

|                                               |                                                               |
|-----------------------------------------------|---------------------------------------------------------------|
| Guide no.: <b>46801</b>                       | Location: <b>San Jose, CA</b>                                 |
| Version no.: <b>2</b>                         | Work center: <b>Assembly</b>                                  |
| Name: <b>100221682</b>                        | Category: <b>Work Instructions / SOP</b>                      |
| ERP reference no.: <b>040-1268-000</b>        | Folder: <b>Applied Engineering/Work Instructions/MBARI</b>    |
| Version status: <b>Published</b>              | Product no.: <b>100221682</b>                                 |
| Guide status: <b>Active</b>                   | Product revision no.: <b>J</b>                                |
| Template: <b>No</b>                           | Product internal revision no.:                                |
| Last update: <b>2023-09-14 18:38:09 UTC</b>   | Description: <b>create WI for pH sensor provided by MBARI</b> |
| Creation date: <b>2023-09-11 15:46:46 UTC</b> |                                                               |
| Author: <b>Tomoaki Clark</b>                  |                                                               |
| reviewer: <b>Jacob Orozco</b>                 |                                                               |



Step 1/50

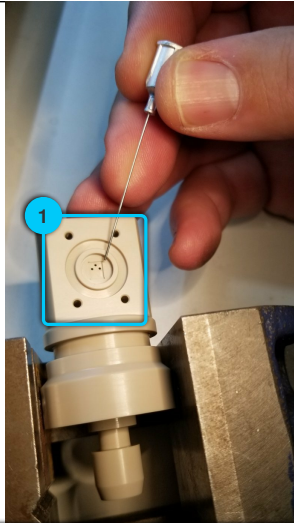
Standard O-ring installation procedure.

Step 2/50

1. Use only lint free cleaning tools. Foam tipped swaps are preferred. Fiber tipped swaps are not acceptable.
2. Inspect O-ring for defects: Excess flash, foreign materials, surface defects, flow marks, indentations, nicks, voids etc.
3. Inspect O-ring groove for damage
4. Clean O-ring groove with denatured alcohol. Use compressed air to clean and dry.
5. Clean O-ring with denatured alcohol. Use compressed air to clean and dry.
6. Apply a light film of grease to all surfaces of O-ring. No clumps or build-up.
7. Inspect, install, inspect

| O-Ring Defect Description: MIL-STD-413C                                             |                                                                                                                                                                                                                                                  | O-Ring Defect Description: MIL-STD-413C (Continue)                                  |                                                                                                                                                                                                                                     |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                                                                         | Definition                                                                                                                                                                                                                                       | Description                                                                         | Definition                                                                                                                                                                                                                          |
| Excess Flash or Parting Line Projection                                             | Parting Line Projection: A continuous ridge of material on the parting line at the ID and/or OD.<br>Flash: A film-like material which extends from the parting line on the ID, and/or OD, and may be superimposed on the parting line projection | Mold Deposit (Dirty Mold)                                                           | Surface indentations, irregular in shape, with a rough surface texture.                                                                                                                                                             |
|   |                                                                                                                                                                                                                                                  |   |                                                                                                                                                                                                                                     |
| Flow Marks (Flow Lines)                                                             | A thread-like recess, usually curved, of very slight depth with normal surface texture and radial edge.                                                                                                                                          | Nicks or Parting Line Indentation                                                   | A shallow, saucer-like recess, sometimes triangular in shape, located on the parting line at the ID or OD, and usually divided by the parting line. The edges are smoothly flared into the O-ring surface and have similar texture. |
|  |                                                                                                                                                                                                                                                  |  |                                                                                                                                                                                                                                     |
| Foreign Material                                                                    | Any extraneous, imbedded matter, or depression formed by its removal.                                                                                                                                                                            | Non-Fill or Void                                                                    | A randomly spaced, irregularly shaped, surface indentation having a coarser texture than the normal O-ring surface. It may have molded edges which may or may not join.                                                             |
|  |                                                                                                                                                                                                                                                  |  |                                                                                                                                                                                                                                     |
|                                                                                     |                                                                                                                                                                                                                                                  | Off-Register and Mismatch                                                           | Off-Register: Misaligned O-ring halves.<br>Mismatch: Cross section of each half are different sizes.                                                                                                                                |
|                                                                                     |                                                                                                                                                                                                                                                  |  |                                                                                                                                                                                                                                     |
|                                                                                     |                                                                                                                                                                                                                                                  | Backring                                                                            | A longitudinal recess of wide angle "U-like" or "W-like" cross sections orientated circumferentially and located only at parting lines.                                                                                             |
|                                                                                     |                                                                                                                                                                                                                                                  |  |                                                                                                                                                                                                                                     |

Step 3/50



Carefully use a .020" gage pin or needle to verify the 3 fuzzy button holes are clear of debris from item 1 housing.

### Step 4/50

### Numbered annotations (1)

- 1 Carefully use a .020" gage pin or needle to verify the 3 fuzzy button holes are clear of debris from item 1 housing.

2

**GDF Production Traveler**

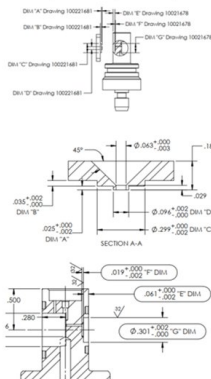
Serial Number:

|                          |
|--------------------------|
| Version:                 |
| Installed on Float w/MO: |

| Step No. | Description                          |       | Date  | By    | Notes |       |
|----------|--------------------------------------|-------|-------|-------|-------|-------|
| 1        | Kit Parts                            |       |       |       |       |       |
| 2        | Visual inspection                    |       |       |       |       |       |
| 3        | Coverplate                           |       |       |       |       |       |
| Dim A    | Dim B                                | Dim C | Dim D | Dim E | Dim F | Dim G |
| 4        | Gasket Thickness                     |       |       |       |       |       |
| -        | Gasket Material                      |       |       |       |       |       |
| -        | Gasket Compression                   |       |       |       |       |       |
| 5        | Build Sensor                         |       |       |       |       |       |
| 6        | Photos Front and Back                |       |       |       |       |       |
| 7        | Other Photos                         |       |       |       |       |       |
| 8        | VI Pellet Resistance 200K            |       |       |       |       |       |
| 9        | Substrate-Drain Voltage →            |       |       |       |       |       |
| 10       | Substrate-Source Voltage →           |       |       |       |       |       |
| 11       | Counter Electrode resistance (200 Ω) |       |       |       |       |       |
| 12       | K2 Cal                               |       |       |       |       |       |
| 13       | f(p) cal (file name)                 |       |       |       |       |       |
| 14       | Install on Endcap                    |       |       |       |       |       |
| 15       | Test/Calibration K0                  |       |       |       |       |       |
| 16       | Shipped to                           |       |       |       |       |       |
| 17       | Deployed                             |       |       |       |       |       |
| 18       | He Leak Test < 1.0 E-09              |       |       |       |       |       |

**Assembly Notes:**

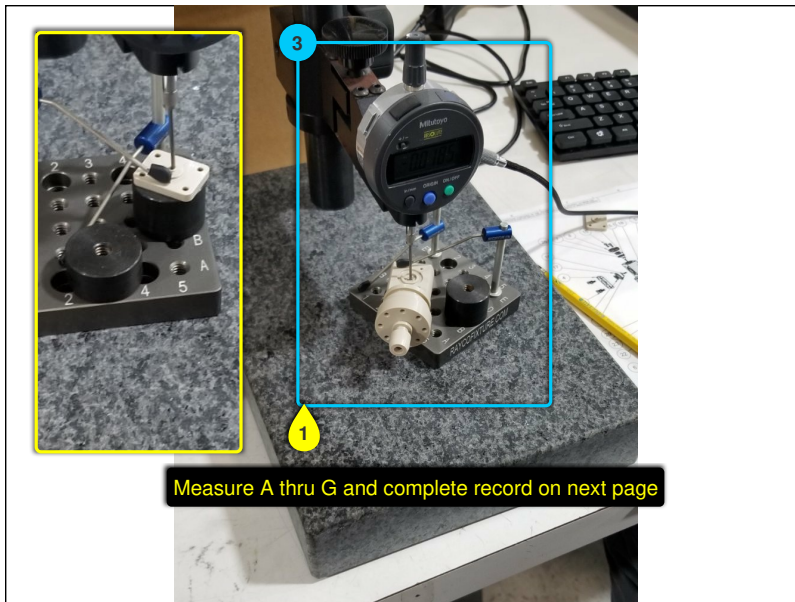
1) After Recording the dimensions above, the housing and front over plate are a matched pair and must remain together in the kit with the assigned S/N



## Step 5/50

### Numbered annotations (1)

- 2 Record the SN of the housings



## Step 6/50

Numbered annotations (2)

