69 bar) for a Second-Stage regulator. Fisher® brand First-Stage regulators are painted red for easy identification. Vents are screened with standard orientation over the outlet.

Type R122H – Designed for use as a First-Stage regulator for domestic applications, the Type R122H's size makes it perfect for tight installations. Stainless steel internal parts and corrosion resistant coatings provide a recommended replacement life of 20 years. Its non-adjustable setpoint makes the unit virtually tamper proof. Inlet and outlet gauge taps allow easy system testing. Large inlet and outlet wrench flats provide for easy installation, even in underground tanks. The outlet pressure setpoint remains at a nominal factory setting of 10 psig / 0,69 bar. The designs superior relief performance exceeds UL requirements and provides double failure overpressure protection when used with R600 Series Second-Stage regulator. The unit's Fluorocarbon (FKM) valve disc provides better lockup performance and durability in contaminated gas. The vent is with 3/8-inch NPT for easy installation of vent piping. A large fabric-reinforced diaphragm provides accurate regulation. The large orifice assists in minimizing freeze problems.

Type R622H – Time proven design constructed of corrosion-resistant and wear-resistant materials, the Type R622H is designed to provide a recommended replacement life of 20 years. Built-in 1/8-inch FNPT gauge taps on both the inlet and outlet pressure sides allow for easy system checks. A large 3/4-inch FNPT drip-lip vent reduces the chance of blockage by freezing rain or sleet when properly installed with the vent pointing down. Each Type R622H is equipped for overpressure protection with a corrosion-resistant internal relief valve that provides high capacity relief and a travel stop on the closing cap. Its size and configuration make it ideal for under-the-dome installations.

First-Stage Regulators

TYPE NUMBER	CAPACITIES IN BTU per hour / SCMH PROPANE[1][3]	INLET CONNECTION, INCHES	OUTLET CONNECTION, INCHES	OUTLET ADJUSTMENT RANGE, psig / bar	OUTLET PRESSURE SETTING, psig / bar
R122H-AAJ	1 100 000 / 12,4	1/4 FNPT	1/2 FNPT	Non-Adjustable	10 / 0,69
R122H-AAJXB[2]					
R622H-BGK	2 000 000 / 22,5	1/2 FNPT		4 to 6 / 0,28 to 0,41	5 / 0,34
R622H-HGK		FPOL			
R622H-JGK	2 250 000 / 25,3		3/4 FNPT		
R622H-BGJ	2 100 000 / 23,6	1/2 FNPT	1/2 FNPT	8 to 12 / 0,55 to 0,83	10 / 0,69
R622H-DGJ	2 400 000 / 27,0	3/4 FNPT	3/4 FNPT		
R622H-HGJ	2 100 000 / 23,6	FPOL	1/2 FNPT		
R622H-JGJ	2 250 000 / 25,3		3/4 FNPT		

1. Based on 30 psig / 2,1 bar inlet pressure and 20% droop.
2. Vent over gauge taps.
3. Metric conversion is based on 2516 BTU/ft^3 of gas at 60°F / 16°C.

SECOND-STAGE REGULATORS

TYPE R222

TYPE R622

TYPE R642

TYPE R652

TYPE HSRL

Types R222, R622, R642, R652, and HSRL Second-Stage regulators are Underwriters Laboratories (UL) listed regulators designed to reduce the outlet pressure from a First-Stage regulator, usually 10 psig / 0,69 bar to 11-inches w.c. / 27 mbar, in domestic installations. Vents are screened with standard orientation over the inlet, but other orientations are available. Fisher® brand Second-Stage regulators are painted palm green for easy identification. Types R222, R622, R642, and R652 are equipped with a stainless steel inlet screen to reduce the amount of debris entering the regulator.

Type R222 is designed for small domestic applications up to 650 000 BTU per hour / 7,3 SCMH. The unit provides the same features as the Type R622 in a smaller package and its design provides a recommended replacement life of 20 years.

Type R622 is designed for Two-Stage domestic applications up to 1 400 000 BTU per hour / 15,8 SCMH. The Type R622's time proven design and corrosion resistant materials, provide a recommended replacement life of 20 years.

Type R622 contains a high performance relief valve and a large 3/4-inch screened vent to limit downstream pressure to less than 2 psig / 0,14 bar in an overpressure situation as required by NFPA 58. The relief valve design exceeds the industry standard by limiting the downstream pressure to 2 psig / 0,14 bar even in a double failure situation when used with a Type R622H or R122H First-Stage regulator. The Type R622 is adjustable from 9 to 20-inches w.c. / 22 to 50 mbar.

For easy system checks, the Type R622 has 1/8-inch NPT built-in gauge taps, orificed to a No. 54 drill size, on both the upstream and downstream sides. This regulator also features a large 3/4-inch drip-lip vent design.

Types R642 and R652 are designed for domestic applications up to 920 000 / 10,4 and 1 000 000 BTU per hour / 11,3 SCMH, respectively. These units provide all the same features as the Type R622, including the 20 year recommended replacement life and double failure protection, in an angle body for the Type R642 and backmounted design for the Type R652.

Type HSRL is an Underwriters Laboratories / UL listed regulator designed for light commercial applications up to 2 600 000 BTU per hour / 29,3 SCMH. It utilizes a high strength cast iron body and a 3/4-inch NPT drip lip vent design. The design also includes a high capacity internal relief valve and a 20 year recommended replacement life.

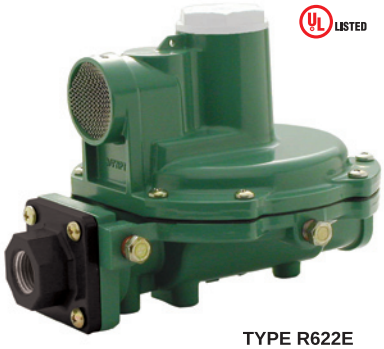
Second-Stage Regulators

TYPE NUMBER	CAPACITIES IN BTU per hour / SCMH PROPANE[1]	INLET CONNECTION, INCHES	OUTLET CONNECTION, INCHES	OUTLET PRESSURE RANGE, INCHES W.C. / mbar	OUTLET PRESSURE SETTING, INCHES W.C. / mbar
R222-BAF	650 000 / 7,3	1/2 FNPT	1/2 FNPT	9.5 to 13 / 24 to 32	11 / 27
R622-BCF	875 000 / 9,8			9 to 13 / 22 to 32	
R622-CFF	1 400 000 / 15,8		3/4 FNPT		
R622-DFF		3/4 FNPT			
R642-DFF	920 000 / 10,4				
R652-CFF	1 000 000 / 11,3	1/2 FNPT			
R652-DFF		3/4 FNPT			
R622-CFGXA	1 125 000 / 12,7	1/2 FNPT	3/4 FNPT	13 to 20 / 32 to 50	18 / 45
HSRL-BFC	2 300 000 / 25,9	3/4 FNPT	3/4 FNPT	9 to 13 / 22 to 32	11 / 27
HSRL-CFC	2 600 000 / 29,3	1 FNPT	1 FNPT		

1. Based on 10 psig / 0,69 bar inlet pressure and 2-inches w.c. / 5 mbar droop.

2-PSI REGULATORS

TYPE R652E



TYPE R622E

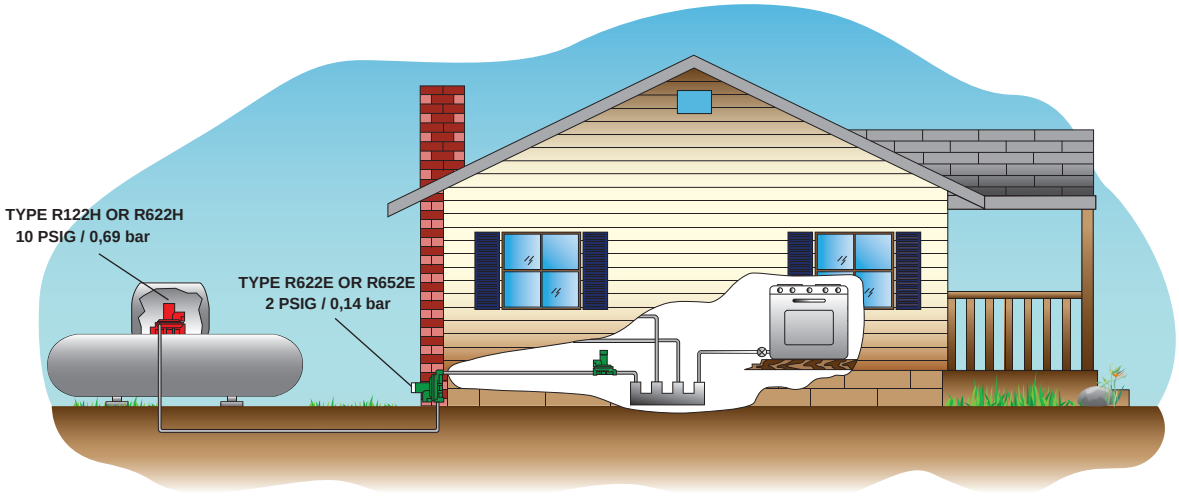
Types R622E and R652E, 2-PSI Service Regulators, are designed for Two-PSI LP-Gas Regulator Systems and listed by Underwriters Laboratories (UL). These units are installed downstream from a First-Stage regulator and reduce an inlet pressure of 10 psig / 0,69 bar to a nominal 2 psig / 0,14 bar outlet pressure. 2-PSI Service Regulators are designed for domestic applications that supply 2 psig / 0,14 bar LP-Gas to a line regulator located inside the building. In most cases a manifold is used with corrugated stainless steel tubing (CSST) as well as other acceptable piping materials for routing to the line pressure regulator supplying approximately 11-inches w.c. / 27 mbar to appliance regulators.

Types R622E and R652E 2-PSI Service Regulators feature a combination relief valve and large vent that provide overpressure protection and exceed UL requirements. Both units have a stainless steel inlet screen to reduce the amount of debris from entering them. Fisher® brand Types R622E and R652E are painted green with a white closing cap for easy identification.

Type R622E – Time proven design constructed of corrosion resistant materials, the Type R622E is designed to provide a recommended replacement life of 20 years. Fisher brand's fabric-reinforced diaphragm and large diaphragm area provide accurate regulation at increased capacities. All components provide superior resistance to field conditions that may cause wear and corrosion. Built-in 1/8-inch taps (orificed to a number 54-drill size) on the upstream and downstream sides allow for easy gas system checks.

Type R652E – Provides the same features as the Type R622E, includes a 20 year recommended replacement life with a back mount design.

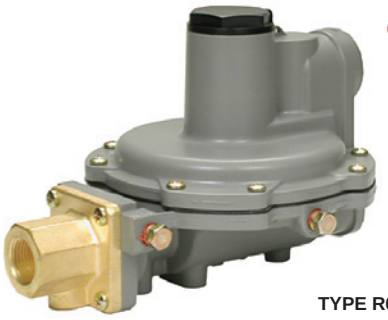
Typical 2-PSI Installation



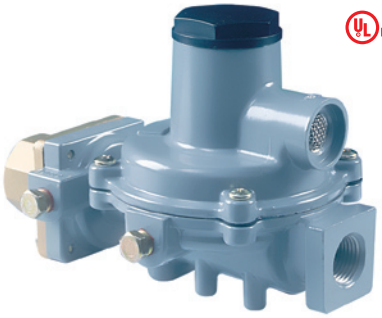
2-PSI Service Regulators				
TYPE NUMBER	CAPACITIES IN BTU per hour / SCMH PROPANE[1]	CONNECTIONS INLET X OUTLET, INCHES	OUTLET PRESSURE RANGE, PSIG / bar	OUTLET PRESSURE SETTING, PSIG / bar
R622E-BCH	1 460 000 / 16,4	1/2 x 1/2 FNPT	1 to 2.2 / 69 mbar to 0,15	2 / 0,14
R622E-DCH	1 680 000 / 18,9	3/4 x 3/4 FNPT		
R652E-DFH	1 500 000 / 16,9			

1. Based on 10 psig / 0,69 bar inlet pressure and 20% droop.

Integral Two-Stage Regulators



TYPE R632



TYPE R232

Integral Two-Stage regulators combine a First-Stage regulator and a Second-Stage regulator into one compact unit. Recommended for installations where piping distance is short, integral Two-Stage regulators provide all of the advantages of Two-Stage regulation (refer to page 23). Fisher® brand integral Two-Stage regulators are color coded gray for easy identification. Vents are screened with standard Second-Stage vent orientation over the outlet. The Types R632 and R232 first-stage screened vent is threaded to accept a 1/4-inch OD copper tube inverted flare with a 7/16-24 UN thread.

Type R632 – is an Underwriters Laboratories (UL) listed regulator with a capacity of up to 850 000 BTU per hour / 9,6 SCMH, recommended for on-site cylinder installations, mobile homes and domestic installations, where separation of the First and Second-Stage is not cost effective. This unit offers a POL inlet connection for the easy drop-in replacement of Single-Stage regulators.

Type R632's high capacity relief valve and large 3/4-inch screened vent limit downstream pressure to less than 2 psig / 0,14 bar in an overpressure situation as required by NFPA 58. Type R632 is adjustable from 9 to 13-inches w.c. / 22 to 32 mbar, with a factory setpoint of 11-inches w.c. / 27 mbar. The Type R632 features include the 20 year recommended replacement life.

Type R632 has 1/8-inch NPT built-in gauge taps, orificed to a No. 54 drill size, on the upstream and downstream sides. These taps provide easy access for testing the proper operation of the First and Second-Stage while the system is pressurized. This regulator also features a large 3/4-inch drip-lip vent to reduce the chance of blockage by freezing rain or sleet when properly installed with the vent pointing down.

Type R232 – Designed for installations with small capacity loads up to 450 000 BTU per hour / 5,1 SCMH. With an overall length of 6.5 or 7-inches / 165 or 178 mm for NPT or FPOL connections respectively, this compact unit fits easily into confined spaces and is ideal for ASME tanks used on small domestic loads. Intermediate and outlet gauge taps facilitate easy system testing. A 3/8-inch NPT vent allows easy installation of vent piping. Use of a valve stem and lever provide stable regulation and excellent durability. A large fabric-reinforced diaphragm provides accurate regulation. The large orifice assists in minimizing freeze problems. Stainless steel internal and corrosion resistant coatings provide excellent corrosion resistance. The Type R232 also has the design that provides a recommended replacement life of 20 years.

Twin Cylinder Installations – The Type R232 can also be used on twin cylinder hook-ups found on travel trailers and stationary applications. These units offer a drip-lip vent style for installations without a vent protector. Proper installation requires the vent to be pointed down in a vertical position. Additional protection may be required if road splatter is a problem.

A **Type P414** manifold can be installed in the regulator's inlet. The Type P414 is a tee check style with a check disc that blocks the flow to the reserve cylinder. The disc moves to either one side of the manifold or the other depending upon which cylinder is to supply gas.

Integral Two-Stage Regulators

TYPE NUMBER	CAPACITIES IN BTU per hour / SCMH PROPANE[1]	INLET CONNECTION, INCHES	OUTLET CONNECTION, INCHES	OUTLET ADJUSTMENT RANGE, INCHES W.C. / mbar	OUTLET PRESSURE SETTING, INCHES W.C. / mbar
R232-BBF	450 000 / 5,1	1/4 FNPT	1/2 FNPT	9.5 to 13 / 24 to 32	11 / 27
R232-BBFXA[2]					
R232-HBF		FPOL			
R232-HBFXA[2]					
R632-BCF	750 000 / 8,4	1/4 FNPT	1/2 FNPT	9 to 13 / 22 to 32	
R632-BCFXA[2]					
R632-CFF	850 000 / 9,6		3/4 FNPT		
R632-CFFXA[2]					
R632-HCF	750 000 / 8,4	FPOL	1/2 FNPT		
R632-HCFXA[2]					
R632-JFF	850 000 / 9,6		3/4 FNPT		
R632-JFFXA[2]					

1. Based on 30 psig / 2,1 bar inlet pressure and 2-inches w.c. / 5 mbar droop.
2. First and Second-Stage spring case vents opposite gauge taps.

AUTOMATIC CHANGEOVER REGULATORS

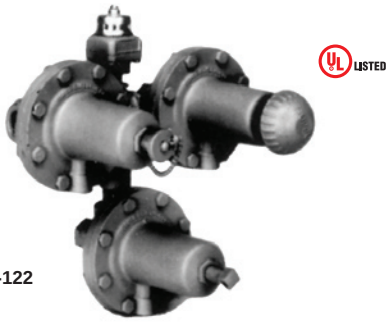
Fisher® brand automatic changeover regulators change from the supply cylinder (when gas is exhausted) to the reserve cylinder automatically.

Type R962 – Type R110 automatic changeover manifold serves as the First-Stage portion of the assembly, connecting to a Type R622 Second-Stage regulator which reduces the pressure to 11-inches w.c. / 27 mbar for appliances.

Type R962 eliminates gas outage problems by switching from the nearly empty cylinder to the reserve cylinder automatically. Gas is withdrawn from the supply cylinder until pressure reaches about 7 psig / 0,48 bar. The changeover manifold then switches to the full cylinder. A red warning flag appears in the built-in indicator to show the changeover has taken place. Additional protection for the vent may be required for Type R962 to prevent wheel spray from blocking the vent with mud on mobile installations. Type R962 does not comply with NFPA 58 or UL 144.

TYPE R962-31

Automatic Changeover Regulators				
TYPE NUMBER(1) HIGH CAPACITY RELIEF	**CAPACITIES IN BTU per hour / SCMH PROPANE(1)**	**INLET CONNECTION, INCHES**	**OUTLET CONNECTION, INCHES**	**VENT SIZE, INCHES**
R962-31 (Types R110 and R622)	600 000 / 6,7	1/4 Inverted Flare	1/2 FNPT	3/4 FNPT
1. Capacity based on 30 psig / 2,1 bar inlet pressure, 11-inches w.c. / 27 mbar outlet pressure setting, and 2-inches w.c. / 5 mbar droop.				



TYPE 64SR-122

Commercial Automatic Changeover Regulators

Designed for large capacity multi-cylinder or tank installations, these regulators are used on applications such as bakeries, motels, restaurants, and grain dryers. The manifold portion of the assembly consists of two 64 Series regulators and a direct mounted 803 Series indicator.

Type 64SR-122 – For high pressure (pounds to pounds) service with the outlet pressure supplied by a Type 64SR that has internal relief protection.

Commercial Automatic Changeover Regulators					
TYPE NUMBER	**CAPACITIES IN BTU per hour / SCMH PROPANE(1)**	**INLET CONNECTION, INCHES**	**OUTLET CONNECTION, INCHES**	**OUTLET PRESSURE SETTING, PSIG / bar**	**OUTLET ADJUSTMENT RANGE, PSIG / bar**
64SR-122	1 210 000 / 13,6	1/2 FNPT	1/2 FNPT	10 / 0,69	5 to 20 / 0,34 to 1,4

TYPE R110-21

TYPE R130-21

TYPE 749B-21

Changeover Manifold Assemblies

Type R110-21 – This manifold supplies an outlet pressure of approximately 15 psig / 1,0 bar from the supply cylinder and 7 psig / 0,48 bar from the reserve cylinder. A built-in indicator gives indication of when the changeover has taken place. This manifold changeover regulator can connect to a Second-Stage regulator but does not comply with NFPA 58 or UL 144.

Type R130-21 – Composed of two Type 67C regulators and a special 0 to 60 psig / 0 to 4,1 bar pressure gauge, the Type R130 delivers a 45 psig / 3,1 bar outlet pressure on supply and 30 psig / 2,1 bar on reserve. The gauge, which serves as the changeover indicator, is painted red from 0 to 35 psig / 0 to 2,4 bar. When the dial reads in the 0 to 35 psig / 0 to 2,4 bar range, it indicates that the manifold has switched from the supply to the reserve cylinder.

Type 749B-21 – Large capacity changeover manifold for commercial and industrial applications. It consists of two 64 Series regulators and a 803 Series direct indicator. The assembly is used primarily in conjunction with either an Type HSRL or a Type 64SR regulator. The standard outlet setting is 15 psig / 1,0 bar from the supply and 5 psig / 0,34 bar from the reserve.

Note: These units are intended for use with Second-Stage regulators and/or separate relief devices which provide overpressure protection required by NFPA 58. Capacity of all these changeover manifolds is dependent on the size of the Second-Stage regulator with which they are used. If the manifolds are used as a Final-Stage (pounds to pounds), a relief valve is required in the downstream system.

Changeover Manifold Regulators

TYPE NUMBER	CAPACITIES IN BTU per hour / SCMH PROPANE[1]	INLET CONNECTION, INCHES	OUTLET CONNECTION, INCHES	OUTLET PRESSURE SETTING	
				Supply Setting, psig / bar	Reserve Setting, psig / bar
R110-21	500 000 / 5,6	1/4 Inverted Flare	1/4 FNPT	15 / 1,0	7 / 0,48
R130-21	1 475 000 / 16,6	1/4 FNPT	1/4 FNPT	45 / 3,1	30 / 2,1
749B-21	1 500 000 / 16,9	1/2 FNPT	1/2 FNPT	15 / 1,0	5 / 0,34

1. Based on 100 psig / 6,9 bar inlet, reserve setting.

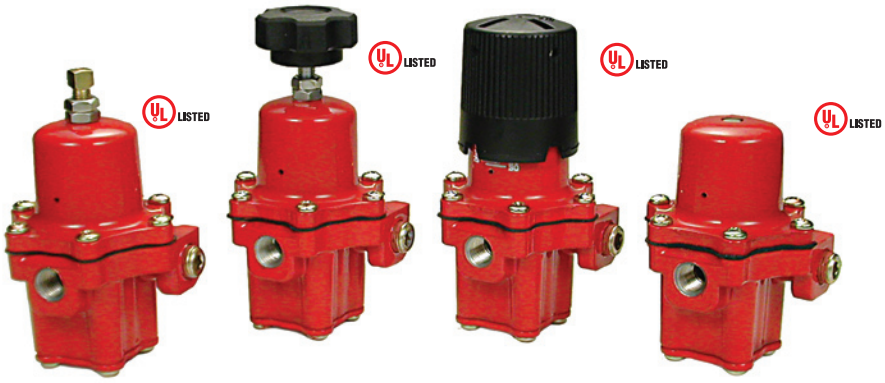
Remote Indicator

803 Series – give remote visual indication that the supply cylinder is empty and that the regulator is withdrawing gas from the reserve cylinder. The indicator has 360° visibility and is weatherproof.

Type 803-21 – Indicator only

TYPE 803-21

COMMERCIAL/INDUSTRIAL HIGH PRESSURE REGULATORS



TYPE 67CW TYPE 67CH TYPE 67CD TYPE 67CN

67C Series

Suitable for liquid or vapor service, the 67C Series high pressure (pounds to pounds) regulators are used on a variety of applications. All types within the series have a 1/4-inch FNPT side outlet in which a pressure gauge (J500 Series) can be installed. The compact size of the 67C Series regulators make them particularly useful on installations where space is limited.

The regulator design utilizes precise guiding of the valve plug to provide close regulation and high performance.

Type 67CW – Standard regulator with wrench adjustment.

Type 67CH – Standard regulator with handwheel adjustment.

Type 67CD – With dial calibration accuracy nearly equivalent to that of a commercial pressure gauge, the Type 67CD eliminates the need for a pressure gauge on portable applications.

Outlet pressure is calibrated on the spring case allowing visual adjustment of the outlet pressure without having to use a pressure gauge. The unit is ideal for service where gauge breakage is a problem.

Type 67CN – Extremely compact unit with a fixed (non-adjustable) outlet setting and a tamper resistant spring case. Three different setpoints are available: 10, 15, and 20 psig / 0,69; 1,0; and 1,4 bar.

Note: 67C Series regulators do not have an internal relief and should be installed with additional/external overpressure protection. These units should not be installed in fixed piping serving 14-inches w.c. / 35 mbar appliance systems. Please consult with your LP-Gas Equipment Distributor for more information.

High Pressure Regulators

TYPE NUMBER	DESCRIPTION	CAPACITIES IN BTU per hour / SCMH PROPANE[1]	OUTLET PRESSURE SETTING, psig / bar	OUTLET ADJUSTMENT RANGE, psig / bar	INLET AND OUTLET CONNECTIONS, INCHES
67CW-683	Basic Regulator (Wrench Adjustment)	675 000 / 7,6	15 / 1,0	3 to 20 / 0,21 to 1,4	1/4 FNPT
67CW-684		750 000 / 8,4	20 / 1,4	3 to 35 / 0,21 to 2,4	
67CW-685		1 200 000 / 13,5	40 / 2,8	30 to 60 / 2,1 to 4,1	
67CW-701		1 000 000 / 11,3	50 / 3,4	50 to 120 / 3,4 to 8,3	
67CH-751	Basic Regulator (Handwheel Adjustment)	675 000 / 7,6	15 / 1,0	3 to 20 / 0,21 to 1,4	
67CH-743		750 000 / 8,4	20 / 1,4	3 to 35 / 0,21 to 2,4	
67CH-742		1 200 000 / 13,5	40 / 2,8	30 to 60 / 2,1 to 4,1	
67CH-741		1 000 000 / 11,3	50 / 3,4	50 to 120 / 3,4 to 8,3	
67CH-745	Basic Regulator (Handwheel Adjustment) with Type M318 installed	750 000 / 8,4	20 / 1,4	3 to 35 / 0,21 to 2,4	
67CD-100	Dial Cap Adjustment	675 000 / 7,6	15 / 1,0	5 to 20 / 0,34 to 1,4	
67CD-102		1 200 000 / 13,5	40 / 2,8	20 to 50 / 1,4 to 3,4	
67CD-103		1 000 000 / 11,3	50 / 3,4	40 to 100 / 2,8 to 6,9	
67CN-106	Non-Adjustable	400 000 / 4,5	10 / 0,69	Non-Adjustable	
67CN-104		600 000 / 6,7	15 / 1,0	Non-Adjustable	
67CN-105		750 000 / 8,4	20 / 1,4	Non-Adjustable	

1. Based on inlet pressure 20 psig / 1,4 bar greater than outlet with 20% droop; Liquid capacity = 3 to 5 GPH / 11,4 to 18,9 l/hr .

