



# SEA-BIRD ELECTRONICS, INC.

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SBE P/N 24023

DATE	SYM	REVISION RECORD	AUTH	DR	CHK
04.00	A	Added AutoCAD Drawings	MJ	PM	
11.02	B	Replace Assembly drawing	CB	MJ	

## Replacement of SBE pH Electrodes

### KIT CONTENTS

SBE P/N	Manufacturer P/N	Primary SBE Application	QTY
24023	PH SENSOR 1/4" ISO.	Innovative pH probe for SBE 18, 22, 27, 30	1

### I. Background

This procedure is intended to allow the customer to perform a field replacement of their pH probe on any type of SBE pH sensor.

### II. Precautions

**It is extremely easy to destroy this sensor during assembly.**

**---It is imperative that you use low heat and heat sinks on all steps, so as not to allow overheating of crucial components.**

### III. Equipment needed

#### Tools and Equipment Needed

Low heat Solder Station  
Assortment of heat shrink  
#24 black TFE wire

Low Heat air gun  
A few metal heat sinks  
Clear teflon sleeving

## Replacement of the pH Probe

### A. Open sensor housing and remove old probe

1. Open aluminum housing by carefully unscrewing plastic endcap.
2. Use a razor blade to cut off heat shrink from I1 (upside down IC). Do this gently so you don't break the free lead.
3. Unsolder lap-sliced coax wire from I1. Note position of unsoldered wire with respect to the free lead. Note how wires are "dressed" against the board. The replacement will need to be installed the same way to prevent damage when threading plastic endcap back onto housing.
4. Unsolder #24 TFE wire from the solder turret marked REF.
5. Remove pH electrode guard, then remove pH sensor using a 10" adjustable (crescent) wrench or 3/4" open-end wrench. When electrode has been unthreaded, be sure to gently remove wires through the endcap, so as not to damage any circuit board components, or any other wires that might be present.

### B. Install new probe

1. Take new pH electrode from box. Inspect for any damage due to shipping. Be sure there is buffer solution in the keeper bottle on probe end, and that o-ring is present on the end. Inspect o-ring for debris or damage.
2. Lubricate o-ring at sensor base with Parker Super-O.

SBE DRAWING: 40185

TITLE: SBE18 pH Sensor Final Assembly  
REV: B

### **Sea-Bird Electronics Procedure**

**PROCEDURE NUMBER: 67072**

**TITLE: SBE pH Electrode Replacement Instructions**

**REVISION: B**

**EFFECTIVE DATE: 11/21/2002**

**CHECKED BY:** \_\_\_\_\_ **PAGE 1 of 2**



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3. Place a small amount of Loctite 222 on inner threads of plastic endcap (where previous electrode was removed).
4. Thread new probe into endcap, taking care to route coax cable to correct side of circuit board for "dressing" and soldering.

### C. Probe wiring and prep (for probes not prepared at factory)

#### ***These steps assume specific knowledge of pH sensor model.***

*In general, all replacement pH probes will be prepped at the factory. If probe wires fit the sensor assembly, probe has been prepped, and all of procedure step "C" should be skipped. If the coax cable is much too long, the probe will need to be prepped. For pH sensors prepared at the factory, the following steps are necessary for-assembly.*

1. For pH sensor not prepared at SBE, look at the sketch that most nearly represents the model to be repaired.
2. Cut coax cable to just reach center of I1. SEE DRAWING
3. For SBE 18, remove outer insulation to just past small circuit board ( $\approx 1.50$  inches.) Remove all but .25" of the exposed shield.  
For SBE 22, 27, 30, wire must be draped around components. SEE DRAWING Remove outer insulation to first turn ( $\approx 3.5$ "). Remove all but .25" of exposed shield.
4. For all SBE pH units, prepare a 2" piece of black #24 TFE wire: strip .2" from one end, .4" from other. Wrap .4" around exposed shield. Solder using minimum heat and a heat sink, so as not to melt inner conductor. Put a 1" piece of 1/16" heat shrink over joint. Shrink.
5. Remove black conducting insulation back to shield joint ( $\approx 1.5$ " for SBE 18, 3.5" for others) without removing clear teflon inner insulation of inner conductor. Now, cover all of clear insulation except the last .5" with 1/16" heat shrink. Shrink down, being careful not to melt the inner conductor. Take shield joint and gently bend back toward the sensor. Cover this bend and area on either side of the joint with 1.0" piece of 1/8" heat shrink. Shrink using minimum heat.
6. Bare last .25" of inner conductor. There should now be a bare .25" length of inner conductor wire, a .25" long piece of clear teflon insulation, and the outer piece of heat shrink—SEE DETAIL ON SKETCH

### D. Probe wiring for "factory prepped" probes

1. Cut a piece of 1/16" heat shrink .7" long. Slide over inner conductor of coax cable for strain relief.
2. Lap splice inner connector to free lead of I1.
3. Slide heat shrink over splice. Shrink using low heat.
4. Completely surround both ends of heat shrink with RTV.
5. Solder black #24 TFE wire to REF turret.
6. Allow time for RTV to cure before threading endcap back onto housing.
7. Using a piece of waxed string, tie down strain relief to Mylar capacitor to prevent wires from getting caught in endcap during re-assembly. (not needed for SBE 18)
8. When RTV has cured, unit is ready to be closed up. It is a good idea to place a 1 gram desiccant bag into the housing. Check to make sure there is no debris on the o-ring, as this could cause a leak. Rethread endcap onto housing, making sure no wires are caught in the threads.