- 3 Measure and record dimensions of 100221681 and 100221678 on following sheet
- 1 Once the measurements are complete, make sure the housing and the cover plate remain as matched pairs

| GDF Production Traveler    |                                      |       |       |       |       |       |
|----------------------------|--------------------------------------|-------|-------|-------|-------|-------|
| Serial Number:             |                                      |       |       |       |       |       |
| Version:                   |                                      |       |       |       |       |       |
| Installed on Float w/ WIG: |                                      |       |       |       |       |       |
| Step No.                   | Description                          | Date  | By    | Notes |       |       |
| 1                          | Kit Parts                            |       |       |       |       |       |
| 2                          | Visual inspection                    |       |       |       |       |       |
| 3                          | Coverplate                           |       |       |       |       |       |
| Dim A                      | Dim B                                | Dim C | Dim D | Dim E | Dim F | Dim G |
| 4                          | Gasket Thickness                     |       |       |       |       |       |
| -                          | Gasket Material                      |       |       |       |       |       |
| -                          | Gasket Compression                   |       |       |       |       |       |
| 5                          | Build Sensor                         |       |       |       |       |       |
| 6                          | Photos Front and Back                |       |       |       |       |       |
| 7                          | Other Photos                         |       |       |       |       |       |
| 8                          | VI Pellet Resistance 200K            |       |       |       |       |       |
| 9                          | Substrate-Drain Voltage              |       |       |       |       |       |
| 10                         | Substrate-Source Voltage             |       |       |       |       |       |
| 11                         | Counter Electrode resistance (200 Ω) |       |       |       |       |       |
| 12                         | K2 Cal                               |       |       |       |       |       |
| 13                         | f(p) cal (file name)                 |       |       |       |       |       |
| 14                         | Install on Endcap                    |       |       |       |       |       |
| 15                         | Test/Calibration KO                  |       |       |       |       |       |

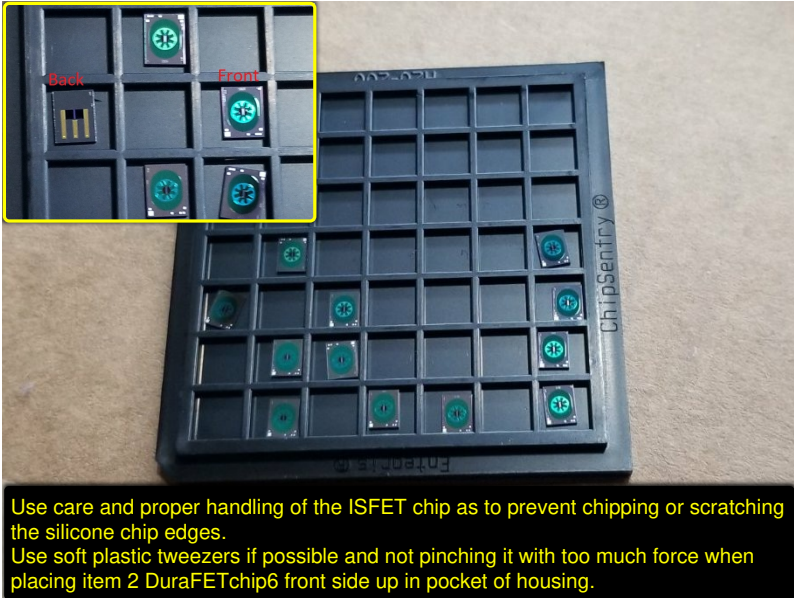
Complete production traveler for measurements taken and gasket compression calculations.

1) After Recording the dimensions above, the housing and front over plate are a matched pair and must remain together in the kit with the assigned S/N

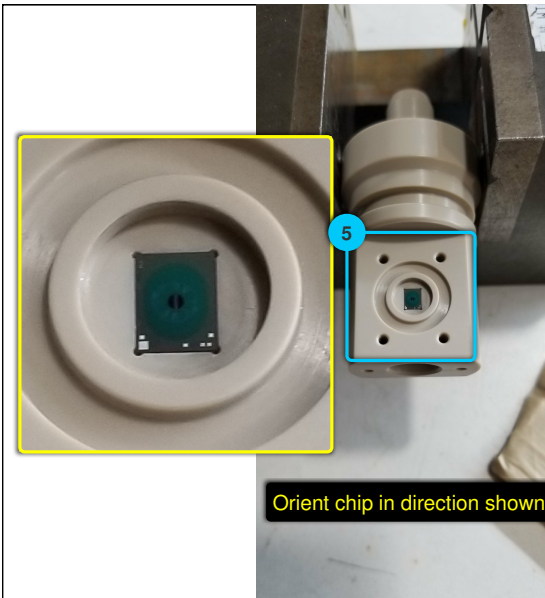
## Step 7/50

Numbered annotations (1)

- 4 record the dimension measurements in the traveler(A-G).



## Step 8/50

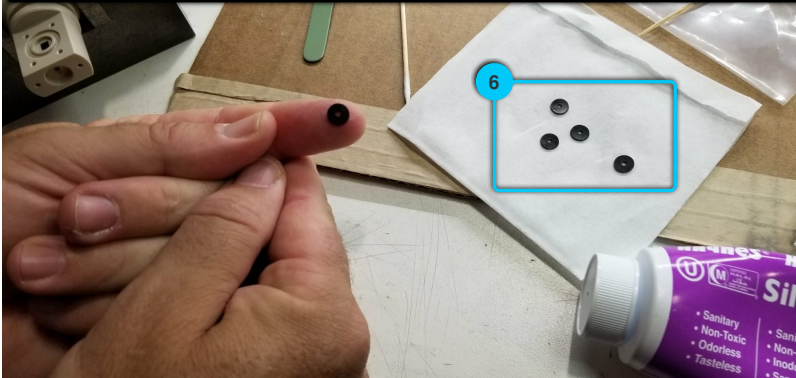


## Step 9/50

Numbered annotations (1)

- 5 Place item 2 DuraFETchip6 front up in pocket of housing  
Orient chip in direction shown

Inspect edges of item 3 gasket for taper or flashing under magnification, then apply a light film of grease to top, bottom and OD of the O-ring. Try to keep grease off of O-ring ID.

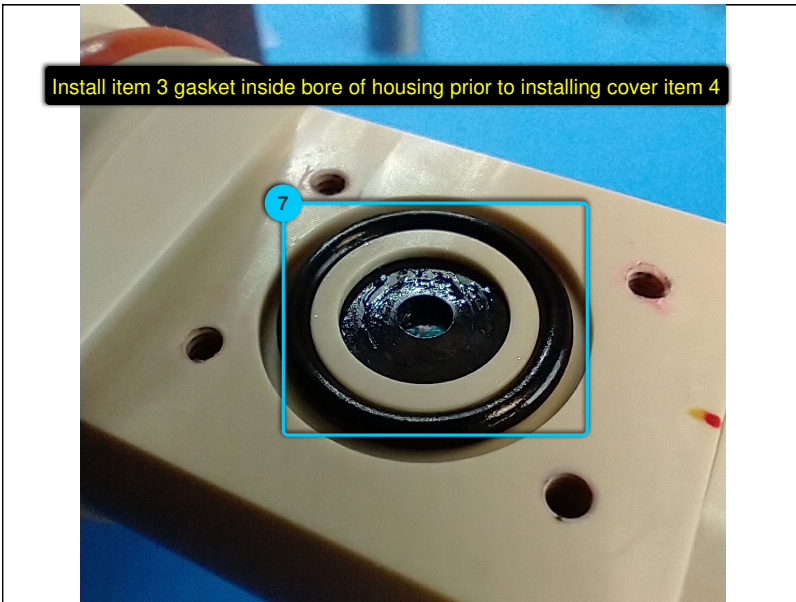


## Step 10/50

Numbered annotations (1)

- 6 Inspect edges of gasket for taper or flashing under magnification, then apply a light film of grease to top, bottom and OD of the O-ring. Try to keep grease off of O-ring ID.

Install item 3 gasket inside bore of housing prior to installing cover item 4

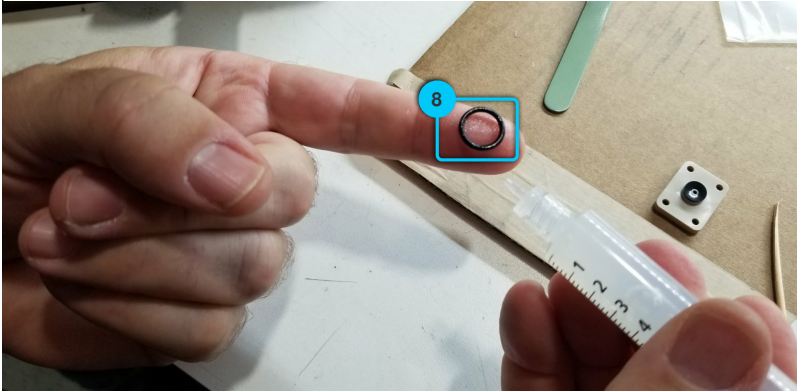


## Step 11/50

Numbered annotations (1)

- 7 Install item 3 gasket inside bore of housing prior to installing cover item 4.

