

DATA SHEET

PRESSURE SENSITIVE REGULATING UNLOADER



The Pumps with Nine Lives

Brass Models: 7537, 7542



Model 7537 Shown

FEATURES

- Maintains full system pressure while running in by-pass without full load on pump.
- Senses pressure built up from downstream flow changes and by-passes flow to protect pump from overpressure.
- Minimum pressure fluctuations with alternating use of multiple guns.
- Multiple ports for convenient mounting.
- Color coded spring for easy identification and simple change from one model to another.
- Standard NBR o-rings with alternative options for temperature and chemical compatibility.
 - FPM – .0110 (7537.0110, 7542.0110)

SPECIFICATIONS

7537

	U.S.	Metric
Flow Range	1 - 21 gpm	3.8 - 80 lpm
Pressure Range	230 - 2600 psi	15.8 - 180 bar
Weight	2.54 lbs.	1.15 kg

7542

	U.S.	Metric
Flow Range	1 - 21 gpm	3.8 - 80 lpm
Pressure Range	800 - 4000 psi	55 - 275 bar
Weight	2.54 lbs.	1.15 kg

COMMON

SPECIFICATIONS

	U.S.	Metric
Maximum Operating Temperatures		
Standard Buna O-Rings	140° F	60° C
Std. Buna O-rings (Intermittent)	195° F	90° C
Optional FPM O-rings	240° F	116° C
Inlet Ports (2)	1/2" NPT(F)	1/2" NPT(F)
Discharge Port	1/2" NPT(F)	1/2" NPT(F)
By-Pass Port	1/2" NPT(F)	1/2" NPT(F)
Dimensions	7.57 x 3.96 x 1.74"	192.2x100.5x44.3mm

Use only at above specifications to assure proper unloader life and performance.
For Relief Valve version add .100 to unloader model number.

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

SELECTION

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

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

These pressure sensitive regulating unloaders 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 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

These unloaders operate properly when mounted in any direction, however, it is preferred to keep the plumbing to a minimum and the hex adjusting nut easily accessible. The best mounting location is directly on the pump discharge manifold head.

There are two (2) inlet connections on these unloaders. Both are 1/2" NPT(F) ports and are located on the short extension side and bottom. An arrow and the word IN is cast into the body indicating the direction of flow. Liquid from the manifold discharge goes through these connections.

The discharge connection is a 1/2" NPT(F) hex fitting. An arrow and the word OUT is cast into the body indicating the direction of flow. Discharge plumbing for the spray guns, solenoid (gate) valves or nozzles are connected to this port.

The by-pass connection is a 1/2" NPT(F) port located on the side of the body. The word BY-PASS is cast into the body. By-Pass liquid is directed out of this port and can be routed to a reservoir (preferred method), or to a drain or to the pump inlet.

OPERATION

These pressure sensitive regulating unloaders hold 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 the by-pass and return to established system pressure.

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 hex adjusting nut 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 hex adjusting nut.

Note: Pressure is not set at the factory.

Notice: 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 nozzle (zero by-pass) the “cushioning” feature of the by-pass liquid is eliminated and the unloader can prematurely wear or malfunction.

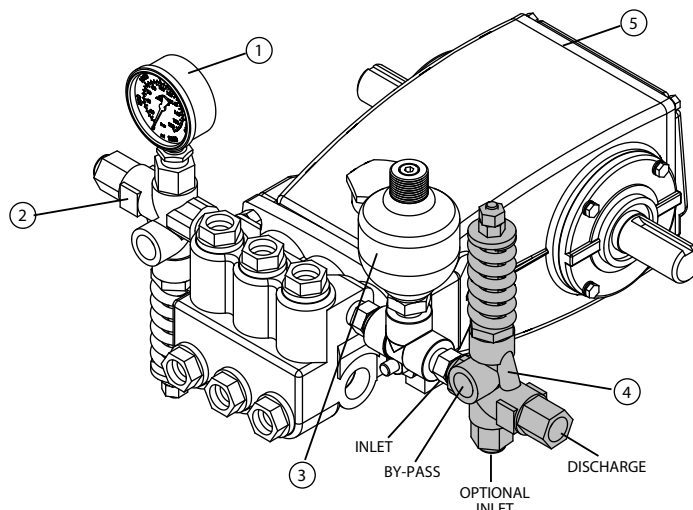
8. If desired system pressure cannot be reached, review TROUBLESHOOTING chart.
9. When servicing existing systems, follow adjustment procedures as stated above.

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.

Note: By removing the check valve and spring, these unloaders can function as a secondary relief valve.

