

# DATA SHEET

## HIGH-PRESSURE REGULATORS



**Steel/Nickel Plated  
Models:**

**7001–7033**

**Stainless Steel Models:**

**7001.100–7033.100, 7001.200–7033.200**



### FEATURES

- Stainless steel conical piston and seat enhance valve life by ensuring a consistently smooth flow, which reduces wear and compensates for pressure spikes.
- Lightweight, flow-through design facilitates easy installation.
- Unique high-velocity design maintains consistent pressure for multiple pump or shut-off gun installations.
- Models 7001–7033 feature nickel-plated steel for both the lower and upper bodies.
- Models 7001.100–7033.100 have 316 stainless steel lower bodies and nickel-plated steel upper bodies.
- Models 7001.200–7033.200 are equipped with 316 stainless steel lower bodies and 304 stainless steel upper bodies.
- Internal parts are made of stainless steel for enhanced durability and compatibility.
- Standard FPM elastomers are used for compatibility with a wide range of liquids and can withstand temperatures up to 240° F.

### SPECIFICATIONS

#### U.S. Measure

#### Metric Measure

#### Models 7001, 7002, 7003, .100 and .200 Series

Flow Range		0.5–5.0 gpm	1.9–19 lm
Pressure Range	(7001)	100–1000 psi	7–70 bar
	(7002)	500–2000 psi	35–140 bar
	(7003)	1500–3000 psi	105–210 bar
Maximum Temperature		240° F	116° C
Inlet/Outlet Port		¾" NPT(F)	¾" NPT(F)
Bypass Port		½" NPT(F)	½" NPT(F)
Weight		2.25 lbs	1.02 kg
Dimensions		6.25 x 1.5"	159 x 38 mm

#### Models 7011, 7012, 7013, 7014, .100 and .200 Series

Flow Range		1.0–10.0 gpm	3.8–38 lm
Pressure Range	(7011)	100–1000 psi	7–70 bar
	(7012)	500–2000 psi	35–140 bar
	(7013)	1500–3000 psi	105–210 bar
	(7014)	2000–4000 psi	140–275 bar
Maximum Temperature		240° F	116° C
Inlet/Outlet Port		½" NPT(F)	½" NPT(F)
Bypass Port		¾" NPT(F)	¾" NPT(F)
Weight		3.75 lbs	1.70 kg
Dimensions		7.5 x 1.88"	191 x 48 mm

#### Models 7021, 7022, 7023, 7024, .100 and .200 Series

Flow Range		2.5–25.0 gpm	9.5–95 lm
Pressure Range	(7021)	100–1000 psi	7–70 bar
	(7022)	500–2000 psi	35–140 bar
	(7023)	1500–3000 psi	105–210 bar
	(7024)	2000–4000 psi	140–275 bar
Maximum Temperature		240° F	116° C
Inlet/Outlet Port		¾" NPT(F)	¾" NPT(F)
Bypass Port		1" NPT(F)	1" NPT(F)
Weight		5.0 lbs	2.40 kg
Dimensions		8.5 x 2.25"	216 x 57 mm

#### Models 7031, 7032, 7033, .100 and .200 Series

Flow Range		3.5–35 gpm	13.2–133 lm
Pressure Range	(7031)	250–1000 psi	18–70 bar
	(7032)	1000–2000 psi	70–140 bar
	(7033)	1500–3000 psi	105–210 bar
Maximum Temperature		240° F	116° C
Inlet/Outlet Port		¾" NPT(F)	¾" NPT(F)
Bypass Port		1" NPT(F)	1" NPT(F)
Weight		5.5 lbs	2.50 kg
Dimensions		8.5 x 2.25"	216 x 57 mm

**Read all CAUTIONS and WARNINGS before commencing service or operation of any high-pressure system**

## SELECTION

These pressure regulators are designed for systems with single or multiple pumps, solenoid (gate) valves, nozzles, and standard or “weep” guns.

