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**APPLICATION NOTE NO. 40**

**Revised June 2007**

**SBE 5T and SBE 5P PUMP SPEED ADJUSTMENT**

**Equipment:** DC power supply  
 Frequency counter

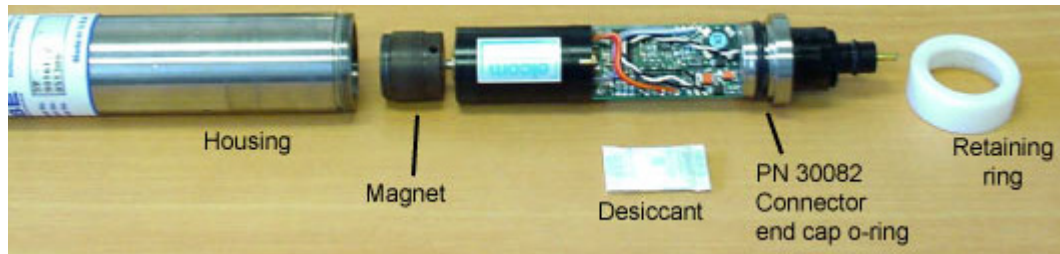
**Drawings:** 31441B (schematic)  
 41250A (assembly)

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

1. Remove the electronics from the housing:

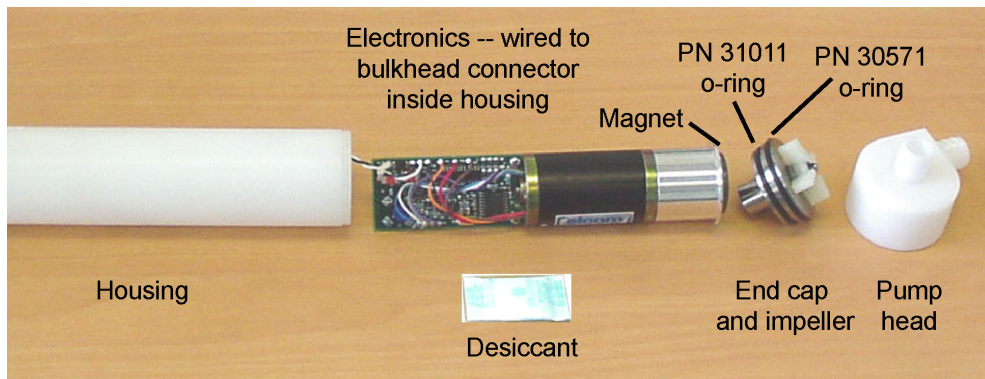
• **SBE 5T Titanium Pump –**

- 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.



• **SBE 5P Plastic Pump -**

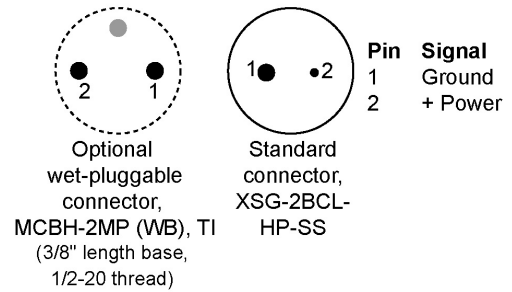
- A. Unscrew the pump head from the housing.
- B. Pull out the end cap from the housing.
- C. Pull out the electronics from the housing. Note that the electronics are wired to the bulkhead connector inside the housing.



2. Connect the positive lead of your frequency counter to the yellow test post (T1) (drawing 41250A). Connect the frequency counter ground (negative) to the power supply ground (negative).

3. Supply power:

- **Low voltage pump** (pump with LV in the serial number) - Supply 6 volts DC power to the bulkhead connector or directly to the PCB (P8 is positive, P19 or P18 is common, drawing 41250A).
- **Normal voltage pump** - Supply 12 volts to the bulkhead connector or directly to the PCB (P8 is positive, P19 or P18 is common, drawing 41250A).



