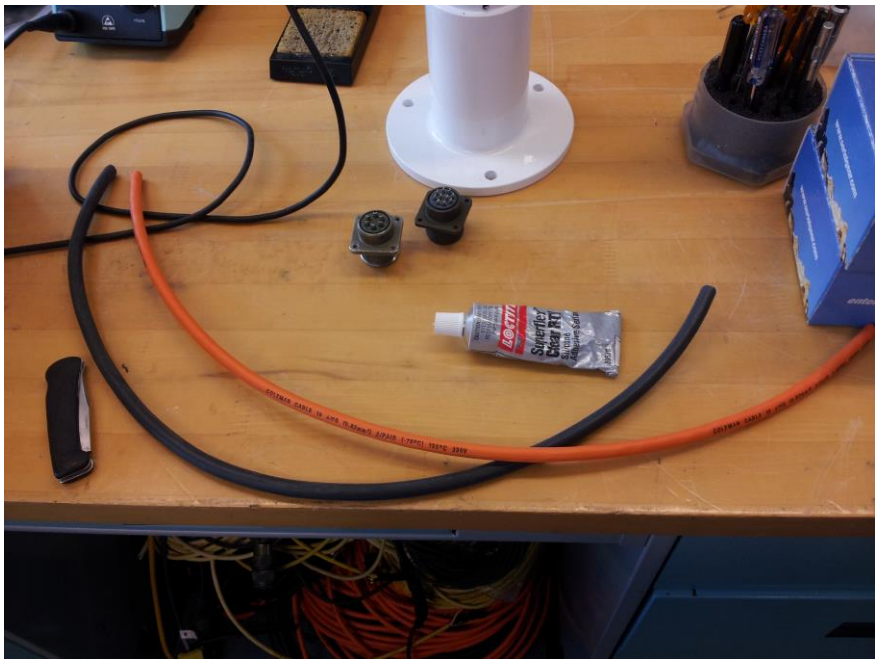
Tracker Refurbishment

Addition of Rotary Connector

- Disassemble tracker shaft, drive disk and bearing parts in preparation of new assembly.

Prepare the Tracker shaft

- Assemble shaft and base parts using high strength Loctite (red), install and **securely tighten set screws** adding wicking Loctite (green).

- Cut 26” piece of power cable and data cable
- 
- Solder on the power and data bulkheads and pot wire contact solder joints with clear RTV silicone and allow to dry

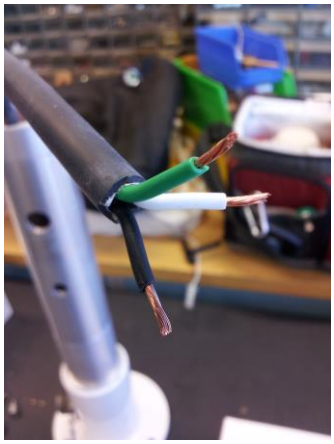


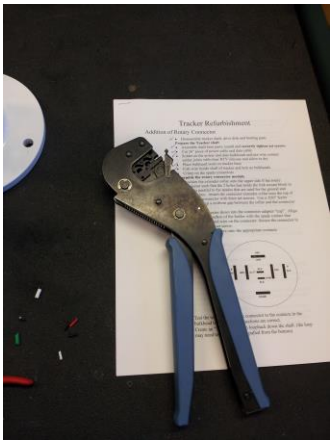



- Add bulkhead seals and fish wire inside shaft of tracker and bolt on bulkheads.



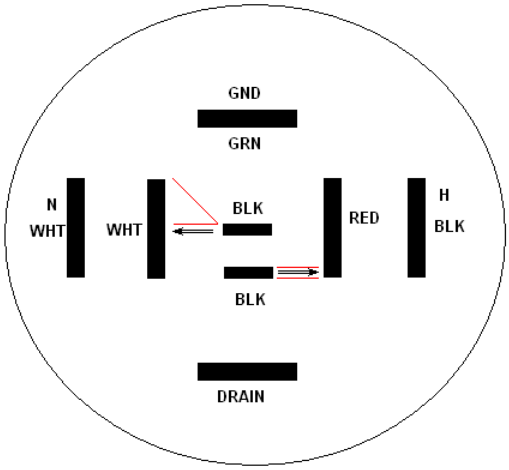
- Crimp on the spade connectors

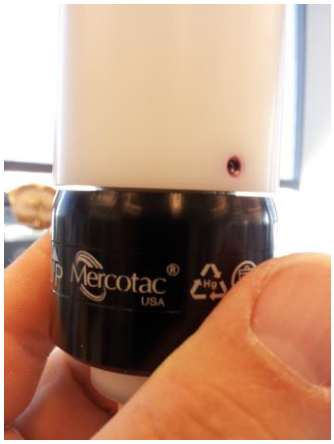



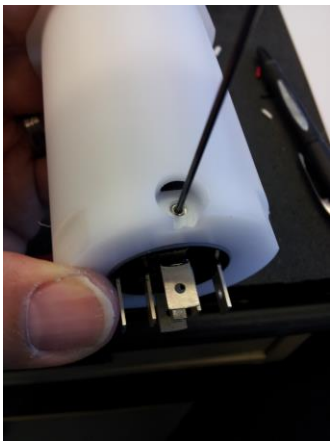
Assemble the rotary connector module.