**Note:** For multiple pump systems, it is best to use a pressure regulator, not a pressure-sensitive regulating unloader.

These regulators should meet both the desired system flow (combined nozzle flow rate requirement) and the desired system pressure.

**Note:** Operation below the minimum flow of the regulator cause cycling. Operation above the maximum rated flows of the regulator may cause cycling, and premature regulator wear, preventing attaining desired system pressure.

## INSTALLATION

These regulators can operate when mounted in any direction. However, it is preferred to keep the plumbing to a minimum and the adjusting nut easily accessible. The best mounting location is directly on the pump discharge manifold head or in the discharge line. A flexible, high-pressure hose (minimum single wire braid) should be at least the size of the regulator ports when plumbing to and from the regulator.

Since this is a flow-through design regulator, the inlet and discharge connections are interchangeable and are located on either side. An arrow on the label indicates liquid flow in either direction. Port size varies with each size of regulator (see specifications). Plumb into one side for inlet flow from pump and plumb opposite side to the discharge line with spray guns, solenoid (gate) valves or nozzles.

The bypass connection of this regulator is located on the bottom. An arrow on the label indicates the direction of flow. Port size varies with each size of regulator (see specifications). Bypass liquid is directed out this port and can be routed to a reservoir or to a drain.

## OPERATION

These pressure regulators maintain established system pressure in the discharge line and at the pump head when the trigger gun or the solenoid (gate) valve is closed, or the nozzles are clogged, thus bypassing all unrequired flow. Squeezing the trigger gun or opening the solenoid (gate) valve allows for a quick return to established system pressure.

## PRESSURE ADJUSTMENT

**Note:** Pressure is not set at the factory.

1. Setting and adjusting the regulator pressure must be done while the system is running.
2. Start the system with the regulator backed off to the lowest pressure setting (counterclockwise).
3. Increase the regulator pressure setting by turning the pressure adjusting nut clockwise.
4. Squeeze the trigger and read the pressure on the gauge at the pump.

**Note:** Do not read the pressure at the gun or nozzle.

5. If more pressure is desired, release the trigger, turn brass adjusting nut one-quarter turn in a clockwise direction.
6. Squeeze the trigger and read the pressure.
7. Repeat this process until desired system pressure is attained.

**Note:** A minimum of 5% of the flow through the regulator should bypass for proper regulator performance. If the entire regulator flow pumps through the nozzle (zero-bypass), the valve can easily be set for pressure higher than the desired pressure, causing a malfunction or premature wear.

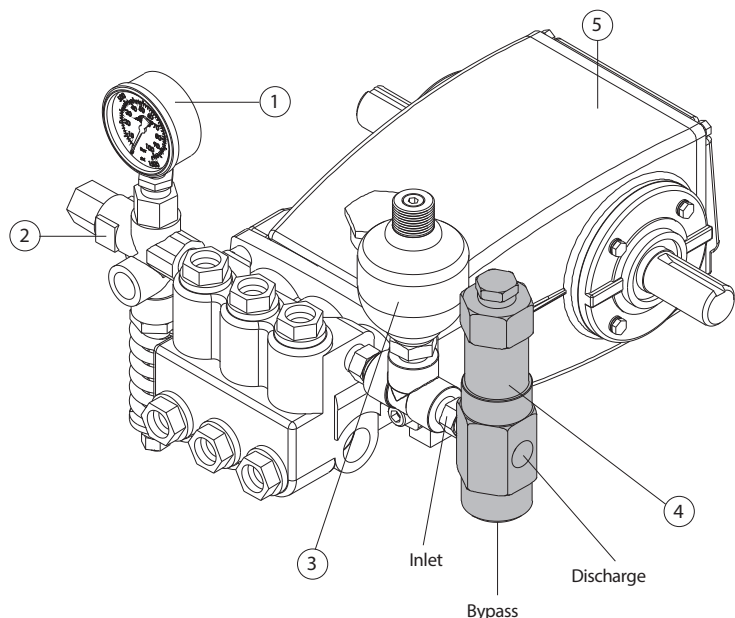
**Note:** Do not adjust regulator pressure setting to compensate for a worn nozzle. Check the nozzle as part of the regular maintenance and replace it if worn.

