

# DATA SHEET

## MULTIPLE GUN REGULATING UNLOADERS



**Standard Model: 7593**



SPECIFICATIONS	U.S. Measure	Metric Measure
Flow Range	10 - 52 gpm	39 - 197 lpm
Pressure Range	750 - 4050 psi	52 - 279 bar
Inlet Port (Flush Back)	1" BSPP (G)	1" BSPP (G)
Discharge Port (Extended Front)	1" BSPP (G)	1" BSPP (G)
By-Pass Port (Flush Bottom)	1" BSPP (G)	1" BSPP (G)
Maximum Operating Temperatures:		
Standard Buna O-Rings	140° F	60° C
Standard Buna O-Rings (Intermittent)	195° F	90° C
Weight	7.6 lbs.	3.4 kg
Dimensions	10.2 x 5.0 x 2.2"	259 x 129 x 55 mm

For Relief Valve version add .100 to unloader model number.

### FEATURES

- Maintains full system pressure while running in by-pass without full load on pump.
- Offers pump protection against pressure fluctuations and system changes.
- Minimum pressure fluctuations with alternating use of multiple guns.
- Easy external pressure adjustment with locking nut to prevent over pressure.
- Lightweight flow through design for compact installation.

### SELECTION

This is a pressure sensitive regulating unloader. Designed for systems with single or multiple pumps, solenoid (gate) valves, nozzles, standard guns.

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

This pressure sensitive regulating unloader should meet both the desired system flow (combined nozzle flow rate requirement) and the desired system pressure.

**CAUTION:** When operating multiple guns, be certain to establish a minimum of 10 GPM per gun to avoid cycling of the unloader.

**Note:** Operation below the minimum flow of the unloader causes the unloader to cycle. Operation above the maximum flows of the unloader causes premature unloader wear, cycling and prevents attaining desired system pressure.

### INSTALLATION

This unloader operates properly when mounted in any direction, however, it is preferred to keep the plumbing to a minimum and the pressure adjuster easily accessible. The best mounting location is directly on the pump discharge manifold head.

The inlet connection on this unloader is a 1" BSPP (G) sized port and is located on the back side. There is an arrow and the word IN cast into the body indicating the direction of flow. Fluid from the discharge of the manifold goes through this connection.

The discharge connection on this unloader is a 1" BSPP (G) sized port and is located on the front side (hex end). There is an arrow and the word OUT cast into the body indicating the direction of flow. Plumbing for the spray guns, solenoid (gate) valves or nozzles are connected here.

The by-pass connection of this unloader is a 1" BSPP (G) sized port and is located on the bottom. There is an arrow and the word BY PASS cast into the body indicating the direction of flow. By-Pass fluid is directed out of this port and can be routed to a reservoir (preferred method), or to a drain or to the pump inlet.

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

### OPERATION

This pressure sensitive regulating unloader holds established system pressure in the discharge line when the trigger gun is closed or solenoid (gate) valve is closed or the nozzle is clogged, thus by-passing all unrequired flow. Squeezing the trigger gun or opening the solenoid (gate) valve will close off the by-pass and return to established system pressure without delay.

### PRESSURE ADJUSTMENT

1. Setting and adjusting the unloader pressure must be done with the system "on".
2. Start the system with unloader backed off to the lowest pressure setting (counterclockwise direction).
3. Squeeze the trigger and read the pressure on the gauge at the pump.

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

4. If more pressure is desired, release the trigger, turn pressure adjuster one quarter turn in clockwise direction.
5. Squeeze the trigger and read the pressure.
6. Repeat this process until desired system pressure is attained.
7. Once the desired system pressure is reached, stop turning the pressure adjuster.
8. Thread locking nut down to spring retainer.

Note: Locking nut is not set at the factory.

**CAUTION:** A minimum by-pass flow of 5% of the unloader rated flow capacity is required for proper unloader performance. If the entire flow is directed through the unloader (zero by-pass) the "cushioning" feature of the by-pass liquid is eliminated and the unloader can malfunction or wear prematurely.