• Position the extender collar onto the upper side if the rotary connector such that the 2 holes that holds the fork mount block in place is parallel to the spades that are used for the ground and shield wires. Attach the connector extender collar onto the top of the rotary connector with three set screws. Use a .020" feeler gauge to keep a uniform gap between the collar and the connector body



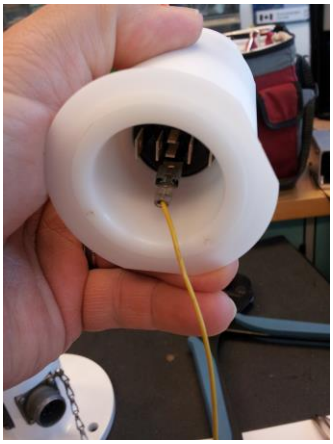
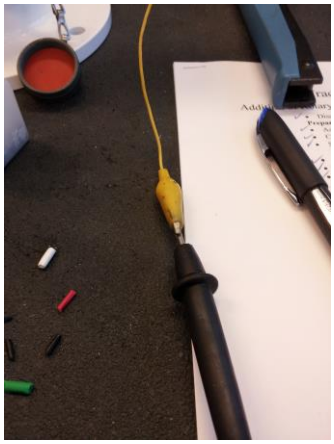
• Press the connector down into the connector adapter “cup”. Align the holding set screw of the holder with the spade contact that accepts the ground wire on the connector. Secure the connector in the cup with the set screw.



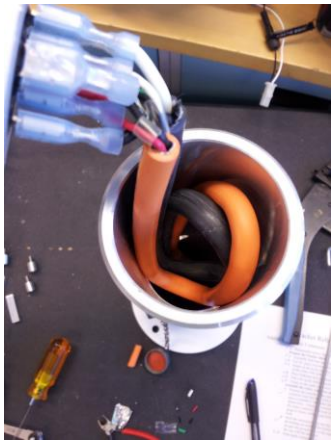
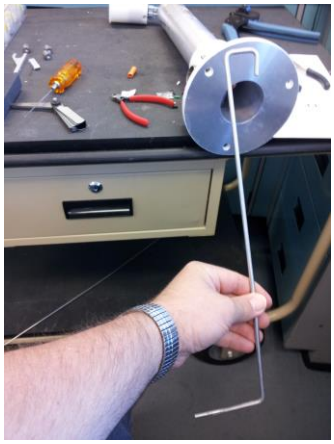
• Push spade connectors onto the appropriate contacts



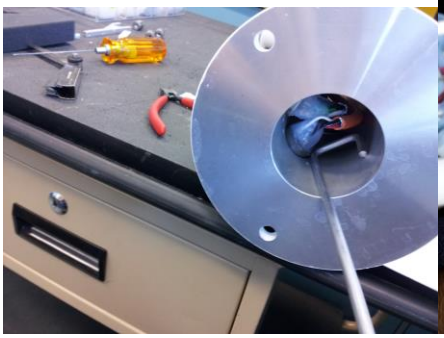
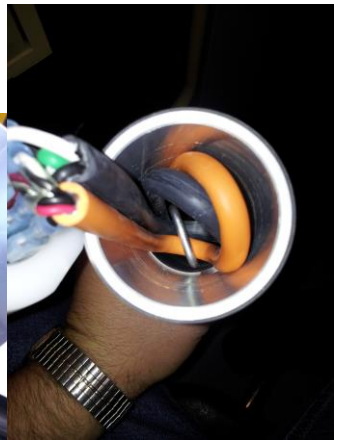
• Test the top contacts of the connector to the contacts in the bulkhead to ensure all connections are correct.

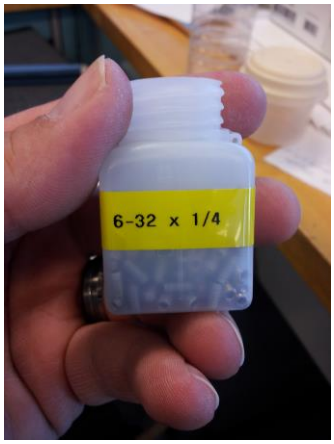

• Create an “S’ loop and push loopback down the shaft. (the loop may need to be hooked and pulled from the bottom)

• Now work the loop (or hook and pull from the bottom) down into the shaft. Lower cup and connector until fully seated into the shaft.

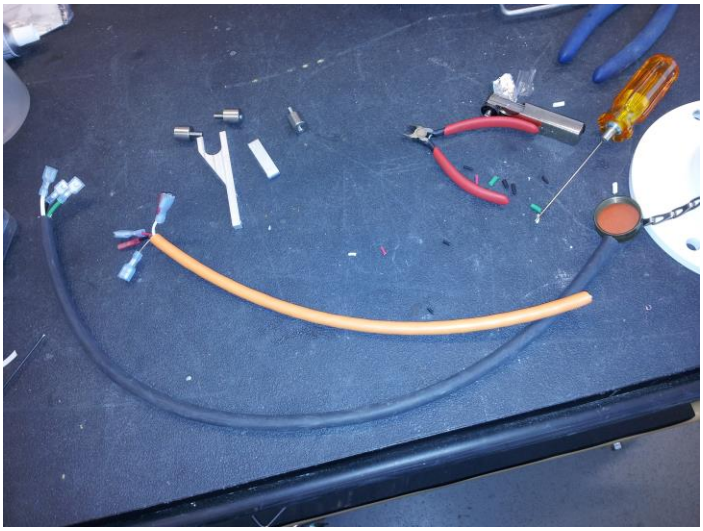

• Orient the cup such that the 2 flats on the cup line up with the 2 set screws in the shaft. Secure the cup in place with the set screws.

• Place an ethafoam cork with a centre ¼” breathing hole into the bottom of the shaft. Lightly glue in place with clear silicone in two spots.



• Cut a 13” piece of data cable and a 22” piece of power cable to be connected to the top of the rotary connector and crimp on the spade connectors



- Push Spade connectors onto the appropriate contacts

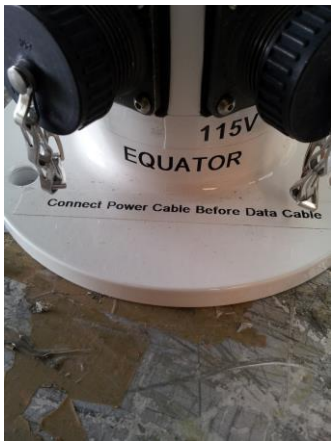

Tracker Shaft Installation.