4. A 2K ohm potentiometer (R11, drawing 41250A) is located on the back side of the board. Adjust the potentiometer to obtain the frequency corresponding to the desired speed (Frequency \* 30 = rpm):

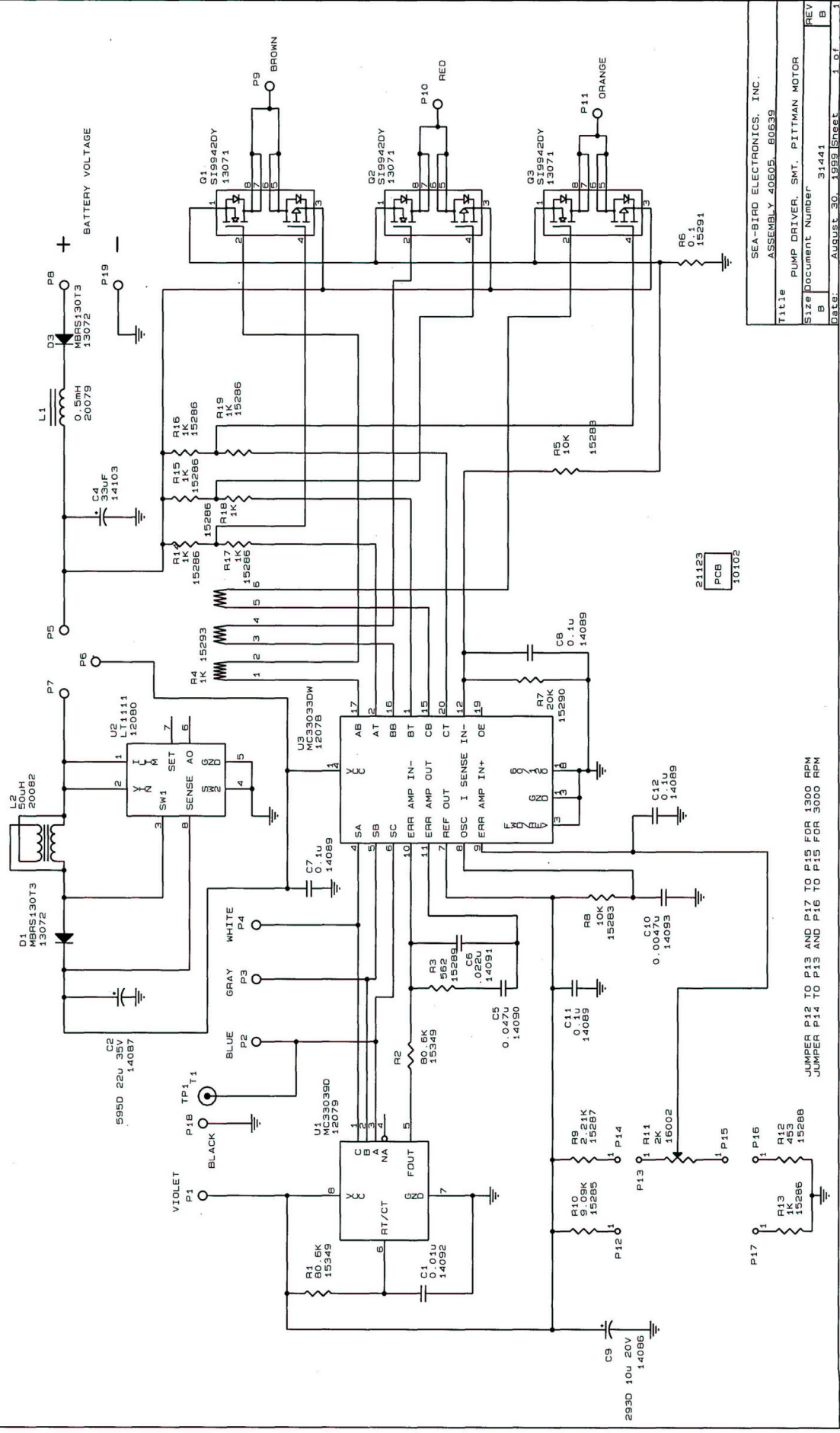
- Pittman **18.2Ω motor** (P/N 3711B113-R1) - Set jumper position P15 to P17 (1300 rpm) and P12 to P13 (1300 rpm), and adjust the speed as desired, up to the nominal maximum of 2000 rpm.
- Pittman **7.4Ω motor** (P/N 3711B112-R1) - Set jumper position P15 to P16 (3000 rpm) and P14 to P13 (3000 rpm), 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** (P/N 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.