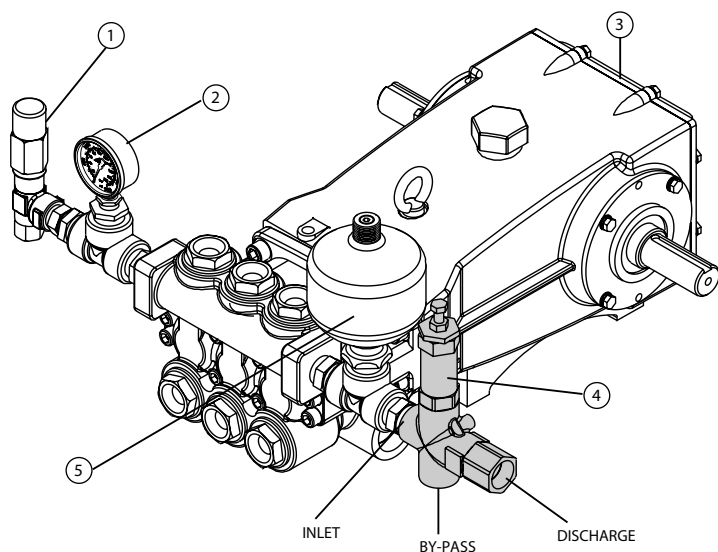
9. If desired system pressure cannot be reached, review TROUBLESHOOTING chart.
10. When servicing existing systems, back locking nut away from spring retainer.
11. Follow adjustment procedures as stated above for new unloaders.

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

**Note:** A secondary pressure safety relief device (i.e. pop-off valve, safety valve) should be used along with this pressure sensitive regulating unloader. Final adjustment for the relief valve should relieve at 200 psi above the system operating pressure.

### TYPICAL UNLOADER INSTALLATION

1. Relief Valve  
Shown as a secondary safety relief valve
2. Pressure Gauge
3. Triplex Plunger Pump
4. Pressure Sensitive Regulating Unloader
5. Pulsation Dampener



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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 by-pass, discharge and inlet plumbing from unloader.
2. Remove unloader from pump.
3. Secure lower body of unloader in a vise with pressure adjuster facing up.
4. Remove discharge fitting and o-ring, spring, check valve and o-ring.
5. Inspect check valve and discharge fitting for wear, spring for wear or fatigue and o-rings for cuts or wear and replace as needed.

**Note:** While the discharge fitting is removed, inspect sealing area where the check valve makes contact within the internal body of the unloader for grooves, pitting and wear. If damage is found, stop the repair and replace with complete new unloader. If not, proceed with disassembly.

6. Unscrew and remove pressure adjuster, locking nut, spring retainer, upper spring retainer, spring, lower spring retainer and ball. Inspect all parts for scale build up or wear and replace as needed. Examine spring for fatigue or wear and replace as needed.
7. Unscrew upper body from lower body.
8. Secure the valve on the flat surfaces and using an 8mm allen wrench unthread the piston stem from the valve.
9. Remove piston retainer, o-rings and back-up-ring. Examine piston retainer for wear. Examine o-rings and back-up-ring for cuts or wear and replace as needed.
10. Examine the valve and piston stem for wear. Examine o-rings and back-up-rings for cuts or wear and replace as needed.
11. Press the seat out of the lower body from the by-pass port. Examine seat for grooves and o-ring for cuts or wear and replace as needed.

#### Reassembly:

1. Lubricate and install o-ring on outside diameter of seat and press seat squarely into position in the lower body.
2. Lubricate and install o-ring and then back-up-ring onto piston stem. Press piston stem with threads facing down into the top end of the upper body.
3. Lubricate and install back-up-ring and then o-ring into inside diameter of piston retainer. Insert piston retainer into the bottom of the upper body.
4. Apply Loctite® 242® to the threads of the piston stem and valve. Thread valve onto piston stem and tighten with wrench.
5. Lubricate and install o-ring on to bottom of the upper body. Carefully hand thread upper body into lower body and tighten with a wrench.
6. Replace the ball, lower spring retainer, spring, upper spring retainer and spring retainer into top of upper body.
7. Thread in locking nut and pressure adjuster.
8. Lubricate and install o-ring onto check valve. Place spring inside check valve. Insert check valve with o-ring and spring into discharge port of lower body.
9. Lubricate and install o-ring onto threaded end of discharge fitting. Thread in discharge fitting to discharge port of lower body and tighten with wrench.
10. Remove unloader from vise.
11. Re-install unloader onto pump.
12. Reconnect by-pass, discharge and inlet plumbing to unloader.
13. Proceed to PRESSURE ADJUSTMENT.

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### PRESSURE READING

Approximate Pressure Reading at Gauge	Gauge Between Pump/Unloader	Gauge Between Unloader/Gun-Nozzle-Valve
System in Operation (gun open)	System Pressure	System Pressure
System in By-Pass (all guns, valves closed)	Low Pressure 0 - 150 psi	System Pressure +200 psi