SBE DRAWING: 40185

TITLE: SBE18 pH Sensor Final Assembly  
REV: B

### **Sea-Bird Electronics Procedure**

**PROCEDURE NUMBER: 67072**

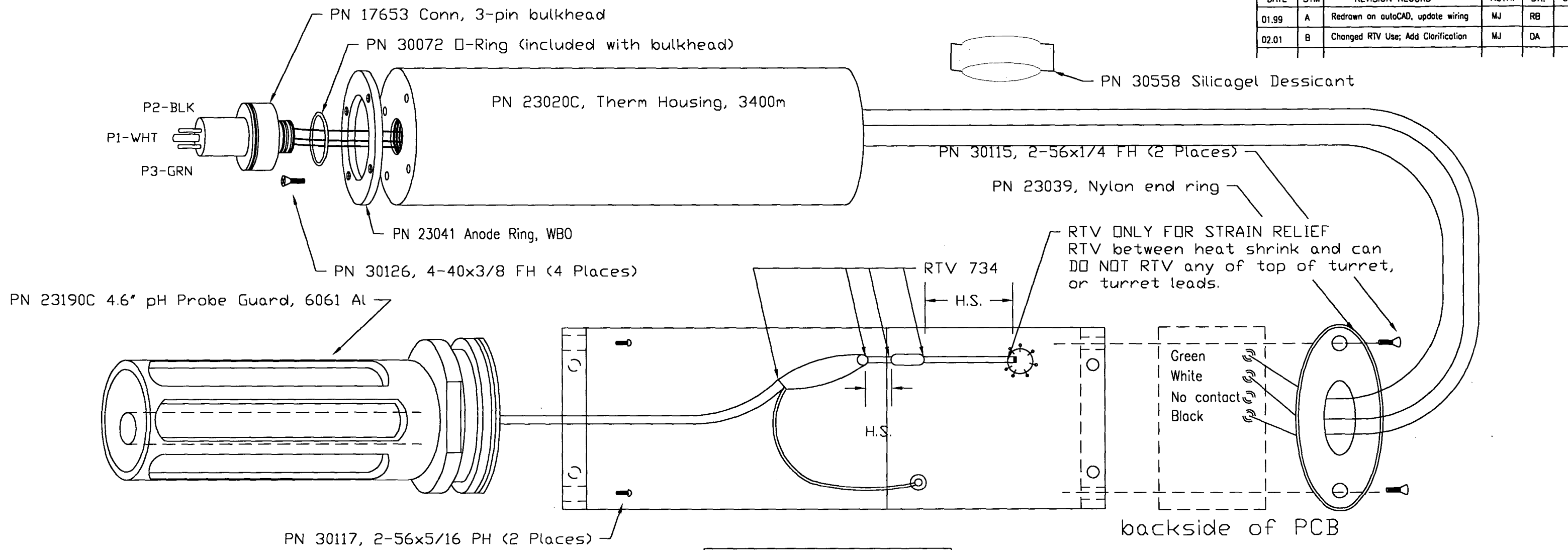
**TITLE: SBE pH Electrode Replacement Instructions**

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**CHECKED BY:** \_\_\_\_\_ **PAGE 2 of 2**

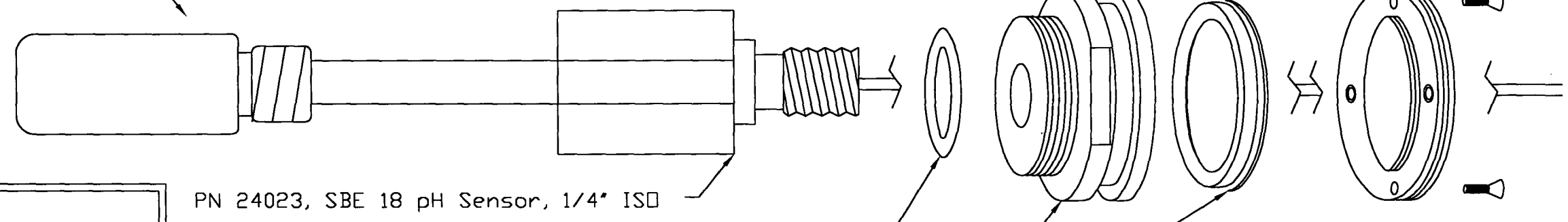
DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.
01.99	A	Redrawn on autoCAD, update wiring	MJ	RB	
02.01	B	Changed RTV Use; Add Clarification	MJ	DA	



RTV ONLY FOR STRAIN RELIEF  
 RTV between heat shrink and can  
 DO NOT RTV any of top of turret,  
 or turret leads.

Refer to SBE Procedure  
 75018 for instructions  
 regarding the precise  
 wiring of this sensor

(Poly bottle, filled with pH solution)



**RTV HEAT SHRINK CONNECTIONS**  
 1. Apply RTV 734 to ends of each piece  
 Do Not apply to top of inverted turret.  
 Do Not apply excessiv amounts.  
 Always keep turning sensor until RTV skins,  
 in order to insure a quality seal.

TOLERANCES					<b>SEA-BIRD ELECTRONICS, INC</b>				
FRACTIONAL	P/N	90044	SCALE	N.T.S.	DRAWN BY		MJ		
DECIMAL	TITLE				SBE 18 pH Sensor Final Assembly				
ANGULAR	DATE	10.30.98	DRAWING NUMBER	40185	REV		B		