### NOTICE

A secondary pressure relief device (i.e., pop-off valve) should be used along with this pressure regulator. The final adjustment for the relief valve should relieve at 200 psi above the system operating pressure.

## TYPICAL REGULATOR INSTALLATION

1. Pressure Gauge
2. Relief Valve  
(Secondary Pressure Relief Device)
3. Pulsation Dampener
4. **Pressure Regulator**  
**(Secondary Pressure Regulating Device)**
5. Triplex Plunger Pump



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### SERVICING

**CAUTION** Before commencing with service, shut off drive (electric motor, gas or diesel engine) and turn off water supply to pump. Relieve all discharge line pressure by triggering gun or opening valve in discharge line.

#### Disassembly

1. Disconnect bypass, discharge and inlet plumbing from the regulator.
2. Remove regulator from the pump.
3. Secure lower body of regulator in a vise with brass adjusting nut facing up.
4. Turn the brass adjusting nut counter-clockwise to relieve the spring tension.
5. Remove the upper body by unthreading from lower body.
6. Grasp top of piston stem and separate from the conical piston.
7. Remove piston stem with stack of spring washers, flat washers and anti-rotating washer and place on a flat surface.
8. Remove conical piston with reverse pliers by making contact on the inside diameter of conical piston.

**NOTICE** Exercise extreme caution to avoid contact and damage to outside diameter and sharp tip of the conical piston.

9. Remove piston retainer from the lower body of regulator.

**NOTICE** Exercise extreme caution to avoid contact and damage to the inside diameter of the piston retainer.

10. Remove conical seat from the lower body of regulator.

**NOTICE** Exercise extreme caution to avoid contact and damage to outside diameter and the tapered surface of the seat.

**Note:** With the regulator completely disassembled, inspect lower body sealing areas where the conical seat and piston retainer make contact. Look for grooves, pitting and wear. If damage is found, replace with a new lower body or completely new regulator. If not, proceed with reassembly.

#### Reassembly:

**Note:** The conical piston and seat should be changed as a matched set when upgrading from the old tapered piston and seat. See Tech Bulletin 072.

**Note:** Spring washers and flat washers should be changed as a spring set. See Tech Bulletin 072.

1. Place the lower regulator body with bypass port facing down into a vise.
2. Lubricate and install O-ring onto outside diameter of conical seat. Press conical seat down into the lower regulator body with small hole facing up.
3. Lubricate and install the O-ring onto piston retainer. Press piston retainer into the lower regulator body with raised surface facing up.
4. Lubricate and install backup ring, then O-ring onto outside diameter of conical piston. Press conical piston with sharp point facing down into the piston retainer.
5. Replace piston stem with stack of spring washers and flat washers into the hole of the conical piston.
6. Place anti-rotating washer on top of the spring set. Align tabs on washer with slots on the upper body.