### TROUBLESHOOTING

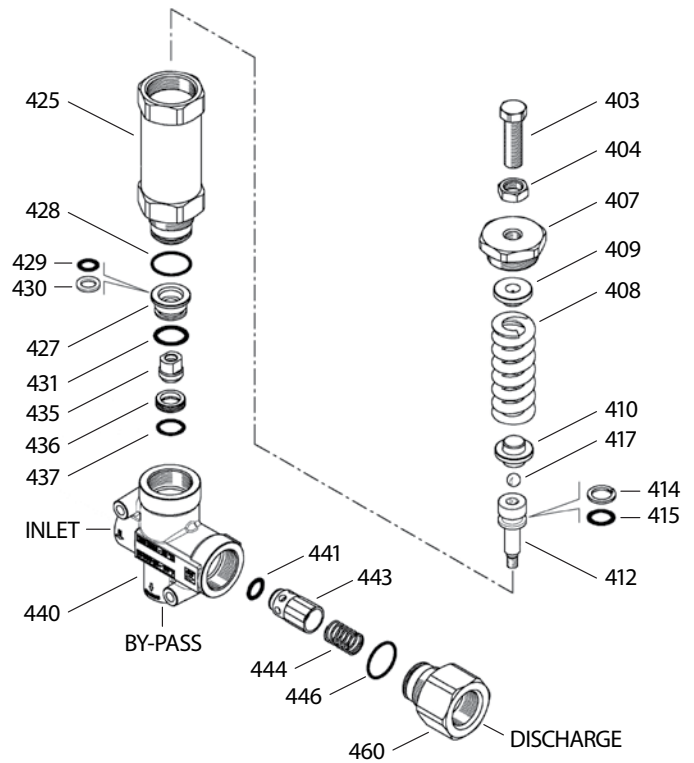
Unloader cycles	<ul style="list-style-type: none"> <li>• Check for leak downstream of unloader.</li> <li>• Worn O-ring or check valve.</li> <li>• Air in system, poor connection.</li> <li>• O-ring in gun worn.</li> <li>• Insufficient flow through unloader.</li> </ul>
Liquid leaking from bottom fitting	<ul style="list-style-type: none"> <li>• O-ring for fitting cut or worn.</li> </ul>
Liquid leaking from middle	<ul style="list-style-type: none"> <li>• O-ring for piston worn or cut.</li> <li>• O-rings for piston stem worn or cut.</li> </ul>
Unloader will not come up to pressure	<ul style="list-style-type: none"> <li>• Not properly sized for system pressure.</li> <li>• Foreign material in unloader. Clean filter.</li> <li>• Piston stem O-rings worn.</li> <li>• O-ring for seat cut or worn.</li> <li>• Nozzle worn.</li> <li>• Insufficient flow to pump.</li> </ul>
Extreme pressure spikes	<ul style="list-style-type: none"> <li>• Adjusting nut turned completely into unloader.</li> <li>• Restricted by-pass or no by-pass.</li> <li>• System flow exceeds unloader rating.</li> </ul>
Filtration	<ul style="list-style-type: none"> <li>• Clean filter on regular schedule to avoid cavitation.</li> </ul>

## PARTS LIST

ITEM	P/N	MATL	DESCRIPTION	QTY
403	—	S	Adjuster, Pressure	1
404	33823	SS	Nut, Lock	1
407	—	BB	Retainer, Spring	1
408	—	STL	Spring	1
409	—	BB	Retainer, Upper Spring	1
410	—	BB	Retainer, Lower Spring	1
412	32776	S	Stem, Piston	1
414	—	PTFE	Backup-Ring, Piston Stem	1
415	—	NBR	O-Ring, Piston Stem	1
417	31075	SSSS	Ball, Seat	1
425	—	BB	Body, Upper	1
427	32777	BB	Retainer, Pistion	1
428	—	NBR	O-Ring, Piston Retainer	1
429	—	NBR	O-Ring, Piston	1
430	—	PTFE	Backup-Ring, Piston	1
431	—	NBR	O-Ring, Piston Retainer	1
435	32774	S	Valve	1
436	32775	S	Seat	1
437	—	NBR	O-Ring, Seat	1
440	—	BB	Body	1
441	—	NBR	O-Ring, Check Valve	1
443	32902	BB	Valve, Check	1
444	32782	S	Spring, Check Valve	1
446	—	NBR	O-Ring, Discharge Fitting	1
460	—	BB	Fitting, Discharge [1" BSPP (G)]	1
468	76186	NBR	Kit, O-Ring (Incls: 414, 415, 428 - 431, 437, 441, 446)	1

Material Codes (Not Part of Part No.):  
 BB=Brass NBR=Medium Nitrile (Buna-N)  
 PTFE=Pure Polytetrafluoroethylene  
 S=304SS SSSS=440SS STL=Steel

## EXPLODED VIEW



### ⚠ CAUTIONS AND WARNINGS

All High Pressure Systems require a primary pressure regulating device (i.e. regulator, unloader) and a secondary pressure relief device (i.e. 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/cautions-warnings](http://www.catpumps.com/cautions-warnings) or can be requested directly from Cat Pumps.

### WARRANTY

View the Limited Warranty on-line at [www.catpumps.com/warranty](http://www.catpumps.com/warranty).



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