COMMERCIAL/INDUSTRIAL HIGH PRESSURE REGULATORS

64 SERIES

64 Series

High pressure (pounds to pounds) regulators usually reduce tank pressure to an intermediate pressure for use by another regulator. They may be used as high pressure regulators on distribution systems when used in conjunction with a First-Stage downstream regulator. The Type 64SR may be used for First-Stage when set at 10 psig / 0,69 bar. They are also used for Final-Stage service on high pressure burners in crop dryers and tobacco curers, as well as other medium sized commercial/industrial applications.

The 1/4-inch FNPT side outlet, which is normally plugged, provides an opening for an outlet pressure gauge. Standard 64's Series are capable of handling liquid or vapor at temperatures under 150°F / 66°C. A cover or auxiliary vent assembly should be used to protect the 1/4-inch FNPT regulator vent opening on outdoor installations.

64 Series – is an adjustable high pressure regulator with a wide range of available outlet pressure ranges. It does not contain a relief valve. It should always be used in conjunction with a downstream regulator and/or separate relief devices in compliance with NFPA 58 overpressure protection requirements.

Type 64SR – is a high pressure regulator, which has an internal relief valve. As such it may be used as a Final-Stage regulator on high pressure systems. It may also be used as a First-Stage regulator when set at 10 psig / 0,69 bar or less.

Note: 64 Series regulators do not have an internal relief and should be installed with additional/external overpressure protection. These units should not be installed in fixed piping serving 14-inches w.c. / 35 mbar appliance systems. Please consult with your LP-Gas Equipment Distributor for more information.

Note: If the installation location makes the ignition of vented gas a possibility, then a vent line should be installed from the Type 64SR vent to a safe location.

High Pressure Regulators

TYPE NUMBER	DESCRIPTION	CAPACITIES IN BTU per hour / SCMH PROPANE[1]	OUTLET PRESSURE SETTING, psig / bar	OUTLET ADJUSTMENT RANGE, psig / bar	INLET AND OUTLET CONNECTIONS, INCHES
64-33	Basic Regulator	2 625 000 / 29,6	10 / 0,69	3 to 15 / 0,21 to 1,0	1/2 FNPT
64-35		3 600 000 / 40,5	20 / 1,4	5 to 35 / 0,34 to 2,4	
64-36		4 150 000 / 46,7	40 / 2,8	30 to 60 / 2,1 to 4,1	
64-222		5 250 000 / 59,1	50 / 3,4	35 to 100 / 2,4 to 6,9	
64SR-21	With Internal Relief Valve	2 625 000 / 29,6	10 / 0,69	3 to 15 / 0,21 to 1,0	
64SR-22		3 000 000 / 33,8	15 / 1,0	5 to 20 / 0,34 to 1,4	
64SR-23		3 600 000 / 40,5	20 / 1,4	5 to 35 / 0,34 to 2,4	

1. Based on inlet pressure 20 psig / 1,4 bar greater than outlet with 20% droop; Liquid capacity = 160 GPH / 606 l/hr.

Commercial/Industrial Direct-Operated High Pressure Regulators

TYPE 627

TYPE 630

For Commercial and Industrial high-pressure applications like factories, office building, restaurants, etc., Regulator Technologies has a wide variety of products. For ease of reference, only the most popular commercial and industrial regulators are shown in these pages. Other orifice sizes, body sizes, and outlet pressure ranges are available. The higher capacities on commercial and industrial installations usually require a Two-Stage regulator system.

Note: Because of various spring ranges and orifice sizes, all commercial and industrial regulators should be individually sized for the particular installation. Consult specific product bulletins for maximum pressure ratings. Contact your local LP-Gas Equipment Distributor for assistance.

Types 627 and 630 – Large capacity direct-operated high pressure regulators designed for loads up to 10 700 000 and 14 000 000 BTU per hour / 120 and 157 SCMH, respectively. The Types 627 and 630 are normally used in conjunction with Type CS400 units, however, they can also be used on Final-Stage (pounds to pounds) service. Additional overpressure protection is recommended to prevent excessive build-up in the downstream line. The diaphragm case and body of the Type 627 can be rotated in four positions to allow easy installation. Additional configurations of the Type 627 with internal relief and control line connections for monitor systems are available. For both the Types 630 and 627, additional pressure ranges and orifice sizes are available.

Note: Types 627 and 630 regulators do not have an internal relief and should be installed with additional/external overpressure protection. These units should not be installed as part of a 2-stage system in fixed piping serving 14-inches w.c. / 35 mbar appliance systems unless additional overpressure protection is installed that will make the system compliant with NFPA 58 requirements for a 2-stage system. Please consult with your LP-Gas Equipment Distributor for more information.

Flanged Bodies – The Type 630 and Type 627 are available with flanged bodies. Flanges are available for 2-inch CL300 FF.

Overpressure Protection – The Type 627 is also available in monitor configurations. Note that the Type 627 monitor regulators have unique type numbers. For more information on monitor overpressure protection, see Page 42.

Fluorocarbon Trim – The Type 627 is available with Fluorocarbon (FKM) Trim for high temperature applications such as vaporizors. Part numbers are listed below with a 'V' suffix.

Type 1301F – The proven reliability and accurate regulation of the Type 1301F regulator makes it ideal for numerous high-pressure drop applications. This multi-purpose regulator can be used as pilot supply or pressure-loading regulators where high-pressure operating medium must be reduced for use by gas regulator pilots or pressure-loaded regulators.

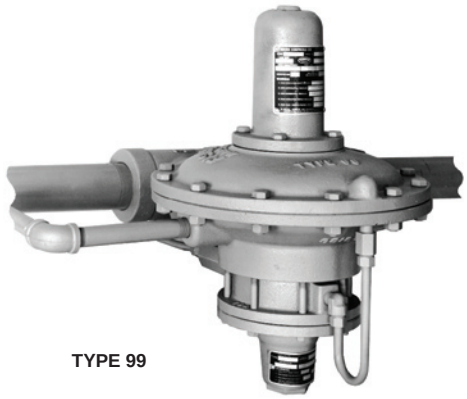
COMMERCIAL/INDUSTRIAL DIRECT-OPERATED HIGH PRESSURE REGULATORS

High Pressure Commercial/Industrial Regulators						
TYPE NUMBER	**CAPACITIES IN BTU per hour / SCMH PROPANE**	**ORIFICE SIZE, INCHES / mm**	**INLET AND OUTLET CONNECTIONS**	**OUTLET PRESSURE RANGE, psig / bar**	**OUTLET PRESSURE SETTING, psig / bar**	**MAXIMUM OPERATING INLET PRESSURE, psig / bar**
627R-113[5]	6 080 000 / 68,4	3/8 / 9,5	3/4-inch FNPT	5 to 20 / 0,34 to 1,4	10 / 0,69	200 / 13,8
627-5810[3]	6 080 000 / 68,4					250 / 17,2
627-5810V	6 080 000 / 68,4					250 / 17,2
627M-421[4]	10 755 000 / 121	1/2 / 13				250 / 17,2
627R-117[5]	10 755 000 / 121					200 / 13,8
627-6210[3]	10 755 000 / 121					250 / 17,2
627-6210V	10 755 000 / 121					250 / 17,2
627R-193[5]	7 434 000 / 83,5	3/8 / 9,5	1-inch FNPT	5 to 20 / 0,34 to 1,4	10 / 0,69	200 / 13,8
627-117	14 632 000 / 164			15 to 40 / 1,0 to 2,8	40 / 2,8	250 / 17,2
627-493	14 632 000 / 164					250 / 17,2
627R-194[5]	14 632 000 / 164					200 / 13,8
627-496	10 773 000 / 121	1/2 / 13		5 to 20 / 0,34 to 1,4	10 / 0,69	250 / 17,2
627-576	10 773 000 / 121					250 / 17,2
627M-471[4]	10 773 000 / 121					250 / 17,2
627R-197[5]	10 773 000 / 121					200 / 13,8
627-7710[3]	10 773 000 / 121					250 / 17,2
627-7710V	10 773 000 / 121					250 / 17,2
627-497	14 837 000 / 167			15 to 40 / 1,0 to 2,8	40 / 2,8	250 / 17,2
627R-198[5]	14 837 000 / 167					200 / 13,8
627-577	20 948 000 / 235	1/2 / 13	2-inch FNPT	15 to 40 / 1,0 to 2,8	40 / 2,8	250 / 17,2
627M-268[4]	20 948 000 / 235					250 / 17,2
630-104/78	14 000 000 / 158	1/2 / 13	2-inch FNPT	8 to 20 / 0,55 to 1,4	10 / 0,69	250 / 17,2
630-104/78F	14 000 000 / 158	1/2 / 13	2-inch / DN 50 CL300 FF	8 to 20 / 0,55 to 1,4	10 / 0,69	250 / 17,2
1301F-1	3 863 000 / 43,5[2]	5/64 / 2,0	1/4-inch FNPT	10 to 75 / 0,69 to 5,2	75 / 5,2	6000 / 414

1. For Types 627 and 630, capacity based on inlet pressure 20 psig / 1,4 bar greater than outlet pressure, Internal registration, and 20% droop.
2. Capacity based on 2000 psig / 138 bar inlet pressure and 10% droop.
3. UL listed construction.
4. For Monitor Applications. Standard with blocked throat and external sensing.
5. "R" denotes token relief. Check with your LP-Gas Equipment Distributor on relief capacities.

NOTE: Additional spring ranges and body styles are available. Ask your LP-Gas Equipment Distributor for additional configurations and for more information.

Commercial/Industrial Pilot-Operated High Pressure Regulators



TYPE 99

For Commercial and Industrial high-pressure applications, such as distributed community systems, factories, office buildings, restaurants, Regulator Technologies has a wide variety of products and solutions. For ease of reference, only the most popular commercial and industrial regulators are shown on these pages. Other orifice sizes, body sizes, and outlet pressure ranges are available. The higher capacities on commercial and industrial installations usually require a Two-stage regulator system.

Note: Because of various spring ranges and orifice sizes, all commercial and industrial regulators should be individually sized for the particular installation. Consult specific product bulletins for maximum pressure ratings. Contact your local LP-Gas Equipment Distributor for assistance.

Type 99 – Pilot-operated unit keeps outlet pressure constant despite varying flow rates and inlet pressures. Designed to handle loads up to 74 318 000 BTU per hour / 837 SCMH, the Type 99 is ideal for multiple customer installations. The unique pilot design, with fast opening and closing operation, makes the Type 99 ideal for large industrial boiler applications. The Type 99 can be used for low or high pressure applications. A downstream control line is required. Additional overpressure protection is recommended to prevent excessive buildup in the downstream line.

Note: Type 99 regulators do not have an internal relief and should be installed with additional/external overpressure protection. These units should not be installed as part of a 2-stage system in fixed piping serving 14-inches w.c. / 35 mbar appliance systems unless additional overpressure protection is installed that will make the system compliant with NFPA 58 requirements for a 2-stage system. Please consult with your LP-Gas Equipment Distributor for more information.

Flanged Bodies - 99F Series is equipped with 2-inch CL300 flanged bodies.

Overpressure Protection - The Type 99 is also available in monitor configurations. Note that the Type 99 monitor regulators have unique type numbers. For more information on monitor overpressure protection, see page 41.

Pilot-Operated High Pressure Commercial/Industrial Regulators

TYPE NUMBER	CAPACITIES IN BTU per hour / SCMH PROPANE[1]	ORIFICE SIZE, INCHES / mm	INLET AND OUTLET CONNECTIONS	OUTLET PRESSURE RANGE, psig / bar	OUTLET PRESSURE SETTING, psig / bar	MAXIMUM OPERATING INLET PRESSURE, psig / bar
99-510P	29 400 000 / 331	7/8 / 22	2-inch FNPT	7-inches w.c. to 2 / 17 mbar to 0,14	1 / 69 mbar	250 / 17,2
99F-510P			2-inch / DN 50 CL300 FF			
99-511P	33 206 000 / 374		2-inch FNPT	1 to 5 / 69 mbar to 0,34	5 / 0,34	
99F-511P			2-inch / DN 50 CL300 FF			
99-513P	36 368 000 / 409		2-inch FNPT	2 to 10 / 0,14 to 0,69	10 / 0,69	
99F-513P			2-inch / DN 50 CL300 FF			
99-512P	37 950 000 / 427		2-inch FNPT	5 to 15 / 0,34 to 1,0	15 / 1,0	
99F-512P			2-inch / DN 50 CL300 FF			
99-515P	41 112 000 / 463		2-inch FNPT	10 to 20 / 0,69 to 1,4	20 / 1,4	
99F-515P			2-inch / DN 50 CL300 FF			
99-903P	44 275 000 / 498		2-inch FNPT	10 to 65 / 0,69 to 4,5	30 / 2,1	
99F-903P			2-inch / DN 50 CL300 FF			
99-502PH	50 600 000 / 570	1-1/8 / 29	2-inch FNPT	1 to 5 / 69 mbar to 0,34	5 / 0,34	300 / 20,7
99F-502PH			2-inch / DN 50 CL300 FF			
99-503PH	61 668 000 / 694		2-inch FNPT	2 to 10 / 0,14 to 0,69	10 / 0,69	
99F-503PH	61 668 000 / 694		2-inch / DN 50 CL300 FF			
99-504PH	63 250 000 / 712		2-inch FNPT	5 to 15 / 0,34 to 1,0	15 / 1,0	
99F-504PH	63 250 000 / 712		2-inch / DN 50 CL300 FF			
99-505PH	67 993 000 / 765		2-inch FNPT	10 to 20 / 0,69 to 1,4	20 / 1,4	
99F-505PH	67 993 000 / 765		2-inch / DN 50 CL300 FF			
99-901PH	74 318 000 / 837		2-inch FNPT	10 to 65 / 0,69 to 4,5	30 / 2,1	
99F-901PH	74 318 000 / 837		2-inch / DN 50 CL300 FF			

1. Capacity based on inlet pressure 20 psig / 1,4 bar greater than outlet pressure, external registration, and 20% droop.
NOTE: Additional spring ranges and body styles are available. Ask your LP-Gas Equipment distributor for more information.

COMMERCIAL/INDUSTRIAL PILOT-OPERATED HIGH PRESSURE REGULATORS

TYPE 1098-EGR

Type 1098 - The Type 1098-EGR regulator provides large capacities for use in large commercial applications and large distributed community systems. Designed to handle loads from 170 000 000 BTU / 1910 SCM (2-inch size) to in excess of 1 000 000 000 BTU / 11 234 SCM (4-inch size) and rated to 75 psig / 5,2 bar for Maximum Outlet Pressure, the Type 1098H is a regulator unmatched in performance in the LP-Gas Industry. The Type 1098's pilot-operated two-path system is designed to quickly respond to sudden changes in the downstream demand, making this regulator ideal for fuel gas supply to industrial boilers, furnaces, ovens, and mixers.

Type 1098H - The Type 1098H-EGR regulator also provides large capacities used in systems similar to Type 1098. The Type 1098H uses a special cast iron actuator assembly that increases the Maximum Downstream Pressure rating of the standard Type 1098 up to 300 psig / 20,7 bar, offering an even greater level of protection with outlet pressure settings up to 125 psig / 8,6 bar.

Flanged Bodies - The Types 1098 and 1098H are available with flanged bodies. Flanges are available in 2, 3, and 4-inch body sizes and CL300 FF end connection.

Note: Type 1098 regulators do not have an internal relief and should be installed with additional/external overpressure protection. These units should not be installed as part of a 2-stage system in fixed piping serving 14-inches w.c. / 35 mbar appliance systems unless additional overpressure protection is installed that will make the system compliant with NFPA 58 requirements for a 2-stage system. Please consult with your LP-Gas Equipment Distributor for more information.

Overpressure Protection - The Type 1098H is also available in monitor configurations. Note that the Type 1098H regulators may be used either as the worker or monitor regulator. For more information on monitor overpressure protection, see page 41.

The Type 1098 regulator is a highly advanced regulator with many configurations for various applications. **Always consult Regulator Technologies to discuss your application prior to placing your order.**

Pilot-Operated High Pressure Commercial/Industrial Regulators

TYPE NUMBER	CAPACITIES IN BTU per hour / SCMH PROPANE	ORIFICE SIZE, INCHES / mm	INLET AND OUTLET CONNECTIONS	OUTLET PRESSURE RANGE, psig / bar	OUTLET PRESSURE SETTING, psig / bar	MAXIMUM OPERATING INLET PRESSURE, psig / bar
1098-L21	170 500 000 / 1915[1]	2-3/8 / 60	2-inch FNPT	2 to 10 / 0,14 to 6,9	10 / 6,9	400 / 27,6
1098-L22	215 300 000 / 2419[2]			3 to 40 / 0,21 to 2,7	20 / 1,4	
1098-L23	322 300 000 / 3621[3]			35 to 75 / 2,4 to 5,2	50 / 3,4	
1098-F21	170 500 000 / 1915[1]		2-inch / DN 50 CL300 FF	2 to 10 / 0,14 to 6,9	10 / 6,9	
1098-F22	215 300 000 / 2419[2]			3 to 40 / 0,21 to 2,7	20 / 1,4	
1098-F23	322 300 000 / 3621[3]			35 to 75 / 2,4 to 5,2	50 / 3,4	
1098-F31	356 300 000 / 4003[1]	3-3/8 / 86	3-inch / DN 80 CL300 FF	2 to 10 / 0,14 to 6,9	10 / 6,9	
1098-F32	447 400 000 / 5026[2]			3 to 40 / 0,21 to 2,7	20 / 1,4	
1098-F33	669 500 000 / 7521[3]			35 to 75 / 2,4 to 5,2	50 / 3,4	
1098-F41	551 300 000 / 6193[4]	4-3/8 / 111	4-inch / DN 100 CL300 FF	2 to 10 / 0,14 to 6,9	10 / 6,9	
1098-F42	693 500 000 / 7791[4]			3 to 40 / 0,21 to 2,7	20 / 1,4	
1098-F43	1 035 500 000 / 11 633[3]			35 to 75 / 2,4 to 5,2	50 / 3,4	

NOTE: Additional spring ranges and body styles are available. Ask your LP-Gas Equipment Distributor for more information.
1. Capacity based on 30 psig / 2,1 bar inlet pressure and 15 psig / 1,0 bar setpoint.
2. Capacity based on 40 psig / 2,8 bar inlet pressure and 20 psig / 1,4 bar setpoint.
3. Capacity based on 75 psig / 5,2 bar inlet pressure and 50 psig / 3,4 bar setpoint.
4. Capacity based on 25 psig / 1,7 bar inlet pressure greater than outlet pressure setting.

COMMERCIAL LOW PRESSURE REGULATORS

TYPE CS200

TYPE CS400

TYPE CS800 NEW

Regulator Technologies has a wide range of low-pressure regulators to meet almost any commercial or industrial application. For ease of reference, only the most popular commercial and industrial regulators are shown on this page. Other orifice sizes, body sizes, and outlet pressure ranges are available. See the product guides on pages 37 and 39.

Note: Because of various spring ranges and orifice sizes, all commercial and industrial regulators should be individually sized for the particular installation. Consult specific product bulletins for maximum pressures ratings. Contact your local LP-Gas Equipment Distributor for assistance.

Type CS400 – The Type CS400 is a medium capacity low pressure, direct-operated regulator designed for loads up to 7 800 000 BTU per hour / 88 SCMH, ideal for installations at schools, bakeries, and many other commercial/industrial applications. Available in 1-1/4, 1-1/2, and 2-inch body sizes with spring ranges from 4.5-inches w.c. to 5.5 psig / 11 mbar to 0,38 bar.

Type CS200 – The Type CS200 is a medium capacity low pressure, direct-operated regulator designed for loads up to 3 800 000 BTU per hour / 44 SCMH, ideal for installations on smaller commercial/industrial applications. Available in 3/4, 1, and 1-1/4-inch body sizes with spring ranges from 3.5-inches w.c. to 2 psig / 9 mbar to 0,14 bar.

Flanged Bodies **–** The Types CS400 and CS800 are available with a flanged body. Flanges are available in 2-inch / DN 50 body size and CL125 FF end connection.

Type CS800 – The Type CS800 is a direct-operated, spring-loaded regulator which has been engineered for low pressure commercial service applications. This regulator can accommodate up to 21 600 000 BTU per hour / 243 SCMH of flow capacity and is available in 1-1/2 and 2-inch body sizes with 8-inches w.c. to 5.5 psig / 20 mbar to 0,38 bar pressure ranges.

Note: Types CS200, CS400, and CS800 regulators should be installed with additional/external overpressure protection. These units when installed as part of a 2-stage system in fixed piping serving 14-inches w.c. / 35 mbar appliance systems require additional overpressure protection to make the system compliant with NFPA 58 requirements for a 2-stage system. Please consult with your LP-Gas Equipment Distributor for more information.

Low Pressure Commercial Regulators

TYPE NUMBER	CAPACITIES IN BTU per hour / SCMH PROPANE[1]	ORIFICE SIZE, INCHES / mm	INLET AND OUTLET CONNECTIONS, INCHES	OUTLET PRESSURE RANGE	OUTLET PRESSURE SETTING	MAXIMUM OPERATING INLET PRESSURE, psig / bar
CS200IR-6EC1	2 500 000 / 28	1/2 / 12,7	3/4 FNPT	10 to 14-inches w.c. / 25 to 35 mbar	11-inches w.c. / 27 mbar	40 / 2,8
CS200IR-6EC3	3 800 000 / 43		1 FNPT			
CS200IR-6EC6	3 900 000 / 44		1-1/4 FNPT			
CS400IR-8EC6	6 800 000 / 76	3/4 / 19,1	1-1/4 FNPT			20 / 1,4
CS400IR-8EC7	7 600 000 / 85		1-1/2 FNPT			
CS400IR-8EC8	7 600 000 / 85		2 FNPT			
CS800IR-8CC7	10 460 000 / 118	1 / 25,4	1-1/2 FNPT	8 to 12-inches w.c. / 20 to 30 mbar		30 / 2,1
CS800IR-8CC8	21 809 000 / 245		2 FNPT			
CS200IR-6HC1	3 760 000 / 42	1/2 / 12,7	3/4 FNPT	1 to 2 psig / 0,06 to 0,14 bar	2 psig / 0,14 bar	40 / 2,8
CS200IR-6HC3	4 780 000 / 54		1 FNPT			
CS200IR-6HC6	5 327 000 / 60		1-1/4 FNPT			
CS400IR-8HC6	9 715 000 / 109	3/4 / 19,1	1-1/4 FNPT			20 / 1,4
CS400IR-8HC7	10 500 000 / 118		1-1/4 FNPT			
CS400IR-8HC8	8 775 000 / 99		2 FNPT			
CS820IR-8FC7	15 011 000 / 169	1 / 25,4	1-1/2 FNPT	1 to 2.5 psig / 0,06 to 0,17 bar		30 / 2,1
CS820IR-8FC8	21 436 000 / 241		2 FNPT			
CS400IR-8IC6	7 365 000 / 83	3/4 / 19,1	1-1/4 FNPT	2 to 5.5 psig / 0,14 to 0,38 bar	5 psig / 0,35 bar	20 / 1,4
CS400IR-8IC7	6 895 000 / 77		1-1/2 FNPT			
CS400IR-8IC8	7 365 000 / 83[2]		2 FNPT			
CS820IR-8HC7	15 262 000 / 171	1 / 25,4	1-1/2 FNPT	2.5 to 5.5 psig / 0,17 to 0,38 bar		30 / 2,1
CS820IR-8HC8	16 532 000 / 186		2 FNPT			

1. Capacities are based on 10 psig / 0,69 bar and 2-inches w.c. / 5 mbar droop.
2. Capacities are based on 10 psig / 0,69 bar and 20% droop.

NOTE: Additional combinations of body sizes, spring ranges, and orifice sizes are available. See guides on Page 37. Consult your LP-Gas Equipment distributor for more information.

