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Retrofit for SBE 37 MicroCATs with Optional Pressure Sensor - Pressure Port Plug Removal, Oil Refill, and Nylon Capillary Fitting Installation

Equipment Affected:

SBE 37 MicroCATs that meet **all** of the following criteria:

- Paine pressure sensor,
- Full scale pressure ≤ 1500 psi, and
- Serial number ≤ 1789

Description of Problem:

The MicroCAT's low pressure (≤ 1500 psia) Paine pressure sensor is made of stainless steel. When installed in the MicroCAT, the sensor is in electrical contact with the titanium end cap. The pressure sensor and end cap pressure port were originally filled with a silicon oil, and a pressure port plug was used to retain the oil. In some cases, there has been intrusion of salt water into the pressure sensor cavity, leading to corrosion.

This retrofit kit is being provided to prevent corrosion from occurring in the future. The kit consists of a pressure port capillary fitting to replace the pressure port plug and a higher viscosity oil.

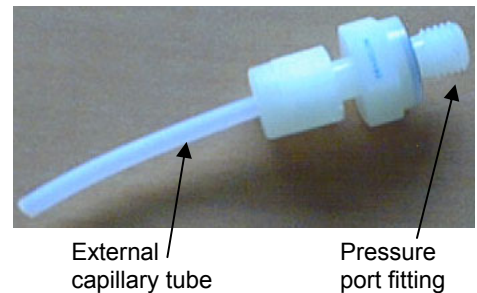
Solution:

Retrofit is simple and requires:

- removing the pressure port plug,
- refilling the internal pressure capillary tube with a higher viscosity oil, and
- installing a nylon pressure capillary fitting

The retrofit procedure follows.

Nylon pressure capillary fitting

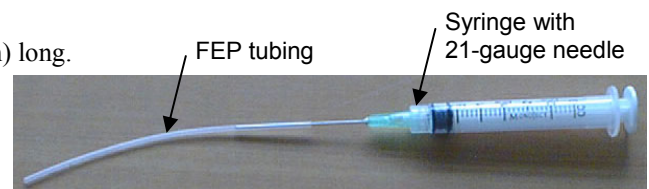


P/N 50284 MicroCAT Retrofit Oil Fill Kit

P/N	Description	Quantity
50283	Nylon pressure capillary fitting	1
30419	Syringe for injecting DC-200	1
30420	Needle (21 gauge) for syringe	1
30421	76mm (3 inch) long FEP tubing ($1/32$ inch I.D.; $1/16$ inch O.D.), to place on end of syringe needle	1
31152	Dow Corning DC-200 silicon oil (10,000 centistokes viscosity)	1 ounce

To replace the needle (if necessary):

1. Use a 21-gauge surgical needle, minimum 25 mm (1 inch) long.
2. Grind off the tip so the needle is no longer sharp.
3. Remove any burrs.
4. Verify that the needle still has a hole through it.
5. Screw-lock the needle into place on the syringe.



Procedure

1. Seal the end of the glass conductivity cell (using Tygon tubing or similar material) to avoid contaminating the cell with oil.
2. Unscrew the pressure port plug (P/N 231593) from the end cap pressure port. The fitting contains silicon oil, so there will be some spillage.

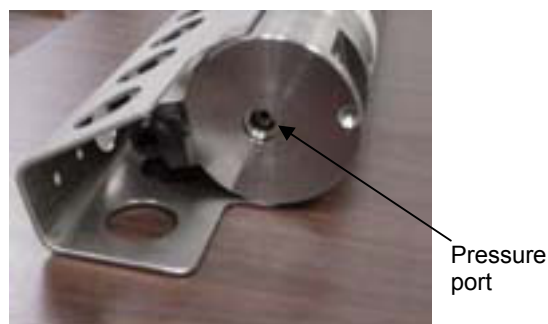
CAUTION: Be careful not to hit the glass conductivity cell with the screwdriver, as doing so will break the cell.



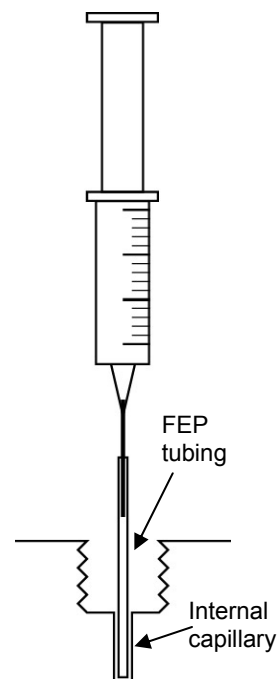
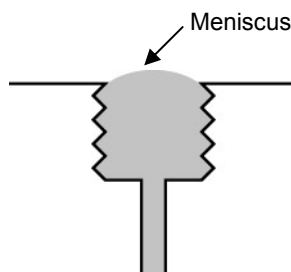
3. Rinse the pressure port with warm, de-ionized water to remove any corrosion.

CAUTION: Do not put a brush or any object in the pressure port. Doing so may damage or break the pressure sensor.

4. Drain all water from the pressure port cavity. Let the cavity dry overnight or use low-pressure (< 100 psi) air to dry it before continuing.
5. Calibrate the pressure sensor (if desired):
 - A. The pressure port is tapped with a 7/16-20 straight thread to accept your pressure fitting.
 - B. Calibrate the pressure sensor.
 - C. Remove the pressure fitting.



6. Turn the instrument so that the end cap faces up.
7. Fill the pressure sensor internal capillary with oil:
 - A. Fill the syringe with the DC-200 oil provided with the retrofit kit.
NOTE: This oil is of a thicker viscosity than the oil normally used with Sea-Bird products. The oil was specifically purchased for this application and should only be used as part of this kit.
 - B. Insert the syringe's FEP tubing as far as it will go into the pressure port's internal capillary.
 - C. Fill the internal capillary with oil, slowly pulling the syringe tubing out of the capillary as the capillary fills. Make sure to keep the tip of the syringe tubing below the oil surface as you pull out the syringe. When filled, a slight meniscus forms at the surface of the end cap.



8. With the end cap still facing up, install the new nylon pressure capillary fitting on the end cap. Do not overtighten the fitting. The oil from the internal capillary should fill the fitting and overflow the top of the external capillary tube as the fitting is screwed in. If it does not, remove the capillary fitting and repeat Steps 6 through 8 to fill with additional oil.
9. Clean up any spilled oil on the instrument.
10. Remove the material used to seal the end of the glass conductivity cell.



Oil from internal capillary should fill fitting, and overflow top end of external capillary tube

NOTE: The oil in the nylon pressure capillary fitting transmits hydrostatic pressure to the pressure sensor inside the instrument, and prevents corrosion that might occur if the sensor diaphragm was exposed to water. Because of the viscosity of the silicone oil and capillary action, the silicone oil does not run out of the external capillary tube. However, due to temperature and pressure cycling over long periods, it is normal for some oil to slowly leak out of the external capillary tube. When the oil is not visible or is receding inside the translucent tube, or if the fitting has been damaged, refill the oil using the procedure described above.