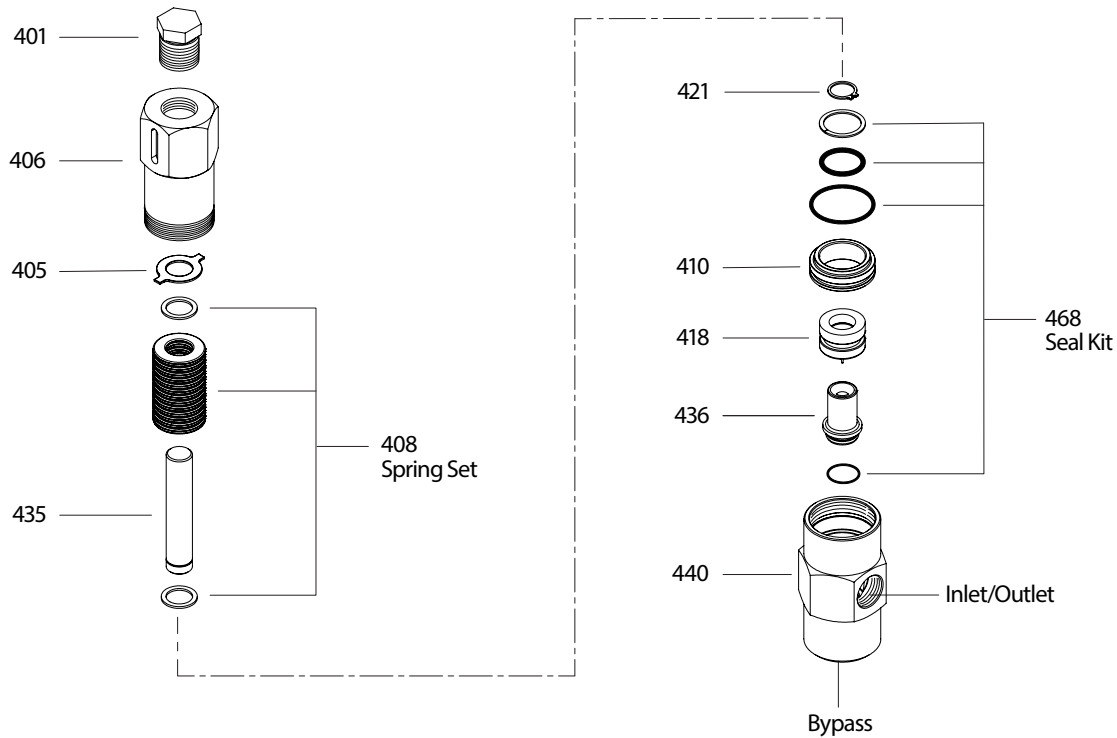
**Note:** The number of flat washers varies with each spring set. Place the first flat washer between the anti-rotating washer and spring stack. Place the second washer (if required) between spring stack and retaining ring. Place all remaining washers with the first washer.

7. Thread upper body into lower body.
8. Re-install regulator onto pump.
9. Reconnect bypass, discharge and inlet plumbing to regulator.
10. Proceed to PRESSURE ADJUSTMENT.

### TROUBLESHOOTING

Problems	Probable Cause	Solution
Excessive pressure fluctuations	<ul style="list-style-type: none"><li>• Too little flow for valve specifications</li><li>• Air in system, poor connections</li><li>• Inlet seals in pump worn</li><li>• O-ring in gun worn</li></ul>	<ul style="list-style-type: none"><li>• Replace with proper valve</li><li>• Check connection, tighten</li><li>• Replace with seal kit</li><li>• Replace O-ring in gun</li></ul>
System will not build up to pressure	<ul style="list-style-type: none"><li>• Nozzle worn</li><li>• Improper nozzle size for system specifications</li><li>• Foreign material trapped in seat</li></ul>	<ul style="list-style-type: none"><li>• Replace nozzle</li><li>• Change nozzle to proper size</li><li>• Clean out debris</li></ul>
Pressure drop	<ul style="list-style-type: none"><li>• Nozzles worn</li><li>• Piston and seat in regulator worn</li><li>• Air in system, poor connections</li><li>• Insufficient flow to pump</li><li>• Filter clogged</li></ul>	<ul style="list-style-type: none"><li>• Replace nozzle</li><li>• Replace piston and seat</li><li>• Check connection, tighten</li><li>• Increase flow to pump</li><li>• Check and clean regularly</li></ul>
Pressure spikes while in bypass	<ul style="list-style-type: none"><li>• Minimum bypass of 10% not present</li><li>• Excessive pressure adjustment made for worn nozzle</li></ul>	<ul style="list-style-type: none"><li>• Back-off adjusting handle and reset</li><li>• Replace nozzle, reset system pressure</li></ul>
Leakage from regulator vent hole	<ul style="list-style-type: none"><li>• O-ring around piston worn or piston retainer scored</li></ul>	<ul style="list-style-type: none"><li>• Service with O-ring kit</li></ul>