Type CS200 Selection Guide

BASE		SENSING		RELIEF		ORIFICE		REGULATOR SETPOINTS		BODY OPTION	
CODE	DESCRIPTION	CODE	DESCRIPTION	CODE	DESCRIPTION	CODE	SIZE Inch / mm	CODE	Inches w.c. / mbar	CODE	DESCRIPTION
CS200	Basic	I	Internal	N	None	1	1/8 / 3,2	A	3.5 to 5 / 9 to 12	C1	3/4-inch FNPT, Cast Iron
				R	Internal	2	3/16 / 4,8	B	4.5 to 6.5 / 11 to 16	C3	1-inch FNPT, Cast Iron
						3	1/4 / 6,4	C	6 to 8 / 15 to 20	C6	1-1/4-inch FNPT, Cast Iron
						5	3/8 / 9,5	D	7.5 to 11 / 19 to 27		
						6	1/2 / 12,7	E	10 to 14 / 25 to 35		
								F	12 to 19 / 30 to 47		
								G	18 to 1 psig / 45 mbar to 0,06 bar		
								H	1 to 2 psig / 0,06 to 0,13 bar		

Type CS400 Selection Guide

BASE		SENSING		RELIEF		ORIFICE		REGULATOR SETPOINTS		BODY OPTION	
CODE	DESCRIPTION	CODE	DESCRIPTION	CODE	DESCRIPTION	CODE	SIZE Inch / mm	CODE	Inches w.c. / mbar	CODE	DESCRIPTION
CS400	Basic	I	Internal	N	None	2	3/16 / 4,8	A	3.5 to 5 / 9 to 12	C6	1-1/4-inch FNPT, Cast Iron
		E	External	R	Internal	3	1/4 / 6,4	B	4.5 to 6.5 / 11 to 16	C7	1-1/2-inch FNPT, Cast Iron
				T	Token	5	3/8 / 9,5	C	6 to 8 / 15 to 20	C8	2-inch FNPT, Cast Iron
						6	1/2 / 12,7	D	7.5 to 11 / 19 to 27	C9	2 inch / DN 50 CL150 FF, Ductile Iron
						8	3/4 / 19,1	E	10 to 14 / 25 to 35		
								F	12 to 19 / 30 to 47		
								G	18 to 1 psig / 45 mbar to 0,06 bar		
								H	1 to 2 psig / 0,06 to 0,13 bar		
								I	2 to 5.5 psig / 0,14 to 0,38		

Type CS800 Selection Guide

BASE		SENSING		RELIEF		ORIFICE		REGULATOR SETPOINTS		BODY OPTION	
CODE	DESCRIPTION	CODE	DESCRIPTION	CODE	DESCRIPTION	CODE	SIZE Inch / mm	CODE	Inches w.c. / mbar	CODE	DESCRIPTION
CS800	Basic	I	Internal	N	None	2	1/4 / 6,4	A	3.5 to 6 / 9 to 15	C6	1-1/4-inch FNPT, Gray Iron
CS820	High Outlet	E	External	R	Internal	3	3/8 / 9,5	B	5.5 to 8.5 / 11 to 16	C7	1-1/2-inch FNPT, Gray Iron
				T	Token	4	1/2 / 12,7	C	8 to 12 / 15 to 20	C8	2-inch FNPT, Gray Iron
				Q	High Capacity	6	3/4 / 19,1	D	10 to 16 / 25 to 40	C9	2-inch / DN 50 CL125 FF Gray Iron
						8	1 / 25,4	E	14 to 30 / 25 to 75	D11	2-inch / DN 50 CL150 FF, Ductile Iron
						9	1-3/8 / 34,9	F	1 to 2.5 psig / 0,06 to 0,17 bar		
								G	1.5 to 3.5 / 0,10 to 0,24 bar		
								H	2.5 to 5.5 / 0,17 to 0,38 bar		

COMMERCIAL SERVICE OVERPRESSURE PROTECTION

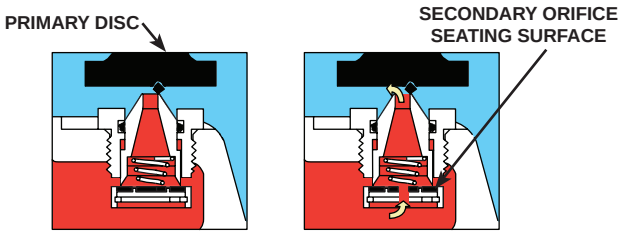
Types CS205 and CS206 Secondary Seat™ Protection

3/4-inch FNPT to 1-1/4-inch Body Sizes
1.83 to 2.24 MBTU per hour / 20,6 to 25,2 SCMH

Type CS205: CS200 platform with a modified orifice that contains a second sealing surface. Should damage occur to the primary seating surface, outlet pressure will continue to rise and prevent lockup. The additional pressure will cause the disc to push the modified orifice into the secondary sealing surface to provide a bubble tight lockup.

Type CS206: CS205 Secondary Seat™ with a limited bleed to downstream system as an indication that the secondary seat is providing lockup. The minimal amount of gas will cause the Internal Relief to begin to discharge, allowing the odorant in the gas to be detected.

See Selection Guide on Page 39 for available options.



SECONDARY SEAT™ LOCKUP

SECONDARY SEAT™ LOCKUP WITH BLEED

SETPOINT	TYPE CS205	TYPE CS206
Inches w.c. / mbar	Shutoff above Setpoint	Downstream Pressure Buildup
7 / 17	5-inches w.c. / 12 mbar	25.1-inches w.c. / 62 mbar
11 / 27	5.5-inches w.c. / 14 mbar	29.6-inches w.c. / 74 mbar
14 / 35	5.8-inches w.c. / 14 mbar	1.26 psig / 0,08 bar
1 psig / 0,07 bar	7.8 inches w.c. / 19 mbar	1.90 psig / 0,13 bar
2 psig / 0,14 bar	13-inches w.c. / 32 mbar	3.42 psig / 0,24 bar

Type CS403 with Integral True-Monitor™ Protection

1-1/4-inch FNPT to 2-inch FNPT Body Sizes
(2-inch / DN 50 CL150 Flange Available)
7.65 to 8.44 MBTU per hour / 85,9 to 94,8 SCMH
Internal Registration

Type CS403: Combines operation of a conventional two-regulator wide-open monitor set into one body. During normal operation, the monitor is in a wide open state at a setpoint higher than the primary regulator. If the downstream pressure should rise due to loss of control by the primary regulator, the integral monitor will assume control and regulate the flow to the downstream system.

See Selection Guide on Page 39 for available options.

TYPE CS403

PRIMARY SETPOINT	MONITOR SETPOINT	MONITOR SPRING RANGE
Inches w.c. mbar	Inches w.c. / mbar	Spring Range
7 / 17	14 / 35	11 to 16-inches w.c. / 27 to 40 mbar
11 / 27	21 / 52	16 to 23-inches w.c. / 40 to 57 mbar
14 / 35	21 / 52	16 to 23-inches w.c. / 40 to 57 mbar
1 psig / 0,07 bar	1.5 psig / 0,10 bar	1 to 2 psig / 0,07 to 0,14 bar
2 psig / 0,14 bar	2.5 psig / 0,17 bar	1.5 to 2.5 psig / 0,10 to 0,17 bar
5 psig / 0,35 bar	6 psig / 0,41 bar	4 to 7.5 psig / 0,28 to 0,52 bar

Type CS404 with Integral Slam shut

1-1/4-inch FNPT to 2-inch FNPT Body Sizes
(2-inch / DN 50 CL150 Flange Available)
7.65 to 8.44 MBTU per hour / 85,9 to 94,8 SCMH
Internal Registration

Type CS404: Integrates a fast acting shutoff device that provides overpressure shutoff (OPSO) or over/underpressure shutoff (UPSO/OPSO) protection by completely shutting off the flow of gas to the downstream system. The Slam Shut operates independently of the main regulator, and does not affect normal operation unless the downstream pressure fluctuates outside of the desired ranges.

See Selection Guide on Page 39 for available options.

TYPE CS404

PRIMARY SETPOINT	SLAM-SHUT SETPOINT	
	OPSO	UPSO - OPSO
Inches w.c. / mbar	Inches w.c. / mbar	Inches w.c. / mbar
7 / 17	17 / 42	- - - -
11 / 27	19 / 47	6.3 / 16 - 25 / 62
14 / 35	30 / 75	8.8 / 22 - 28 / 70
1 psig / 0,07 bar	1.9 psig / 0,13 bar	16 / 40 - 1.9 psig / 0,13 bar
2 psig / 0,14 bar	3.3 psig / 0,23 bar	1 psig / 0,07 bar - 3.2 psig / 0,22 bar
5 psig / 0,35 bar	6.7 psig / 0,46 bar	2.9 psig / 0,20 bar - 7.5 psig / 0,52 bar

Types CS205 and CS206 Selection Guide

BASE		SENSING		RELIEF		ORIFICE		REGULATOR SETPOINTS		BODY OPTION	
CODE	DESCRIPTION	CODE	DESCRIPTION	CODE	DESCRIPTION	CODE	SIZE Inch / mm	CODE	Inches W.C. / mbar	CODE	DESCRIPTION
CS205	Basic	I	Internal	N	None	1	1/8 / 3,2	A	3.5 to 5 / 9 to 12	C1	3/4-inch FNPT, Cast Iron
CS206	Basic			R	Internal	2	3/16 / 4,8	B	4.5 to 6.5 / 11 to 16	C3	1-inch FNPT, Cast Iron
						3	1/4 / 6,4	C	6 to 8 / 15 to 20	C6	1-1/4-inch FNPT, Cast Iron
						4	5/16 / 7,9	D	7.5 to 11 / 19 to 27		
								E	10 to 14 / 25 to 35		
								F	12 to 19 / 30 to 47		
								G	18-inches w.c. to 1 psig / 45 mbar to 0,06 bar		
								H	1 to 2 psig / 0,06 to 0,13 bar		

Type CS403 Selection Guide

BASE		SENSING		RELIEF		ORIFICE		REGULATOR SETPOINTS		BODY OPTION	
CODE	DESCRIPTION	CODE	DESCRIPTION	CODE	DESCRIPTION	CODE	SIZE Inch / mm	CODE	Primary - Monitor Inches w.c. / mbar	CODE	DESCRIPTION
CS403	Integral Monitor	I	Internal	N	None	2	3/16 / 4,8	D	11 / 27 - 21 / 52	D2	1-1/4-inch FNPT, Ductile Iron
		E	External	T	Token	3	1/4 / 6,4	H	2 psig / 0,14 bar - 2.5 psig / 0,17 bar	D3	1-1/2-inch FNPT, Ductile Iron
						5	3/8 / 9,5	L	5 psig / 0,35 bar - 6 psig / 0,41 bar	D4	2-inch FNPT, Ductile Iron
						6	1/2 / 12,7			D9	2 inch / DN 50 CL125 FF, Ductile Iron
						8	3/4 / 19,1				

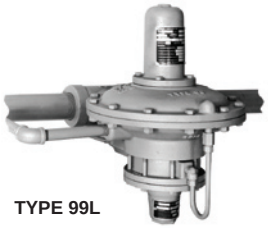
Type CS404 Selection Guide

BASE		SENSING		RELIEF		ORIFICE		REGULATOR SETPOINTS		BODY OPTION	
CODE	DESCRIPTION	CODE	DESCRIPTION	CODE	DESCRIPTION	CODE	SIZE Inch / mm	CODE	Primary - Slam shut Inches w.c. / mbar	CODE	DESCRIPTION
CS404	Integrated Slam shut	I	Internal	N	None	2	3/16 / 4,8	D	11 / 27 - 19 / 47	D2	1-1/4-inch FNPT, Ductile Iron
		E	External	T	Token	3	1/4 / 6,4	K	2 psig / 0,14 bar - 3.3 psig / 0,23 bar	D3	1-1/2-inch FNPT, Ductile Iron
						5	3/8 / 9,5	N	5 psig / 0,35 bar - 6.7 psig / 0,46 bar	D4	2-inch FNPT, Ductile Iron
						6	1/2 / 12,7	V*	11-inches w.c. / 27 mbar - 6.3-inches w.c. / 16 mbar - 25-inches w.c. / 62 mbar	D9	2-inch / DN 50 CL125 FF, Ductile Iron
						8	3/4 / 19,1	AB*	2 / 0,14 - 1 / 0,06 - 3.2 / 0,22		
								AE*	5 / 0,35 - 2.9 / 0,2 - 7.5 / 0,52		
								* set pressures for: Primary - Underpressure - Over-pressure. Units are in Psig / bar			

INDUSTRIAL SERVICE LOW PRESSURE REGULATORS

TYPE 133H
OR 133L

TYPE 299H



TYPE 99L

Regulator Technologies has a wide range of low-pressure regulators to meet almost any commercial or industrial application. For ease of reference, only the most popular commercial and industrial regulators are shown on this page. Other orifice sizes, body sizes, and outlet pressure ranges are available.

Note: Because of various spring ranges and orifice sizes, all commercial and industrial regulators should be individually sized for the particular installation. Consult specific product bulletins for maximum pressures ratings. Contact your local LP-Gas Equipment Distributor for assistance.

Type 299H – A high capacity pilot-operated regulator. Incorporates a lightweight design (21 pounds / 10 kg) with dependable operation. With a capacity up to 38 000 000 BTU per hour / 428 SCMH, the Type 299H is ideal for applications from large commercial sites to smaller multi-dwelling establishments. The unit comes with a 1-1/2 or 2-inch cast iron body with internal or external registration. Internal registration allows easy installation while external registration provides higher accuracy. 2-inch / DN 50 flanged body, or steel body material also available. Alternate outlet settings from 3.5-inches w.c. to 60 psig / 9 mbar to 4,1 bar are available. **The Type 299H has maximum inlet pressure rating of 150 psig / 10 bar so it can not be used as a First-Stage regulator.**

Type 99L – Pilot-operated unit keeps outlet pressure constant despite varying flow rates and inlet pressures. Designed to handle loads up to 63 250 000 BTU per hour / 712 SCMH, the Type 99L is ideal for multiple customer installations. The unique pilot design, with fast opening and closing operation, makes the Type 99L ideal for large industrial boiler applications. The Type 99L can be used for low pressure. A downstream control line is required.

133 Series – Self-operated Second-Stage regulator ideal for large industrial applications with loads up to 70 875 000 BTU per hour / 798 SCMH. The unit can be used for either low pressure or pounds service. Maximum inlet pressure is 60 psig / 4,1 bar, and a downstream control line is required.

Low Pressure Commercial/Industrial Regulators

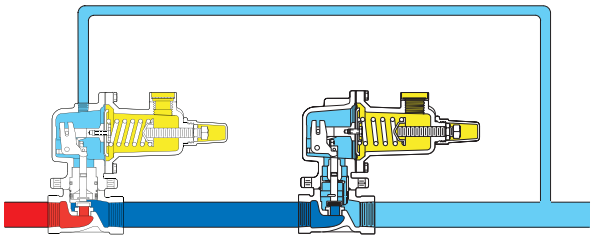
TYPE NUMBER	CAPACITIES IN BTU per hour / SCMH PROPANE	ORIFICE SIZE, INCHES / mm	INLET AND OUTLET CONNECTIONS, INCHES	OUTLET PRESSURE RANGE	OUTLET PRESSURE SETTING	MAXIMUM OPERATING INLET PRESSURE, psig / bar
S201-CNC	21 600 000 / 243	1 / 25	2 FNPT	9 to 18-inches w.c. / 22 to 44 mbar	11-inches w.c. / 27 mbar	25 / 1,7
299H-101	13 100 000 / 148[1]	3/4 / 19	1-1/2 FNPT	9 to 20-inches w.c. / 22 to 50 mbar	11-inches w.c. / 27 mbar	150 / 10,3
299H-102	19 700 000 / 222[1]		2 FNPT			
299H-103	23 300 000 / 262[2]		1-1/2 FNPT	6 to 16 psig / 0,41 to 1,1 bar	10 psig / 0,69 bar	
299H-104	38 000 000 / 428[2]		2 FNPT			
299H-105	20 400 000 / 230[3]		1-1/2 FNPT	9 to 20-inches w.c. / 22 to 50 mbar	11-inches w.c. / 27 mbar	
299H-106			2 FNPT			
299H-107	38 000 000 / 428[4]		1-1/2 FNPT	6 to 16 psig / 0,41 to 1,1 bar	10 psig / 0,69 bar	
299H-108			2 FNPT			
99-501P	49 000 000 / 552[6]	1-1/8 / 29	2 FNPT	7-inches w.c. to 2 psig / 17 mbar to 0,14 bar	1 psig / 69 mbar	150 / 10,3
99-502P	50 600 000 / 570[6]			1 to 5 psig / 69 mbar to 0,34 bar	5 psig / 0,34 bar	
99-503P	61 650 000 / 694[6]			2 to 10 psig / 0,14 to 0,69 bar	10 psig / 0,69 bar	
99-504P	63 250 000 / 712[6]			5 to 15 psig / 0,34 to 1,0 bar	15 psig / 1,0 bar	
133L-4	70 875 000 / 798[3]	2 / 51		8.5 to 18-inches w.c. / 21 to 45 bar	14-inches w.c. / 35 mbar	60 / 4,1
133H-1	66 150 000 / 745[5]			1.5 to 3 psig / 0,10 to 0,21 bar	3 psig / 0,21 bar	

1. Capacity based on inlet pressure of 10 psig / 0,69 bar, Internal Registration and 2-inches w.c. / 5 mbar droop.
2. Capacity based on inlet pressure of 20 psig / 1,4 bar higher than outlet pressure, Internal Registration and 20% droop.
3. Capacity based on inlet pressure of 10 psig / 0,69 bar, External Registration and 2-inches w.c. / 5 mbar droop.
4. Capacity based on inlet pressure 20 psig / 1,4 bar higher than outlet pressure, External Registration and 2-inches w.c. / 5 mbar droop.
5. Capacity based on inlet pressure of 10 psig / 0,69 bar, External Registration, and 20% droop.
6. Capacity based on inlet pressure of 20 psig / 1,4 bar higher than outlet pressure, External Registration and 20% droop.

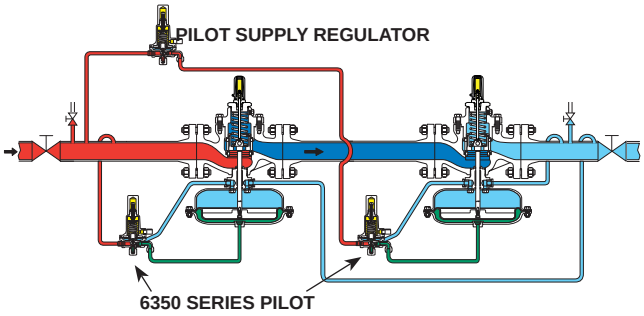
NOTE: Additional spring ranges and body styles are available. Ask your LP-Gas Equipment Distributor for more information.

Monitor Overpressure Protection

Monitoring is overpressure control by containment. When the working pressure reducing valve ceases to control the pressure, a second regulator installed in series, which has been sensing the downstream pressure, goes into operation to maintain the downstream pressure at a slightly higher than normal pressure. The monitoring concept is gaining in popularity, especially in low-pressure systems, because very accurate relay points permit reasonably close settings of the working and monitoring regulators.



TYPE 627M (DIRECT-OPERATED) MONITOR

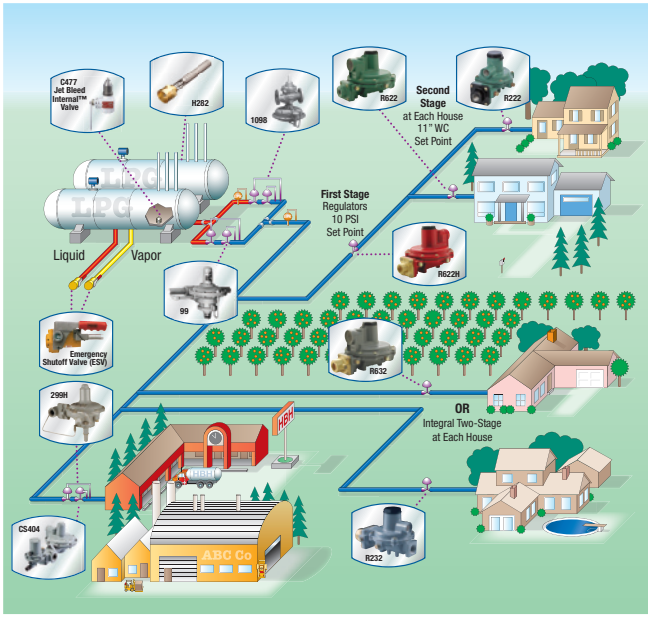


TYPE 1098H (PILOT-OPERATED) MONITOR

INLET PRESSURE
OUTLET PRESSURE
LOADING PRESSURE
ATMOSPHERIC PRESSURE
INTERMEDIATE PRESSURE

The major advantage is that there is no venting to atmosphere. During an overpressure situation, monitoring keeps the customer on line and keeps the downstream pressure relatively close to the setpoint of the working regulator. Testing is relatively easy and safe. To perform a periodic test on a monitor, increase the outlet set pressure of the working device and watch the pressure to determine if the monitor takes over.

When selecting regulators for use in a monitor system, the upstream regulator must have a control line. When determining the capacity of a monitor system you will get approximately 70% to 73% of the capacity of a single regulator when using the same regulator for both regulators in the system.



COMMUNITY SYSTEM MAP

Fisher® offers a wide variety of products for monitor applications. Provided for your reference below is a list of commonly used regulators for various capacity requirements. Note that Pilot operated regulators may be used in conjuntion with self operated regulators in monitor applications, depending on the application requirement. Please call your local LP-Gas Equipment Distributor to review your monitor requirements

Typical Wide-Open Monitor System

OPERATING REGULATOR	ORIFICE SIZE, INCHES / mm	BODY SIZE, INCHES	MONITOR REGULATOR	ORIFICE SIZE, INCHES / mm	BODY SIZE, INCHES	REGULATING CAPACITY, BTU per hour / SCMH[1]
Type 627-5810	3/8 / 9,53	3/4 NPT	Type 627M-421	1/2 / 12,7	3/4 NPT	5 750 000 / 64,6
Type 627-6210	1/2 / 12,7	3/4 NPT	Type 627M-421	1/2 / 12,7	3/4 NPT	7 050 000 / 79,2
Type 627-7710	1/2 / 12,7	1 NPT	Type 627M-421	1/2 / 12,7	1 NPT	7 050 000 / 79,2
Type 630-104/78	1/2 / 12,7	2 NPT	Type 627M-267	1/2 / 12,7	2 NPT	8 400 000 / 94,4
Type 630-104/78	1/2 / 12,7	2 NPT	Type 99M-504PH	1-1/8 / 28,6	2 NPT	13 500 000 / 152
Type 99-504PH	1-1/8 / 28,6	2 NPT	Type 99M-504PH	1-1/8 / 28,6	2 NPT	42 650 000 / 479
Type 99-504PH	1-1/8 / 28,6	2 NPT	Type 1098	2-3/8 / 60,3	2 NPT	54 500 000 / 612
Type 1098	2-3/8 / 60,3	2 NPT	Type 1098	2-3/8 / 60,3	2 NPT	136 900 000 / 1538
Type 1098	2-3/8 / 60,3	3 NPT	Type 1098	3-3/8 / 85,7	3 NPT	283 700 000 / 3187
Type 1098	2-3/8 / 60,3	4 NPT	Type 1098	4-3/8 / 111	4 NPT	437 800 000 / 4918

1. Capacities are based on 30 psig / 2,1 bar in and 8 psig / 0,55 bar out.

BACKPRESSURE REGULATORS/RELIEF VALVES

Relief Valve for Liquid Service

Type 98H – is a self-operated relief valve for use on relief and backpressure applications involving large LP-Gas pumping systems and vaporizers. Internal pressure registration eliminates the need for a control line.

TYPE 98H

Liquid Service Relief Valves

TYPE NUMBER	BODY SIZE, INCHES	RELIEF PRESSURE RANGE, psig / bar	RELIEF PRESSURE SETTING, psig / bar	PROPANE RELIEF CAPACITY GPM / l/min AT FOLLOWING PRESSURE BUILD-UP OVER RELIEF SETTING				
				5 psig / 0,34 bar	10 psig / 0,69 bar	20 psig / 1,4 bar	30 psig / 2,1 bar	50 psig / 3,4 bar
98H-13	1/2 FNPT	25 to 75 / 1,7 to 5,2	50 / 3,4	10.5 / 39,7	15.4 / 58,3	21.7 / 82,1	25.9 / 98,0	30.8 / 117
98H-14		70 to 140 / 4,8 to 9,7	100 / 6,9	8.4 / 31,8	15.4 / 58,3	27.3 / 103	32,9 / 125	39.2 / 148
98H-22	3/4 FNPT	70 to 140 / 4,8 to 9,7	100 / 6,9	30.8 / 117	49.0 / 185	67.9 / 257	79.8 / 302	93.1 / 352
98H-30	1 FNPT	70 to 140 / 4,8 to 9,7	100 / 6,9	30.8 / 117	49.0 / 185	67.9 / 257	79.8 / 302	93.1 / 352

Diaphragm Relief Valves

Type 1805 – relief valve are designed for installation between the First and Second-Stage regulators or in the downstream line from a high pressure regulator used for a Final-Stage service. Available in 1 or 2-inch valve bodies.

Type 289H – relief valve is designed for installation downstream of a large Second-Stage regulators like the Type CS400. The larger diaphragm in this relief valve provides extremely sensitive operation.

