

DATA SHEET

MODULAR PRESSURE-SENSITIVE REGULATING UNLOADER



Brass Model: 7850



Use with Pump Series 3CP or 5CP
(Except Models 5CP4120, 5CP6120, 5CP6180CSS and 5CP6190)

FEATURES

- Provides system pressure control and protection for single or non-weep gun applications.
- Built-in bypass channel allows for safe low pressure bypass when the gun is shut off.
- Convenient flow-thru screws promotes easy direct mounting.
- Pressure sensitive feature provides immediate pressure when the gun opens.
- Handle permits easy adjustments of pressure.

SPECIFICATIONS

	U.S.	Metric
Flow Range	0.5–6.0 gpm	1.9–23 lpm
Pressure Range	100–4000 psi	6.9–275 bar
Maximum Temperature	160° F	71° C
Inlet Port (1)	½" NPT(F)	½" NPT(F)
Outlet Port (1)	¾" NPT(M)	¾" NPT(M)
Bypass Port	Built-in channel	Built-in channel
Weight	2.21 lbs	1.00 kg
Dimensions	7.0 x 4.0 x 1.62"	178 x 101.6 x 41 mm

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

SELECTION

This pressure-sensitive regulating unloader is designed for systems with single or multiple pumps, solenoid (gate) valves, nozzles and standard guns. Weep guns are not recommended with this unloader.

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

NOTICE Operation below the minimum rated flow of the unloader causes the unloader to cycle. Operation above the maximum rated flow of the unloader causes cycling and premature unloader wear, preventing achieving the desired system pressure.

INSTALLATION

This pressure sensitive regulating unloader mount directly to the inlet and discharge ports of brass 3CP and 5CP plunger pumps. The unloader is held in place by one ½" NPT(M) flow-thru screw on the bottom and one ⅜" NPT(M) flow-thru screw at the top.

Note: There are two seal washers for each port size. One seal washer is mounted between the pump manifold and unloader body and the other is located between the unloader body and under the head of the flow-thru screw.

The inlet connection of this unloader has a ½" NPT(F) port is located on the bottom. There is an arrow cast into the body indicating the direction of flow. The water supply connects here.

The discharge connection of this unloader with the chemical injector installed is a ⅜" NPT(M) port. An arrow with the word OUT is cast into the body indicating the direction of flow. Plumbing for the spray gun, solenoid (gate) valve or nozzle is connected here.

There is no bypass connection for this unloader; this unloader has a built-in channel that provides an internal bypass.

OPERATION

This unloader holds established system pressure in the discharge line when the trigger gun or solenoid (gate) valve is closed, or the nozzle is clogged; thus bypassing all unrequired flow. Squeezing the trigger gun or opening the solenoid (gate) valve will close off the bypass and return to established system pressure.

PRESSURE ADJUSTMENT

Note: Pressure is not set at the factory.

1. Setting and adjusting the unloader pressure must be done while the system is running.
2. Start the system with unloader backed off to the lowest pressure setting (counterclockwise direction).
3. Increase the unloader pressure setting by turning the adjusting cap 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 the cap handle one quarter turn in clockwise direction.
6. Squeeze the trigger and read the pressure.
7. Repeat this process until desired system pressure is reached.
8. If desired system pressure cannot be reached, review TROUBLESHOOTING chart.

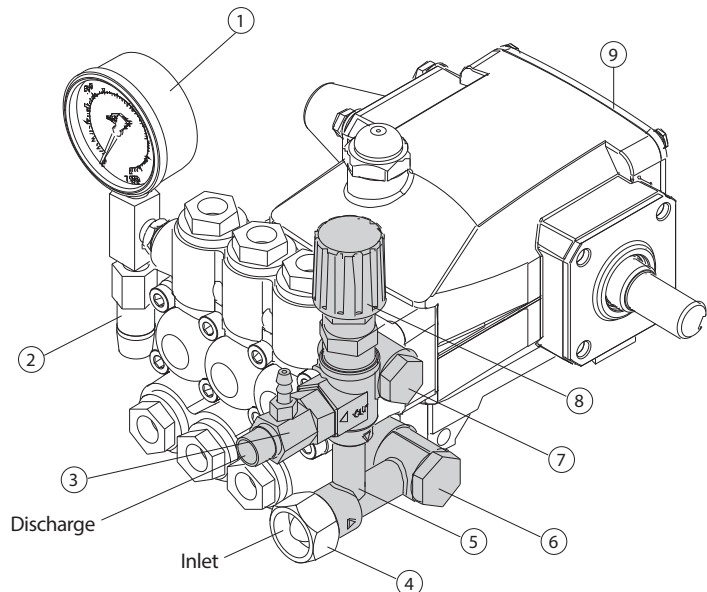
NOTICE A secondary pressure safety relief device (e.g. pop-off valve, relief valve) should be used along with this pressure-sensitive regulating unloader. Final adjustment for the secondary relief valve should be approximately 200 psi above the system operating pressure.

Note: A minimum of 5% of the flow through the unloader should bypass for proper regulator performance. If the entire unloader 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 unloader pressure setting to compensate for a worn nozzle. Check the nozzle as part of the regular maintenance and replace if worn.