6. Reinstall the electronics in the housing:

- **SBE 5T Titanium Pump** –
  - 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 connector end cap 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 o-ring lubricant (Parker Super O Lube) 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.
- **SBE 5P Plastic Pump** -
  - 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 o-ring lubricant (Parker Super O Lube) 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). **CAUTION: If you are not careful, you may pinch the o-ring which may allow water to enter the housing, damaging the electronics.**
  - C. Reinstall the pump head on the end cap.

DATE	SYN	REV	REVISION	REASON	BY	CHK
08/30/95	B	1	ECN622	RY/RZ/PN	EC	WAS
						33UF
						06



SEA-BIRD ELECTRONICS, INC.  
 ASSEMBLY 40605\_60639  
 TITLE PUMP DRIVER, SMT, PITTMAN MOTOR  
 Size Document Number 31441  
 Date August 30, 1995 Sheet 1 of 1

JUMPER P12 TO P13 AND P17 TO P15 FOR 1300 RPM  
 JUMPER P14 TO P13 AND P16 TO P15 FOR 3000 RPM

DATE	SYM	REVISION RECORD	AUTH. DR.	CHK.
4/05	A	ADD 801572 * ASSY	CB	CB

SLB PRINTED ON 10-10-20 13 APR 2005  
 PART NUMBER..... DESCRIPTION..... BPA

- 80675 SBE 5T #5VDC MOTOR/DRIVER, 7.4 OHM 1.0000
- 80081 MOTOR, PUMP, 7.4 OHM 1.0000
- 23595 SPEED PUMP PCB MOUNT 1.0000
- 30235 WASHER, WN-2, #2 NYLON 2.0000
- 30357 MACH SCREW, 2-56 X 1/4 2.0000
- 30560 MACH SCREW, 2-56 X 9/16 2.0000
- 80639 PUMP DRIVER, SURFACE MOUNT /DNG 4060SC 1.0000

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 SLB PRINTED ON 10-10-21 13 APR 2005  
 PART NUMBER..... DESCRIPTION..... BPA

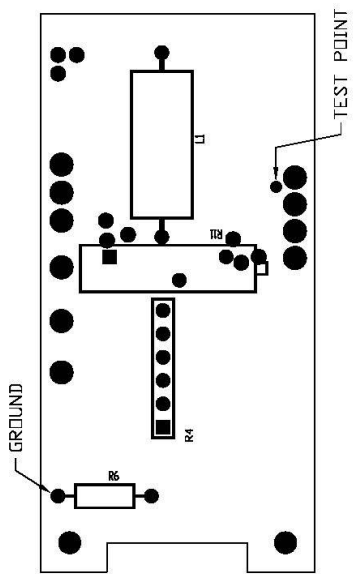
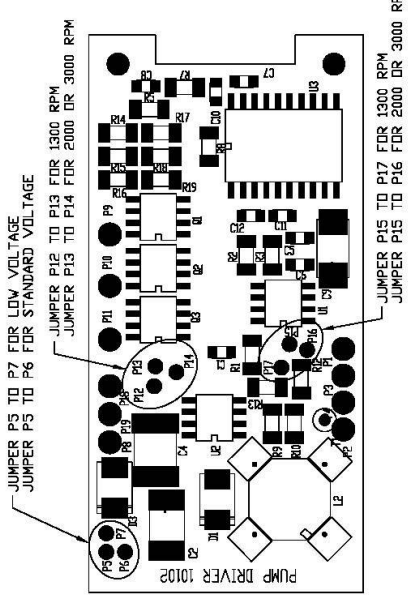
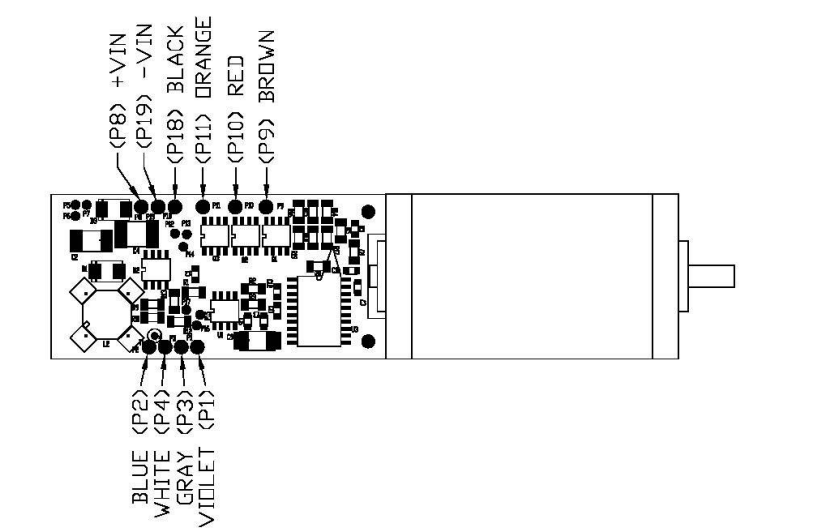
- 80676 SBE 5T #5VDC MOTOR/DRIVER, 18.02 OHM 1.0000
- 20080 MOTOR, PUMP, 18.02 OHM 1.0000
- 23595 SPEED PUMP PCB MOUNT 1.0000
- 30235 WASHER, WN-2, #2 NYLON 2.0000
- 30357 MACH SCREW, 2-56 X 1/4 2.0000
- 30560 MACH SCREW, 2-56 X 9/16 2.0000
- 80639 PUMP DRIVER, SURFACE MOUNT /DNG 4060SC 1.0000