- Attach the Fork mount block to the extender collar (rounded edged goes towards the wires



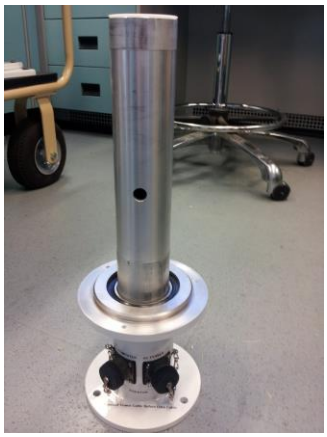
- Thread in ½" stand-offs into the upper bearing housing (c/w bearing) using wicking Loctite


- Apply tracker shaft labels

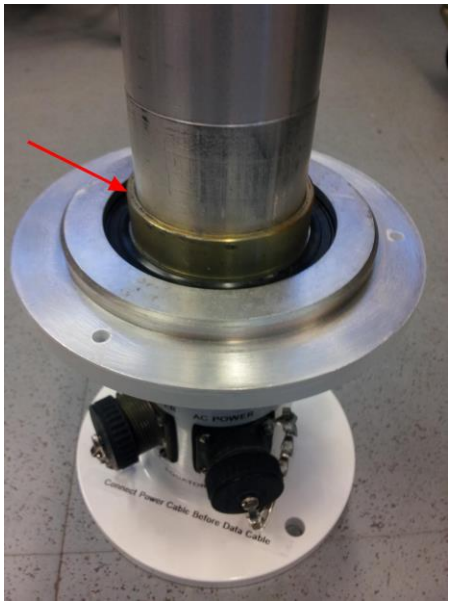


- Install lower bearing housing onto the shaft

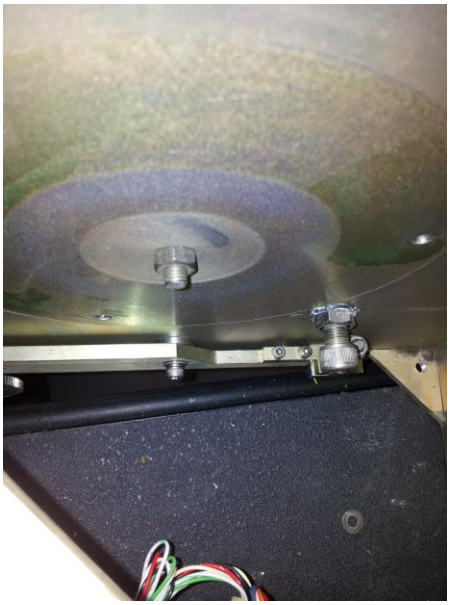




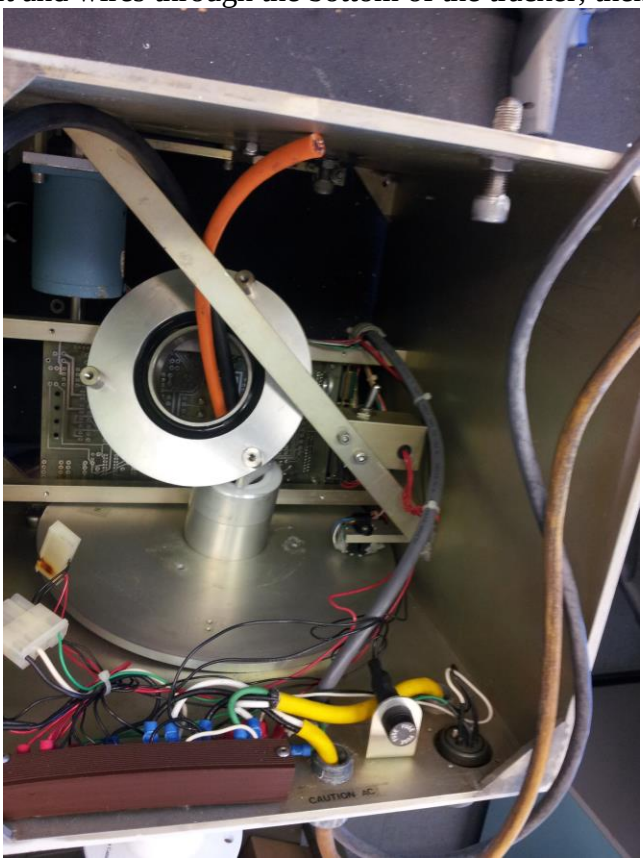
- Place drive plate spacer onto the shaft



• Replace the ¼”-28 x ½” long bolt and nut in the top center of the tracker with ¼”-28 x 1/4” long bolt and ny-lock nut (removes sharp edges that may come in contact with the wires at the shaft)

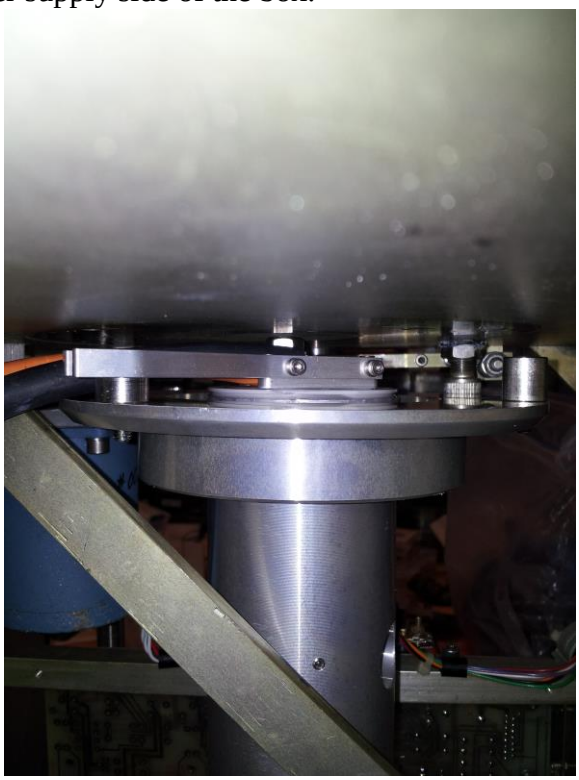


• Feed the shaft and wires through the bottom of the tracker; then drive plate; then upper bearing