TYPICAL PRESSURE CLEANING INSTALLATION 3CP or 5CP Plunger Pump

1. Pressure Gauge
2. Pop-Off Valve
(Secondary Pressure Relief Device)
3. Fixed Chemical Injector
4. Garden Hose Fitting (¾" GHF x ½" NPT(M))
(Not Included with Unloader)
5. **Pressure-Sensitive Regulating Unloader**
(Primary Pressure Regulating Device)
6. ½" NPT(M) Flow-Thru Screw
7. ⅜" NPT(M) Flow-Thru Screw
8. Black Pressure Adjusting Handle
9. Triplex Plunger Pump



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SERVICING

Disassembly

1. Disconnect inlet and discharge plumbing from unloader.
2. Remove unloader from pump by unthreading inlet and discharge flow-thru screws.
3. Remove black adjusting handle.
4. Loosen M4 set screw on locking nut and turn locking nut in a clockwise direction away from brass adjusting cap.
5. Remove brass adjusting cap by turning in a counterclockwise direction.
6. Remove locking nut.
7. Pull exposed spring and flat spring retainer from unloader body. Examine spring for fatigue or breaks and replace as needed.
8. Using a wrench, unthread piston retainer with O-ring from unloader body. Examine O-ring for cuts or wear and replace as needed.

Note: The piston stem and valve/ball assembly will either come out as one assembly when removing the piston retainer or will remain in unloader body.

9. Unthread the piston stem from valve/ball assembly by securing valve/ball assembly with pliers and placing screwdriver into slotted head of piston stem. Remove washer and valve retainer with O-rings and backup rings.

CAUTION: Exercise extreme caution to avoid contact that could damage the tapered surface of the valve/ball.

10. Remove seat with attached O-ring from unloader body. Examine seat for grooves, pitting or wear and replace as needed. Examine O-ring for cuts or wear and replace as needed.
11. Unthread chemical injector from unloader body.
12. Remove O-ring, check valve with O-ring and spring. Examine check valve and spring for fatigue and wear and replace as needed. Examine O-rings for cuts or wear and replace as needed.

Reassembly

1. Before installing the chemical injector, inspect sealing area where the check valve makes contact within the internal body of the unloader for grooves, pitting and wear. If unloader surface is damaged, stop the repair and discard unloader and install complete new unloader onto pump. If not, proceed with step 2.
2. Place spring on end of check valve without O-ring. Install assembly into chemical injector.
3. Apply Loctite® 609 to threads of chemical injector. Thread chemical injector into body of unloader.
4. Lubricate and press seat with O-ring into unloader body.
5. Lubricate and install O-ring over slotted head of piston stem, then position backup ring on top of O-ring.
6. Lubricate and install larger O-ring around outside diameter of valve retainer and smaller O-ring on the inside diameter of valve retainer. Install backup ring below O-ring on inside diameter of valve retainer.
7. Place washer, then valve retainer with O-rings onto piston stem. Apply Loctite® 242® to threads of piston stem and screw into valve/ball assembly.
8. Insert complete piston stem and valve/ball assembly into unloader chamber with valve/ball assembly facing down and slotted head of piston stem facing up.
9. Apply Loctite® 609 to threads of piston retainer and hand thread into unloader body. Then tighten with wrench.
10. Place flat spring retainer on top of piston stem head and then install spring.
11. Thread locking nut and brass adjusting cap onto retainer.
12. Reinstall M4 set screw, but do not tighten until system pressure is set.
13. Place black adjusting handle over brass adjusting cap.
14. Re-install unloader onto pump by using 3/8" and 1/2" flow-thru screws and seal washers.
15. Reconnect inlet and discharge plumbing to unloader.
16. Proceed to PRESSURE ADJUSTMENT to set system pressure.

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TROUBLESHOOTING

Unloader cycles	<ul style="list-style-type: none"> • Check valve O-ring is worn out • Fitting leaking downstream • Worn O-ring inside gun
Liquid leaking from bottom	<ul style="list-style-type: none"> • Seat or inlet fitting O-ring is cut or worn
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 are worn • Nozzle worn or sized incorrectly
Extreme pressure spikes	<ul style="list-style-type: none"> • Adjusting handle turned completely into unloader • Restricted bypass or no bypass • System flow exceeds unloader rating • Locking nut not properly set