TYPE 1805-19P

TYPE 289H-2

Diaphragm Relief Valves

TYPE NUMBER	BODY SIZE, INCHES	RELIEF PRESSURE SETTING, psig / bar	RELIEF ADJUSTMENT RANGE, psig / bar	PROPANE RELIEF CAPACITY AT FOLLOWING PRESSURE BUILD-UP OVER RELIEF SETTING	
				Build-up over set pressure, psig / bar	Capacity, SCFH / SCMH
1805-19P	1 FNPT	30 / 2,1	10 to 60 / 0,69 to 4,1	15 / 1,0	2840 / 80,4
1805-52P	2 FNPT	30 / 2,1	10 to 50 / 0,69 to 3,4	15 / 1,0	12 000 / 340
289H-2	2 FNPT	1.0 / 0,07	14-inches w.c. to 2.25 / 35 mbar to 0,16	1 / 69 mbar	11 000 / 311
289H-43	1 FNPT	15 / 1,0	10 to 20 / 0,69 to 1,4	5 / 0,34	20 000 / 566
289H-42	1 FNPT	10 / 0,69	4 to 15 / 0,28 to 1,0	5 / 0,34	17 600 / 498

TYPE Y602-1 (UMBRELLA TYPE)

TYPE Y602-13 (ANGLE TYPE)

Vent Assemblies

Attached directly to the regulator vent connection to a regulator vent line, vent assemblies should be pointed downward on outdoor installations to avoid moisture build-up in the regulator spring case. Units with stabilizer assembly are intended for regulators with stability problems. The stabilizer gives a restricted breathing rate under normal conditions, opening for rapid discharge when necessary.

Vent Assemblies

TYPE NUMBER		SIZE	STABILIZER
Umbrella Type	Angle Type		
- - - -	Y602-13	1/4-inch FNPT	No
- - - -	Y602-14		Yes
Y602-1	- - - -	1/4-inch MNPT	No
Y602-2	- - - -		Yes
Y602-3	- - - -	3/8-inch O.D. Tubing (Flare Connection)	No
Y602-4	- - - -		Yes
- - - -	Y602-5	3/8-inch FNPT	No
- - - -	Y602-6		Yes
- - - -	Y602-7	1/2-inch FNPT	No
- - - -	Y602-8		Yes
- - - -	Y602-9	3/4-inch FNPT	No
- - - -	Y602-23	3/4-inch MNPT	No
- - - -	Y602-25	1-inch MNPT	No

TYPE 912-101

Small Portable Appliance Regulators

Type 912 – Designed for use on small portable outdoor appliances.

Underwriters Laboratory (UL) requires horizontally mounted regulators to be installed with vent opening protection to prevent blockage by freezing rain. Vent protector Type P331 can be used on a horizontally mounted Type 912.

Appliance Regulators

TYPE NUMBER	PRESSURE RANGE Inches w.c. / mbar	OUTLET PRESSURE Inches w.c. / mbar	Capacities in BTU per hour Propane			INLET CONNECTION, Inches / mm	OUTLET CONNECTION, Inches / mm	ORIFICE SIZE, Inches / mm
			10 psig, Inlet	25 psig, Inlet	100 psig, Inlet			
912-194[1]	3 to 7 / 7 to 17	5 / 12	101 000	151 000	- - - -	1/4 / 6,4	1/4 / 6,4	0.073 / 1,85
912-104	9.25 to 13 / 23 to 32	11 / 27	101 000	270 000	349 000	1/4 / 6,4	1/4 / 6,4	0.073 / 1,85
912N-109[1]	5 to 10 / 12 to 25	7 / 17	123 000	232 000	556 000	1/4 / 6,4	3/8 / 9,5	0.073 / 1,85
912-101	9.25 to 13 / 23 to 32	11 / 27	110 000	201 000	494 000	1/4 / 6,4	3/8 / 9,5	0.073 / 1,85
912-122	9.25 to 13 / 23 to 32	11 / 27	110 000	201 000	494 000	1/4 / 6,4	3/8 / 9,5	0.073 / 1,85
912H-108	0.5 to 2.7 psig / 0,03 to 0,19 bar	1.5 psig / 103	131 000	202 000	470 000	1/4 / 6,4	3/8 / 9,5	0.094 / 2,39

1. Not UL listed.

Regulator Accessories

TYPE P331

Vent Protector

Type P331 – For Type 912 regulators that are installed horizontally. The protector should not be used if the regulator is installed vertically or beneath a hood.

TYPE P100A

TYPE P100C

Mounting Brackets

Mounting brackets are used to mount regulators securely to the container or to the side of the building.

Mounting Brackets			
REGULATOR TYPE	BRACKET STYLE		
	Triangular	Bowtie	Strap
R622, R632, R642, and R622H	P100A	P100C	- - - -
R122H, R222, and R232	P100A	- - - -	- - - -
912	P100A	- - - -	P102A

TYPE P499

Adaptor With Screen

Used to convert a 1/4-inch NPT inlet on regulators such as Types 912 and 67C to an inverted flare.

Adaptor with Screen	
TYPE NUMBER	SIZE
P499	1/4-inch Inverted Flare x 1/4-inch MNPT

TYPE P500

Type P500 Plug

Keeps dirt and foreign material from entering changeover assemblies like Type R110. 1/4-inch Inverted Flare.

Type P501 Filter Assembly

Intended for the inlet of Type 67C Series regulators, the Type P501 prevents foreign material from reaching the regulator's valve disc.

TYPE J600

Pressure Gauge Adaptor and Test Block

Type J600 test block connects to the container valve to check for leaks in the downstream system.

Type J600 – Male POL x Female POL, test block with 0 to 300 psig / 0 to 20,7 bar gauge.

TYPE P400 TEE BLOCK

TYPE P414 TEE CHECK

Tee Blocks and Checks

Tee blocks are a 3-way POL connection that allows connection of two containers to a regulator inlet.

Tee checks allow the connection of two containers to a regulator inlet. A check disc inside the Tee check body permits flow only from the container with the highest vapor pressure.

Tee Blocks and Checks

TYPE OF MANIFOLD		PIGTAIL OR PIPING CONNECTION	REGULATOR CONNECTION, INCHES
Tee Block (Without Check)	Tee Check		
P403	- - - -	Female POL	Female POL
P400	P410		Male POL
- - - -	P413		1/4 MNPT
- - - -	P414	1/4-inch Inverted Flare	1/4 MNPT

Terluran® is a trademark of BASF.

TYPE 50-2

TYPE 50P-2

TYPE 50P-5

Test Gauge Assemblies

The 50 Series test gauges are used to check appliance line pressure after the regulator has been installed.

Test Gauge Assemblies

TYPE NUMBER	INLET CONNECTION	HOSE	PLASTIC	RANGE, INCHES W.C. / mbar
50-2	1/4-inch MNPT	No	No	0 to 35 / 0 to 87
50P-2	Female Hose	Yes	Yes	
50P-5		Yes	No	

BOTTOM CONNECTION

BACK CONNECTION

Pressure Gauges

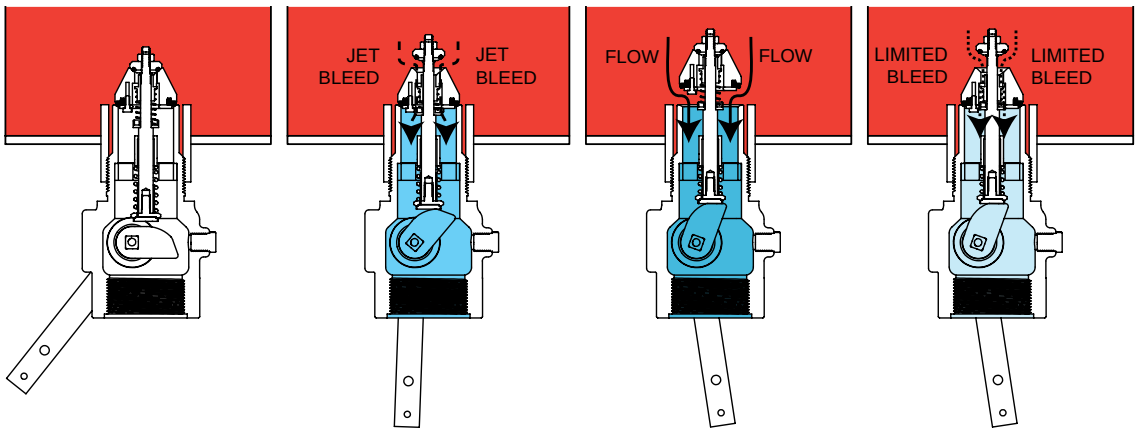
Fisher® brand offers pressure gauges with bottom, back, or top connection for LP-Gas service. The back connection makes a more compact assembly on installations where space is limited. All gauges have a 2-inches (51 mm) diameter face/black Terluran® plastic case.

Pressure Gauges

PRESSURE GAUGE RANGE, psig / bar							
Connection	Size	0 to 15 / 0 to 1,0	0 to 30 / 0 to 2,1	0 to 60 / 0 to 4,1	0 to 160 / 0 to 11	0 to 300 / 0 to 20,7	0 to 400 / 0 to 27,6
Bottom	1/4-inch	J500	J501	J502	J504	J506	J542[/1]
Back	1/4-inch	J510	J511	J512	J514	J516	N/A

1. For LP-Gas or Anhydrous ammonia (NH_3) service.

INTERNAL VALVES



1. Because of the integral back check function of these valves, selective filling of manifold storage tanks requires the use of additional shutoff valves.

Fisher® brand internal valves have gained wide field acceptance for use as primary shutoff valves, excess flow valves and back check valves(1). Internal valves are installed in the inlets and outlets (liquid or vapor) of pressure vessels and in piping systems to control the flow of LP-Gas and NH_3 (anhydrous ammonia). The most frequent application is on bobtail and transport truck tanks, but they may also be used on large stationary storage tanks and on in-line installations. The valves can be used in conjunction with or without pumps and compressors.

Features and Benefits

- **Patented rapid equalization bleed area***—provides fast valve response for quick opening.
- **Unique Serviceability Features***—Removable gland packing, stainless trim parts, and poppet designed with integral wrench flat for easy maintenance.
- **Durable Design**—Stainless poppet and stem* interface smoothly for a long wear life.
- **Excess Flow Closure**—Functions when flow exceeds the valves rated capacity or piping is sheared off at the valve.
- **Back Check Feature**—Allows reverse flow, fill with or without actuator device in valve open position.
- **Spring loaded PTFE stub shaft packing**
- **PTFE wear pads and Rulon™ Bushings at critical wear points**
- **Manual, Cable or Air Open/Close Control**
- **Thermal Fusible links or plugs melt at 212° to 220°F / 100° to 104°C and allow valve closure in the event of a fire at the valve.**

Principle of Operation

The operational schematic below depicts threaded valves, however flanged styles operate in the same manner. For detailed information, refer to the Instruction Manual provided with the valve.

View #1
The valve is held closed by both tank pressure and the valve's closing spring. There is no leakage past the resilient seats in the poppet to the valve outlet.

View #2
The valve is opened by moving the operating lever to approximately midpoint in its 70° travel. This allows the cam to place the rapid equalization portion of the valve stem in the pilot opening, permitting a larger amount of product to bleed downstream than if the operating lever were moved to the full open position.

View #3
When tank and downstream pressure are nearly equal after a few seconds, the excess flow spring pushes open the main poppet and the operating lever can be moved to the full open position.

If tank pressure is greater than the valve's outlet pressure, the main poppet will remain in the closed position. If valve outlet piping is closed off by other valves, however, product bleeding through the pilot will increase until it nearly equals tank pressure and the main poppet opens. The main poppet will not open if valve outlet piping is not closed off so that the outlet pressure can approach tank pressure.

View #4
Once the main poppet opens, a flow greater than the valve's excess flow spring rating or a sufficient surge in flow forces the main poppet closed against the excess flow spring. The pilot valve allows a small amount of product to bleed, but much less than view # 2 where the rapid equalization portion of the stem is placed in the pilot opening. When the operating lever is moved to the closed position, the valve closes completely and seals tightly (view #1).

* Unique to the Jet Bleed Internal™ Valve Design only.

C407 SERIES

C477 SERIES

C471 SERIES

Threaded Internal Valves

Regulator Technologies offers the widest variety of threaded internal valves in the industry. While their most frequent use is in the liquid and vapor openings of bobtail and transport trucks, the valves can also be used in stationary storage tanks, complying with NFPA 58 requirements. Designed as primary shutoff valves, the units are designed with several features that help control product discharge.

Steel and stainless steel constructions are standard throughout with total stainless steel construction available. The valves have spring-loaded PTFE packing for an effective seal against leakage. Standard disc material is Nitrile (NBR), but PTFE, Perfluoroelastomer (FFKM), Fluorocarbon (FKM), Ethylenepropylene (EPDM), and Neoprene are available. (Note: PTFE seats are not bubble tight.)

All Fisher® brand internal valves are suitable for LP-Gas or anhydrous ammonia (NH_3) service. Special construction is available for other compressed gases. All threaded internal valves have a compact, one-piece body design. They can be actuated manually, by cable control, or with an air cylinder.

C407-10 Series (1-1/4-inch / DN 32 Body Size) – An excellent valve for vapor return lines on bobtail trucks. Other applications include use as a main valve on small capacity pumping systems, anhydrous ammonia (NH_3) nurse tanks and in-line installations.

C400 Series (2 and 3-inch Body Sizes)

Regulator Technologies offers three different body styles in 2 and 3-inch NPT sizes so that the best body style can be selected for the particular application.

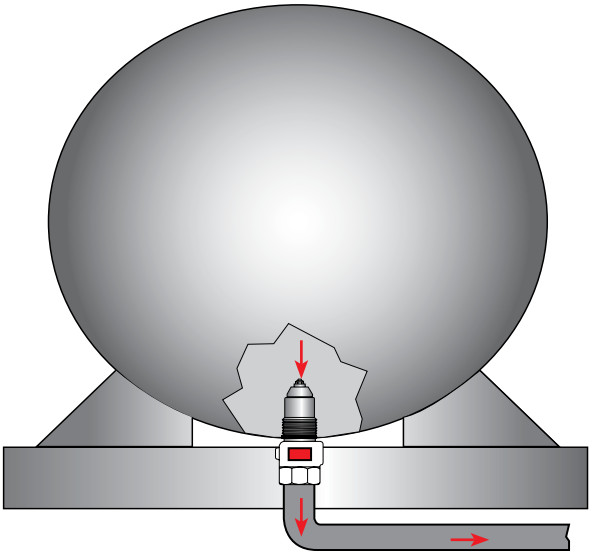
C477 Series (Straight-Through Body) – The most compact and economical unit in the Series, the C477 Series has one bottom outlet. The C477 Series can be used on bobtail, transport, stationary tank and in-line installations.

C471 Series (Tee Body) – This unit is designed with two outlets, bottom and side. The side outlet permits installing horizontal piping immediately adjacent to the tank without the need for extra pipe fittings. Either connection can be used for truck filling or withdrawal. The C471 Series is used primarily on bobtails and transport trucks.

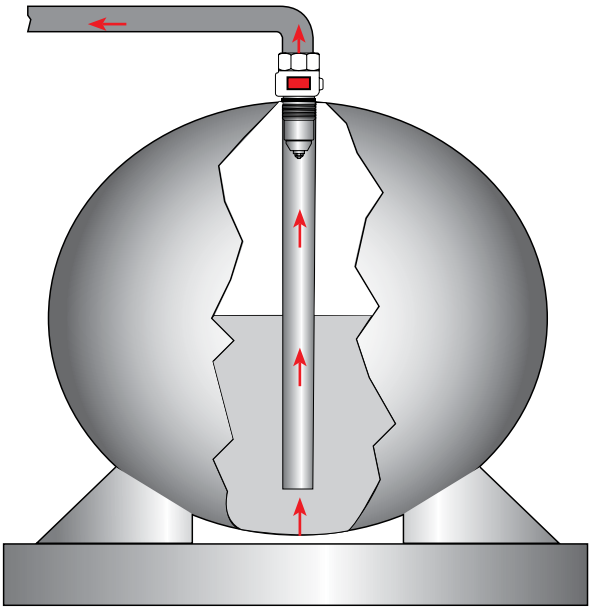
Threaded Internal Valves

CONNECTIONS INLET X OUTLET	TYPE NUMBER		CLOSING FLOW GPM / l/min PROPANE[2]		VAPOR CAPACITY SCFH / SCMH PROPANE[2]	
	Straight Body	Tee Body	Half Coupling	Full Coupling	25 psig / 1,7 bar Inlet	100 psig / 6,9 bar Inlet
1-1/4-inch MNPT x 1-1/4-inch FNPT	C407-10-03	- - - -	30 / 114	- - - -	5600 / 159	9300 / 263
	C407M-10-03[1]					
	C407-10-05	- - - -	50 / 189	35 / 133	7800 / 221	13 200 / 374
	C407M-10-05[1]					
	C407-10-08	- - - -	80 / 303	65 / 246	11 200 / 317	19 200 / 544
	C407M-10-08[1]					
2-inch MNPT x 2-inch FNPT	C477-16-10	C471-16-10	100 / 379	60 / 227	26 100 / 739	45 000 / 1274
	C477-16-15	C471-16-15	150 / 568	90 / 341	39 400 / 1116	69 000 / 1954
	C477-16-25	C471-16-25	250 / 946	130 / 492	- - - -	- - - -
3-inch MNPT x 3-inch FNPT	C477-24-16	C471-24-16	160 / 606	120 / 454	41 100 / 1164	71 000 / 2011
	C477-24-26	C471-24-26	265 / 1003	230 / 871	71 800 / 2033	127 000 / 3596
	C477-24-37	C471-24-37	375 / 1419	320 / 1211	99 000 / 2803	178 000 / 5040
	C477-24-46	C471-24-46	460 / 1741	380 / 1438	- - - -	- - - -

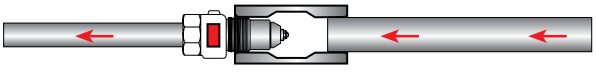
1. Includes a factory installed Type P340 / P341 latch.
2. Closing Flows and Vapor Capacities listed are with valve in “bottom of tank” position. See product bulletins for additional data.



"BOTTOM OF TANK" POSITION



"TOP OF TANK" POSITION



"HORIZONTAL" POSITION

INTERNAL VALVE TANK POSITIONS

Threaded Valve Specifications

Pressure Rating: 400 psig / 27,6 bar WOG
Temperature: Up to 150°F / 66°C
Body: Ductile iron (C471 and C477 Series)
Cast steel (C407-10 Series)
Packing: PTFE
Seat Discs: Synthetic rubber
Stub Shaft and Stem: Stainless steel

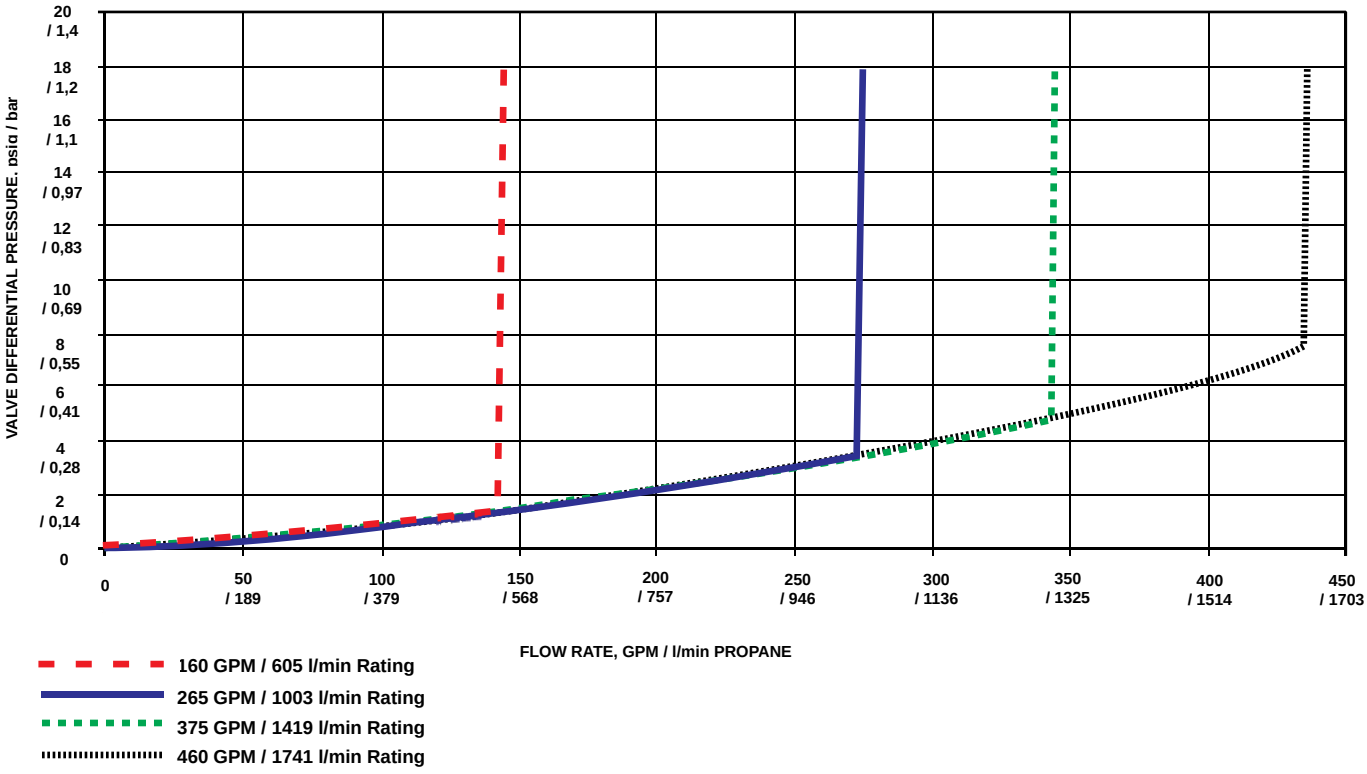
WARNING

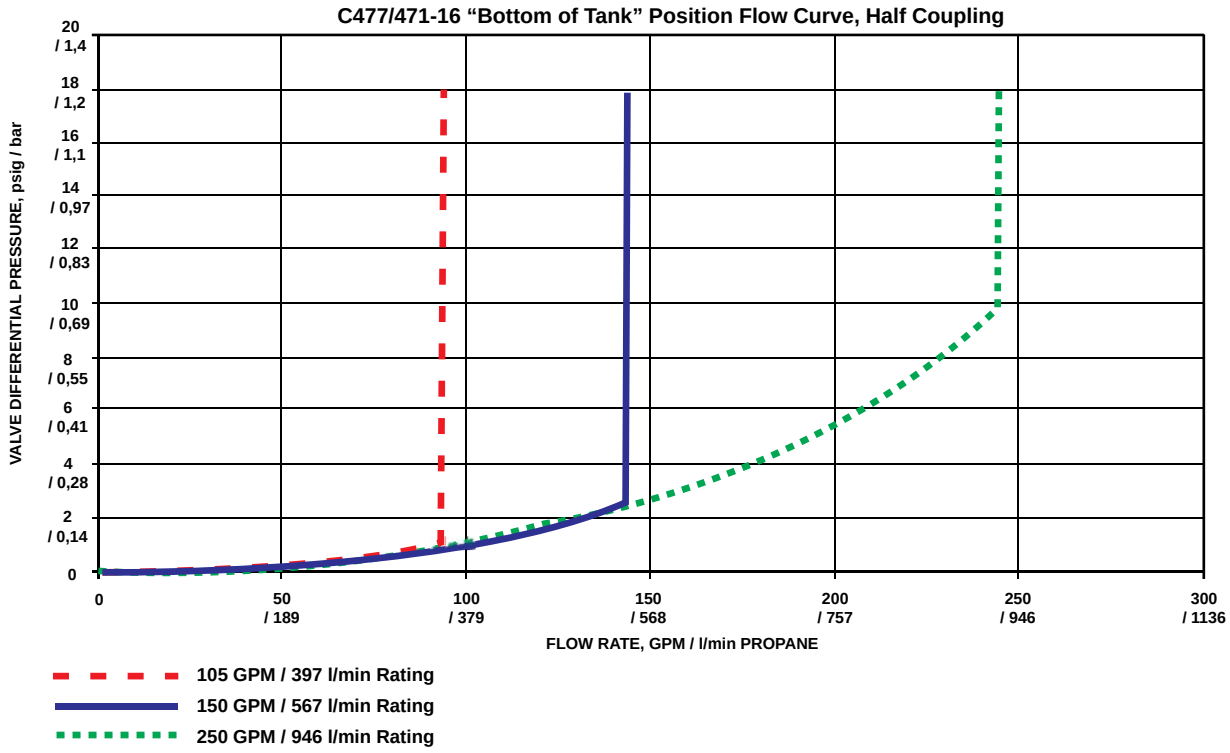
A line break downstream of a pump may not actuate the excess flow valve. If any break occurs in the system or if the excess flow valve closes, the system should be shutdown immediately.

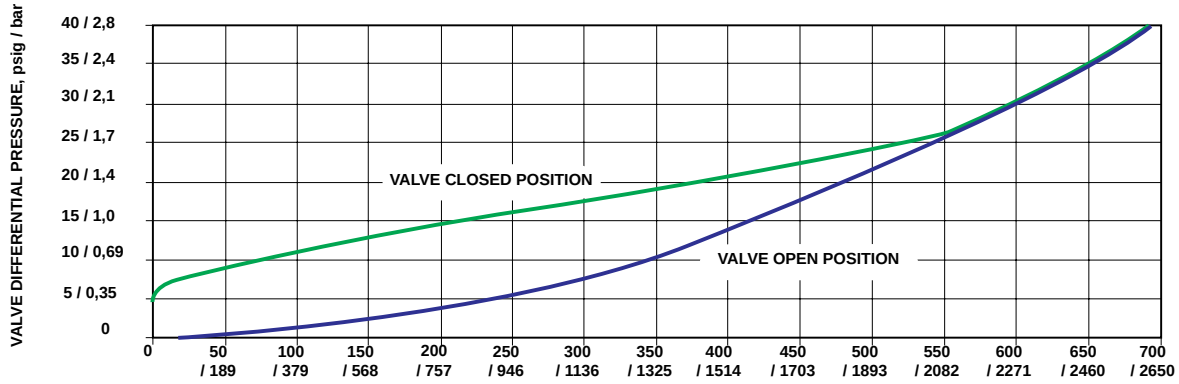
DO NOT USE the excess flow function incorporated into Fisher® C Series internal valves or F Series excess flow valves to satisfy the passive shutdown requirement in 49CFR§173.315(n)(2). DO NOT include the excess flow incorporated into Fisher C Series internal valves or F Series excess flow valves in a DCE certification under 49CFR§173.315(n)(2). The cargo tank manufacturer must install some other equipment that satisfies the requirement for passive shutdown capability under 49CFR§173.315(n)(2).