TYPICAL UNLOADER INSTALLATION

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



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SERVICING

Disassembly

1. Disconnect by-pass, discharge and inlet plumbing from unloader.
 2. Remove unloader from pump.
 3. Secure body of unloader in a vise with hex adjusting nuts facing up.
 4. Remove discharge fitting and O-ring, spring, and check valve with O-ring.
 5. Examine 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. Remove two (2) hex adjusting nuts by turning in a counterclockwise direction.
 7. Remove spring retainer and spring.
 8. Examine spring and spring retainer for scale build up, fatigue or wear and replace as needed.
 9. Use wrench to unthread and remove piston retainer and piston stem together from main unloader body.
 10. Examine piston stem and piston retainer for scale build up, scoring, pitting and wear and replace as needed. Examine O-rings and backup rings for cuts or wear and replace as needed.
 11. Remove unloader body from vise and reposition in vise with bottom inlet port facing up.
 12. Remove inlet fitting with O-ring, seat spring and ball.
 13. Remove unloader body from vise and reposition in vise with bottom inlet port facing down.
 14. Drive out seat and O-ring from the top side.
 15. Examine seat, seat spring and ball for scale build up, scoring and wear and replace as needed. Examine O-rings for cuts or wear and replace as needed.

Reassembly

1. Remove unloader body from vise and reposition in vise with bottom inlet port facing up.
2. Lubricate and install O-ring onto outside diameter of seat.
3. Place seat with O-ring into unloader body with small inside diameter hole facing up.
4. Place ball onto seat and then spring.
5. Lubricate and install O-ring onto inlet fitting. Thread in inlet fitting by hand and tighten.
6. Remove unloader body from vise and reposition in vise with bottom inlet fitting facing down.
7. Lubricate and install O-ring and then backup ring over threaded end of piston stem small diameter groove.
8. Install backup-ring, o-ring and then backup-ring on opposite end of threaded piston stem. Lubricate all parts.
9. Lubricate and install O-ring onto piston retainer.
10. Place threaded end of piston retainer over the threaded end of the piston stem.
11. Place piston retainer and piston stem assembly into unloader body with threaded end of piston stem facing up. Thread piston retainer into unloader body by hand and tighten with wrench.
12. Apply Loctite® 242® to the bottom threads of the piston stem.
13. Hand thread one (1) hex nut onto piston stem and tighten with wrench.
14. Place spring over piston stem and then spring retainer onto spring with stepped surface facing down.
15. Hand thread two (2) hex nuts onto piston stem.
16. Lubricate O-ring on check valve. Insert check valve with O-ring facing into unloader body. Place spring onto check valve.
17. Lubricate O-ring on discharge fitting. Hand thread into unloader body and tighten with wrench.
18. Remove unloader from vise.
19. Re-install unloader onto pump.
20. Reconnect by-pass, discharge and inlet plumbing to unloader.
21. Proceed to PRESSURE ADJUSTMENT.

Loctite and 242 are registered trademarks of the Henkel Corporation.

TROUBLESHOOTING

Unloader cycles	<ul style="list-style-type: none"> • Worn O-ring or check valve • Fitting leaking downstream • O-ring in gun worn
Liquid leaking from bottom	<ul style="list-style-type: none"> • O-ring for seat or inlet fitting cut or worn
Liquid leaking from middle	<ul style="list-style-type: none"> • O-ring for piston worn or cut
Unloader will not come up to pressure	<ul style="list-style-type: none"> • Not properly sized for system pressure • Foreign material in unloader • Piston o-rings worn • Nozzle worn or too large • Jam nuts not properly set
Extreme pressure spikes	<ul style="list-style-type: none"> • Adjusting handle turned completely into unloader • Restricted by-pass or no by-pass • System flow exceeds unloader rating