7345 CHEMICAL INJECTOR PERFORMANCE CHART

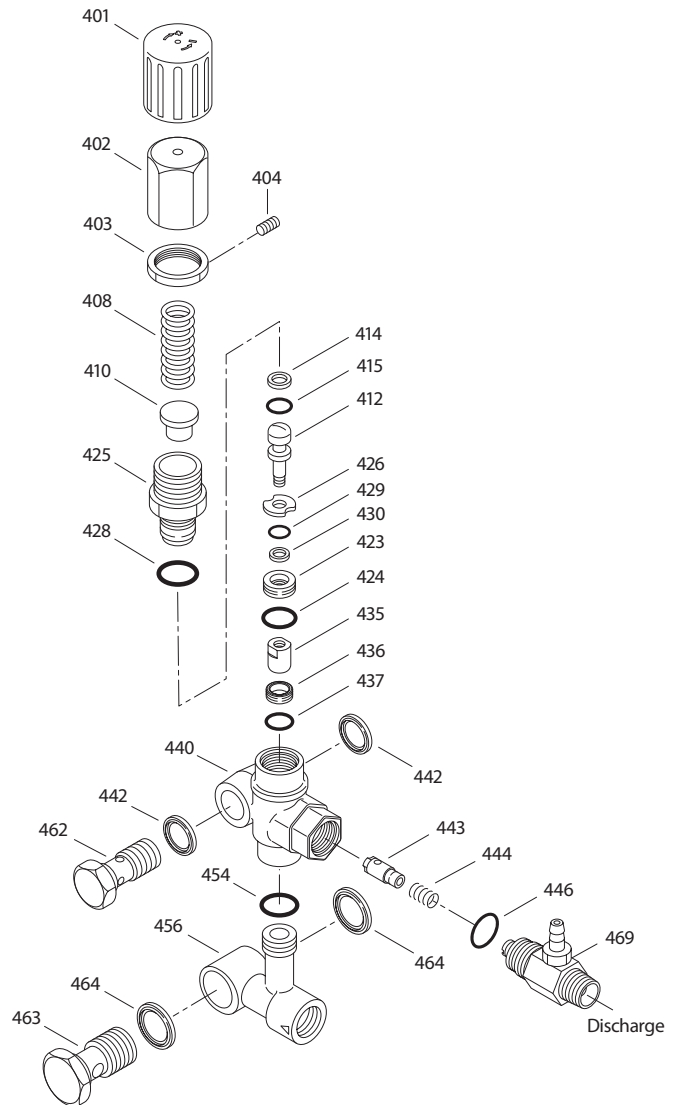
Unloader Model	Pump Flow	Orifice Size (MM)	Maximum Injecting Pressure (PSI)	Maximum Chemical Draw (oz/min)	Pressure Drop Across Orifice (PSI)
7850	3.0	2.1	190	70.0	136
7850	3.5	2.1	260	74.2	245
7850	4.0	2.1	358	76.8	288

Optimum performance of chemical injector occurs with a 35 ft. high-pressure hose with a minimum 3/8" I.D. The type of hose, extended lengths, reduced I.D. and fittings may create additional back pressure above the maximum injecting pressure rating of the injector and prevent it from drawing chemical.

PARTS LIST

ITEM	P/N	MATL	DESCRIPTION	QTY
401	49100	NY	Handle, Adjusting (Black)	1
402	49099	BB	Cap, Adjusting	1
403	125521	BB	Nut, Locking (M25 x 1)	1
404	88953	S	Screw, Set (M4 x 4)	1
408	45198	ZP R	Spring, Pressure	1
410	49101	STZP R	Retainer, Spring	1
412	49103	S	Stem, Piston	1
414	129638	PTFE	Backup Ring, Piston Stem	1
415	49104	NBR	O-Ring, Piston Stem-90D	1
423	49105	BB	Retainer, Valve	1
424	49106	NBR	O-Ring, Valve Retainer-70D	1
425	49102	BB	Retainer, Piston	1
426	49107	S	Washer	1
428	26133	NBR	O-Ring, Piston Retainer-80D	1
429	22056	NBR	O-Ring, Valve Retainer-70D	1
430	49123	D	Backup Ring, Valve Retainer	1
435	76108	S	Valve/Ball Assembly	1
436	49257	S	Seat	1
437	13965	NBR	O-Ring, Seat-70D	1
440	—	FBB	Body	1
442	49121	STL	Washer, Seal (3/8")	2
443	49245	BB	Valve, Check with NBR O-Ring	1
444	117275	S	Spring, Check Valve	1
446	26133	NBR	O-Ring, Body-80D	1
454	11346	NBR	O-Ring, Manifold-70D	1
456	—	BB	Manifold, Lower Body	1
460	126724	BB	Fitting, Discharge (3/8" NPT[F]) (Not Shown)	1
462	49120	BB	Screw, Flow-Thru (3/8" NPT[M])	1
463	49117	BB	Screw, Flow-Thru (1/2" NPT[M])	1
464	49118	STL	Washer, Seal (1/2")	2
468	31708	NBR	Kit, O-Ring (Includes: 414, 415, 424, 428, 429, 430, 437, 446, 454)	1
469	7345	BB	Injector, Chemical Fixed (M18 x 1)	1

EXPLODED VIEW



Italics are optional items. R Components comply with RoHS Directive.

MATERIAL CODES (Not Part of Part Number): BB=Brass D=Acetal
 FBB=Forged Brass NBR=Medium Nitrile (Buna-N) NY=Nylon
 PTFE=Pure Polytetrafluoroethylene S=304SS STL=Steel
 STZP=Steel/Zinc Plated ZP=Zinc Plated

⚠ 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 or can be requested directly from Cat Pumps.

WARRANTY

View the Limited Warranty online at www.catpumps.com/literature/cat-pumps-limited-warranty