## EXPLODED VIEW



## PARTS LIST

Item	Description	MATL	7001	7002	7003	7011	7012	7013	7014	7021	7022	7023	7024	7031	7032	7033
401	Nut, Adjusting	BB R	30758	30758	30758	30759	30759	30759	30759	30760	30760	30760	30760	30760	30760	30760
405	Washer, Anti-Rot	STL	34491	34491	34491	34492	34492	34492	34492	34493	34493	34493	34493	34493	34493	34493
406	Body, Upper	STNP	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	<i>Body, Upper (.200 Option)</i>	S	—	—	—	—	—	—	—	—	—	—	—	—	—	—
408	Spring Set	STL	76201	76202	76202	76211	76212	76213	76214	76221	76222	76223	76224	76221	76222	76223
410	Retainer, Piston	SSS	30873	30873	30874	30875	30875	30876	30876	30877	30877	30878	30878	30877	30877	30878
	<i>Retainer, Piston (.100 Option)</i>	SS	33885	33885	33886	31635	31635	31666	31666	33877	33877	31878	31878	33877	33877	31878
418	Piston, Conical	SSB	31733	31733	31734	31738	31738	31739	31739	31743	31743	31744	31744	—	—	—
	Piston, Conical	SSSS R	—	—	—	—	—	—	—	—	—	—	—	31749	31749	31750
421	Ring, Retainer	STL R	30585	30585	30585	30886	30886	30886	30886	30887	30887	30887	30887	30887	30887	30887
435	Stem, Piston	STL	30588	30588	30588	30889	30889	30889	30889	30892	30892	30892	30892	30892	30892	30892
436	Seat, Conical	SSB	31732	31732	31732	31736	31736	31736	31736	31742	31742	31742	31742	—	—	—
	Seat, Conical	SSSS R	—	—	—	—	—	—	—	—	—	—	—	31748	31748	31748
440	Body, Lower	STNP R	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	<i>Body, Lower (.100, .200 Options)</i>	SS	—	—	—	—	—	—	—	—	—	—	—	—	—	—
468	Kit, O-Ring, Hex Body Style	FPM	30771	30771	30775	30777	30777	30781	30781	30783	30783	30787	30787	30783	30783	30787

For EPDM O-Ring Kits add .0220 to the FPM kit part numbers (i.e., 30771.0220)

**It is recommended to replace spring washers and flat washers as a set.**

*Italics are optional items.* See Tech Bulletins 022, 044, 097 and 102 for additional information. R components comply with RoHS Directive.

Material Codes (Not Part of Part Number): BB=Brass FPM=Fluorocarbon S=304SS SS=316SS SSB=316SS Condition B SSS=416SS SSSS=440SS

STNP=Steel/Nickel Plated STL=Steel. Contact Cat Pumps for optional NBR or EPDM O-Ring Kits.

### ⚠ CAUTIONS AND WARNINGS

All high-pressure systems require a primary pressure regulating device (e.g. regulator, unloader) and a secondary pressure relief device (e.g. pop-off valve, relief valve). Failure to install such relief devices could result in personal injury or damage to pump or property. Cat Pumps does not assume any liability or responsibility for the operation of a customer's high-pressure system.

Read all CAUTIONS and WARNINGS before commencing service or operation of any high-pressure system. The CAUTIONS and WARNINGS are included in each Service Manual and with each Accessory Data sheet. CAUTIONS and WARNINGS can also be viewed online at [www.catpumps.com/dynamic-literature/cautions-and-warnings](http://www.catpumps.com/dynamic-literature/cautions-and-warnings) or can be requested directly from Cat Pumps.

### WARRANTY

View the Limited Warranty online at [www.catpumps.com/literature/cat-pumps-limited-warranty](http://www.catpumps.com/literature/cat-pumps-limited-warranty)