Inspect and apply a light film of grease to all O-ring surfaces.

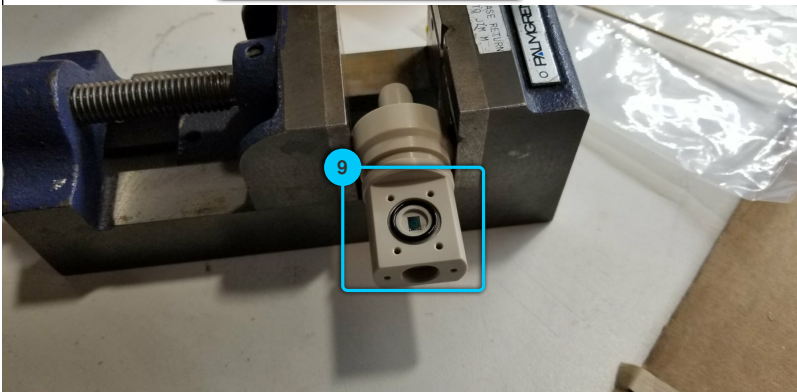


## Step 12/50

Numbered annotations (1)

- 8 Inspect and apply a light film of grease to all O-ring surfaces.

Install item 12 o-ring in housing

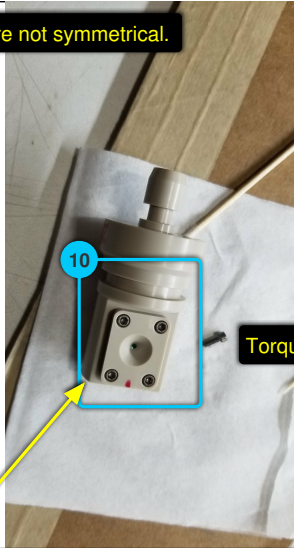


## Step 13/50

Numbered annotations (1)

- 9 Install o-ring item 17 in housing

Verify orientation, holes are not symmetrical.



Torque to 3 in. lbs.

Verify there is a small gap between the housing and cover prior to installing screws

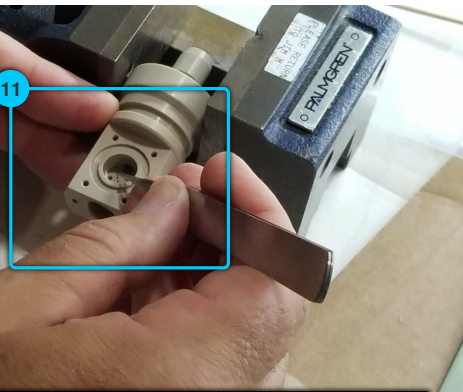
## Step 14/50

Numbered annotations (1)

- 10 Verify orientation, holes are not symmetrical, then, Install item 4 cover onto housing using item 23 screws [4X]



11



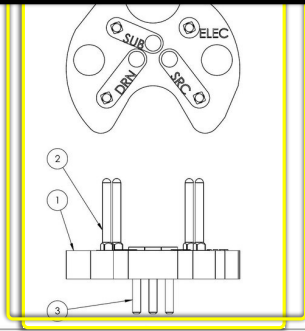
Use magnetic tweezers to lift and insert item 10 fuzzy buttons 3X into housing. DO NOT SQUEEZE fuzzy buttons with tweezers they could be damaged.

## Step 15/50

Numbered annotations (1)

- 11 Use magnetic tweezers to lift and insert 3X item 16 fuzzy buttons into housing. DO NOT SQUEEZE fuzzy buttons with tweezers they could be damaged.

Assemble and solder 3X item 3 and press fit 4X item 2 per attached BOM and drawing.



MBARI BOM

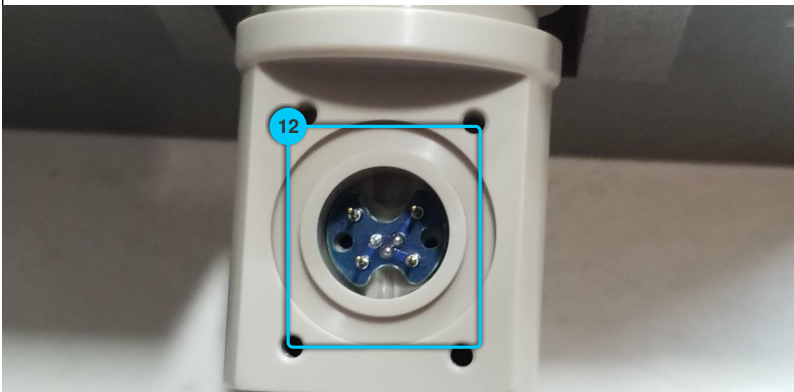
| ITEM NO. | Revision | SW-File Name(File Name)          | Vendor   | VendorNo                | Manufacturer | ManufacturerNo          | ASSY. QTY. |
|----------|----------|----------------------------------|----------|-------------------------|--------------|-------------------------|------------|
| 1        | B        | 100221480rb2_isfetinterfacepcb   |          |                         | MBARI        | 100221480rb2            | 1          |
| 2        | B        | mill-max-8969-0-05-21-00-00-03-0 | Mill-Max | 8969-0-05-21-00-00-03-0 |              |                         | 4          |
| 3        | B        | mill-max-4068-0-00-15-00-00-33-0 | Mill-Max | 4068-0-00-15-00-00-03-0 | Mill-Max     | 4068-0-00-15-00-00-03-0 | 3          |

## Step 16/50

Numbered annotations (1)

- 1 Assemble and solder 3X item 3 and press fit 4X item 2 per attached BOM and drawing.

Insert item 9.3 PCB into housing in direction shown.



## Step 17/50

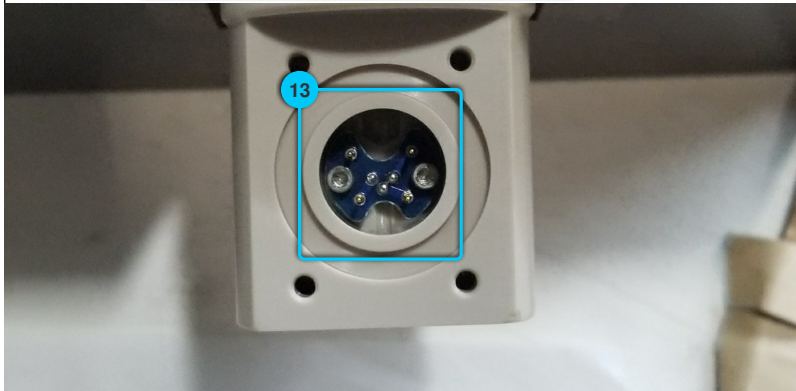
Numbered annotations (1)

- 12 Insert item 30 PCB into housing in direction shown

## Step 18/50

Numbered annotations (1)

- 13 Afix the PCB to the housing using item 22 (92196A0S2) WITH VIBRA-TITE [2X]

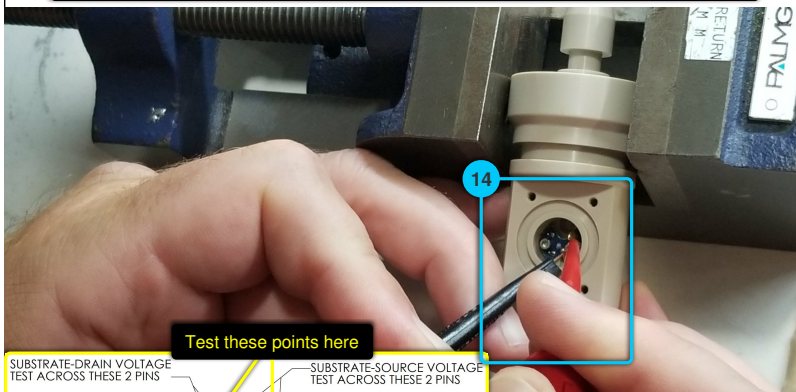


Torque to 1.0 in. lb.