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 PART NUMBER..... DESCRIPTION..... BPA

- 801572 SBE 5T #9VDC MOTOR/DRIVER, 3.55 OHM 1.0000
- 20176 MOTOR, PUMP, 3.55 OHM 1.0000
- 23595 SPEED PUMP PCB MOUNT 1.0000
- 30235 WASHER, WN-2, #2 NYLON 2.0000
- 30357 MACH SCREW, 2-56 X 1/4 2.0000
- 30560 MACH SCREW, 2-56 X 9/16 2.0000
- 80639 PUMP DRIVER, SURFACE MOUNT /DNG 4060SC 1.0000

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 FINISH GENERIC ASSEMBLY TO SPECIFIC ASSEMBLY BY INSTALLING VOLTAGE AND SPEED JUMPERS AS SHOWN ON THE CHART

<b>SEA-BIRD ELECTRONICS, INC</b>			
PART NO.	VARIOUS	DRWN BY	DG
SCHEM	31441B	FR. SCALE	0.90
TITLE SBE 5T MOTOR/DRIVER ASSEMBLY			
DATE	2/13/03	DWG NO.	41250
		REV	A



SBE PN	DESCRIPTION	VOLTAGE	SPEED
80675.2	#3 WINDING (7.4 OHM), STANDARD VOLTAGE, 2000 RPM	P5-P6	P15-P16
80675.2LV	#3 WINDING (7.4 OHM), LOW VOLTAGE, 2000 RPM	P5-P7	P15-P16
80675.3	#3 WINDING (7.4 OHM), STANDARD VOLTAGE, 3000 RPM	P5-P6	P15-P16
80676.1	#5 WINDING (18.02 OHM), STANDARD VOLTAGE, 1300 RPM	P5-P6	P15-P17
80676.1LV	#5 WINDING (18.02 OHM), LOW VOLTAGE, 1300 RPM	P5-P7	P15-P17
80676.2	#5 WINDING (18.02 OHM), STANDARD VOLTAGE, 2000 RPM	P5-P6	P15-P16
80676.2LV	#5 WINDING (18.02 OHM), LOW VOLTAGE, 2000 RPM	P5-P7	P15-P16
801572.2	#3 WINDING (3.55 OHM), STANDARD VOLTAGE, 2000 RPM	P5-P6	P15-P16
801572.2LV	#3 WINDING (3.55 OHM), LOW VOLTAGE, 2000 RPM	P5-P7	P15-P16
801572.3	#3 WINDING (3.55 OHM), STANDARD VOLTAGE, 3000 RPM	P5-P6	P15-P16