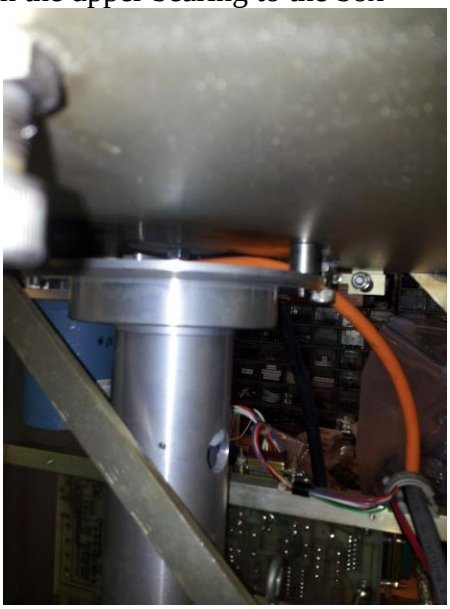


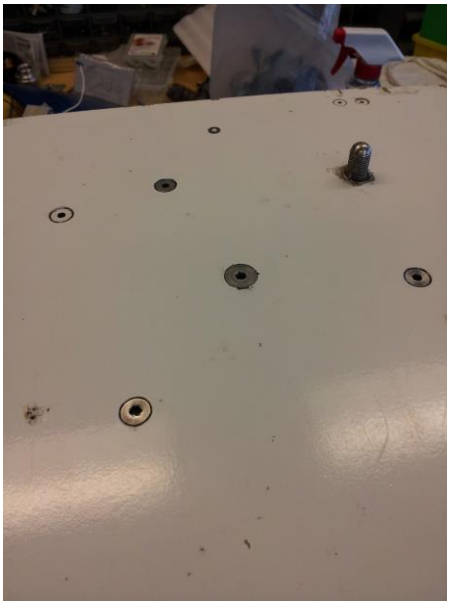
• Get the tracker shaft fully seated into the upper bearing but do not attach the bearing to the top of the tracker

• Attach follower fork to the fork mount block, with the fork encompassing the ½” stand-off farthest from the power supply side of the box.



- Attach the upper bearing to the box



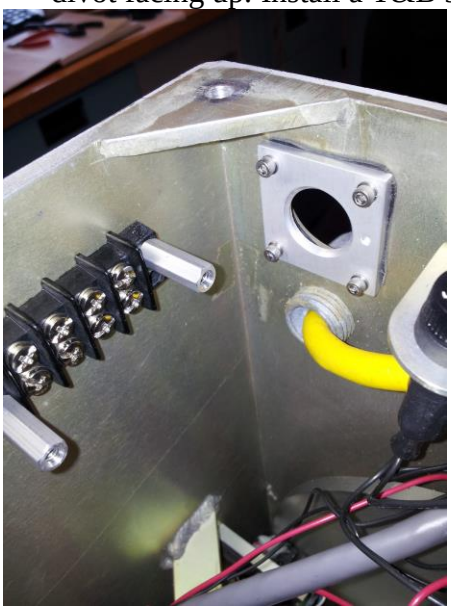


- Attach the lower bearing to the box

AC Power Installation

- Remove the primary power terminal cover.
- Remove the original power bulkhead and remove the wires going to the primary power terminal

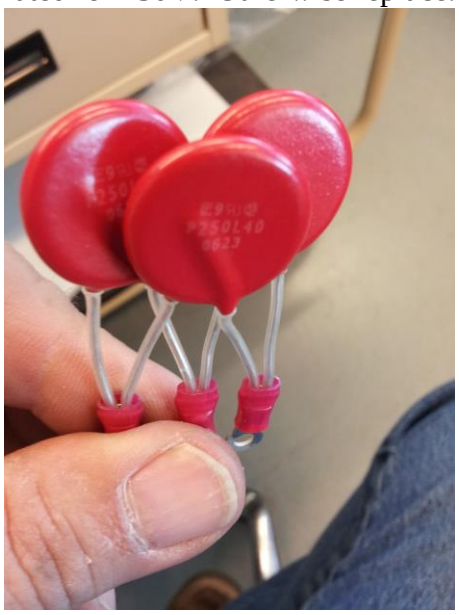
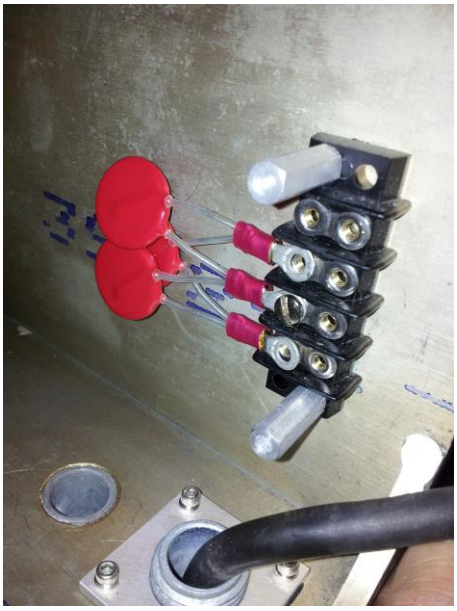
- Install the bulkhead adapter plate c/w seal on the inside of the box with the indicator divot facing up. Install a T&B strain relief bushing into the plate.



- Remove the auxiliary power connector then install the connector in the opening at the front edge of the tracker. This allows better alignment for data cord and stops the auxiliary cord from rubbing on the tracker legs.

- If the tracker is an older model and does not have the primary power terminal, then it will need to be installed. Refer to the section "Addition of Primary Power Terminal".

- Inspect the metal oxide varistors on the primary power terminal strip and ensure they are rated for 250V. Otherwise replace.