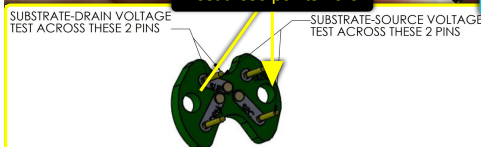
## Step 19/50

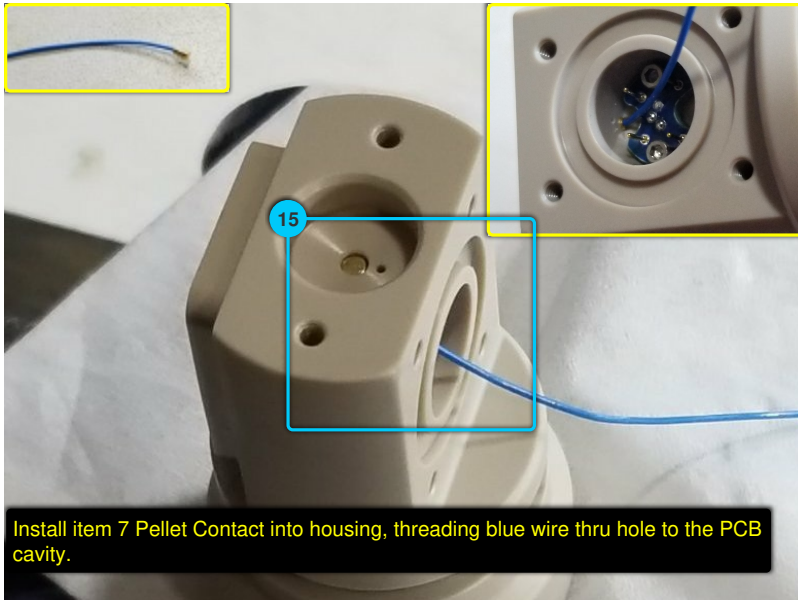
Numbered annotations (1)

- 14 Test connections for continuity (Detail to be provided by MBARI)



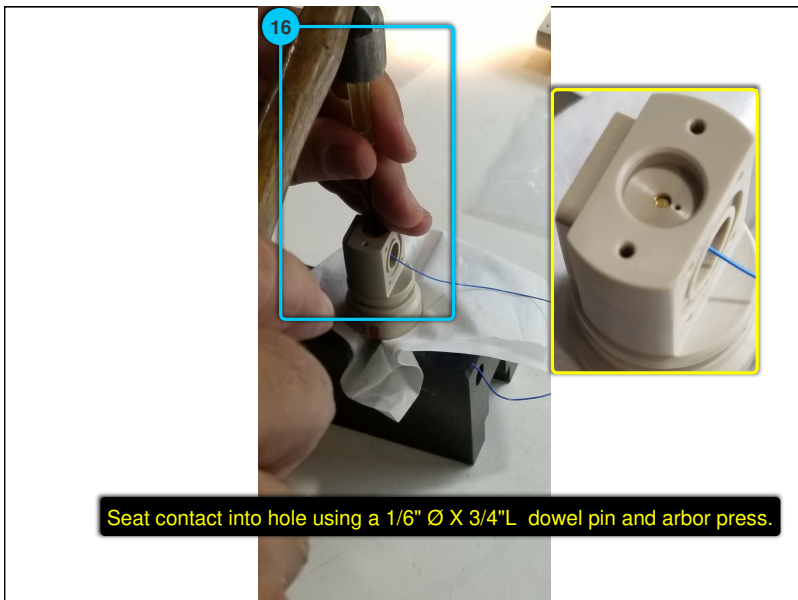
Test these points here



**Step 20/50**

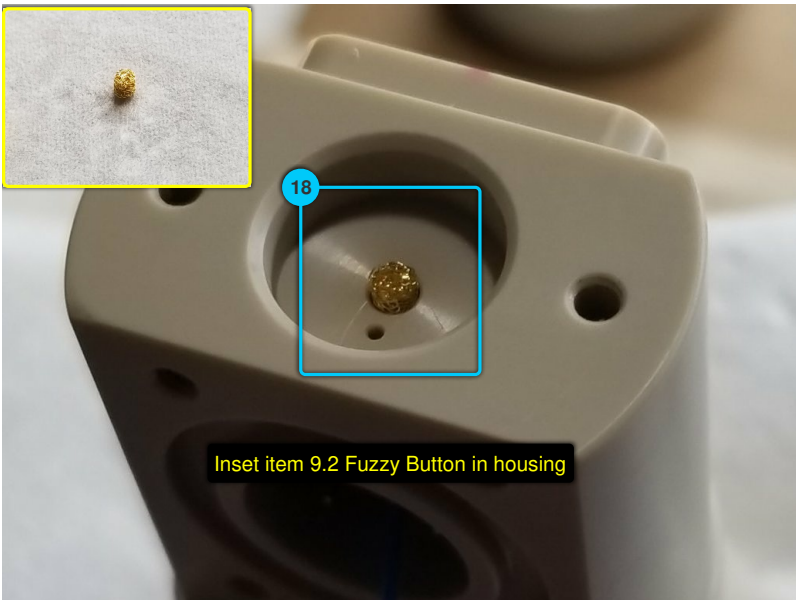
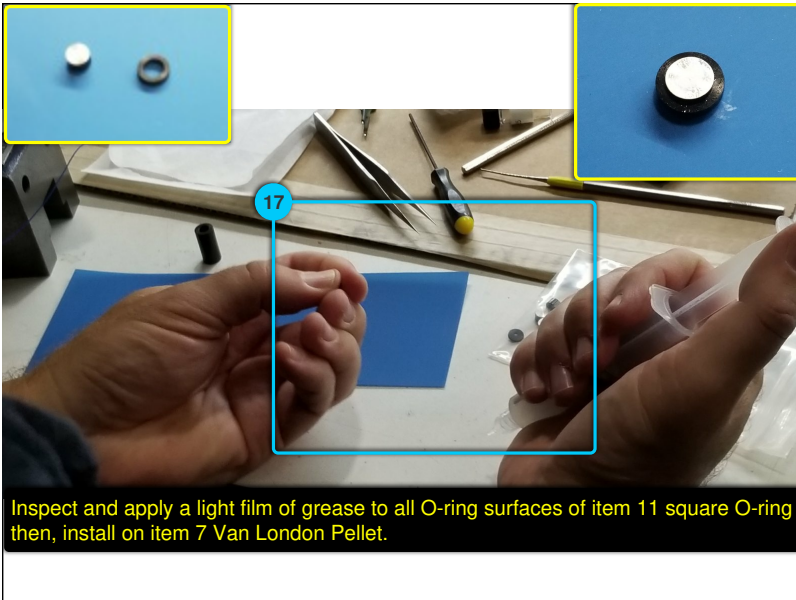
Numbered annotations (1)

- 15 Install item 25 Pellet Contact into housing, threading blue wire thru hole to the PCB cavity.

**Step 21/50**

Numbered annotations (1)

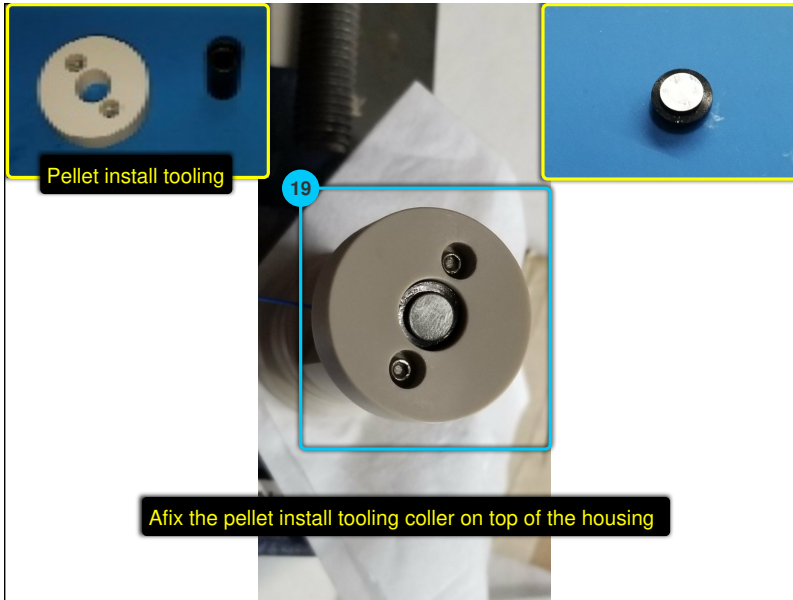
- 16 Seat contact into hole using a 1/6" Ø X 3/4"L dowel pin and arbor press.