Failure to follow this warning could result in serious personal injury or property damage from fire or explosion in the event of an unintentional release of product during an unload operation.

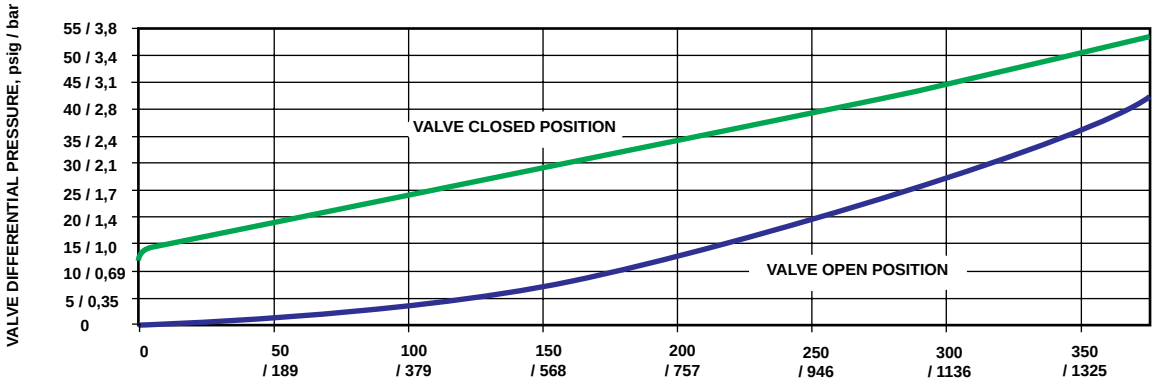
C477/471-24 "Bottom of Tank" Position Flow Curve, Half Coupling



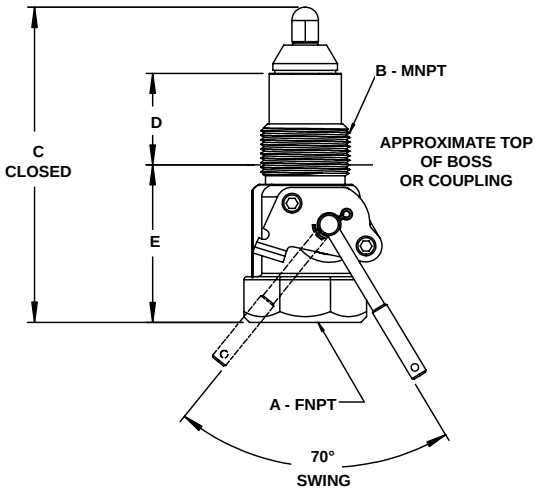




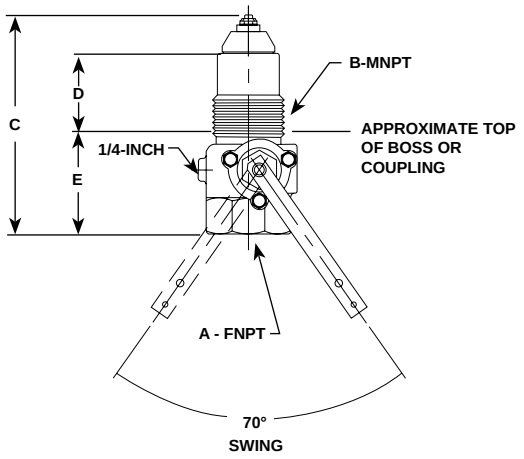
C477-24 Typical Reverse Flow Curve



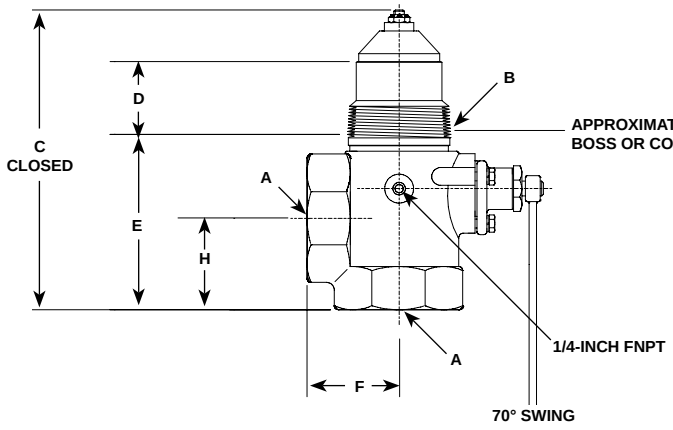
C477-16 Typical Reverse Flow Curve



C407-10 SERIES

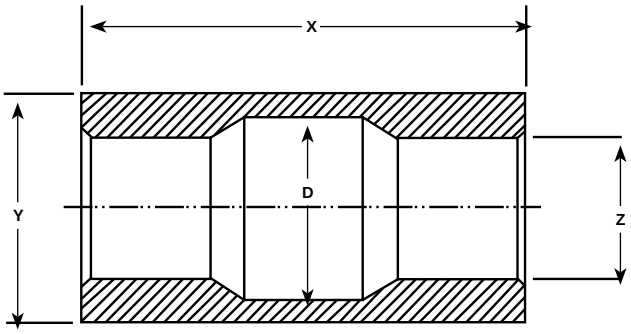


C477 SERIES



C471 SERIES

Threaded Valves								
TYPE NUMBER	A, INCH (FNPT)	B, INCH (MNPT)	DIMENSIONS, INCHES / mm					INSTALLATION CLEARANCE DIAMETER, INCHES / mm
			C	D	E	F	H	
C407-10	1.25	1.25	5.90 / 150	1.86 / 47	2.88 / 73	- - - -	- - - -	5.00 / 127
C471-16	2	2	8.07 / 205	2.40 / 61	4.05 / 103	2.76 / 70	2.66 / 68	10.00 / 254
C471-24	3	3	9.00 / 229	2.60 / 66	4.57 / 116	3.25 / 83	3.26 / 83	13.38 / 340
C477-16	2	2	8.07 / 205	2.40 / 61	4.05 / 103	- - - -	- - - -	10.00 / 254
C477-24	3	3	9.00 / 229	2.60 / 66	4.57 / 116	- - - -	- - - -	13.38 / 340



IN-LINE ADAPTOR

In-Line Adaptors			
Z	DIMENSIONS, INCHES / mm		
	X	Y	D
1-1/4-inch FNPT	4.70 / 119	2.75 / 70	2.05 / 52
2-inch FNPT	6.77 / 172	3.5 / 89	2.80 / 71
3-inch FNPT	7.53 / 191	4.5 / 114	3.80 / 97

FLANGED INTERNAL VALVES

TYPE C483-24

TYPE C484-24

Flanged Internal Valves

Flanged valves provide a sturdy and compact means of directly mounting a pump or piping connection. Special stud bolts, weakened with a groove on the outside diameter, are furnished with the valves to permit the pump or piping to shear off in the event of an accident, leaving the valve intact. A built-in excess flow valve reduces the chance of uncontrolled product discharge when flow exceeds the rated flow capacity.

All flanged valves have an internal screen for pump protection that can be easily removed if the valve is used primarily for filling the tank. They also contain PTFE packing to resist stub shaft leakage. These valves can be activated manually, by cable control or by air cylinder (refer to pages 58 and 59).

3-inch / DN 80 Flanged Sizes

Type C484-24 – A single-flange unit widely used on bobtail and transport trucks for a compact means of direct pump connection to the valve outlet. Another application for the Type C484-24 is on in-line installations.

Type C483-24 – A double-flange unit designed for special bobtail truck applications where the pump must be lowered to clear the truck frame or other obstacles. A special shear section in the body permits the lower section of the valve to shear off in the event of an accident, leaving the critical shutoff parts within the tank.

3-inch / DN 80 Flanged Internal Valves					
TYPE NUMBER		CLOSING FLOW, GPM / l/min PROPANE			CLOSING FLOW, GPM / l/min NH_3
Single Flange	Double Flange	Single Flanged, Bottom of Tank Position	Double Flanged, Bottom of Tank Position	Top of Tank Position, Single - Double Flanged	Single - Double Flanged, Bottom of Tank Position
C484-24-16	C483-24-16	160 / 606	160 / 606	180 / 681 - 180 / 681	144 / 545 - 144/ 545
C484-24-25	C483-24-26	250 / 946	265 / 1003	250 / 946 - 290 / 1098	239 / 905 - 226 / 855
C484-24-40	C483-24-40	400 / 1514	400 / 1514	400 / 1514 - 400 / 1514	361 / 1366 - 361 / 1366
		VAPOR CAPACITY SCFH / SCMH PROPANE			
		100 psig / 6,9 bar Inlet, Single - Double Flanged, Standard Position		100 psig / 6,9 bar Inlet, Single - Double Flanged, Inverted Position	
C484-24-16	C483-24-16	71 000 / 0,8 - 71 000 / 0,8		96 000 / 1,1 - 96 000 / 1,1	
C484-24-25	C483-24-26	NOT LISTED - 127 000 / 1,4		NOT LISTED - 148 000 / 1,6	
C484-24-40	C483-24-40	181 000 / 2,0 - 181 000 / 2,0		190 000 / 2,1 - 190 000 / 2,1	

Flanged Valve Specifications

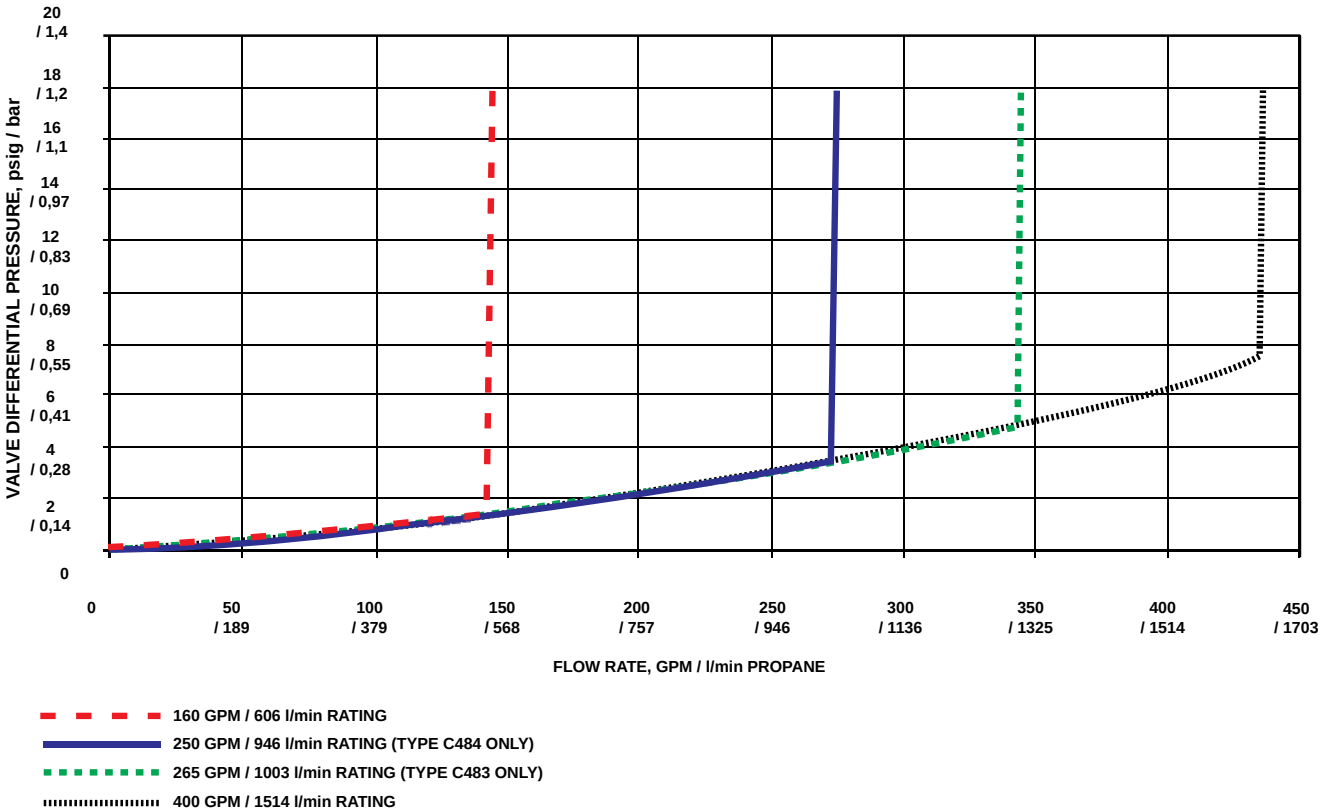
Pressure Rating: 400 psig / 27,6 bar WOG
Temperature: Up to 150°F / 66°C
Body: Cast steel, WCC (Types C483 and C484-24)
Stainless steel (Type C484-32)
Packing: PTFE
Seat Discs: Synthetic rubber
Stub Shaft and Stem: Stainless steel
Gaskets: Non-asbestos spiral wound graphite

WARNING

A line break downstream of a pump may not actuate the excess flow valve. If any break occurs in the system or if the excess flow valve closes, the system should be shutdown immediately.

DO NOT USE the excess flow function incorporated into Fisher® C Series internal valves or F Series excess flow valves to satisfy the passive shutdown requirement in 49CFR§173.315(n)(2). DO NOT include the excess flow incorporated into Fisher C Series internal valves or F Series excess flow valves in a DCE certification under 49CFR§173.315(n)(2). The cargo tank manufacturer must install some other equipment that satisfies the requirement for passive shutdown capability under 49CFR§173.315(n)(2).

Failure to follow this warning could result in serious personal injury or property damage from fire or explosion in the event of an unintentional release of product during an unload operation.



FLANGED INTERNAL VALVES

TYPE C404-32

TYPE C404A32

TYPE C404M32

4-inch / DN 100 Flanged Size (Stainless Steel Construction)

Type C404-32 – Used widely on transport trucks and large storage tanks, the 4-inch / DN 100 flanged unit comes standard with all stainless steel construction for maximum protection against rust and corrosion. For easy field maintenance, the seat ring is field replaceable.

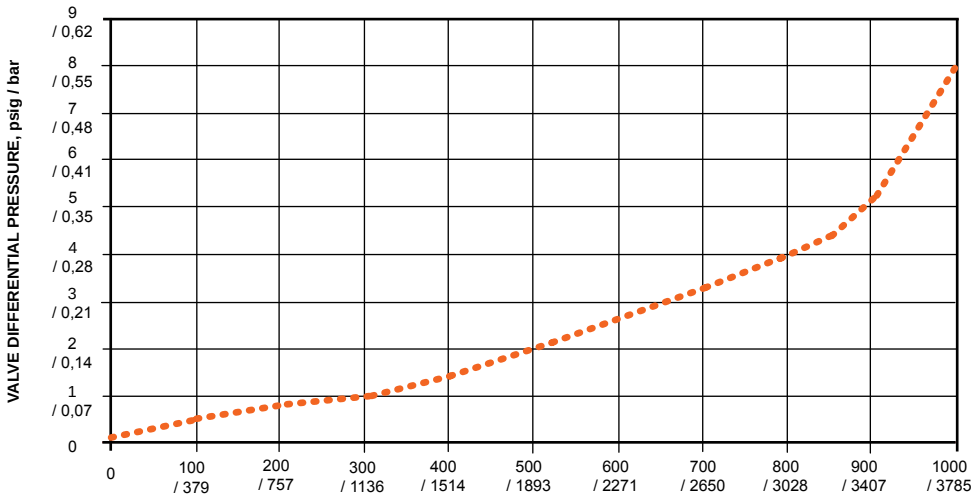
The Type C404-32 is the only internal valve that cannot be opened and closed by the Type P650 cable control (refer to page 59).

Factory installation of an air cylinder or manual operating handle (with remote release mechanism) is available on the 4-inch / DN 100 flanged valves. Refer to ordering information below.

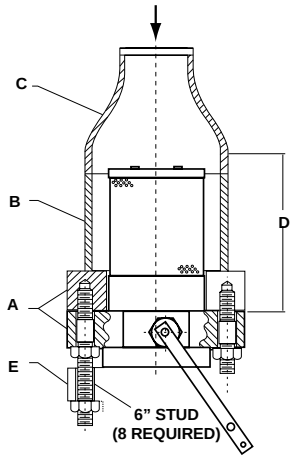
4-inch / DN 100 Flanged Internal Valves

TYPE NUMBER[1]			INLET, INCHES / DN	OUTLET, INCHES / DN	CLOSING FLOW, GPM / l/min PROPANE[2]	VAPOR CAPACITY , SCFH / SCMH PROPANE	
Cable	Air	Manual				25 psig / 1,7 bar Inlet	100 psig / 6,9 bar Inlet
C404-32-34	C404A-32-34	C404M-32-34	4 / 100 CL300 ASME RF Modified 5-7/8 / 149 mm diameter bore	4 / 100 CL300 ASME RF	340 / 1287	61 600 / 1745	104 800 / 2968
C404-32-40	C404A-32-40	C404M-32-40			400 / 1514	63 900 / 1810	108 600 / 3076
C404-32-60	C404A-32-60	C404M-32-60			600 / 2271	83 200 / 2356	141 500 / 4007
C404-32-80	C404A-32-80	C404M-32-80			800 / 3028	259 600 / 7352	356 200 / 10 088
C404-32-100	C404A-32-100	C404M-32-100			1000 / 3785	- - - -	- - - -

1. 4-inch / DN 100 size available in single flange only.
2. Closing flow vertical down.

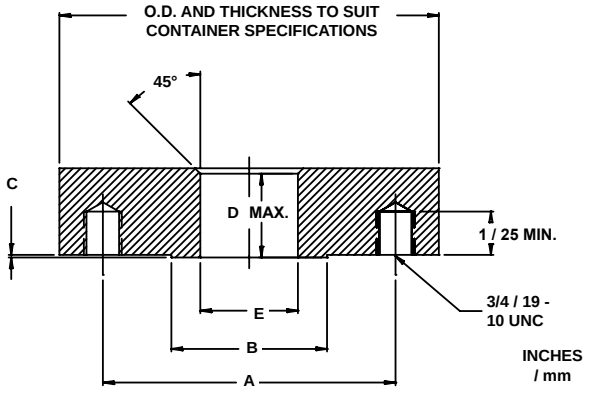


TYPE C404-32 CAPACITY CURVE



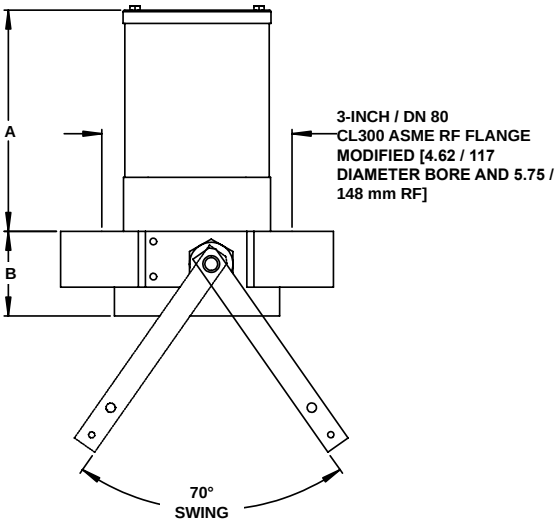
In-Line Piping				
A	DIMENSIONS, INCHES / mm			OUTLET
	B	C	D	E
ASME CL300 RF Flange	Pipe Size	Reducer	Minimum	ASME CL300 RF Flange
3-inch / DN 80	6 / 152	6 x 3 / 152 x 76	7.9 / 201	3-inch / DN 80
4-inch / DN 100	8 / 203	8 x 4 / 203 x 102	11.5 / 292	4-inch / DN 100

Studding Outlet

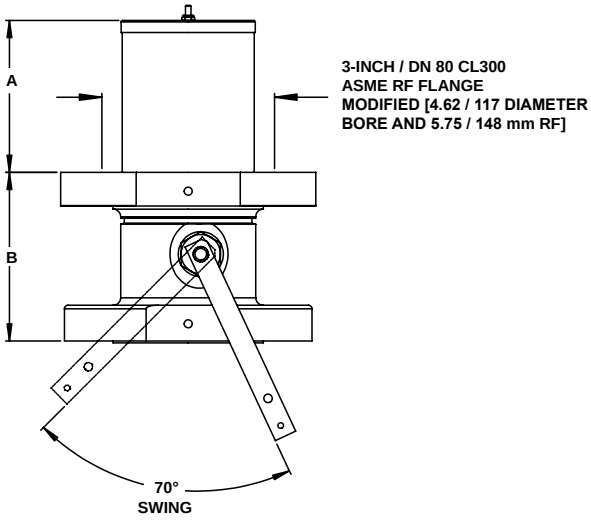


Tank Connections								
MODIFIED CL300 ASME RF FLANGE	DIMENSIONS, INCHES / mm							MATING FLANGE O.D., INCHES / mm
	A			B RF	C RF	D	E	
	DBC	No.	Size					
3-inch / DN 80	6.62	8	0.75	5.75 / 146	0.06 / 1,5	1.50 / 38	4.62 / 117	8.25 / 210
4-inch / DN 100	7.88	8	0.75	7.00 / 178	0.06 / 1,5	1.56 / 40	5.88 / 149	10.00 / 254

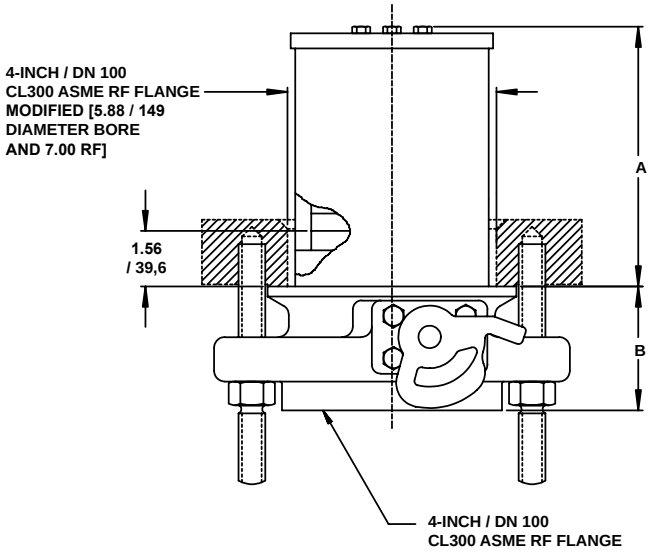
FLANGED INTERNAL VALVES



TYPE C484-24



TYPE C483-24



TYPE C404-32

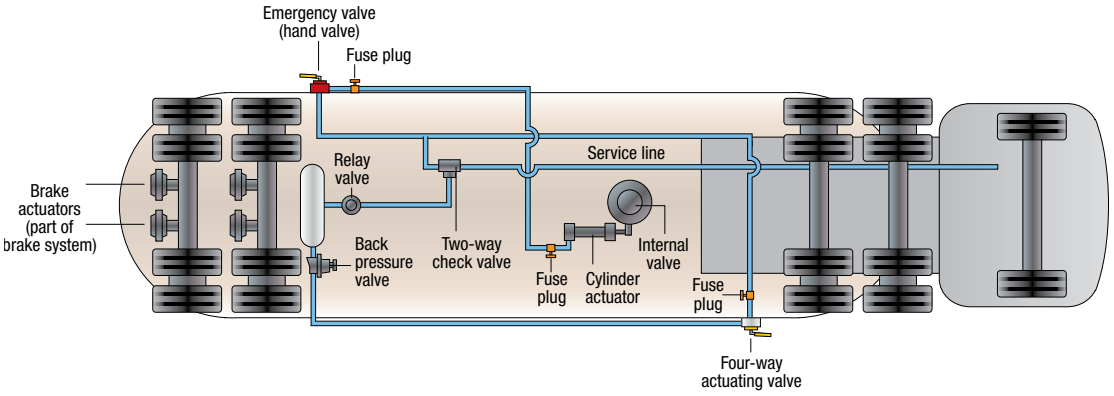
Flanged Valves			
TYPE NUMBER	TANK CONNECTIONS, INCHES / DN	DIMENSIONS, INCHES / mm	
		A	B
C484-24	3 / 80 CL300 RF Flange	6.75 / 171	2.56 / 65
C483-24	3 / 80 CL300 RF Flange	5.33 / 135	5.62 / 143
C404-32	4 / 100 CL300 RF Flange	7.55 / 192	3.48 / 88

Air Interlock Systems

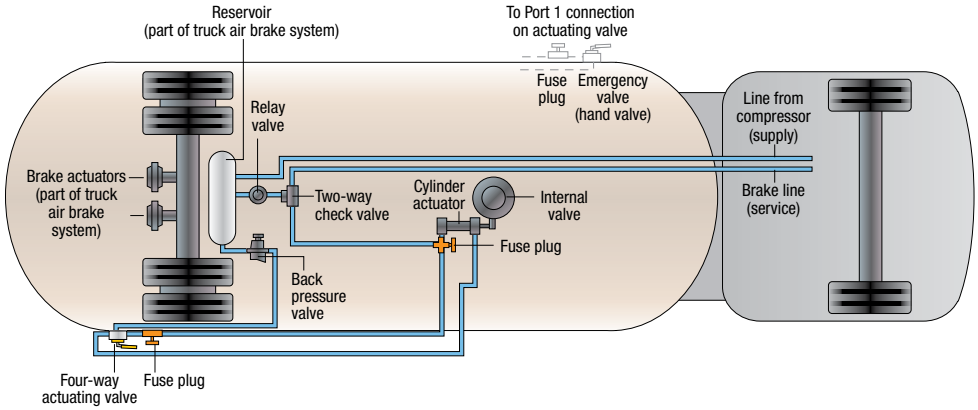
An air interlock system can be configured for transport and bobtail trucks with air brakes by using air cylinder actuated internal valves. This system simultaneously interlocks the internal operation with the truck air brakes without affecting normal air brake operation. It complies with DOT MC331 and NFPA 58 requirements regarding thermal and remote release feasibility.