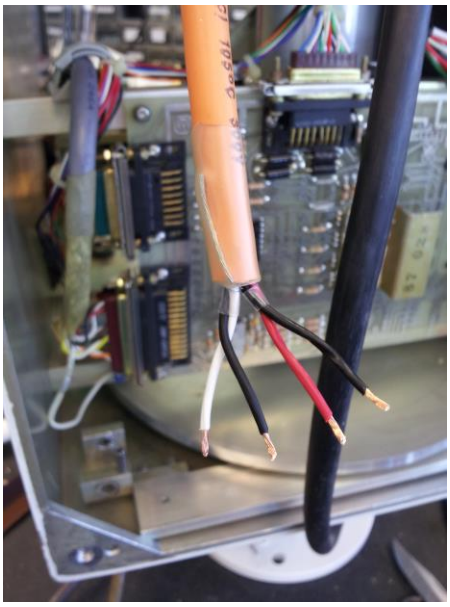



- The AC power cable running to the rotary connector will now connect to the primary power terminal on the wall of the tracker.

Data Surge Protector / Tracker Proportional Heater Control

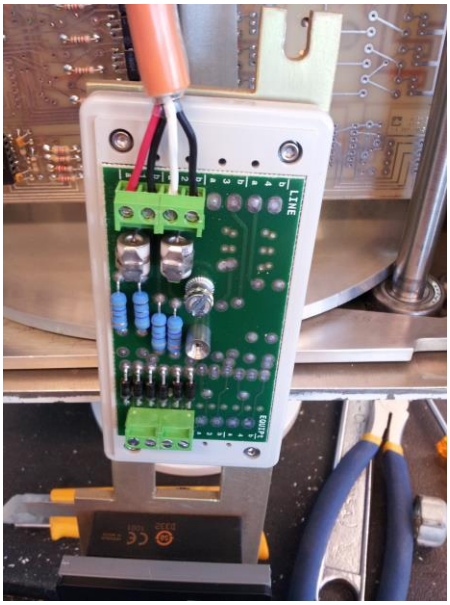
- Mount the Data Surge protector and the proportional power control to the mounting bracket

- Strip the data wire coming from the rotary connector and peel back and heat shrink the ground wire in place.



- Attach the communication wires to the surge protection board

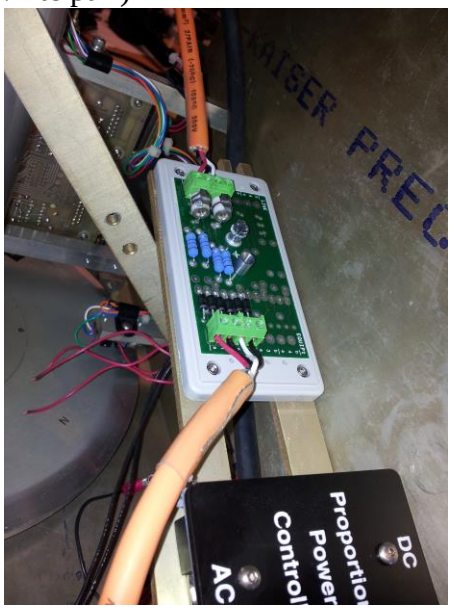
1a – Red
1b – Black (from red pair)
2a – White
2b – Black (from white pair)



- Cut a 48” piece of Data cable and insert through strain relief in bottom of tracker
- Strip the data wire coming through strain relief in bottom of tracker and peel back and heat shrink the ground wire in place.

- Attach the communication wires to the surge protection board

1a – Red
1b – Black (from red pair)
2a – White
2b – Black (from white pair)



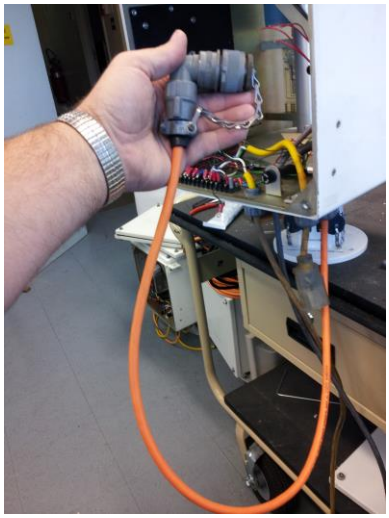
- Cut a 19”piece of 16 ga., green wire for ground. Install ring terminals on either end and attach from the surge protector ground lug to the tracker case ground.

- Put surge protector cover on

- Remove two ½” long, 10-32 inner most bolts from the Brewer foot mount brackets from the side opposite the power supply. Replace with 1” long bolts.

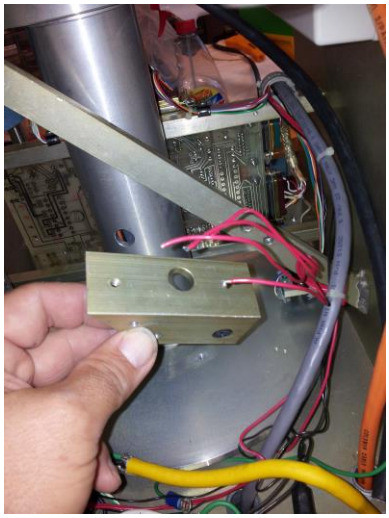
- Mount the data surge bracket onto the newly installed bolts with Nylock nuts.