**Step 24/50**

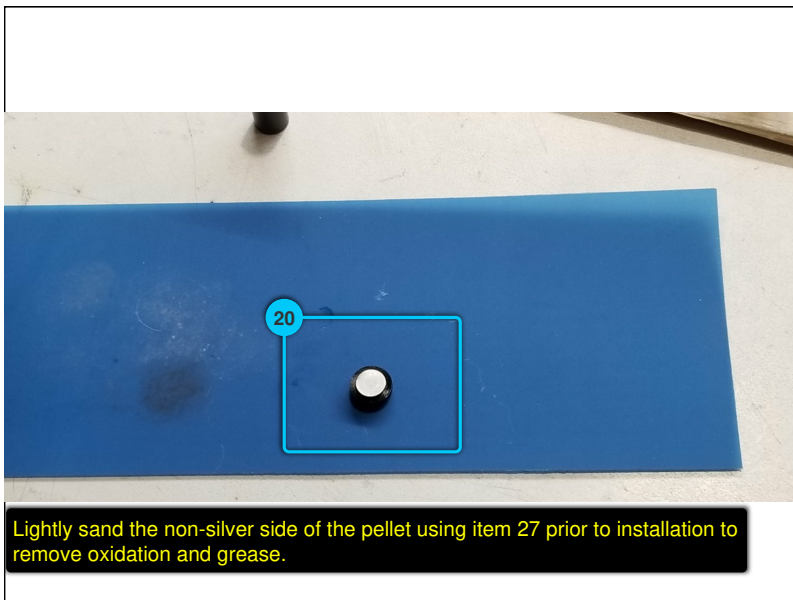
Numbered annotations (1)

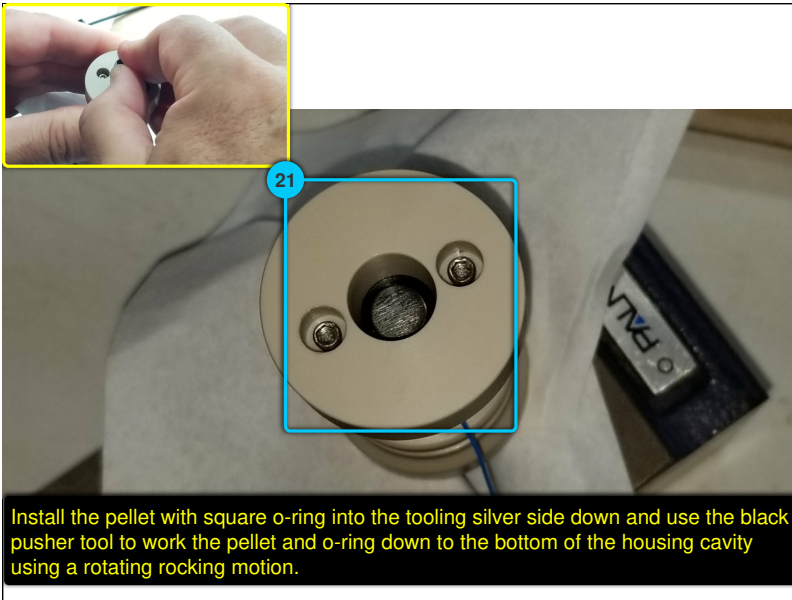
- 19 Afix the pellet install tooling coller on top of the housing

**Step 25/50**

Numbered annotations (1)

- 20 Lightly sand the non-silver side of the pellet using item 27 prior to installation to remove oxidation and grease.

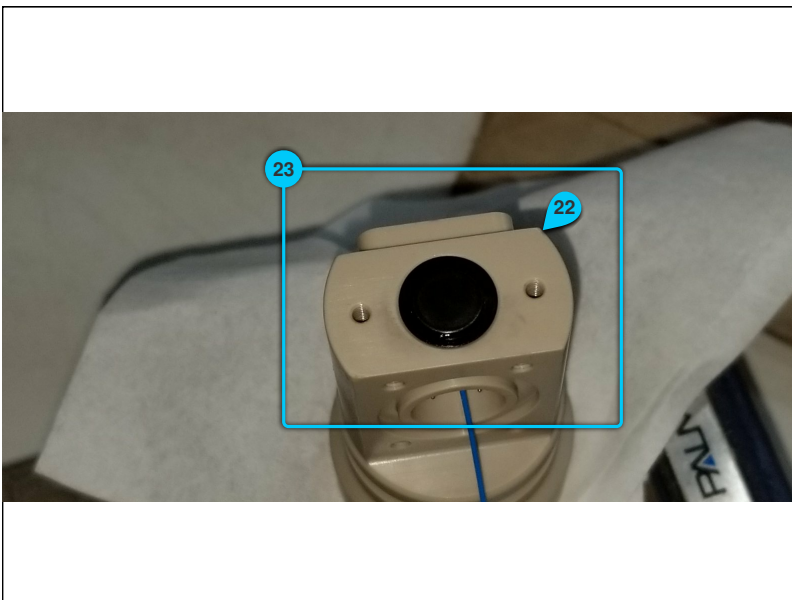




## Step 26/50

### Numbered annotations (1)

- 21 Install the pellet with square o-ring into the tooling silver side down and use the black pusher tool to work the pellet and o-ring down to the bottom of the housing cavity using a rotating rocking motion.



## Step 27/50

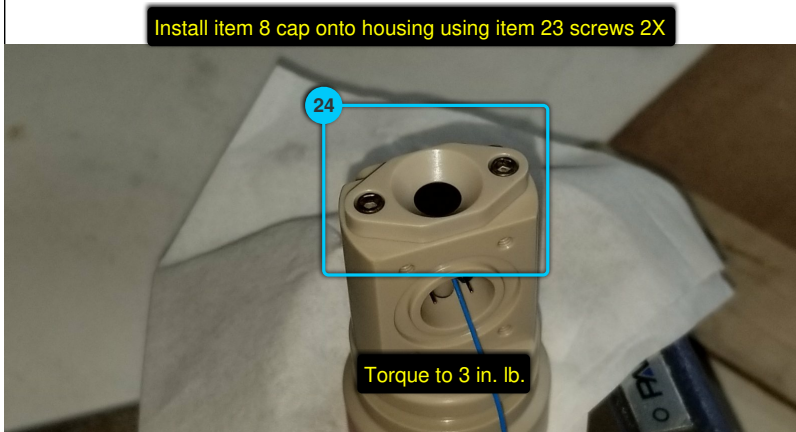
### Numbered annotations (2)

- 22 before inserting the installation tool, lightly sand the pellet before installing the cap
- 23 Remove the pellet install tooling and verify the pellet is flush to the top of the housing

## Step 28/50

Numbered annotations (1)

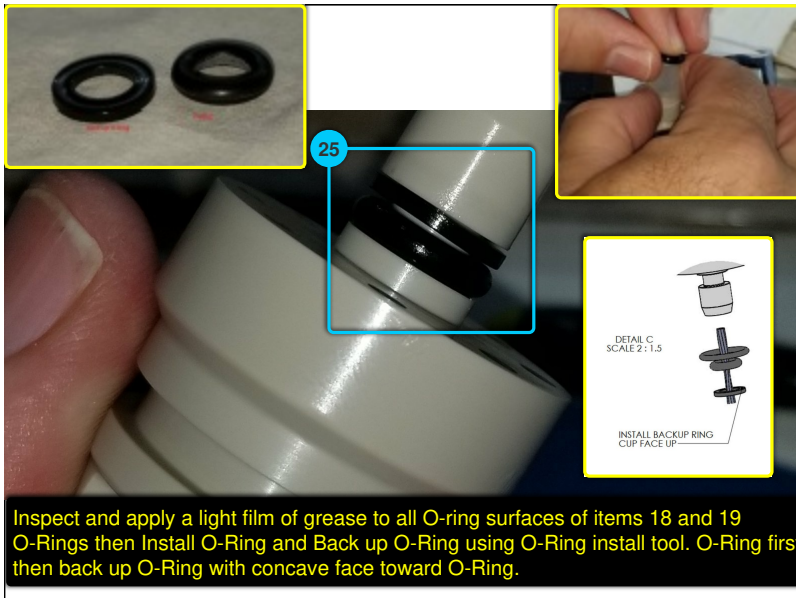
- 24 using vibra-tite, install item 8 cap (100221687) onto the housing using item 23 screws (95345A207) [2X]



## Step 29/50

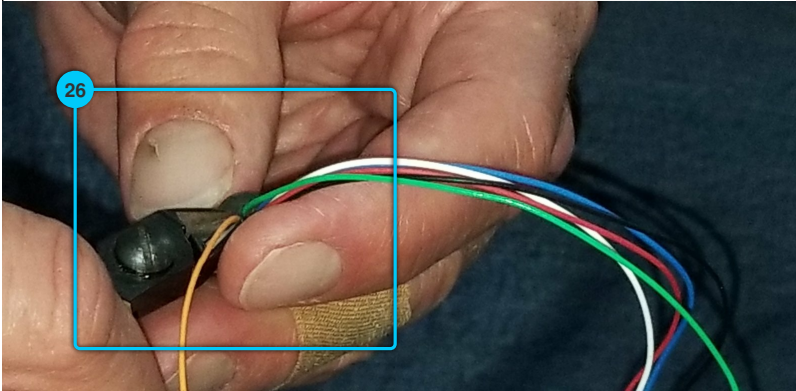
Numbered annotations (1)

- 25 Inspect and apply a light film of grease to all O-ring surfaces of items 18 and 19 O-Rings then Install O-Ring and Back up O-Ring using O-Ring install tool.