The air interlock system permits the air brakes to set before the internal valve opens – even if the truck operator forgets to set the brakes. The brakes cannot be released until the internal valve is closed.

In addition, a 4–way actuating valve can be used with Type C404A32 to pressure both sides of the air cylinder depending upon the position of the operating handle. This allows air pressure to close as well as to open the internal valve.



AIR INTERLOCK HOOK-UP ON TRANSPORT TRUCK



AIR INTERLOCK HOOK-UP ON BOBTAIL TRUCK

INTERNAL VALVE ACCESSORIES

TYPE P650

TYPE P341

TYPE P313

TYPE P340

Cable Controls

Fisher® brand cable controls and accessories can be furnished to remotely open and close all internal valves except the 4-inch / DN 100 flanged size. This equipment can be used to comply with NFPA 58 and DOT requirements for MC331 cargo tanks.

Cable systems can also be used on stationary storage tanks at bulk plants and on in-line applications to increase safety during transfer operations. All fusible elements and links used in the cable control systems comply with NFPA 58 and MC331 requirements.

Type P650 or P651 Primary Cable Control – Capable of actuating all Fisher brand internal valves except the 4-inch / DN 100 Type C404-32, the Type P650 or P651 opens and closes the valve from a remote point, usually the rear of the bobtail or transport. Pulling the handle of the primary control opens the internal valve; pushing the handle closes the valve. There are three notches on the primary control that give a travel of 4, 5, or 6-inch / 102, 127, or 152 mm depending upon the travel required by the valve's operating lever.

Included with each Type P650 primary control is a 20-foot / 6,1 m cable, Type P134 fusible links, a return spring and mounting hardware. If just the primary cable control is needed, order Type P651, which is available without any of the other accessories.

Type P163A or P164A Auxiliary Remote Release – These units allow the internal valve to be closed from a location other than the primary control point (Type P650 or P651). Pulling the auxiliary release handle trips the release mechanism on the primary control to close the internal valve.

The two assemblies are identical except for the length. Type P163A has an untrimmed length of 25 feet / 7,6 m and Type P164A has an untrimmed length of 50 feet / 15,2 m. Both cables can be trimmed to any length. Both releases can be installed through mounting brackets up to 3/8-inch / 9,5 mm thick.

Type P164B – a release assembly that uses 50 feet / 15 m of cable housing which does not require elaborate guiding like uncovered cables.

Type P164C – an Auxiliary Remote Release without cable is also available.

Latch/Remote Release Mechanisms

With the exception of the 3-inch / DN 80 flanged sizes, all Fisher brand internal valves can be fitted with a manual latch/remote release mechanism. When the internal valve's operating lever is manually moved to the open position, the lever can be latched in the open position. The lever can be released from a remote location by pulling on the cable attached to a pull ring, thus closing the internal valve. A built-in fusible element in the latch/release melts if exposed to fire allowing the operating lever to return to the closed position.

Type P340 – Fits all 2 and 3-inch NPT internal valves (Types C471 and C477). Type P340 is easily installed in the field by removing two of the three gland cap screws.

Type P341 – Fits 1-1/4-inch NPT C407 Series internal valves. Also available factory installed, Type C407M10.

Type P342 – Bi-directional latch/remote release for the 1-1/4-inch NPT C407-10 Series allows operation from two directions.

Type P313 – Fits 4-inch / DN 100 Type C404-32 internal valves. Also available factory installed, Type C404M32. The Type P315 remote release should be used with this release.

Internal Valve Accessories

INTERNAL VALVE SIZE, INCHES / DN	PRIMARY CABLE CONTROL	AUXILIARY REMOTE RELEASE	CABLE ASSEMBLY	LATCH/RELEASE MECHANISM
1-1/4, 2, and 3 / 32, 50, and 80 (NPT or Flanged)	Type P650 or P651[1]	Type P163A or P164A	Included with Type P650	Type P341, P342 (C407-10 Series) Type P340 (C400 Series)
4 / 100 Flanged	Use Allegheny or Wheaton Control	Type P315	Type P314	Type P313[2]

1. Type P651 is a primary control only, no accessories.
2. Use with Type P315 remote release mechanism.

TYPE P613

TYPE P623

TYPE P639

TYPE P614

TYPE P315

TYPE P631

TYPE P389

NOTE: INTERNAL VALVES SHOWN ARE NOT INCLUDED.

4-inch / DN 100 Valve Accessories

Type P314 – This cable assembly is used as an attachment from the Type C404-32 operating lever to the primary cable control. The assembly includes a 40-foot / 12,2 m cable, a special bushing with a fusible element and clamp. The bushing fits in the valve-operating lever and has a built-in fusible element that will melt if exposed to fire, allowing the Type C404-32 to close. The cable connects to the bushing and the clamp permits the other end of the cable to be attached to the fusible link (not furnished) at the primary cable control.

Type P315 – On manually actuated 4-inch / DN 100 valves (Type C404M32), Type P315 remote handle release can be used to close the internal valve from a remote location. Cable linkage (30 feet / 9,1 m) and mounting hardware are included.

Pneumatic Actuator Accessories

All Fisher® brand internal valves can be ordered with a pneumatic actuators that permits the valve to be opened and closed from a remote location. When air pressure is applied to the actuator, it moves the actuator's rod and internal valve operating lever to the open position. Upon loss of air pressure, the valve's operating lever returns to the closed position. Besides air pressure, nitrogen or carbon dioxide can also be used to pressure the actuators.

Use of a pneumatic actuator permits the opening and closing of the internal valve to be tied into the air brake of the transport or bobtail. Pneumatic Actuators can also provide a convenient way to remotely operate a number of internal valves on stationary storage tanks at bulk plants.

Type P389 (1-1/4-inch / DN 32 Size) – This actuator can only be used with the C407-10 Series valve. All necessary hardware for installing the actuator is included. Minimum pressure is 60 psig / 4,1 bar; maximum pressure is 250 psig / 17,2 bar.

Types P613, P623, P639, and P614 Actuators – Also available factory installed (Type C404A32), the actuator attaches directly to the valve after removal of the cable-operating lever. Included in each assembly is an operating lever and mounting hardware.

These actuators can only be used with the internal valves as specified on the table below. Minimum pressure is 20 psig / 1,4 bar; maximum pressure is 125 psig / 8,6 bar.

Type P631 (1-1/4 inch / DN 32 Size) – This actuator features a stainless steel enclosure for durability in harsh environments. All necesary hardware for installing the actuator is included. This actuator can only be used with C407-10 Series valve. Minimum pressure is 20 psig / 1,4 bar; maximum pressure is 40 psig / 2,8 bar.

Fuse Plugs – When installed in the actuator piping at the valve, will allow the pneumatic pressure to vent closing the valve if the plug is exposed to temperature above 208° to 220°F / 98° to 104°C. Fuse plugs are available in two sizes, 1/8-inch NPT (T1140399982) and 1/4-inch NPT (T1033699982).

Pneumatic Actuators Ordering Information

INTERNAL VALVE TYPE NUMBER	PNEUMATIC ACTUATOR TYPE NUMBER	MAXIMUM INLET PRESSURE TO ACTUATOR, psig / bar	MINIMUM OPERATING PRESSURE TO ACTIVATE INTERNAL VALVE, psig / bar
C407-10	P389	250 / 17,2	60 / 4,1
C407-10	P631	40 / 2,8	20 / 1,4
C484-24	P613	125 / 8,6	20 / 1,4
C483-24	P623	125 / 8,6	20 / 1,4
C471 and C477 (2 and 3-inch NPT Sizes)	P639	125 / 8,6	20 / 1,4
C404-32	P614	125 / 8,6	20 / 1,4

EMERGENCY SHUTOFF VALVES

TYPE N550 (VALVE CLOSED)

TYPE N550 WITH TYPE P327D

TYPE N550 WITH TYPE P539A

Snappy Joe™ Emergency Shutoff Valves for Bulk Plants

Snappy Joe™ **Type N550** Emergency Shutoff Valves (ESVs) are designed for in-line installations, usually near a bulkhead. The valves provide a means of shutting off gas in the event of a hose rupture or piping break at the transfer area to avoid a large scale loss of LP-Gas or anhydrous ammonia (NH_3).

The valves can be manually opened and closed at the installed location or closed remotely by either cable or air. A remote operating actuator is also available.

High Flow Capacity – The main poppet moves completely out of the flow stream for extremely low restriction-to-flow.

Operational Ease – Moving the operating lever to the vertical position opens the valve, making it simple to tell if the unit is open or closed. A pilot valve in the poppet opens as the lever is moved upward to pressurize the hose. Once equalized, the poppet moves quickly to the open position.

The valve is closed by simply pushing the lever down without first having to trip a latch. The operating lever is easily reached from across a bulkhead. All sizes look similar and operate exactly the same, an important point in an emergency situation.

Fusible Element – The fusible element is located at the hub of the operating lever and stub shaft. When exposed to fire, the element melts allowing the stub shaft to turn. The poppet then moves to the closed position, even if the operating lever has been wired open.

Rugged Construction – Heavy duty construction makes Snappy Joe™ ESVs suitable for use as a "working" shutoff valve for the transfer area, even under frequent use. The internal closing spring is protected from the elements and tampering. All seats and seals use metal back-up seals for extended fire resistance. The valves are rated 400 psig / 27,6 bar WOG.

Ease of Service – Serviceable without removal from the pipeline. Parts that wear are external and can be changed out in a matter of minutes. The packing can be changed with the valve in-line.

Cable Release – Standard valves are fitted with a release mechanism for cable attachment. A cable connected to the wire loop allows closure from a safe remote location, such as the bulk plant entrance.

While the ordinary cable can be used, the **Type P164B** release assembly is available. This assembly uses 50 feet / 15 m of cable housing which does not require elaborate guiding like uncovered cables.

Pneumatic Operation – Remote pneumatic closure is available with **Type P327D** release. Depending upon valve inlet pressure, a minimum supply pressure of 30 to 70 psig / 2,1 to 4,8 bar on the Type P327D allows the valve to be latched in the open position with manual closure possible at the valve. Loss of supply pressure to the cylinder permits the ESV to close. Air, nitrogen, or CO_2 can be used for the cylinder supply source. Maximum inlet pressure to the cylinder is 125 psig / 8,6 bar. Operating Temperature Range = -40° to 212°F / -40° to 100°C.

Type P539A pneumatic actuator permits opening and closing Fisher® brand N550 Series Snappy Joe™ emergency shutoff valves (ESVs) both at the valve with the use of a pneumatic 4-way valve and from a remote location. The actuator opens the valve when pressure is applied. Minimum pressure is 20 psig / 1,4 bar and maximum pressure is 30 psig / 2,1 bar.

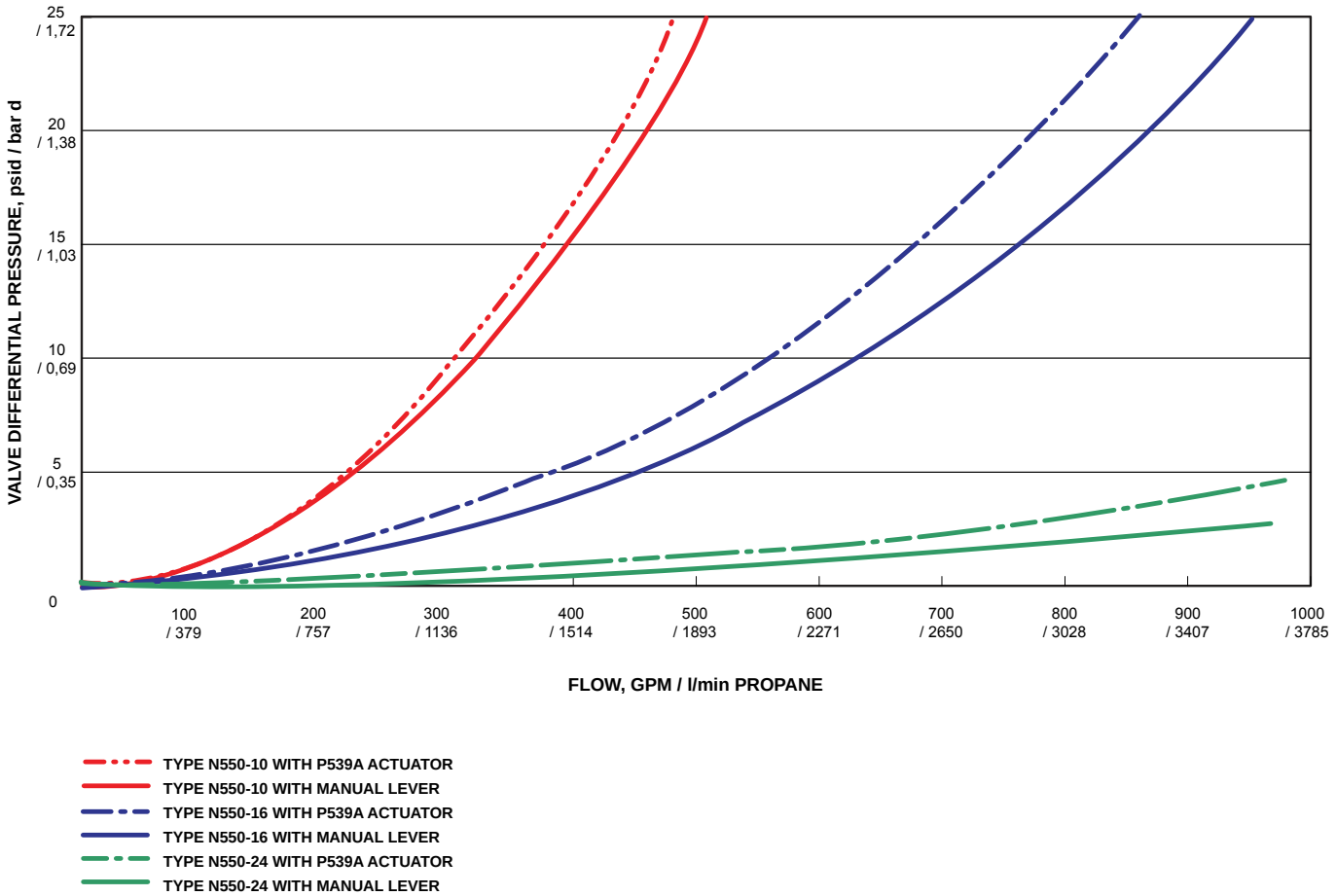
Upon loss of pressure, the N550 Series closes, assisted by the spring in the pneumatic actuator.

Fisher brand makes available a small 3-way control valve **(T1139599012)** for pneumatic ESV installation. This control valve can be used as primary control (open or close the ESV) or an auxiliary remote release (close only).

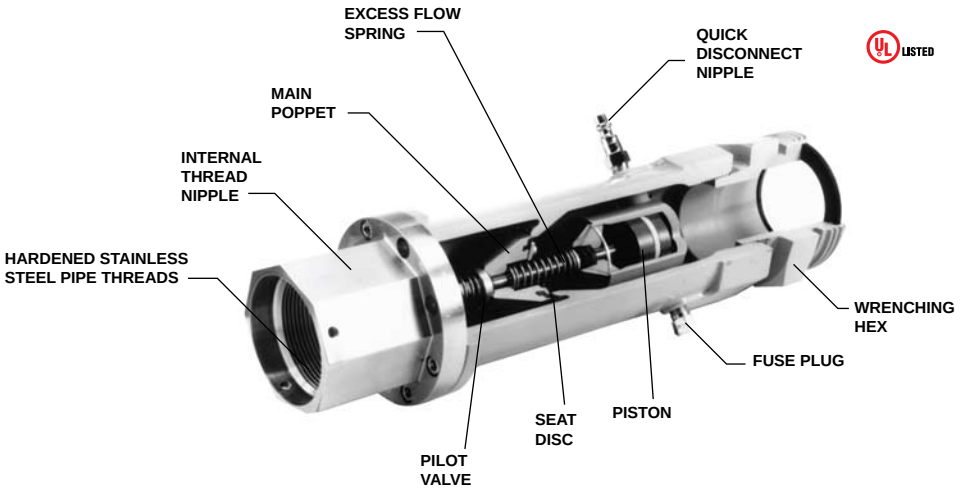
Placing the valve's button in the upward position permits pressure to the cylinder. Pushing the button down exhausts pressure to close all valves connected to the system.

Emergency Shutoff Valves				
TYPE NUMBER	BODY SIZE, INCHES	FLOW IN GPM / l/min PROPANE		ACCESSORIES
		1 psid / 69 mbar d	2 psid / 0,14 bar d	
N550-10	1-1/4 FNPT	50 / 189	75 / 284	Type P164B Cable Release Type P327D Pneumatic Release Type P539A Pneumatic Actuator T1139599012 Control Valve
N550-16	2 FNPT	75 / 284	115 / 435	
N550-24	3 FNPT	195 / 738	275 / 1041	

TYPE N550 CAPACITY CURVE



EMERGENCY SHUTOFF VALVES



TYPE N562

Snappy Joe™ Emergency Shutoff Valves for Railroad Tank Cars

Snappy Joe™ Type N562 Emergency Shutoff Valves (ESVs) are designed for railcar protection and attached to the shutoff valves on railroad tank cars (refer to installation drawing). Typically three Type N562s are used – two on the liquid lines and one on the vapor line. NFPA 58 regulations call for ESV protection on both sides of the transfer hose or piping.

Pneumatically operated, the valve is opened and closed by means of a standard quick-disconnect coupling (furnished). Approximately 20 to 60 psig / 1,4 to 4,1 bar is needed to open the valve, depending upon tank car pressure.

Remote closure from one or more points, such as the unloading riser, is accomplished by exhausting pressure from the valve's piston chamber with a pneumatic control valve.

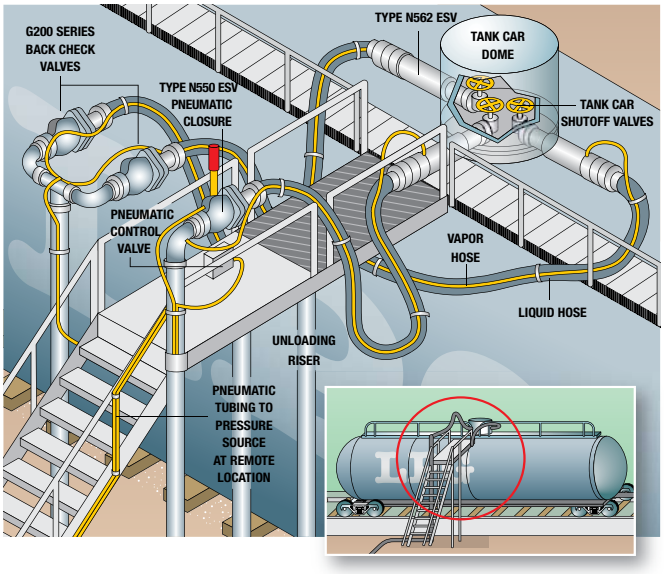
Application Flexibility/Field Serviceability – The Type N562 has a 2-inch NPT female coupling. Nipple lengths attached to the 2-inch NPT coupling are field selectable based on specific application requirements (i.e. the size of the tank dome opening). These field-installed nipples can be easily secured and replaced.

Wrenching Hex – A wrenching hex is built into the body and nipple preventing wear or damage when connecting or disconnecting. A 1/4-inch FNPT opening in the hex portion can be used to install a bleed valve.

Hardened Threads – The 2-inch FNPT threads on the nipple portion are of hardened stainless steel to reduce wear from repeated use.

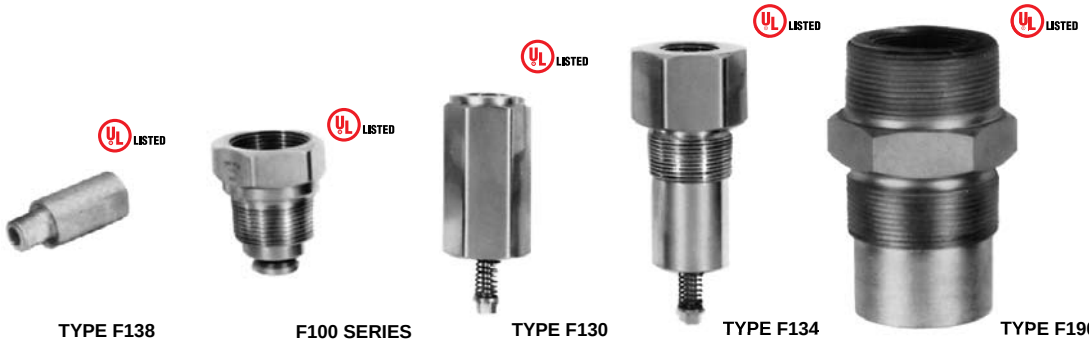
Excess Flow Valve – With a poppet design similar to internal valve series, an excess flow spring is available. The spring has a closing flow of 200 GPM / 757 l/min propane at 13 psid / 0,90 bar d.

Dual Service – With all internal parts either stainless steel or plated steel, the valve can be used on anhydrous ammonia (NH_3) service as well as LP-Gas.



Type N562 Emergency Shutoff Valves		
TYPE NUMBER	SHUTOFF VALVE CONNECTION, INCHES	HOSE CONNECTION, INCHES
N562-16	2 FNPT	2 FNPT
N562-18	2 FNPT	2-1/4 Male Acme
N562-26	2 FNPT	3-1/4 Male Acme

Excess Flow Valves



TYPE F138 | F100 SERIES | TYPE F130 | TYPE F134 | TYPE F190

Excess flow check valves are intended to close upon excessive discharge of vapor or liquid resulting from a break in the hose or piping system. They are used to protect cylinder, tank and piping systems, and are available in a large variety of sizes and body configurations.

When flow exceeds the valve's setting, the valve closes and remains closed until the system equalizes. A built-in equalizing passage automatically opens the valve once pressure on both sides of the poppet is equal. Valves larger than 1/2-inch NPT have a drill size No. 60. Valves with a 1/2-inch NPT and smaller have a limited bypass to comply with NFPA 58.

WARNING

A break or leak downstream of an excess flow valve, that does not allow a flow equal to the valve flow rating, will not actuate the valve and could cause a hazardous condition. For this reason, system operators should be familiar with the shutoff valves in the system so that necessary precautions can be taken in an emergency.

Care must be taken to be sure the valve's closing rate is less than the capacity of the LP-Gas or anhydrous ammonia (NH_3) system in which the valve is installed. Brass valves are not suitable for anhydrous ammonia (NH_3) applications.

See the WARNING on page 53, if these excess flow valves are to be used on DOT Cargo Tanks.