- Add 90 degree MS connector on outer end of data cable and secure with strain relief

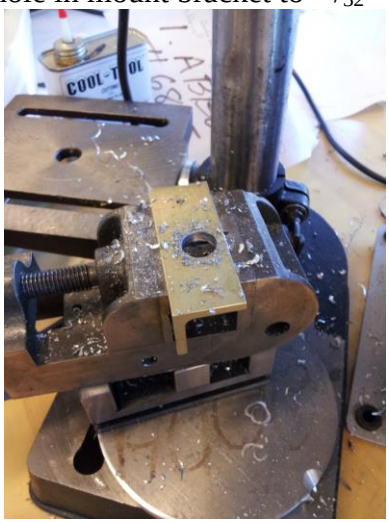


Thermostatic Kill Switch Installation

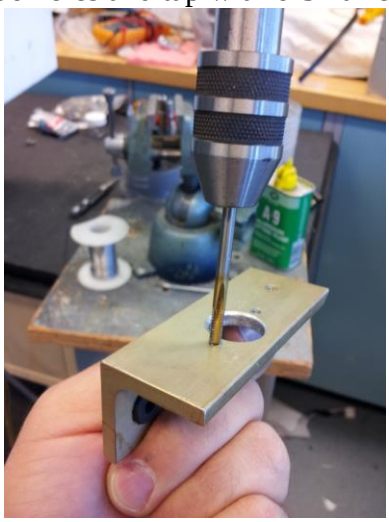
- Disassemble tracker kill switch and remove from mount bracket



- Enlarge hole in mount bracket to $^{21}/_{32}$”

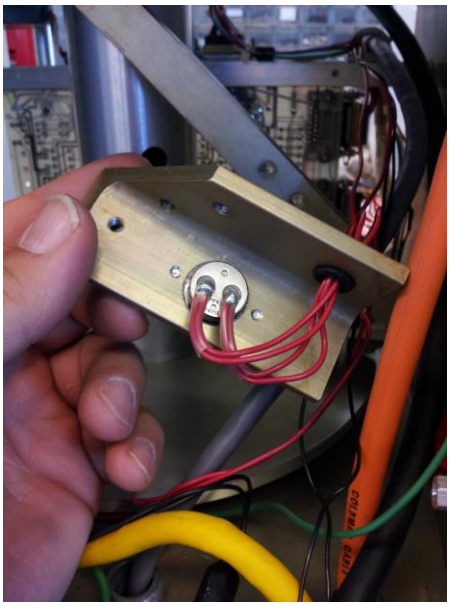



- Drill 2 #36 holes and tap with 6-32 thread to accept thermostatic switch.

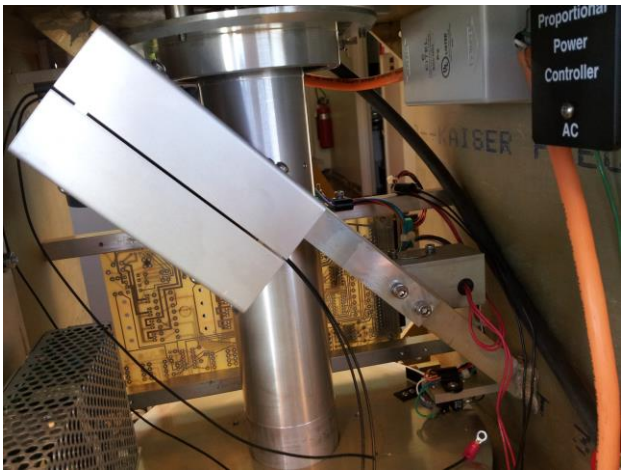



- Install thermostat with contacts facing down

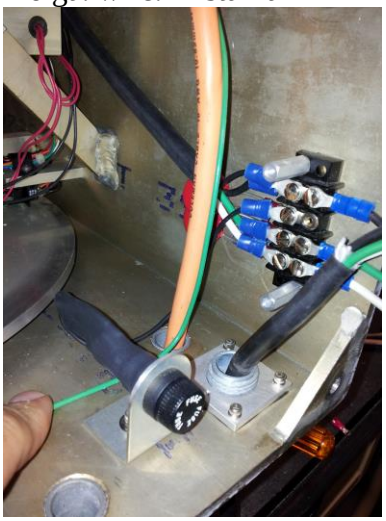

- Solder on the kill switch wires



- Replace bolts with longer hardware and install heater assembly while re-mounting the switch module



- Replace 20 ga. wires on fuse holder with Blk 16 ga. wire. Install an MDL 5A fuse.



Primary Power Terminal (AC Conditioning Terminal Strip)

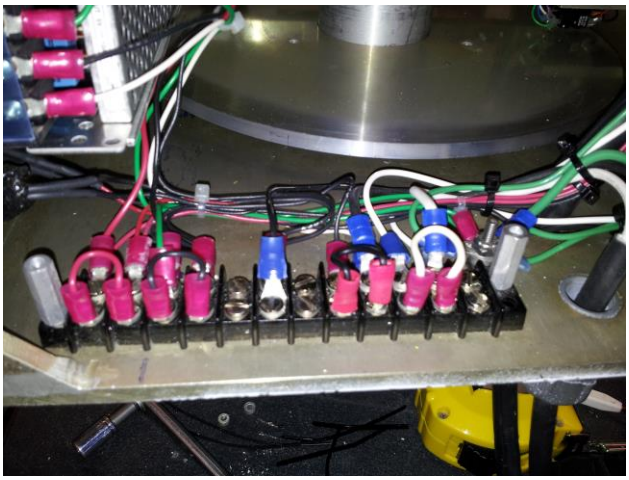
4.	Position A	AC Hot from source, Fuse IN	AC Un-Fused
	Position B	AC Hot Auxiliary	
3.	Position A	MOV, Fuse OUT	AC Fused
	Position B	AC Hot to Schaffner Line filter (P) or Secondary Terminal 9a if Line filter absent	
2.	Position A	MOV, AC GND from source	
	Position B	GND to Chassis, Auxiliary GND	
1.	Position A	MOV, AC Neutral from source	
	Position B	Neutral to Schaffner Line filter (N) or to Secondary Terminal 11a if Line filter absent, Auxiliary Neutral	

