

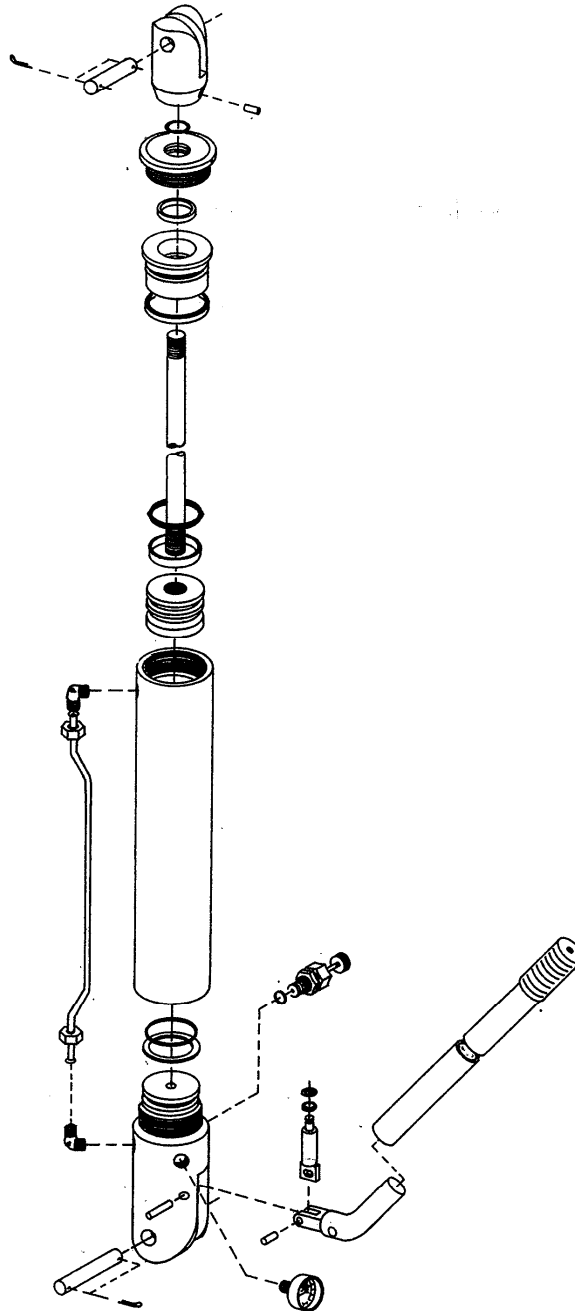
# ***SAILTEC, INC.***

2930 CONGER COURT, OSHKOSH, WI 54904 USA

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

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## **SAILTEC INTEGRAL SERVICE MANUAL**



First Area to Check  
Gland Cap at Top of  
Cylinder

Wiper

Once the wiper is missing  
salt water will cause  
corrosion.

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.

## **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.