

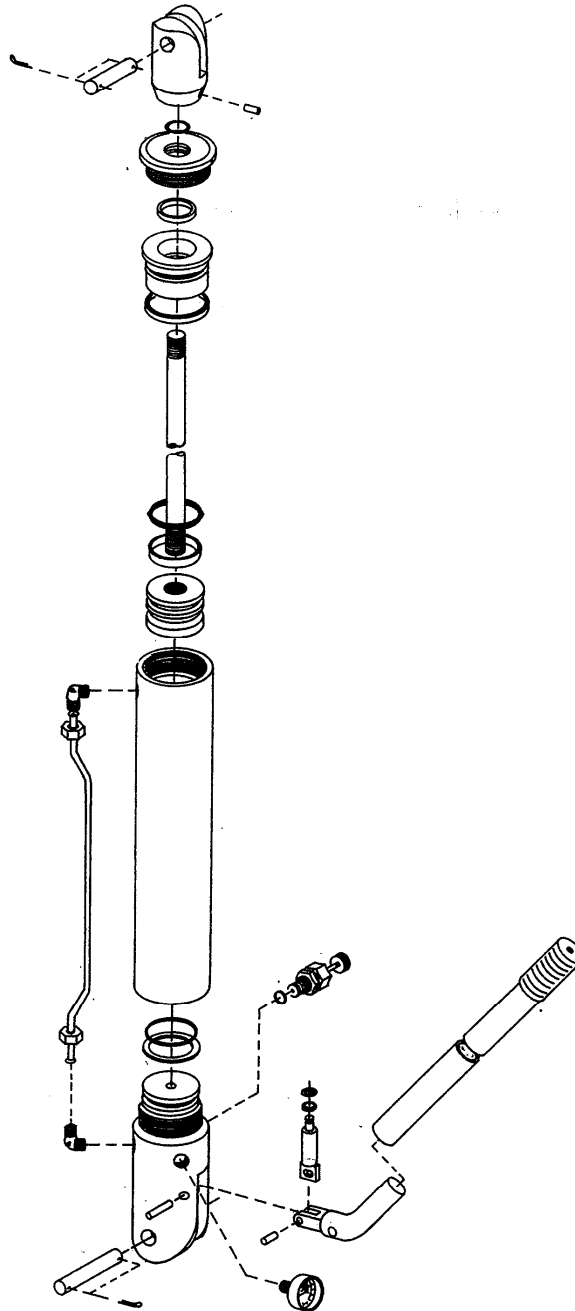
# SAILTEC, INC.

2930 CONGER COURT, OSHKOSH, WI 54904 USA

TEL: 920-233-4242 FAX: 920-233-8767

[info@sailtec.com](mailto:info@sailtec.com)

## SAILTEC INTEGRAL SERVICE MANUAL



First Area to Check  
Gland Cap at Top of  
Cylinder

Wiper

The Gland Cap  
could be "frozen" to  
the Cylinder  
requiring heat with  
torch to separate.



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[info@sailtec.com](mailto:info@sailtec.com)**INTEGRAL TEST / CHECK LIST / PERIODIC REVIEW**

**AIR LOCK:** If integral does not pump rod down initially, open valve (knob) and pump several times for 1-2 minutes, clearing air out of pump. Close valve and try again. If necessary, review the more thorough "air lock" procedure.

**Periodic Review of System Checklist:**

- ✓ Check for visual evidence of external oil.
- ✓ Check for visual evidence of cracked seals at rod or nicks on piston rod.
- ✓ Pump to pressure. Leave handle out. To pass, the pressure will hold and the handle will remain out.
- ✓ Check lever pin for full engagement.

**General Care:**

Periodic inspection is recommended for your safety. Have a qualified rigger check rod or wire terminations for fatigue.

**Procedure for testing an integral:**

- Clean integral making note of any locations where external oil appears.
- Open release valve.
- Pull out piston.
  - Inspect rod. To be free of nicks and scratches, polish out with 150 to 220 emery cloth.
  - Inspect wiper seal for cracks. Replace as needed. UV rays and time will cause failure.
- Close release valve.
- Pump in upright position until ram is retracted. If more than an inch or so of ram is exposed, system is low of oil.
- Place spacer on each side of piston rod between upper jaw and gland cap to act as dead stop. Pump to pressure – pump action should be smooth. Leave pump at pressure with handle out away from cylinder.
- Inspect system visually for evidence of external oil (leaks) including elbows, fittings, gauge port, between jaws, and upper end of cylinder.
- Clean system and leave pressure on one day. If gauge drifts to lower pressure more than a few hundred pounds, inspect for evidence of oil. Pressure is temperature sensitive when using a dead stop so higher or lower pressure reading will result from higher or lower ambient room temperature.
- Handle should remain out when under pressure. If it drifts back to upright, you will have a pressure loss and service is required.
- Service system if pressure loss occurs. Pressure loss is caused by a worn cartridge release valve, external oil leaks, a check ball, or seal leaks.