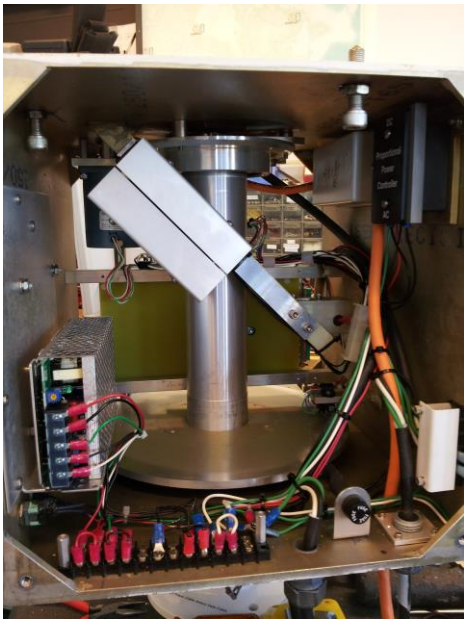
Secondary Power Terminal

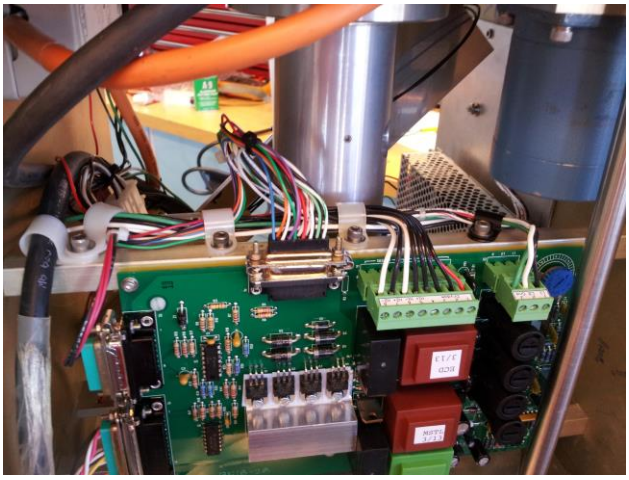
1a	2a	3a	4a	5a	6a	7a	8a	9a	10a	11a	12a
1b	2b	3b	4b	5b	6b	7b	8b	9b	10b	11b	12b

1.	Position A	+5V DC (Red) to Kill Switch or Thermostat, +5V DC (Red) from Tracker Power Supply	+5V DC
	Position B	Jumper from 1b to 2b	
2.	Position A	+5V DC (Red) to Kill Switch or Thermostat, +5V DC (Red) to Power indicator	
	Position B	Jumper from 2b to 1b	
3.	Position A	-5V DC (Black) to Tracker Card, -5V DC (Black) from Tracker Power Supply	-5V DC
	Position B	Jumper from 3b to 4b	
4.	Position A	-5V DC (Black) to Tracker Card, -5V DC (Black) to Power indicator	
	Position B	Ground (Green) to Chassis, Jumper from 4b to 3b	
5.	Position A	No Connection	
	Position B		
6.	Position A	AC Hot from Power Switch “OUT”, AC Hot to Tracker Power Supply	AC Switched
	Position B	Switched AC hot to Proportional Heater Control tracker board or Tracker Heater	
7.	Position A	No Connection	
	Position B		
8.	Position A	AC Hot to Power Switch “IN”	AC Hot Un-switched
	Position B	Jumper from 8b to 9b	
9.	Position A	AC Hot from Primary Power Terminal, AC Hot to Brewer	
	Position B	Jumper from 9b to 8b	
10.	Position A	Neutral to AC input for Power Supply, Proportional Heater Control or Tracker Heater Neutral	AC Nerutral Un-switched
	Position B	Jumper from 10b to 11b	
11.	Position A	Neutral from Primary Power Terminal, Neutral to Brewer	
	Position B	Jumper from 11b to 10b	
12.	Position A	No Connection	
	Position B		