Excess Flow Check Valves

TYPE NUMBER	MATERIAL	APPLICATION	INLET CONNECTION, INCHES	OUTLET CONNECTION, INCHES	UL RATED CLOSING FLOW, PROPANE (HORIZONTAL POSITION)			DIFFERENTIAL PRESSURE, psid / bar d	WORKING PRESSURE, psig / bar
					Liquid GPM / l/min	Vapor SCFH / SCMH			
						25 psig / 1,7 bar Inlet	100 psig / 6,9 bar Inlet		
F138	Brass	In-Line	1/4 MNPT	1/4 FNPT	1.8 / 6,8	377 / 10,7	641 / 18,2	1.4 / 0,097	250 / 17,2
F202	Brass		Male POL	1/2 SAE Flare	1.9 / 7,2	634 / 17,9	1100 / 31,1	2.6 / 0,18	
F170	Brass	Tanks (Full or Half Coupling)	3/4 MNPT	3/4 FNPT	6.6 / 25,0	1184 / 33,5	2012 / 57,0	1.2 / 0,08	
F100	Brass				8.4 / 31,8	2010 / 56,9	3417 / 96,8	2.4 / 0,17	
F101	Brass				20 / 76,0	3459 / 97,9	5880 / 167	8.5 / 0,59	
F102	Brass		1-1/4 MNPT	1-1/4 FNPT	33 / 125	6300 / 178	10 630 / 301	10.7 / 0,74	
F105	Brass				55 / 208	9982 / 283	16 967 / 480	10.7 / 0,74	
F106	Brass		2 MNPT	2 FNPT	85 / 322	18 513 / 524	31 467 / 891	2.6 / 0,18	
F107	Brass				100 / 379	20 796 / 589	35 349 / 1001	3.6 / 0,25	
F130	Brass	In-Line	1 FNPT	1 FNPT	25 / 94,6	5287 / 150	8986 / 254	3.3 / 0,23	
F131	Brass		1-1/2 FNPT	1-1/2 FNPT	60 / 227	11 694 / 331	19 877 / 563	4.7 / 0,32	
F132	Brass		2 FNPT	2 FNPT	96 / 363	19 874 / 563	33 877 / 959	2.1 / 0,14	
F133	Brass				155 / 587	29 202 / 827	49 718 / 1408	4.2 / 0,29	
F134	Brass	Tanks (Full or Half Coupling)	1-1/2 MNPT x 1 FNPT	1 FNPT	28 / 106	5181 / 147	8806 / 249	2.7 / 0,19	
F135	Brass		2-1/2 MNPT x 1-1/2 FNPT	1-1/2 FNPT	60 / 227	12 000 / 340	20 290 / 575	5.2 / 0,35	
F190	Steel	Tanks[1] (Full or Half Coupling)	2 MNPT	2 MNPT x 1-1/4 FNPT	80 / 303	15 400 / 436	26 250 / 743	3.7 / 0,26	
F191	Steel				105 / 397	18 800 / 532	32 000 / 906	8.9 / 0,61	
F194	Steel		3 MNPT	2 MNPT	165 / 625	32 800 / 929	55 950 / 1584	3.1 / 0,21	
F195	Steel				260 / 984	50 650 / 1434	86 350 / 2445	6.9 / 0,48	
F198	Steel		3 MNPT	3 MNPT x 2 FNPT	165 / 625	33 000 / 934	56 250 / 1593	3.1 / 0,21	
F199	Steel				260 / 984	49 500 / 1402	84 350 / 2389	7.1 / 0,49	

1. LP-Gas or NH_3 service.

Internal Relief Valves

Flush Mounted Internal Relief Valves

Primarily for trucks transporting LP-Gas, anhydrous ammonia (NH_3) or other compressed gases. Types H722 and H732 stainless steel relief valves resist rust and corrosion. Stainless steel makes it easy to remove the valve from the tank for periodic testing (as prescribed by DOT), and permits standard tank couplings instead of the more costly flanged tank openings. Field-Repairable valve seats allow for seat replacement without affecting relief setpoint.

Tight fitting protective caps (Types P297 and P298) are standard on the valve to ensure no debris blocks the valve discharge. Standard setpoints listed with UL and approved by ASME include 125, 156, 250, 265, 275, and 312 psig / 8,6; 10,8; 17,2; 18,3; 19,0; and 21,5 bar. Special setpoints are available from 100 to 400 psig / 6,9 to 27,6 bar with ASME approvals. The flow area is 1.39 square inches for the Type H722 and 3.20 square inches for the Type H732.

A 1-1/2 and 2-1/2-inch hex size (Type P304 or P305) wrench can be inserted into the valve socket when installing/removing the valve to provide a means of attaching a standard wrench.

TYPE H722 OR H732

Flush Mounted Internal Relief Valves

TYPE NUMBER	CONTAINER CONNECTION, INCHES	START-TO-DISCHARGE SETTING, psig / bar	FLOW CAPACITY, SCFM / SCMH AIR		FOR TANK WITH AREA UP TO[3]: Ft^2 / m^2	PROTECTIVE CAP (INCLUDED)
			UL	ASME		
H722-250	2 MNPT[1]	250 / 17,2	3660 / 6218	3024 / 5136	171 / 15,9	Type P297
H722-265		265 / 18,3	3555 / 6042	3387 / 5753	166 / 15,4	
H722-275		275 / 19,0	3714 / 6310	3509 / 5960	175 / 16,3	
H732-250	3 MNPT[2]	250 / 17,2	10 508 / 17 853	8827 / 14 997	624 / 58,0	Type P298
H732-265		265 / 18,3	11 220 / 19 063	9332 / 15 855	676 / 62,8	
H732-275		275 / 19,0	11 736 / 19 940	9669 / 16 428	714 / 66,3	

1. Order Type P304 (1-1/2-inch hex bar) installation wrench.
2. Order Type P305 (2-1/2-inch hex bar) installation wrench.
3. Based on UL flow capacities.

Large Relief Valves

Types H282 and H5112 internal spring relief valves can be used in the Combo Joe™ relief valve manifold or as separate units on stationary tanks. The valves are identical except for valve body materials – Type H282 of brass (LP-Gas service) and Type H5112 of 430 stainless steel (anhydrous ammonia (NH_3) or LP-Gas service). Flow area is 3.20 square inches.

When used in ASME tanks, internal spring relief valves have only the poppet and part of the body outside the tank. The adjusting screw and all other parts are inside the tank, safe from tampering. Field-Repairable valve seats allow for seat replacement without affecting relief setpoint. Standard setpoints listed with UL and approved by ASME includes 125, 156, 225, 250, 265, 275, and 312 psig / 8,6; 10,8; 15,5; 17,2; 18,3; 19,0; and 21,5 bar. Special setpoints are available 100 to 400 psig / 6,9 to 27,6 bar with ASME approvals.

The drain deflector is furnished as standard on both the Types H282 and H5112. Type P104-24 pipeaway adaptor (3-inch FNPT) is available for use with either valve. A 3-1/2 inch wrench can be used when installing or removing the valve.

TYPE H282 OR H5112

Large Relief Valves

TYPE NUMBER[2]	CONTAINER CONNECTION, INCHES	SERVICE	CONSTRUCTION MATERIAL	START-TO-DISCHARGE SETTING, psig / bar	FLOW CAPACITY, SCFM / SCMH AIR		FOR TANK WITH AREA UP TO[1]: Ft^2 / m^2
					UL	ASME	
H282-250	2 MNPT	LP-Gas	Brass	250 / 17,2	11 050 / 18 774	9724 / 16 521	664 / 61,7
H282-275				275 / 19,0	12 220 / 20 763	10 651 / 18 096	750 / 69,7
H5112-250		NH_3 or LP-Gas	Stainless Steel	250 / 17,2	11 050 / 18 774	9724 / 16 521	664 / 61,7
H5112-265				265 / 18,3	11 814 / 20 072	10 280 / 17 466	719 / 66,8
H5112-275				275 / 19,0	12 220 / 20 763	10 651 / 18 096	750 / 69,7

1. Based on UL flow capacities.
2. Use with a 3.5-inch hex size installation tool.

TYPE H100

TYPE P206

TYPE P174

TYPE H185

External Relief Valves

Used on ASME and DOT containers, all working parts of these valves are outside the container connection so they must be protected against mechanical damage.

The external relief valves use Brass as material of construction.

Protective caps are shipped with Fisher™ brand external relief valves. Replacement caps may be ordered separately (refer below).

Small External Relief Valves

TYPE NUMBER[2]	CONTAINER TYPE	START-TO-DISCHARGE SETTINGS, psig / bar	CONTAINER CONNECTION, INCHES	FLOW CAPACITY, SCFM / SCMH AIR	ACCESSORY TYPE NUMBERS	
				UL	Pipeaway Adaptor	Protective Cap
H110-250	ASME	250 / 17,2	1/4 MNPT	310 / 527	- - - -	P206
H185-250			3/4 MNPT	2223 / 3777	- - - -	P145
H185-275		275 / 19,0	3/4 MNPT	2456 / 4173	- - - -	P143
H110-312		312 / 21,5	1/4 MNPT	390 / 663	- - - -	P206
H148	DOT or Hydrostatic Relief	375 / 25,9	1/2 MNPT	903 / 1534[1]	P174 (1/2-inch FNPT)	P206
H173			3/4 MNPT			
H123	Hydrostatic Relief		1/4 MNPT	- - - -	- - - -	P206
H120-120		120 / 8,3	1/4 MNPT			
H124		450 / 31,0	1/4 MNPT			
H144			1/2 MNPT			
H174			3/4 MNPT			

1. DOT cylinder water capacity 500 pounds / 227 kg, approved by Bureau of Explosives and CGA.
2. Replacement valves for the Types H135 and H160 will be available in Spring 2011, if we do not provide you with detailed information for UL approved Types H125 and H150 relief valves. Please contact your Fisher LP-Gas Equipment Distributor.

GLOBE AND ANGLE VALVES

TYPE N310
GLOBE VALVE

TYPE N310-24
GLOBE VALVE

TYPE N410-24
ANGLE VALVE

TYPE N450
ANGLE VALVE

Globe and angle valves are widely used at bulk plants to control gas flow in the piping system, at storage tanks, on trucks, and at pumps or compressors. Their body configuration permits installation in a straight section of pipe (globe body) or where it is desired to make a change in piping direction (angle body).

All units have a 1/4-inch FNPT plugged boss in the downstream side of the body. A hydrostatic relief valve (Type H124) or a vent valve (Type J402S) can be installed in this outlet.

Heavy-duty ductile iron (DI A395) valves for either LP-Gas or NH_3 service. Ranging in size from 1/2 to 3-inch / DN 15 to 80, each valve has spring loaded PTFE chevron packing for an effective seal against leakage. The valves are rated for 400 psig / 27,6 bar WOG and a maximum temperature of 150°F / 66°C.

Valve disc rotation stops as soon as the disc contacts the body seat to help minimize disc wear. Oversize ports in all units give high flow capacity.

Types N310 and N410 – Heavy-duty ductile iron valves for either LP-Gas or Anhydrous Ammonia (NH_3) service. Ranging in size from 1/2 to 3-inch / DN 15 to 80 each valve has spring loaded PTFE chevron packing for sealing against leakage. Ball bearing valve disc construction on 1-1/4-inch / DN 32 and larger sizes, gives a strong connection to the stem to protect the disc under back-flow conditions.

Types N350 and N450 – Economy globe and angle valves for LP-Gas service. With many of the construction features of the Types N310 and N410, these valves can be supplied in 1/2 and 3/4-inch / DN 15 to 80 sizes. PTFE spring-loaded packing provides an effective seal against leakage within the valve's pressure range.

Globe and Angle Valves

SERVICE	INLET AND OUTLET CONNECTIONS, INCHES / DN	TYPE NUMBER			
		Heavy-Duty Version		Economy Version	
		Globe	Angle	Globe	Globe
LP-Gas and NH_3	1/2 FNPT	N301-04	N401-04	- - - -	- - - -
	3/4 FNPT	N301-06	N401-06	- - - -	- - - -
	1 FNPT	N301-08	N401-08	- - - -	- - - -
	1-1/4 FNPT	N310-10	N410-10	- - - -	- - - -
	1-1/2 FNPT	N310-12	N410-12	- - - -	- - - -
	2 FNPT	N310-16	N410-16	- - - -	- - - -
	3 FNPT	N310-24	N410-24	- - - -	- - - -
	3 / 80 ASME Flange	N310F-24	N410F-24	- - - -	- - - -
LP-Gas	1/2 FNPT	- - - -	- - - -	N350-04	N450-04
	3/4 FNPT	- - - -	- - - -	N350-06	N450-06

Back Check Valves

G100 SERIES

TYPE G105

TYPE G201

Back check valves allow flow in only one direction and are normally closed. They are installed in liquid filling connections on stationary storage tanks, bobtail delivery trucks and liquid transfer lines.

G100 Series

G100 Series – used mainly in tank inlet connections, are offered in two styles of seat construction: metal-to-metal or soft seat. The soft seated construction is for the filling connection on bobtail delivery trucks. Because the valve gives tight shutoff, piping on the bobtail can be depressurized for maintenance or repair without leakage. The G100 Series has a 250 psi / 17,2 bar rating and bubbles at 0.25 psid / 17 mbar d.

Type G109 – was designed for in-line service at bulk plants with FNPT connections for easy installations.

G200 Series

G200 Series – back check valves are specifically intended for heavy-duty in-line service at the bulk plant's transfer area. The valves are suitable for LP-Gas or Anhydrous Ammonia (NH_3) service.

Flow moves the spring loaded poppet to the open position as soon as pressure differential is created. When flow stops, the poppet closes. A soft seat construction gives tight shutoff so that piping can be blown down for maintenance.

With a body designed to reduce flow resistance, flow capacity is high. The 2-inch / DN 50 body size gives 350 GPM / 1325 l/min LP-Gas at 10 psig / 0,69 bar differential pressure.

The G200 Series is built to stay on the job with all internal parts of plated steel or stainless steel.

Type G201 – has a built-in flow indicator mechanism, (see illustration), which can be used to replace sight flow indicators.

Specifications

Types G200 and G201

Pressure Rating: 400 psig / 28 bar WOG
Body: Ductile iron
Internal Parts: Plated steel or stainless steel
Seat Disc: Synthetic rubber with metal-to-metal backup

Back Check Valves

SEAT CONSTRUCTION	CONTAINER OR INLET CONNECTION, INCHES	OUTLET CONNECTION, INCHES	PROPANE FLOW CAPACITY AT 10 psig / 0,69 bar DIFFERENTIAL PRESSURE, GPM / l/min	TYPE NUMBER			
				Brass	Steel	Ductile Iron	
						No Flow Indicator	Flow Indicator
Metal-to-Metal	3/4 MNPT	3/4 FNPT	21 / 79,5	G100	- - - -	- - - -	- - - -
	1-1/4 MNPT	1-1/4 FNPT	55 / 208	G101	- - - -	- - - -	- - - -
	2 MNPT	2 FNPT	150 / 568	G102	G112	- - - -	- - - -
	2 FNPT	2 FNPT	150 / 568	G109	- - - -	- - - -	- - - -
	3 MNPT	3 FNPT	250 / 946	- - - -	G104	- - - -	- - - -
Soft Seat	1-1/4 FNPT	1-1/4 FNPT	190 / 719	- - - -	- - - -	G200-10	G201-10
	2 FNPT	2 FNPT	350 / 1325	- - - -	- - - -	G200-16	G201-16
	2 MNPT	2 MNPT and 1-1/4 FNPT	137.5 / 520	- - - -	G105	- - - -	- - - -
	3 FNPT	3 FNPT	800 / 3028	- - - -	- - - -	G200-24	G201-24
	3 FNPT	2 MNPT	254 / 961	- - - -	G106	- - - -	- - - -
	3 MNPT	3 MNPT and 2 MNPT	254 / 961	- - - -	G107	- - - -	- - - -

Hose End, Filler, and Liquid Transfer Valves

Hose End Valves

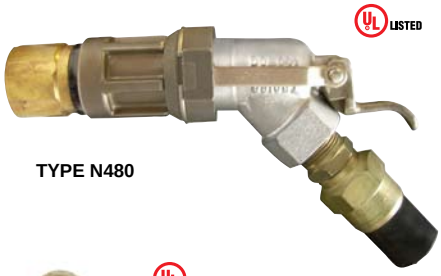
Type N480 – hose end valves are intended for quick opening and closing during bobtail truck deliveries of LP-Gas or Anhydrous Ammonia (NH_3). The unique design prevents opening unless attached to a 1-3/4-inch ACME filler valve at the tank. The 45° angle body configuration with 1-inch NPT inlet gives maximum handling ease during the transfer operation.

For increased safety, the Type N480 is designed to stay closed unless connected even with the operating lever in the open position. This prevents accidental opening during hose reel-up or at other times. The fluted coupler permits quick attachment to the filler valve and the operating lever is easy to reach for opening or closing.

Type M570 – filler hose adaptor, included with the Type N480, permits the hose end valve to be removed from filler valves that fail to close.

Type N481 – hose end valves without the Type M570 filler hose adaptor can be supplied for Anhydrous Ammonia (NH_3) applications.

Caution: Other brands of filler hose adaptors should not be used with the Type N480 because they could allow accidental opening of the valve while it is being handled.



TYPE N480

TYPE D140 OR D141

TYPE D138 OR D139

Large Filler Valves

Regulator Technologies offers large filler valves with heavy-duty construction throughout for rapid filling of ASME tanks or trucks. Thick-walled bodies, formed seat retainers and generous wrenching flats minimize damage to internal parts. The flow channel design offers low resistance-to-flow for increased pump and hose service.

Types D138 and D139 – offer single back check valves for use with either a supplementary G Series back check valve or a manual shutoff valve.

Types D140 and D141 – provide a two-piece design with both an upper and lower back check. The bubble tight upper back check has a resilient seat for maximum service life. A metal-to-metal lower back check protects against loss of product in case of an accident and permits removal of the upper body with the tank under pressure.

Large Filler Valves			
TYPE NUMBER	CONNECTIONS CONTAINER MNPT x LINE ACME	BACK CHECK STYLE	FILLING CAPACITY GPM / l/min PROPANE AT 10 PSI / 0,69 bar DIFFERENTIAL
D138	2 x 2-1/4-inch	Single	105 / 397
D140		Double	100 / 379
D139	3 x 3-1/4-inch	Single	275 / 1041
D141		Double	225 / 852

Liquid Transfer Valves

The Type N456 attaches to a liquid withdrawal valve or similar constructions. The withdrawal valve is activated by means of a special adaptor on the Type N456 that opens the valve the correct distance to permit liquid transfer from the customer tank to the storage tank.

Type N456 – Special 3/4-inch MNPT inlet x 1-3/4-inch male ACME outlet. Consists of a Type N450-06 angle valve, a Type M455 inlet adaptor, a Type M215 outlet adaptor, and a cap and chain to keep dirt from entering the valve when it is not in use.

Type M455 – Special 3/4-inch MNPT inlet x 3/4-inch MNPT outlet. Opens the tank's liquid withdrawal valve the correct distance to permit transfer operations. A nylon gasket is supplied for a tight seal with the withdrawal valve.

Types N456 and M455 should be used with Types F171* and F210* Liquid Withdrawal Valves.

TYPE M455

TYPE N456

*Types F171 and F210 valves are obsolete Fisher® products. Kindly contact your LP-Gas Equipment Distributor.

Bypass Valves for Large Pumps

Designed for bypass on 2 to 4-inch size pumps, the N100 Series is widely used on both LP-Gas and Anhydrous Ammonia (NH_3) applications. The throttling action of the N100 Series allows only surplus pump discharge to be returned to the tank.

A venturi flow passage gives a boost effect, permitting a greater valve opening for increased flow at the lower pressure build-ups when bypassing full pump output. These features help to give rapid, stable liquid transfer and reduce dangerous pressure pulsations. The valves contain only one moving part - the piston style inner valve.

An external sensing line is not required because tank pressure registers through a hole in the inner valve. Complete field servicing can be made without removing the valve from the piping.

All N100 Series bodies have a 1/4-inch FNPT tapped and plugged boss on the side inlet for either a pressure gauge or a hydrostatic relief valve.

N100 SERIES

Large Pump Bypass Valves				
TYPE NUMBER	**PUMP SIZE, INCHES**	**BODY SIZE, INCHES**	**PSID SETTING, psig / bar**	**PSID RANGE, psig / bar**
N100A-08-1[1]	2	1 FNPT	50 / 3,4	25 to 75 / 1,7 to 5,2
N100A-08-2[1]			115 / 7,9	50 to 150 / 3,4 to 10,3
N100A-10-1[1]	2 or 3	1-1/4 FNPT	50 / 3,4	25 to 75 / 1,7 to 5,2
N100A-10-2[1]			115 / 7,9	50 to 150 / 3,4 to 10,3
N100A-12-1[1]		1-1/2 FNPT	50 / 3,4	25 to 75 / 1,7 to 5,2
N100A-12-2[1]			115 / 7,9	50 to 150 / 3,4 to 10,3
N100-16-1	4	2 FNPT	50 / 3,4	25 to 75 / 1,7 to 5,2
N100-16-2			115 / 7,9	50 to 150 / 3,4 to 10,3
N100-20-1		2-1/2 FNPT	50 / 3,4	25 to 75 / 1,7 to 5,2
N100-20-2			115 / 7,9	50 to 150 / 3,4 to 10,3

1. Only the N100A's are UL listed.

Bypass and Backpressure Valves

Bypass Valves for Small Pumps

N110 Series – is intended for bypass service on the smaller pumps (5 to 40 GPM / 18,9 to 151 l/min) used on stationary tanks or delivery trucks. Suitable for LP-Gas or Anhydrous Ammonia (NH_3) installations, the valve has an internal sensing orifice and does not require an external sensing line. A vent opening of the sensing orifice channel allows trapped vapor to escape, eliminating any vapor in the system when the pump is started. The compact size of the N110 Series (less than 6.5-inches / 165 mm overall) permits installation in limited space. A 1/4-inch FNPT tapped and plugged boss on the inlet side of the body can be used to install a hydrostatic relief valve or a pressure gauge. The valve does not have to be removed from the line for servicing; all internal parts can be reached by unscrewing the union nut.

N110 SERIES

Small Pump Bypass Valves				
TYPE NUMBER	**PUMPING CAPACITY, GPM / l/min**	**BODY SIZE, INCHES**	**PSID SETTING, psig / bar**	**PSID RANGE, psig / bar**
N110-06-1	5 to 20 / 18,9 to 75,7	3/4 FNPT	50 / 3,4	25 to 75 / 1,7 to 5,2
N110-08-1	20 to 40 / 75,7 to 151	1 FNPT		
N110-06-2	5 to 20 / 18,9 to 75,7	3/4 FNPT	100 / 6,9	75 to 150 / 5,2 to 10,3
N110-08-2	20 to 40 / 75,7 to 151	1 FNPT		

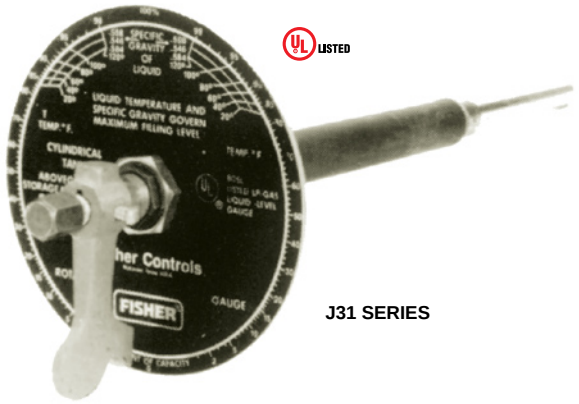
Backpressure Valves

These valves are soft seated, holding a differential backpressure on liquid meters. A N120 Series backpressure valve is installed after the meter, and it holds backpressure on the meter until vapor is forced back to the tank through the vapor eliminator. In this way vapor cannot form within the meter during liquid delivery.

Intended for smaller pumps, N120 Series are ideal on such applications as cylinder filling installations. All units have a 1/4-inch FNPT tapped and plugged boss on the inlet side of body and can be used for both LP-Gas and Anhydrous Ammonia (NH_3) service. The N120 Series has a 1/4-inch FNPT connection in the closing cap for attachment of an external sensing line from the tank vapor space or vapor eliminator.

N120 SERIES

Backpressure Valves				
TYPE NUMBER	**LIQUID METER SIZE, INCHES**	**BODY SIZE, INCHES**	**PSID SETTING, psig / bar**	**PSID RANGE, psig / bar**
N120-06-3	3/4 or 1	3/4 FNPT	12 / 0,83	10 to 20 / 0,69 to 1,4
N120-08-3		1 FNPT		



J31 SERIES

TYPE J415-1

TYPE J415

Rotary Gauges

Fisher® brand rotary gauges can be used on stationary or mobile tanks to visually indicate the amount of LP-Gas or Anhydrous Ammonia (NH_3) in the container. They are also used in filling the tank to the proper liquid level. On mobile applications and some large stationary storage tanks, hangers are recommended to support the horizontal length of the dip tube.

The gauge is operated by opening the small bleed orifice when the tube is in the vapor space of the tank. Moving the pointer on the dial causes the end of the tube to move until it contacts liquid in the container. At that point, discharge from the bleed orifice turns from vapor to liquid and the rotary gauge dial gives the volume percentage of liquid in the tank.

J31 Series – consists of heavy duty gauges that minimize vibration effects (swaying, bouncing) by a long (68-inches / 1,73 meters) stem tube extension. Gauges fit 1-inch / 25,4 mm coupling container connections.

All gauges have stem and dip tubes with an extra large inside diameter. This assures that the correct liquid level can be obtained quickly.

A nylon packing sleeve and a friction ring for the pointer indicator gives smooth rotation and long service life. Steel and stainless steel materials resist rust or corrosion.

Rotary Gauges				
LENGTH, INCHES / mm	**LPG DIAL >1200 GALLON**	**LPG DIAL ≤1200 GALLON**	**NH_3 DIAL >1200 GALLON**	**NO DIAL >1200 GALLON**
68 / 1727	Type J31L-1	Type J31S-1	Type J31A-1	Type J31X-1
69 to 92 / 1753 to 2337	Type J31L-2	Type J31S-2	Type J31A-2	Type J31X-2
93 to 108 / 2362 to 2743	Type J31L-3	Type J31S-3	Type J31A-3	Type J31X-3
109 to 140 / 2769 to 3556	Type J31L-3L	Type J31S-3L	Type J31A-3L	Type J31X-3L
Dial Only	Type P323	Type P322	Type P324	- - - -

Liquid Level Vent Valves

Type J415 – with steel construction, can be used on either LP-Gas or Anhydrous Ammonia (NH_3) service. They can also be installed on large bulk storage tanks at the maximum filling level. Standard valve comes with a 3/4-inch MNPT container connection and two 1/4-inch FNPT side outlets.

Type J415-1 – features the addition of a Type J402S liquid level vent valve and Type J542 (0 to 400 psig / 0 to 27,6 bar) pressure gauge installed.