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## **SERVICE, MAINTENANCE & REPAIR: INTEGRALS**

### **TEAR DOWN PROCEDURE**

Supplies:       Vise  
                  Propane torch  
                  Loctite PST #56747  
                  Red Loctite  
                  Blue Loctite  
                  Blue RTV Sealer  
                  Spanner wrench  
                  Allen wrench 3/32X4", 5/32" X 6", 3/16 X6"  
                                  1/2", 9/16", and 5/8" open-end wrenches

With piston rod fully extended, position integral horizontally in soft-jawed vise.

**NOTE: If this is a cylinder, depress Schrader Valve core to remove air pressure!**

- Remove stainless steel outside return line from the upper cylinder and lower pump elbow. Loosen pump from cylinder several turns. [Hint: Heat cylinder with torch to expand the cylinder at the pump and make turning the pump easier.]
- Elevate pump several inches above cylinder so oil does not drain out of the cylinder.
- Remove pump assembly and set assembly aside.
- Pour off oil in cylinder.
- Remove gland cap by lightly heating cylinder and turning off gland cap.
- Remove elbow from cylinder.
- Remove (Pull) piston/rod/bushing assembly from cylinder.
- Remove seals from piston being careful not to scratch the seal groove.
- Clamp piston rod in vise, heat piston head to break red Loc-Tite, and remove piston head from rod using a spanner wrench.
- Remove rod bushing and gland cap. Tap out bushing rings and bushing seals and remove wiper from the gland cap. Polish out marks on rings and clean all parts thoroughly.
- Disassemble pump. Place in vise, jaw up. [Turning the cylinder back onto the pump can help handling the pump disassembly.]
- Remove cartridge release valve, handle pivot pin, handle and pump piston subassembly.
- Remove cap plug adjacent to pump piston bore. [CAUTION: There is a large spring and ball, and a small spring and ball beneath this cap plug— careful not to lose them.] Save: large spring and large ball, small spring and small ball.
- Remove set screw, elbow and gauge, as necessary.
- Disassemble cartridge release valve, pump piston assembly and clean all components.
- Flush pump body with pressure cleaner, and blow out with compressed air.
- Flush cylinder, piston rod, gland cap, bushing and piston head with solvent cleaner, and blow off with compressed air.

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## **REASSEMBLE CYLINDER**

**Examine all part for dirt, nicks or scratches. Polish out nicks or scratches and clean until no lint, dust or particles are present.**

- Clamp piston rod in soft jawed vise (using a towel or denim material)
- Gland cap: Install wiper with lubricant (oil or bearing marine grease) and press cap onto piston rod.
- Build brass bushing: Using lubricant.
  - Upper: Press poly pack (do not remove 'O' ring) in brass bushing pocket. Put brass ring in place. Make sure lip of poly pack is toward pressure.
  - Lower: Press pack without 'O' ring in lower bushing pocket, lip to pressure. Stake ring in place.
- Press bushing onto piston rod using care not to damage rod seals.
  - Install backup ring and 'O' ring on outside of bushing. Backup ring (flat) first.
- Place piston poly pack on rod with lip toward the bushing.
- Apply Red Loctite to piston rod and piston head threads and install piston head.
  - **TIGHTEN PISTON HEAD WITH A SPANNER WRENCH VERY TIGHT**
  - Install poly pack and wear ring on piston
- To install rod assembly in cylinder
  - Line up groove in bushing with elbow port on cylinder (Recent designs do not have bushing grooves).
  - Press/ Walk cylinder onto piston/rod /bushing assembly.
  - Tap bushing into cylinder with bushing groove lined up with elbow port on the piston.
  - Use Blue Loctite on cap/cylinder threads. Tighten cap into place.
  - Wipe off excess Loctite.
- Slide piston in and out.
  - Install elbow using 567 thread sealant.

## **REASSEMBLE PUMP**

- Flush and clean
- Rebuild cartridge release valve, and pump piston and 'O' ring on cap screw.
- Install the ¼" ball, small spring, 3/8" ball, large spring and cap screw in pump.
- Install cartridge release valve, pump elbow, 1/16 pipe (or 1/8" pipe) plug and gauge.
- Replace backup ring and 'O' ring on pump.
- Assemble lever to pump piston using ¼" X 5/8" pin.
- Install above by greasing, lining up and pressing the pump piston into place.
  - Hint: using 5/8" open end wrench on pump piston flats with lever in place will provide excellent control so you can press the piston into location by rocking and pressing steadily.
- Install pump pivot pin. Use Red Loctite on knurled end of pin and drive securely with ¼' punch

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## **FINAL ASSEMBLY OF CYLINDER, PUMP AND RETURN LINE**

- Fixture cylinder open end up, in vise, with ram extended fully.
- Add oil (see below)
- Put pump assembly on cylinder (use Blue Loctite on threads) and turn into place.
- Replace plumb line.
- Test for pressure: See Test Procedure Checklist.
  - Install spacer between upper jaw and gland.
  - Pull out piston rod. Pump to retract.
  - Pull out, install spacer and pump to pressure.
  - Leave handle out under pressure.