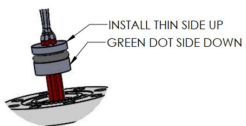
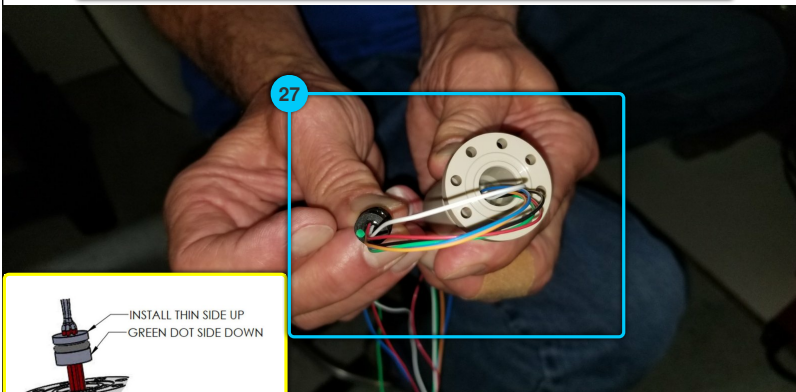
## Step 30/50

On item 9.4.1 cut the orange wire from the side opposite of the green dot.



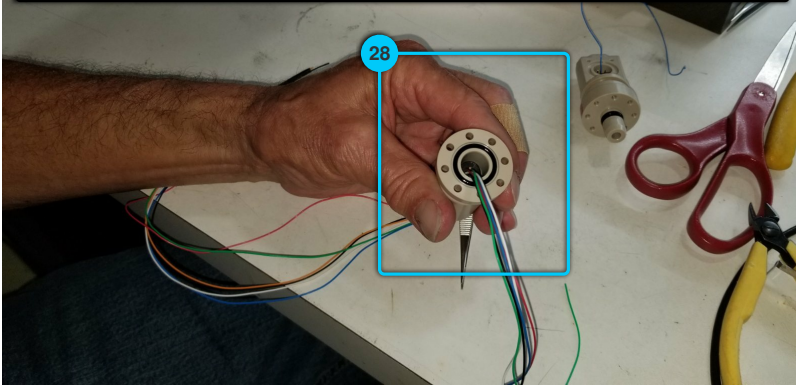
## Step 31/50

Thread item 9.4.1 leads thru item 6 adapter with green dot side down.



DETAIL D  
SCALE 2 : 1.5

Inspect and apply a light film of grease to all O-ring surfaces of item 15 O-ring then install on item 6 adapter.

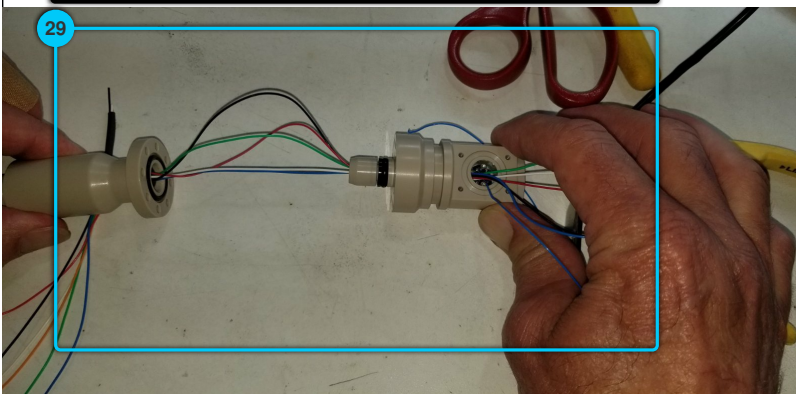


## Step 32/50

Numbered annotations (1)

- 28 Inspect and apply a light film of grease to all O-ring surfaces of item 15 O-ring then install on item 6 adapter.

Feed wires thru the end of item 1 and out the hole with the PCB.

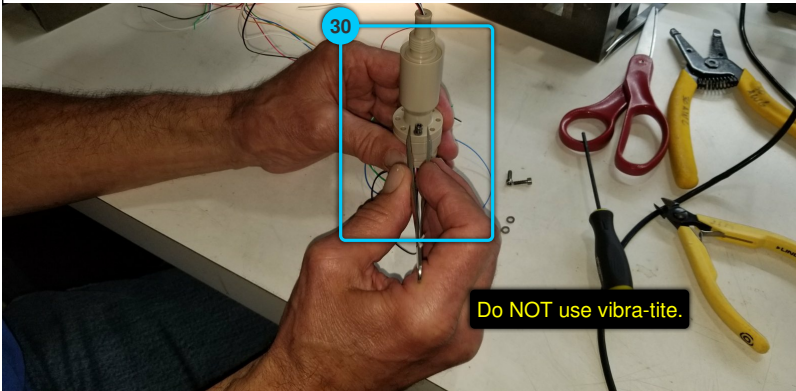


## Step 33/50

Numbered annotations (1)

- 29 Feed wires thru the end of item 1 and out the hole with the PCB.

Pull the wires until the adapter meets the housing then install items 20 and 21 4X ea. at 4 opposing holes with an open hole next to each screw.

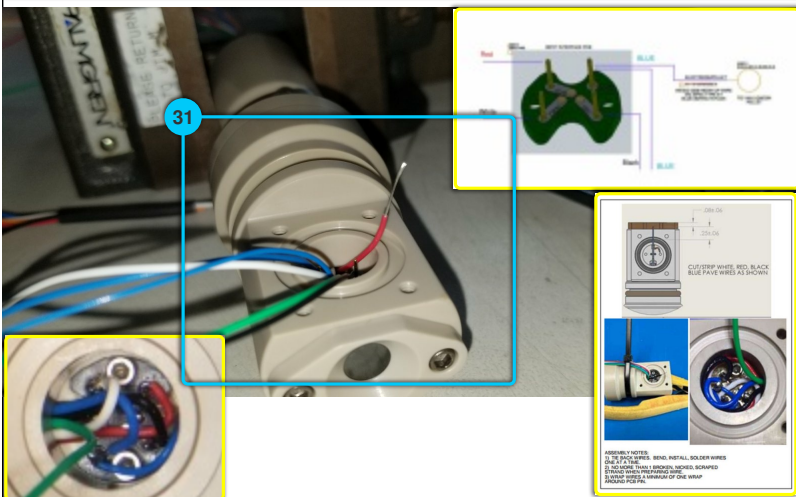


## Step 34/50

Numbered annotations (1)

- 30 Pull the wires until the adapter meets the housing then install items 20 and 21 [4X] ea. at 4 opposing holes with an open hole next to each screw.

Cut the Red, white, blue, and black wires to about 1" long then strip 1/2" on each wire and solder to PCB per 100221659 wire diagram.

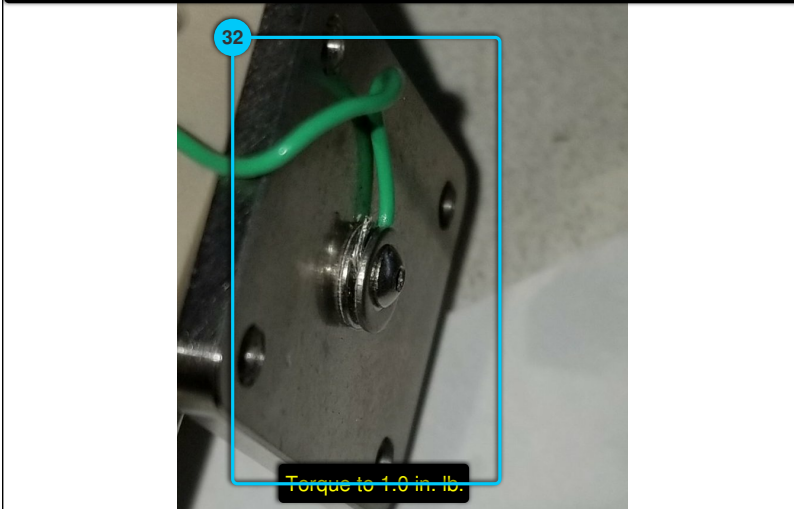


## Step 35/50

Numbered annotations (1)

- 31 Cut the Red, white, blue, and black wires to about 1" long then strip 1/2" from each wire and solder to PCB per 100221659 wire diagram.

Cut the green wire about 2" long and strip 0.5" .  
Attach item 24, 25, 26 to item 5 then wrap min. 2 turns of green wire around the screw between the washers.

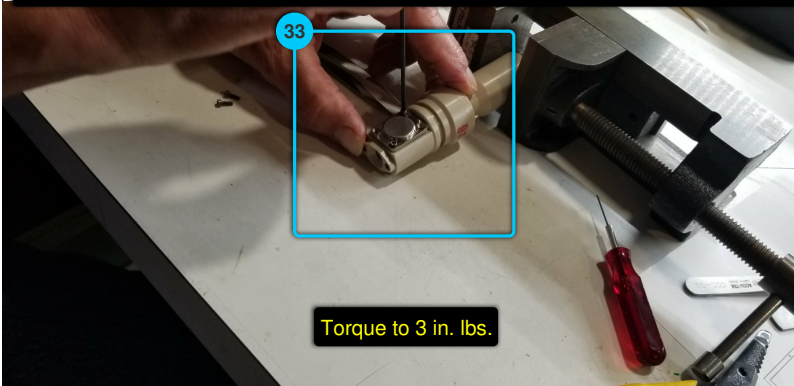


## Step 36/50

Numbered annotations (1)

- 32 Cut the green wire about 2" long and strip 0.5" .  
Attach item 24, 25, 26 to item 5 then wrap min. 2 turns of green wire around the screw between the washers.