TYPE J402S

TYPE J403S

Vent Valves and Fixed Maximum Liquid Level Gauges

Used in all kinds of LP-Gas containers to give positive visual indication of liquid reaching the maximum allowable liquid level.

Types J402S and J403S do not have dip tubes and must be used in containers where a dip tube has been welded in. Stainless steel constructions are for corrosive service.

J700 SERIES OR TYPE J701

Container Thermometers

Suitable for any size tank in LP-Gas and NH_3 service, the 2-inch / 51 mm diameter dial reads from -40° to 120°F / -40° to 49°C. They are dustproof and waterproof. Specify J700 Series for a 1/2-inch MNPT by a 4 inches / 102 mm length or Type J701 for a 1/2-inch MNPT by 6 inches / 152 mm length.

Couplings and Adaptors

Female ACME Filler Couplings

These couplings allow connection of ACME threads to NPT. One side is 1-1/4 through 4-1/4-inch female ACME. The other side is 3/8 through 3-inch NPT. Available in brass or steel.

Female ACME Filler Couplings					
FEMALE ACME, INCHES	OTHER CONNECTION, INCHES	LENGTH, INCHES / mm		TYPE NUMBER	
				Brass	Steel
1-3/4	1/2 MNPT	3 / 76	1	M110	- - - -
	3/4 MNPT	3 / 76	1	M111	M631-6
		6-1/8 / 156	2	- - - -	M635-6
	1 MNPT	3 / 76	1	M112	M631-8
		7 / 178	2	- - - -	M635-8
2-1/4	1-1/4 MNPT	3-1/4 / 83	3	M120[1]	M121
3-1/4	1-1/4 FNPT	1-1/2 / 38	4	M442	- - - -
	2 MNPT	3-3/4 / 95	3	M130[1]	M133
4-1/4	3 MNPT	4-1/2 / 114	3	M664-24	M634-24

1. Steel Nipple

Female ACME Vapor Return Couplings

Vapor return couplings are available with 1-1/4 through 2-1/4-inch female ACME threads on one side and 3/8 through 1-1/4-inch male NPT threads on the other. Brass or steel construction.

Female ACME Vapor Return Couplings				
FEMALE ACME, INCHES	MALE NPT, INCHES	LENGTH, INCHES / mm		TYPE NUMBER
				Brass
1-3/4	**3/4**	7 / 178	6	- - - -
	1	3-1/4 / 83	5	M151
		7-3/8 / 187	6	- - - -
2-1/4	1-1/4	3-3/8 / 86	7	M160

TYPE M270

Male ACME Adaptors

These adaptors are male ACME to male ACME in sizes 1-1/4 by 1-1/4-inch through 4-1/4 by 4-1/4-inch. Brass or steel construction.

Male ACME Adaptors				
MALE ACME, INCHES	TYPE NUMBER			WASHER DRAWING NUMBER
	Brass	Steel	Ductile Iron	
1-1/4 x 1-1/4	M270	- - - -	- - - -	1E8122
1-3/4 x 1-3/4	M273	M536-14	- - - -	1E8124
2-1/4 x 2-1/4	- - - -	M536-18	- - - -	1E8126
3-1/4 x 3-1/4	- - - -	M536-26	- - - -	1E8128
4-1/4 x 4-1/4	- - - -	- - - -	M536-34	T10948

Male ACME by Female NPT Adaptors

These adaptors provide 1-1/4 through 4-1/4-inch male ACME on one side and 1/4 through 3/4-inch female NPT threads on the other side. Brass or steel construction.

Male ACME x Female NPT Adaptors					
MALE ACME, INCHES	FEMALE NPT, INCHES		TYPE NUMBER		WASHER DRAWING NUMBER
			Brass	Steel	
1-3/4	1/4	8	M210	- - - -	1E8124
	1/2	8	M212	- - - -	
	3/4	8	M213	M526-6	
	1	8	M214	M526-8	
2-1/4	1	9	M502-12/8	- - - -	1E8126
	1-1/4	9	M502-16/10	M522-16/10	
	1-1/2	9	M502-16/12	- - - -	
3-1/4	1-1/4	8	M250	- - - -	1E8128
	2	8	M252	M528-16	
	3	8	M508-24	M528-24	
4-1/4	3	8	M509-24	M529-24	T10948

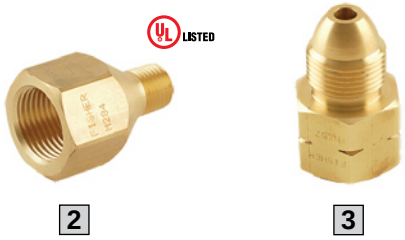
Male ACME by Male NPT Adaptors

Adaptors are 1-1/4-inch through 4-1/4-inch male ACME on one side and 1/2 through 3-inch male NPT on the other. Available in brass or steel.

Male ACME x Male NPT Adaptors

MALE ACME, INCHES	MALE NPT, INCHES	TYPE NUMBER		WASHER DRAWING NUMBER
		Brass	Steel	
1-1/4	1	- - - -	M520-8	1E8122
1-3/4	1/2	- - - -	M521-4	1E8124
	3/4	M215	M521-6	
	1	M216	M521-8	
	1-1/4	M217	M521-10	
2-1/4	1-1/4	M233	M236	1E8126
	1-1/2	M502-12/8	- - - -	
	2	M502-16/10	M522-16/10	
3-1/4	2	M503-16	M263	1E8128
	3	M262	M523-24	
4-1/4	3	M504-24	M524-24	T10948

Maximum allowable Working Pressure 400 psig / 27,6 bar.



2 3

Single-Piece POL Adaptors

These single-piece brass POL adaptors are available in four styles. Connections are 1/4 through 3/4-inch NPT, 3/8-inch flare, and 1/2-inch NPT flare. Brass construction.

Single Piece POL Adaptors

TYPE NUMBER	POL CONNECTION	OTHER CONNECTION, INCHES	
Brass			
M286	Female POL	1/2 MNPT	2
M287		3/4 MNPT	2
M357	Male POL	1/2 FNPT	3

O-rings for Male Adaptors

The 2-1/4 and 3-1/4-inch male adaptors listed above can be supplied with replacement O-rings instead of the conventional washer type of gasket. O-rings give a tighter seal in most cases than the washers.

O-ring for 2-1/4-inch Adaptors T12655T0012

O-ring for 3-1/4-inch Adaptors 1H291706562

TYPE M612

Adaptor Caps

TYPE NUMBER		FEMALE ACME, INCHES	MALE ACME, INCHES
Brass	Steel		
M611	- - - -	2-1/4	1-3/4
M612	M622	3-1/4	1-3/4
M613	M623	4-1/4	3-1/4

TYPE M390

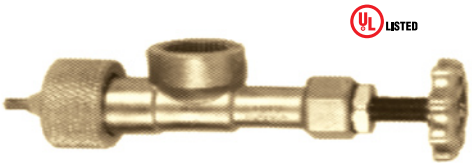
Type M390 POL Filler Coupling

6-inch / 152 mm male POL to 1/4-inch NPT male filler coupling. Brass construction. Replacement O-rings are available.

POL Filler Coupling

TYPE NUMBER	MALE POL	MALE NPT, INCHES	LENGTH, INCHES / mm
Brass			
M390[1]	Soft Nose	1/4	6 / 152

1. Replacement O-ring T12945T0012.



TYPE M450A

Filler Valve Adaptor

Type M450A – allows methanol to be added through conventional designed double back check filler valves with a 1-3/4-inch male ACME filler connection and 3/4-inch FNPT outlet.

TYPE M178

Seals and Plugs

ACME plugs of various sizes and materials are used in female ACME threads to keep debris out of the piping systems.

Seals and Plugs		
DUST SEAL	PLUG	BODY SIZE, INCHES
Type M178 plastic	- - - -	1-1/4 Male ACME
Type M179 plastic	- - - -	1-3/4 Male ACME
Type M180 plastic	- - - -	2-1/4 Male ACME
Type M181 plastic	- - - -	3-1/4 Male ACME
- - - -	Type M535-34 steel	4-1/4 Male ACME

TYPE M570

Filler Hose Adaptor

Intended for the outlet of a bobtail truck filling hose, the Type M570 enables the filling hose to be removed if the filler valve fails to close. An integral back check in the adaptor prevents gas from escaping in the event of a failure of the filler valve. The filler valve should be repaired as soon as possible and the Type M570 removed from the filler valve.

Filler Hose Adaptor			
TYPE NUMBER	FILLER VALVE CONNECTION, INCHES	HOSE END VALVE CONNECTION, INCHES	BODY MATERIAL
M570	1-3/4 Female ACME	1-3/4 Male ACME	Brass

TYPE P104-24

Pipeaway Adaptor

DOT cylinder relief valves must be installed with a pipeaway adaptor to ensure that any discharge is directed away to a safe location.

Relief Valve Pipeaway Adaptor	
PIPEAWAY ADAPTOR STYLE TYPE NUMBER	VALVE TYPE
P104-24	H282
	H5112
P174	H125
	H150
	H148
	H173

Female ACME Caps

ACME caps of various sizes and materials are used on male ACME threads to keep debris out of the piping systems. Small sizes are designed for hand tightening.

Larger sizes are intended to be either tightened by hand or with the use of the Type P120B spanner wrench.

TYPE M108 OR M109

TYPE M219

TYPE M229

TYPE M431

TYPE M432

Female ACME Caps			
SIZE FEMALE ACME, INCHES	TYPE NUMBER		
	Plastic[1]	Brass	Steel
1-1/4	M108	- - - -	- - - -
1-3/4	- - - -	M229[2]	M219[2]
2-1/4	- - - -	M431	M432
3-1/4	- - - -	M441	M443
4-1/4	- - - -	M605-34	M625-34

1. For LP-Gas only.
2. Add - 1 suffix for Type P147 ring and chain.

Clamp Hose Couplings

Type M3162 – Clamp Hose Couplings, for use on LP-Gas or Anhydrous Ammonia (NH_3), are designed to be compact yet rugged for long, dependable service. A small boss on the clamp portion of the coupling keeps the bolt from turning when installing, making installation much easier. Each ductile iron unit receives a coat of electro deposition paint. Larger size clamp hose couplings can be furnished with a swivel nut female ACME outlet that reduces weight and space.

TYPE M3162
(STANDARD OUTLET)

TYPE M3162
(SWIVEL NUT OUTLET)

Clamp Hose Couplings				
TYPE NUMBER[2]	COUPLING STYLE	BODY SIZE, INCHES	HOSE I.D., INCHES / mm	APPROXIMATE HOSE O.D., INCHES / mm
M3162-08	Clamp Type, Standard Outlet	1/2 MNPT	1/2 / 13	15/16 / 24
M3162-12		3/4 MNPT	3/4 / 19	1-1/4 / 32
M3162-16		1 MNPT	1 / 25	1-1/2 / 38
M3162-20		1-1/4 MNPT	1-1/4 / 32	2 / 51
M3162-24		1-1/2 MNPT	1-1/2 / 38	2-1/4 / 57
M3162-32		2 MNPT	2 / 51	2-3/4 / 70
M3162-48		3 MNPT	3 / 76	3-3/4 / 95
M3162-12S[3]	Clamp Type, Swivel Nut Outlet	1-3/4 Female ACME	3/4 / 19	1-1/4 / 32
M3162-32S[3]		3-1/4 Female ACME	2 / 51	2-3/4 / 70
M3162-32B[1]				
M3162-48B	Clamp Type	4-1/4 Female ACME	3 / 76	3-3/4 / 95
M3162-48S	Clamp Type	4-1/4 Female ACME	3 / 76	3-3/4 / 95

1. Has a brass swivel nut with steel or ductile iron nipple. Do not use with anhydrous ammonia (NH_3).
2. Maximum allowable working pressure 350 psig / 24,1 bar.
3. Has a steel swivel nut with ductile iron nipple.

MISCELLANEOUS EQUIPMENT

TYPE P147 OR P148

TYPE P167

TYPE P298

Ring and Chain Assemblies

Ring and chain assemblies prevent loss of caps and seals. Available for 1-1/4-inch ACME caps or dust seals.

Ring and Chain Assemblies			
TYPE NUMBER	FOR CAP OR DUST SEAL SIZE, INCHES	FOR FISHER TYPE	
		Cap	Dust Seal
P147	1-1/4 ACME	M108	M178
P147[1]	1-3/4 ACME	M109 or M219	- - - -
P148[2]		M109	M179
P148	2-1/4 ACME	- - - -	M180
P167		M431 or M432	- - - -
P183	3-1/4 ACME	- - - -	M181
P167		M441 or M443	- - - -
P167	4-1/4 ACME	M605-34, M625-34M and M535-34	- - - -

1. Type P147 fits 3/4-inch pipe size.
2. Type P148 fits 1-1/4-inch pipe size.

TYPE P120B

Spanner Wrench

Used to tighten and loosen large female ACME caps and couplings in the 2-1/4, 3-1/4, and 4-1/4-inch sizes.

Spanner Wrench		
TYPE NUMBER	OVERALL LENGTH, INCHES / mm	CONSTRUCTION MATERIAL
P120B	18 / 457	Aluminum

TYPE P520L

Adjustable Orifice Reamer

Use Type P520L to enlarge orifices on LP-Gas appliances ranging from drill size no. 80 to 50.

Types P206, P297, and P298 protective caps are used to keep moisture and foreign materials from entering the valves. These units are mounted the outside the protective hood on the tank.

Relief Valve Protective Cap	
VALVE TYPE	PROTECTIVE CAP TYPE
H110	P206
H125	
H150	
H148	
H173	
H123	
H120	
H124	
H144	
H174	
H722	P297
H732	P298

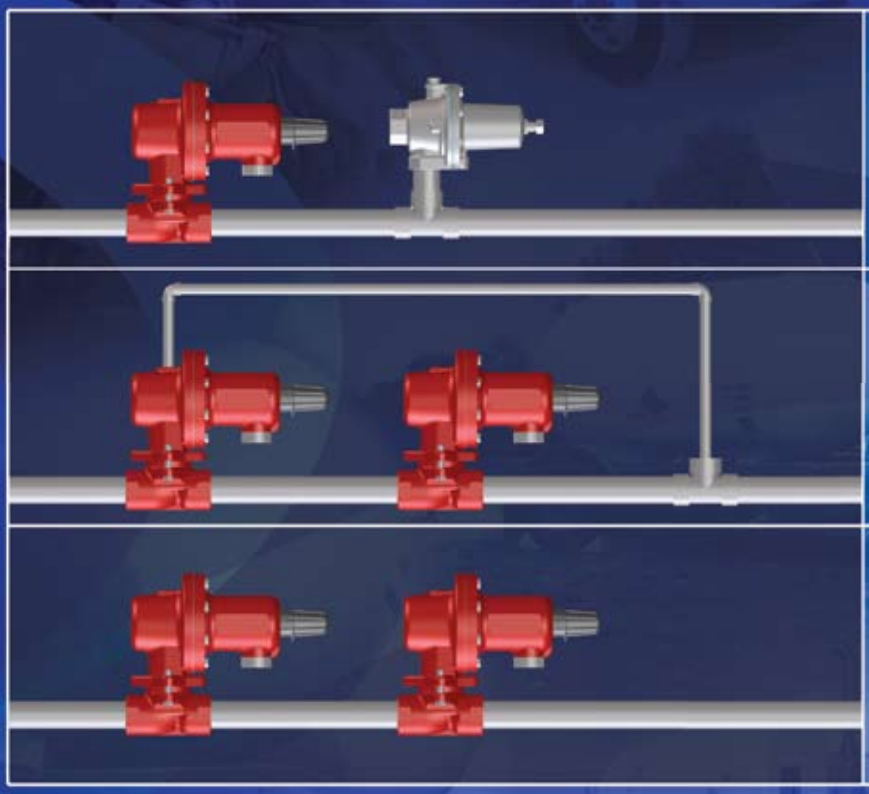
TYPE N201

Cylinder Filling Valve

Type N201 – fills DOT cylinders by weight and stops the gas supply when specified fill weight is reached. Operated by air pressure, it is designed for beam type scales and requires no electrical or mechanical power.

The assembly comes completely piped up and includes special parts that allow the slide weight on the scale to move to zero. A red button appears in the indicator on top of the Type N201 each time a cylinder is filled to the desired weight.

DOT Compliance on Jurisdictional Systems? Fisher is Here to Help.



Relief Valve Over Pressure Protection

- Keeps the customer running with limited increase in the operating pressure
- Releases LPG to atmosphere after primary regulator failure

Monitor System Over Pressure Protection

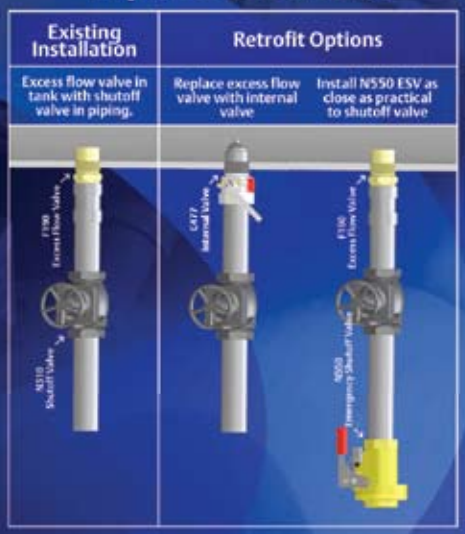
- Higher station capacity than series regulation
- LPG is not vented to atmosphere
- Pressure is maintained close to normal set point after failure of the primary regulator

Series Regulation Over Pressure Protection

- Station Capacity is Reduced
- Pressure after primary regulator failure is significantly higher than normal operating pressure

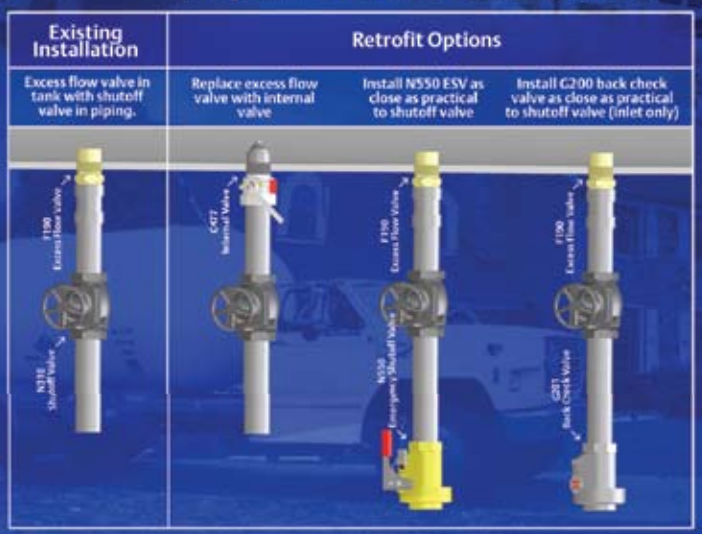
2011 Compliance? Fisher is Here to Help.

Liquid Outlet Lines



Liquid Inlet Lines

Liquid Inlet and Outlet Lines



Literature From Fisher®
The Next Best Thing To An LP-Gas Encyclopedia.

LP-31 Catalog offers the most up-to-date LP product line and serves as a guide to the various Fisher Product that is appropriate for your LP application needs.

LP Application Guide provides application and product data for the different LP products including detailed information on their specifications and capacities.

LP-12 Regulator Chart gives a quick selection guide for LP-Gas regulators and pipe and tubing sizes.

LP-10 Bulletin is the LP-Gas Serviceman's handbook that provides sizing and installation instructions in accordance with standard codes and regulations.

Expanding your knowledge of LP-Gas is quick and easy with absolutely no obligation and no cost to you.

1. Decide which LP-Gas bulletin(s) you would like.
2. Contact your local LP-Gas Regulators and Equipment Distributor to order.

Bulletin LP-10 (D450116T012): LP-Gas Serviceman's Handbook: Popular fact filled 48-page booklet includes data on regulator selection, tank and cylinder location, pipe and tubing sizing, and much more.

Bulletin LP-12 (D450139T012): Regulator Chart. Handy reference guide for selecting Fisher regulators with convenient method of sizing pipe and tubing on the reverse side.

Bulletin LP-15 (D450144T012): Give A Regulator the Attention it Deserves. Explains how domestic direct-operated regulators work, gives installation and maintenance tips.

Bulletin LP-18 (D450145T012): How Drip Lips Can Prevent Regulator Freeze-Ups. Shows how drip-lip style vents can reduce the possibility of vent blockage due to freezing rain or sleet.

Bulletin LP-19 (D450061T012): Keeping Your Internal Valves Working. A thorough discussion about the operation, installation, maintenance, and trouble shooting procedures for Fisher internal valves.

Bulletin LP-24 (D450146T012): Plain Facts About Freezing Regulators. Describes how a regulator can freeze internally and tells ways to minimize freeze-up problems.

Bulletin LP-29 (D450143T012): Complying With NFPA 58 Transfer Area Rulings. Discusses how valves and accessory equipment can be used to satisfy NFPA 58 requirements regarding the transfer area at LP-Gas bulk plants.

Bulletin LP-32 (D450142T012): Inspecting LP-Gas Regulators: What to Look For. Discusses service life of a regulator, how to reduce chance of vent blockage, ways to inspect for internal corrosion.

Remember, Regulator Technologies also provides literature in quantity for instructional purposes for industry association schools, state association schools, and dealer schools.
Visit our web site at www.fisherregulators.com or call +1 800 558 5853 for an Authorized LP-Gas Regulator and Equipment Distributor near you.

Conversion Factors

SI Conversion Factors

Multiply	By	To Obtain
Length and Area		
Millimeters	0.0394	Inches
Meters	3.2808	Feet
Sq. Centimeters	0.155	Sq. Inches
Sq. Meters	10.764	Sq. Feet
Volume and Mass		
Cubic Meters	35.315	Cubic Feet
Liters	0.0353	Cubic Feet
Gallons	0.1337	Cubic Feet
Cubic cm.	0.061	Cubic Inches
Liters	2.114	Pints (US)
Liters	0.2642	Gallons (US)
Kilograms	2.2046	Pounds
Tonnes (metric)	1.1024	Tons (US)
Pressure and Flow Rate		
Millibars	0.4018	Inches WC
Ounces/sq. in.	1.733	Inches WC
Inches w.c.	0.0361	Pounds/sq. in.
Bars	14.50	Pounds/sq. in.
Kilopascals	0.1450	Pounds/sq. in.
Kilograms/sq. cm.	14.222	Pounds/sq. in.
Pounds/sq. in.	0.068	Atmospheres
Liters/hr.	0.0353	Cubic Feet/hr.
Cubic Meters/hr	4.403	Gallons/min.
Miscellaneous		
Kilojoules	0.9478	BTU
Calories, kg	3.968	BTU
Watts	3.414	BTU per hour
BTU	0.00001	Therms
Megajoules	0.00948	Therms

ASME Conversion Factors

Multiply	By	To Obtain
Length and Area		
Inches	25.4	Millimeters
Feet	0.3048	Meters
Sq. Inches	6.4516	Sq. Centimeters
Sq. Feet	0.0929	Sq. Meters
Volume and Mass		
Cubic Feet	0.0283	Cubic Meters
Cubic Feet	28.316	Liters
Cubic Feet	7.481	Gallons
Cubic Inches	16.387	Cubic cm.
Pints (US)	0.473	Liters
Gallons (US)	3.785	Liters
Pounds	0.4535	Kilograms
Tons (US)	0.9071	Tonnes (metric)
Pressure and Flow Rate		
Inches w.c.	2.488	Millibars
Inches w.c.	0.577	Ounces/sq. in.
Pounds/sq. in.	27.71	Inches WC
Pounds/sq. in.	0.0689	Bars
Pounds/sq. in.	6.895	Kilopascals
Pounds/sq. in.	0.0703	Kilograms/sq. cm.
Atmospheres	14.696	Pounds/sq. in.
Cubic Feet/hr.	28.316	Liters/hr.
Gallons/min.	0.2271	Cubic Meters/hr.
Miscellaneous		
BTU	1.055	Kilojoules
BTU	0.252	Calories, kg
BTU per hour	0.293	Watts
Therms	100,000	BTU
Therms	105.5	Megajoules

Abbreviations

ASME	American Society of Mechanical Engineers
BTU per hour	British Thermal Units per Hour
CFH	Cubic Feet per Hour
CGA	Compressed Gas Association
CSST	Corrugated Stainless Steel Tubing
DBC	Diameter Bolt Circle
DOT	Department of Transportation
FNPT	Female National Pipe Thread
FPOL	Female POL Portion of CGA 510 Fitting (See POL)
GPH	Gallons per Hour
GPM	Gallons per Minute
MNPT	Male National Pipe Thread
MPOL	Male POL Portion of CGA 510 Fitting (See POL)
NFPA	National Fire Protection Association
NPT	National Pipe Thread
POL	Generic Term For A Compressed Gas Association Fitting #510
psi	Pounds per Square Inch
psid	Pounds per Square Inch, Differential Pressure
psig	Pounds per Square Inch Gauge
SAE	Society of Automotive Engineers
SCFH	Standard Cubic Feet per Hour
SCFM	Standard Cubic Feet per Minute
SCMH	Standard Cubic Meter per Hour
PTFE	Polytetrafluoroethylene
UL	Underwriters Laboratories Inc.
UNC	Unified National Course (Defines a thread form/shape)
UNF LH	Unified National Fine - Left Hand (Defines a thread form/shape)
WC	Water Column
WOG	Water Oil and Gas

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WARNING

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