Check for:

- Pressure holds at the set level. If not, pull out and push in piston rod and retest. Let hang a day if possible to allow air bubbles to float out.
- If pressure doesn't hold, it could be the check balls, a cartridge release valve 'O' ring or back up, or external leak.
- If handle returns to upright by itself, a check ball in the pump has dirt on it or doesn't seat properly.
  - The system is designed to have a flushing jet internally. To flush the valve seats and check balls, extend piston rod, **CLOSE** the release valve, tip the integral upside down and push piston rod full in. Repeat a couple of times and retest.
  - The **BEST** results can be obtained by extending the piston rod, clamping the integral upside down in a vise, removing the pump piston and cap screw, pulling the large spring and 3/8" ball out with a magnet and examining the ball and internal seat for dirt. Then replacing the parts and re-testing the integral.
  - If the handle snaps back and it is the 3/8" valve seat, then a .340 ball can be used to replace the 3/8" ball. Remove the 3/8" ball, replace with a .340 ball, tap gently into place once or twice-lightly using a small punch and hammer. This is designed in for field seat service.

## **OIL VOLUME**

1)	-10 Std	185 ML
2)	-10 Long	260 ML
3)	-12 Std	280 ML
4)	-12 Long	360 ML
5)	-17 Std	420 ML
6)	-17 Long	560 ML
7)	-22 Std	600 ML

Use "Premium" hydraulic oil. ISO grade 32 or lighter. Do not use transmission fluid, jack oil or steering fluid.

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### **TO ADD OIL TO AN INTEGRAL ADJUSTER**

- Sailtec recommends using a premium hydraulic oil, ISO 32 or lighter.
- Oil, fittings & tube must be clean.
- Fully extend piston rod.
- Disconnect outside oil line from the upper fitting/elbow.
- Fill a 3/8" piece of flexible hose (CLEAR is best) with ISO Grade 32 premium oil. Attach the clear flexible hose to upper elbow (the 3/8" hose should push on to the 7/16" elbow threads). Place the other end of hose in a reservoir of hydraulic oil. This line will act as a siphon so it needs to be primed and free of most air.
- Connect a section of hose to the other (pump) elbow or stainless line and run it to a pan or bottle to collect the overflow oil.
- Slowly retract/push the piston rod into cylinder. [Hint: This works best with the integral upside down.]
- When oil stops being drawn from reservoir, the cylinder is filled, if the siphon line is free of most air bubbles. Reconnect the stainless line and pump system.
- If air bubbles are in the system it won't hold pressure. If that happens, pull piston rod in and out a few times. You may have to allow gravity to work air out.

### **CARTRIDGE VALVE ASSEMBLY INSTALLATION INSTRUCTIONS**

- Line up hex nuts (one under knob, one on stem).
- Install knob on stem.
- Lubricate 'O' ring on tip.
- Turn the valve into the valve port: turn in very slowly, wiggle the body a little so 'O' rings find port, slide into place.
- Tighten down securely with wrench.

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## **GAUGE INSTALLATION INSTRUCTIONS**

- Open release valve
- 
- Fully extend piston rod
- 
- Clamp cylinder in vise, gauge face up.
- 
- Use soft jaws and cloth pads to prevent scratching.
- 
- Remove boot if there is one and remove gauge.

**VERY IMPORTANT: Do not allow foreign matter, chips, dirt, etc. in the gauge port.  
IT IS ESSENTIAL TO KEEP THIS AREA CLEAN .**

## **PREPARE REPLACEMENT GAUGE**

- DO NOT cover the four lead-in threads at the tip.
- 
- Place sealant on upper threads, use Loctite PST # 56747 or an equivalent high quality sealant.
- 
- Again do not cover the four lead-in threads.
- 
- Install the gauge. Tighten until very firm. Orient gauge to orient dial. Usually one or two threads are still exposed.
- 
- Over tightening can damage the gauge; recommend the following:
  - Tighten securely with very firm hand pressure on the wrench.
  - Allow to set up 24-48 hours. Hang upright during this time.
  - Do not put pressure on integral during this time.
  - If glistening leak exists, tighten one more revolution, again not under pressure.