Properly orient to align with the threaded holes on the main housing and attach item 5 cover to item 1 housing using item 23 screws 4X

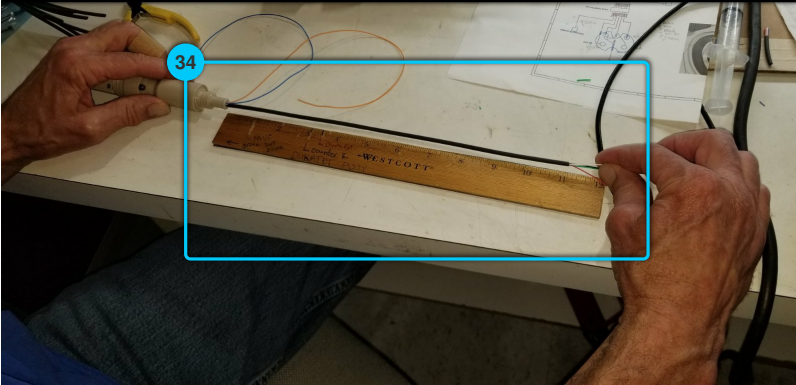


## Step 37/50

Numbered annotations (1)

- 33 Attach item 5 cover to item 1 housing using item 23 screws 4X

Cut the wires coming from the adapter to 12" long. Install 11" of shrink tubing over the white, green, red, and black wires.



### Step 38/50

Numbered annotations (1)

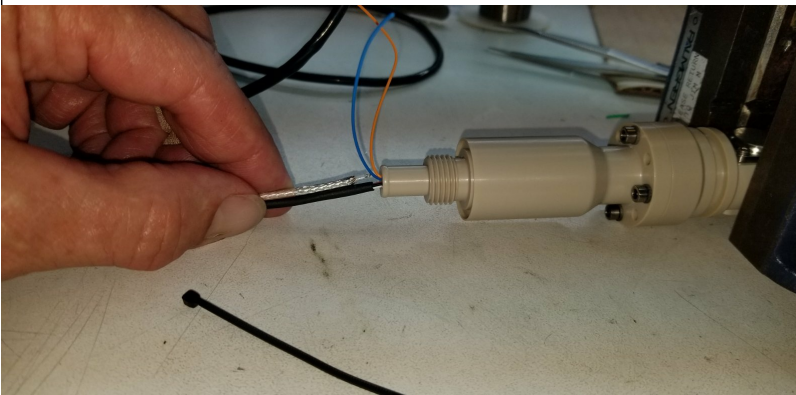
- 34 Cut the wires coming from the adapter to 12" long. Install 11" of shrink tubing over the white, green, red, and black wires.

35

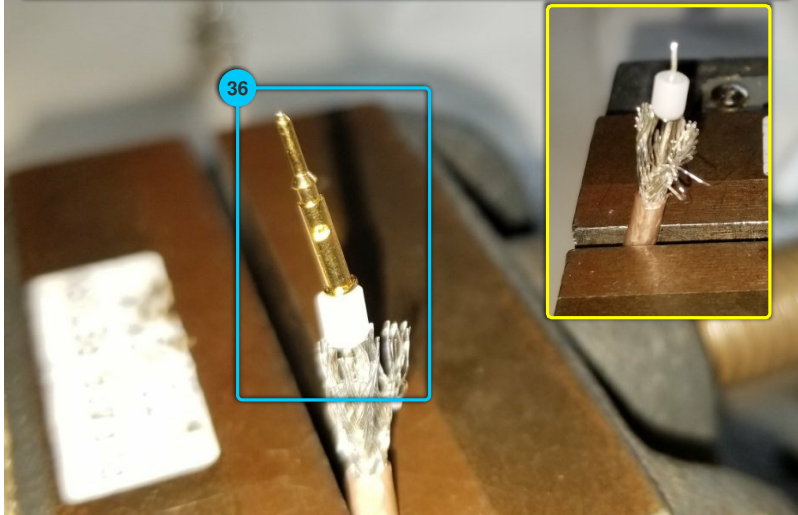
### Step 39/50

Numbered annotations (1)

- 35 install the CSM provided SN label (MBARI\_CFE)



Install the insulator sleeve and pin over core wire and solder thru the hole in pin to the core wire

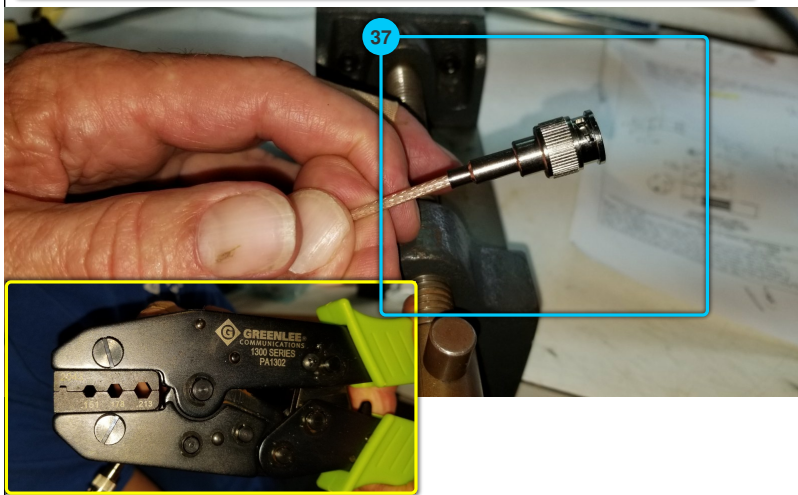


## Step 40/50

Numbered annotations (1)

- 36 Install the insulator sleeve and pin over core wire and solder thru the hole in pin to the core wire

Install the connector on the end of wire and crimp the shoulder to secure to the cable.

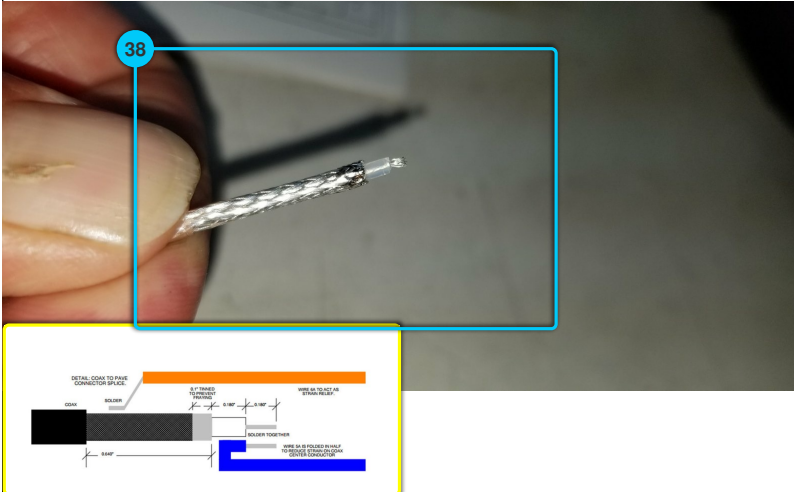


## Step 41/50

Numbered annotations (1)

- 37 Install the connector on the end of wire and crimp the shoulder to secure to the cable.

Prepare the end of 100221659 item 4 per page 3 of 100221659.

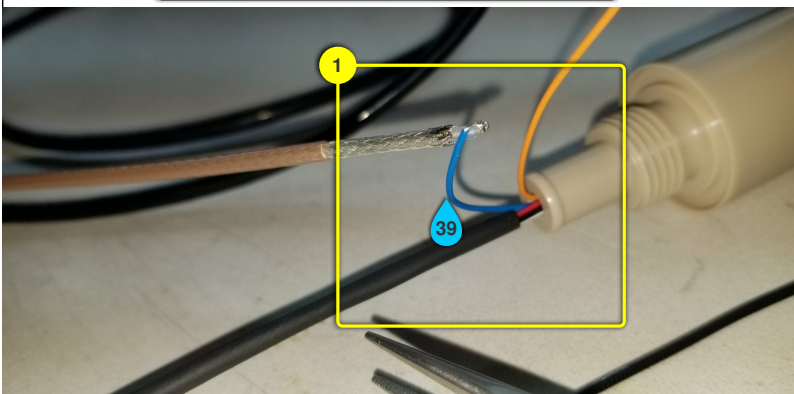


## Step 42/50

Numbered annotations (1)

- 38 Prepare the end of 100221659 item 4 per page 3 of 100221659.

Solder the blue wire to the core wire of the coax.