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

PARTS LIST

ITEM	PN	MATL PN	MATL DESCRIPTION	QTY
	7537 BB	7542 BB		
401	31396	—	31396 — Assembly, Handle	1
402	31766	NY	31766 NY Handle, Cap	1
403	126521	STCPR	126521 STCPR Nut, Hex Adjusting (M8)	2
408	32090	STL	— Spring Pressure (White) 7537	1
—	—	32092	STL Spring Pressure (Blue) 7542	1
409	—	BB	— BB Nut, Hex (M8)	1
410	32115	BB	32115 BB Retainer, Spring	1
412	76170	S	76170 S Stem, Piston	1
414	—	PTFE	— PTFE Back-up-Ring, Piston Stem	1
415	—	NBR	— NBR O-ring, Piston Stem	1
—	—	FPM	— FPM O-ring, Piston Stem	1
425	76727	BB	76727 BB Retainer, Piston	1
428	—	NBR	— NBR O-ring, Piston Retainer	1
—	—	FPM	— FPM O-ring, Piston Retainer	1
429	—	NBR	— NBR O-ring, Piston Stem	1
—	—	FPM	— FPM O-ring, Piston Stem	1
430	—	PTFE	— PTFE Back-up-Ring, Piston Stem	2
434	76022	S	76022 S Spring, Seat	1
435	76706	SS	76706 SS Ball and Seat Assembly (2 pc)	1
437	—	NBR	— NBR O-ring, Seat	1
—	—	FPM	— FPM O-ring, Seat	1
439	—	NBR	— NBR O-ring, Inlet Fitting	1
—	—	FPM	— FPM O-ring, Inlet Fitting	1
440	—	FBB	— FBB Body	1
441	—	NBR	— NBR O-ring, Check Valve	1
—	—	FPM	— FPM O-ring, Check Valve	1
443	76745	BB	76745 BB Valve, Check w/NBR O-ring	1
—	76723	BB	76723 BB Valve, Check w/FPM O-ring	1
444	76722	S	76722 S Spring, Check Valve	1
446	—	NBR	— NBR O-ring, Discharge Fitting	1
—	—	FPM	— FPM O-ring, Discharge Fitting	1
455	76018	BB	76018 BB Fitting, Inlet [1/2" NPT(F)]	1
460	76024	BB	76024 BB Fitting, Discharge [1/2" NPT(F)]	1
462	30533	BB	30533 BB Plug, Inlet [1/2" NPT(M)]	1
468	76671	NBR	76671 NBR Kit, O-Ring (Incls: 414, 415, 428, 429, 430, 437, 439, 441, 446) After week 41, 2016 (7537); week #29, 2016 (7542)	1
—	76680	FPM	76680 FPM Kit, O-Ring (Incls: 414, 415, 428, 429, 430, 437, 439, 441, 446) After week 41, 2016 (7537); week #29, 2016 (7542)	1

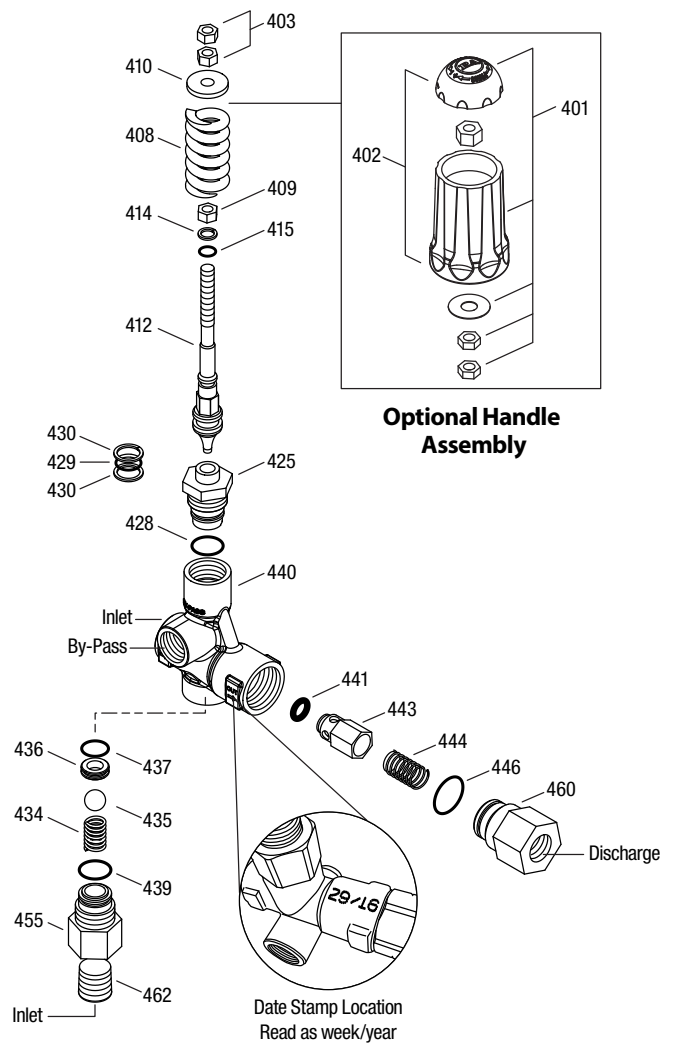
*See Tech Bulletin #120 for changes prior to week 41/2016 and week 29/2016.

Bold print part numbers are unique to a particular model.

Italics are optional items.

R Components comply with RoHS Directive. MATERIAL CODES (Not Part of Part Number): BB=Brass FBB=Forged Brass FPM=Fluorocarbon NBR=Medium Nitrile (Buna-N) PTFE=Pure Polytetrafluoroethylene S=304SS SS=316SS STCPR=Steel/Chrome Plated STL=Steel

EXPLODED VIEW



To convert to optional handle assembly, remove items 403 (quantity 2), 409 and 410. Then reassemble as shown in item 401.

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 or can be requested directly from Cat Pumps.

WARRANTY

View the Limited Warranty on-line at www.catpumps.com/warranty.



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