

SBE 5T and 5P Pump Speed Adjustment

Equipment:

DC power supply Frequency counter Drawings:

31441B and 31441C (schematic)

The pump housing must be disassembled to adjust the pump speed. SBE 5P and 5T electronics are the same, but separate instructions for removing and reinstalling the electronics are provided for each pump, because of differences in mechanical details.

Note: In 2011, Sea-Bird changed the SBE 5T mechanical design. The current design is easily differentiated from the old design because the current design does not have a retaining ring (see photo below). The old SBE 5T is opened from the end with the retaining ring and bulkhead connector; the current SBE 5T is opened from the end with the pump head. Instructions for disassembly/reassembly of the current SBE 5T pump are identical to those for the SBE 5P pump.



Retaining ring (only present on old SBE 5T)

5P Plastic Pump and 5T Titanium Pump

Note that colors may vary from what is shown in photos. The white impeller was replaced with black impeller in 2012; the white pump head was replaced with black pump head in 2015. White and black versions of these parts are interchangeable.

- 1. Unscrew the pump head from the housing.
- 2. Pull the end cap out of the housing.
- 3. Carefully pull the electronics from the housing. They are wired to the bulkhead connector inside the housing.





SBE 5T (current design, 2011 and later)

AN40 Revised 3/2024

4. Connect the positive lead of your frequency counter to the yellow test point. Connect the frequency counter ground (negative) to the power supply ground (negative).

5. Look at the part number on the PCB to determine whether you have a newer (part number 10102A) or

older (part number 10102) pump PCB.



PCB part (10102 or

- 6. Supply power.
 - Low voltage pump, LV in serial number: supply 6 volts DC power to the bulkhead connector or directly • to the PCB (P8 is positive, P19 or P18 is common. Set JP1 to pins 1-2.
 - Normal voltage pump: supply 12 volts to the bulkhead connector or directly to the PCB (P8 is positive, P19 or P18 is common. Set JP1 to pins 2-3.



- 7. A 2K ohm potentiometer at R11 is located on the back of the PCB. Position the jumpers and then adjust the potentiometer as described below to obtain the frequency corresponding to the desired speed (Frequency * 30 = rpm):
 - Reposition JP2 and JP3, and adjust the speed as desired, up to the nominal maximum of 3000 rpm • (note: 4500 rpm uses same jumper setting as 3000 rpm).



8. Disconnect the frequency counter and the power supply.

Caution

Use silicon-based Parker Super O Lube and not a petroleum-based lubricant on the O-rings.

Caution

Be careful not to pinch the O-ring; this may allow water to enter the housing and cause damage to the electronics.

- 9. Reinstall the electronics in the housing:
 - A. Inspect the connector end cap O-ring and the mating surface in the housing for dirt, nicks, and cuts. Clean and/or replace O-rings as necessary.
 - B. Apply a light coat of Parker Super O Lube O-ring lubricant to the O-ring and mating surfaces. Gently place a **new desiccant bag** (PN 30558 1 gram) on the electronics (see *Application Note 71* for desiccant use and regeneration). Reinstall the electronics in the housing. Reinstall the end cap in the housing, carefully aligning the end cap with the housing and pushing hard on the end cap to seat the first O-ring in the housing (only 1 O-ring should now be visible). Reinstall the pump head on the end cap.

A R3 WAS SHOWN AS 562K 115285 B ECN642: R1/R2 PN, C4 WAS 33U L2 CTX50-: 20082 MBRS130T +BIGPAD PAD 40/80TH JP1 15001.3 470uH C2 22uF 2DV 14067 BATTERY VOLTAGE C4 33uF 25V LT1111 P19 BIGPAD PAD 40/80TH D31/6 15507 AD TIME C7 .1uF R1 80.6K 15512 RR AM R3 562 EF OUT R7 20K 155 CS JP2 15001.3 R5 10K 15283 D ohm 15628 R24 100K 15117 JP3 SEA-BIRD ELECTRONICS, INC ASSEMBLY 40605D SBE ST PUMP DRIV 31441

Schematic #31441C for Reference

5T Titanium Pump with retaining ring

This design was discontinued in 2011.

Note that colors may vary from what is shown in photos. The white impeller was replaced with black impeller in 2012; the white pump head was replaced with black pump head in 2015. White and black versions of these parts are interchangeable.

- 1. Remove the electronics from the housing:
 - A. Unscrew the white plastic end cap retainer ring.
 - B. Install a 2-pin dummy plug with locking sleeve over the bulkhead connector to provide a good grip and protect the connector pins. Rotate the end cap back and forth while carefully pulling the end cap away from the housing. Pull the end cap and attached electronics out of the housing.



2. Look at the part number on the PCB to determine whether you have a **newer** (part number 10102A) or **older** (part number 10102) pump PCB.



- 3. Supply power:
 - Low voltage pump, LV in serial number: supply 6 volts DC power to the bulkhead connector or directly to the PCB (P8 is positive, P19 or P18 is common). Jumper P5 to P7.
 - Normal voltage pump: supply 12 volts to the bulkhead connector or directly to the PCB (P8 is positive, P19 or P18 is common.) Jumper P5 to P6.



4. A 2K ohm potentiometer at R11 is located on the back of the PCB. Position the jumpers and then adjust the potentiometer as described below to obtain the frequency corresponding to the desired speed (Frequency * 30 = rpm):



- Pittman **18.2Ω motor** (PN 3711B113-R1) Set jumper position P15 to P17 (1300 rpm) and P12 to P13 (1300 rpm), and adjust the speed as desired, up to the nominal maximum of 2000 rpm.
- Pittman 7.4Ω motor (PN 3711B112-R1) Set jumper position P15 to P16 (3000 rpm) and P14 to P13 (3000 rpm), and adjust the speed as desired, up to the nominal maximum of 4500 rpm. To adjust speed below approximately 2200 rpm, set jumper position P15 to P17 (1300 rpm) and P12 to P13 (1300 rpm), and adjust speed using the potentiometer.
- Pittman 3.55Ω motor (PN 3711B112-R2) Set jumper position P15 to P16 (3000 rpm) and P14 to P13 (3000 rpm), and adjust the speed as desired, up to the nominal maximum of 4500 rpm. To adjust speed below approximately 2200 rpm, set jumper position P15 to P17 (1300 rpm) and P12 to P13 (1300 rpm), and adjust speed using the potentiometer.
- 5. Disconnect the frequency counter and the power supply.

Caution

Use silicon-based Parker Super O Lube and not a petroleum-based lubricant on the O-rings.

Caution

Be careful not to pinch the O-ring; this may allow water to enter the housing and cause damage to the electronics.

- 6. Reinstall the electronics in the housing:
 - A. Inspect the connector end cap O-ring and the mating surface in the housing for dirt, nicks, and cuts. Clean as necessary. If the O-ring or mating surface is damaged, return the pump to Sea-Bird for repairs. Note: Sea-Bird recommends that this O-ring replacement be performed at the factory, because the pump's physical configuration makes customer-replacement of this O-ring difficult to perform without special tools.
 - B. Apply a light coat of Parker Super O Lube lubricant to the O-ring and mating surfaces. Gently place a **new desiccant bag** (PN 30558 1 gram) on the electronics (see Application Note 71 for desiccant use and regeneration). Reinstall the electronics in the housing, until the O-ring has fully seated. Reinstall the retaining ring on the connector end cap.



Schematic #31441b for Reference