## Step 43/50

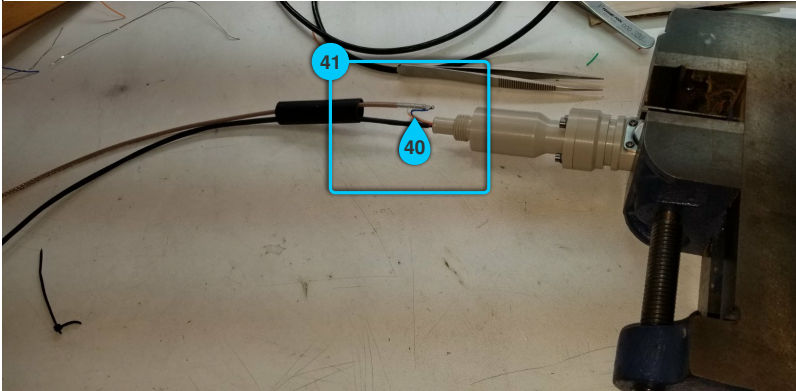
Numbered annotations (2)

- 39 cut the blue wire at 1.75" with a 0.25" strip
- 1 Solder the blue wire to the core wire of the coax.

### Step 44/50

Numbered annotations (2)

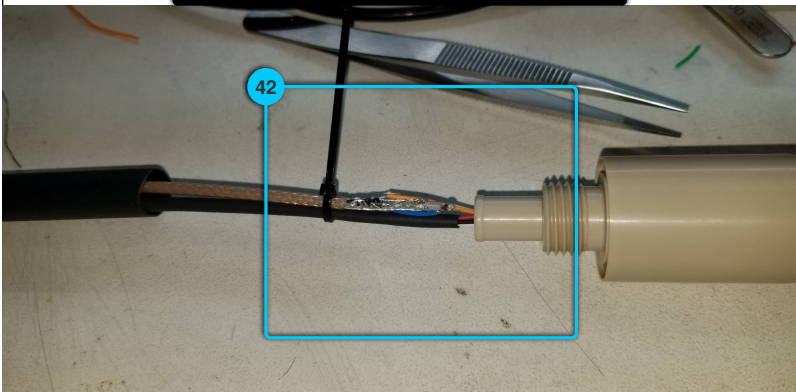
- 40 cut the orange wire 1.00" from the tip to prepare soldering
- 41 pass the shrink tube through from the other end, and add an S/N label prior to soldering



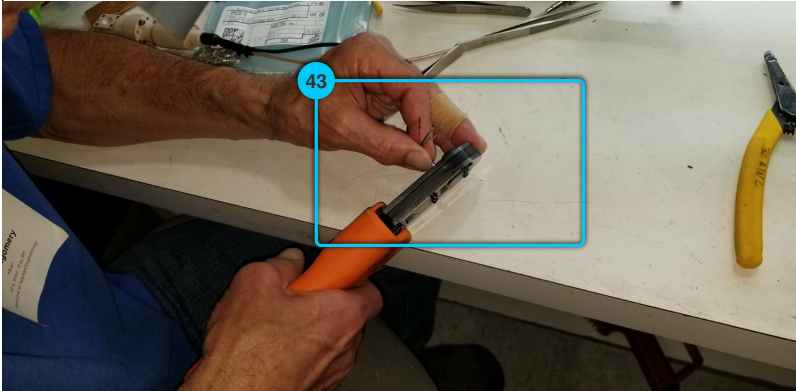
### Step 45/50

Numbered annotations (1)

- 42 Solder the orange wire to the shield of the coax.



Crimp pins on the ends of the white, red, green, and black wires.

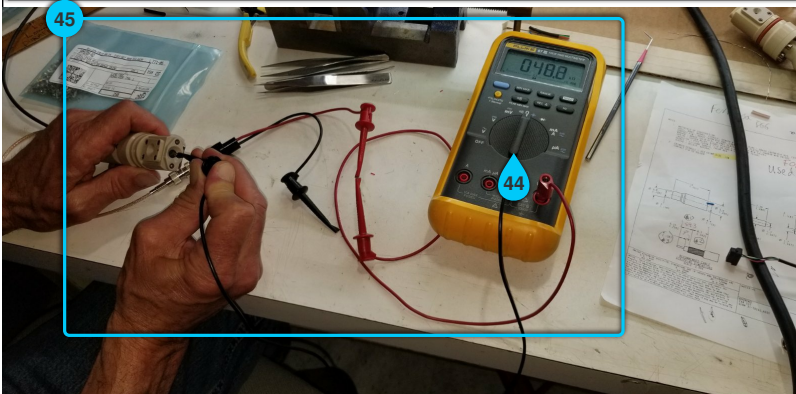


## Step 46/50

Numbered annotations (1)

- 43 Crimp pins on the ends of the white, red, green, and black wires.

Test the VL Pellet resistance at the exposed surface of the pellet and the core wire of the coax and record on step 8 of the production traveler.

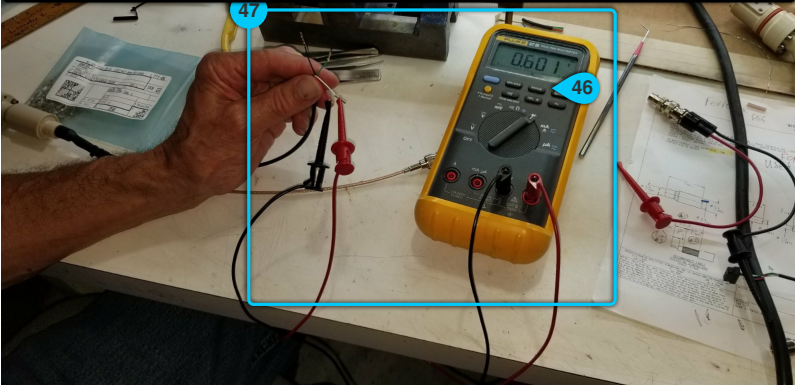


## Step 47/50

Numbered annotations (2)

- 44 set the meter to measure 200 k  $\Omega$
- 45 Test the VL Pellet resistance at the exposed surface of the pellet and the core wire of the coax and record on step 8 of the production traveler.

Test Drain Voltage at connections of the red and white wires and record on step 9 on production traveler.

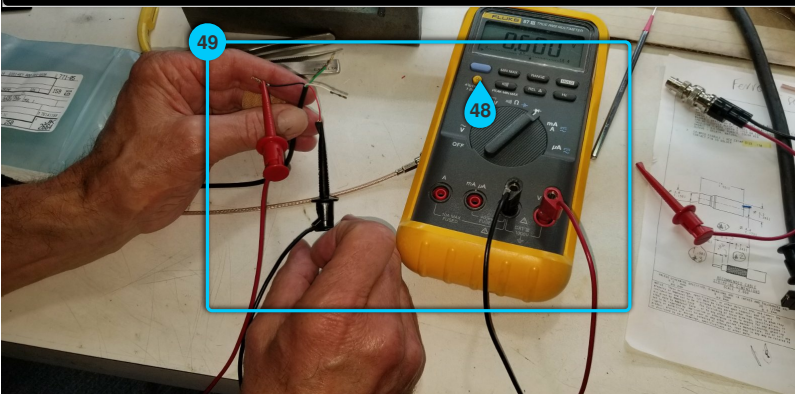


## Step 48/50

Numbered annotations (2)

- 46 set the voltmeter to measure 200 K  $\Omega$
- 47 Test Drain Voltage at connections of the red and white wires and record on step 9 on production traveler.

Test Source voltage at connections of the red and black wires and record on step 9 on production traveler.

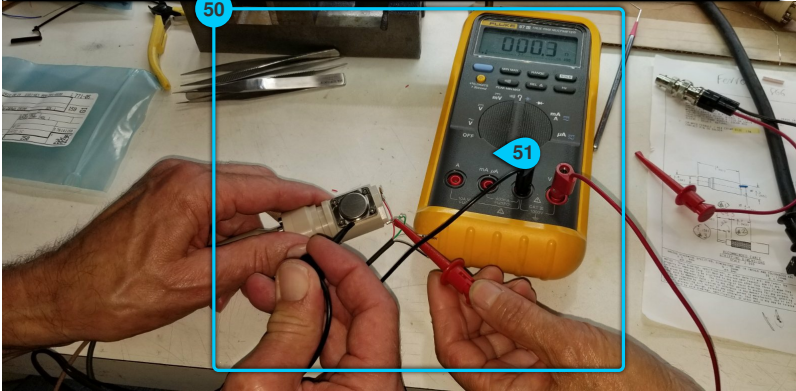


## Step 49/50

Numbered annotations (2)

- 48 set the meter to measure diodes (DIODE MODE)
- 49 Test Source voltage at connections of the green and black wires and record on step 9 on production traveler.

Test Counter Electrode resistance at green wire and cover and record on step10 of production traveler.



## Step 50/50

Numbered annotations (2)

- 50 Test Counter Electrode resistance at green wire and cover and record on step10 of production traveler.
- 51 set the meter to 200 k  $\Omega$