- Neatly cable tie wires

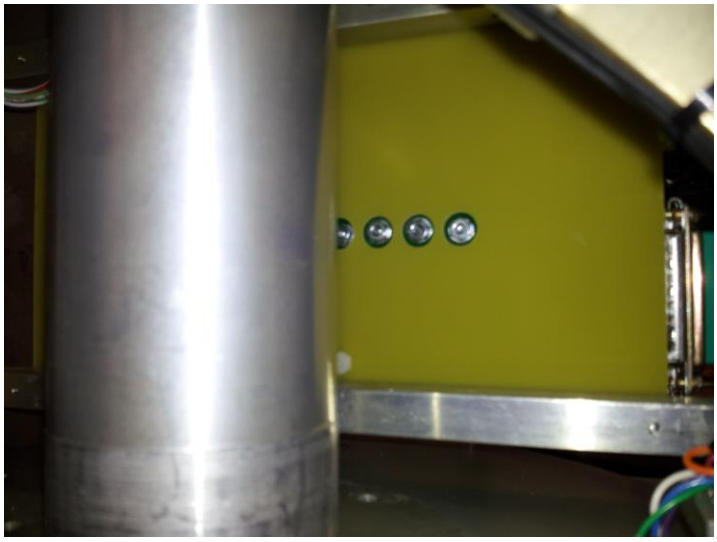


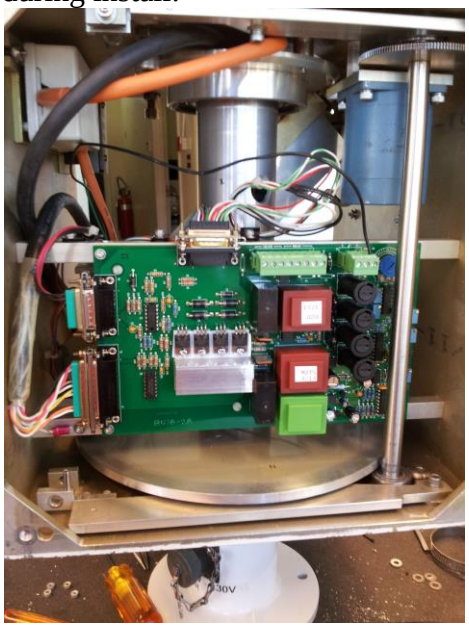




Addition of Proportional Heater Control

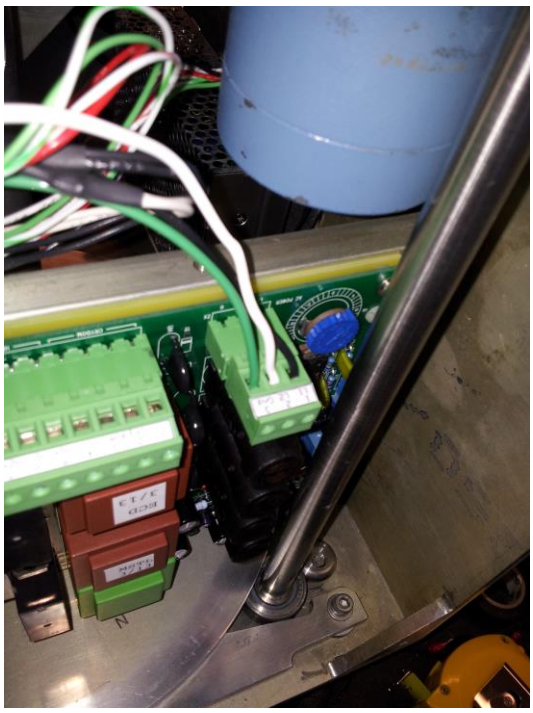
- Replace original tracker board BA-C99 with new Comptus Inc. Proportional Heater Control tracker board and apply insulator backing during install.





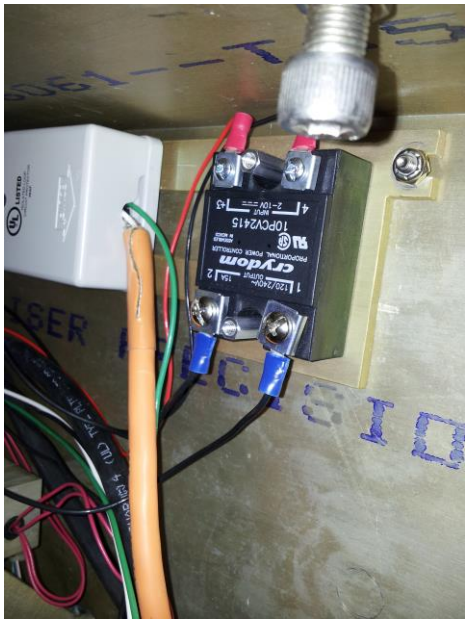
- Connect L1 of the Proportional Heater Control tracker board to Position 6b of the secondary supply terminal (switched AC Power) with 29” Black 16 ga. Wire.

- Connect L2 of the Proportional Heater Control tracker board to Position 10a of the primary supply terminal with 28” White 16 ga. Wire
- Connect Gnd of the Proportional Heater Control tracker board to Chassis GND lug with 26” Green 16 ga. Wire

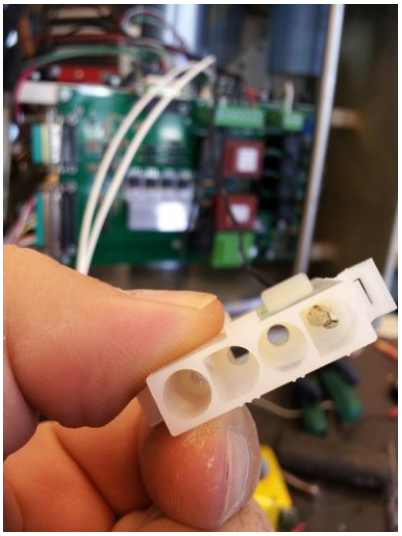


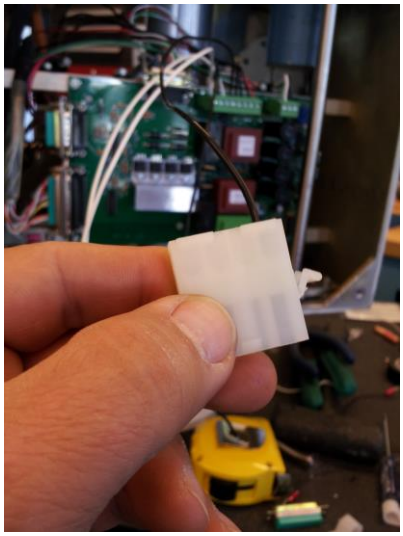
- Connect the DC input for the Crydom Proportional Controller to the Comptus tracker board. Tracker board Crydom 1 is 20 ga. Red (DC+) - 20” to position 3 on the proportional controller. Tracker board Crydom 2 is 20 ga. Black (DC-) 20.5” to position 4 on the proportional controller.

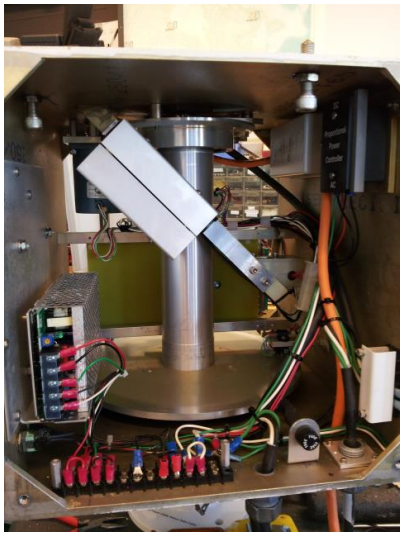
- Connect the AC input to the Crydom Proportional Controller from the Comptus tracker board. Tracker board Crydom 3 is 16 ga. Black – 17.5” to position 1 of the proportional power controller.
- Connect the AC output from the Crydom Proportional Controller to the Comptus tracker board. Tracker board Crydom 4 is 16 ga. Black – 17.5” to position 2 of the proportional power controller.



- Cut 2 pieces of 16 ga. Black Wire, 13” from Tracker board Heater 5(H1+) and 7 (H2+) to Heater 1, positions 1 and Heater 2, positions 3 of molex connector
- Cut 2 pieces of 16 ga. White Wire, 13” from Tracker board Heater 6(H1-) and 8 (H2-) to Heater 1, positions 2 and Heater 2, positions 4 of molex connector

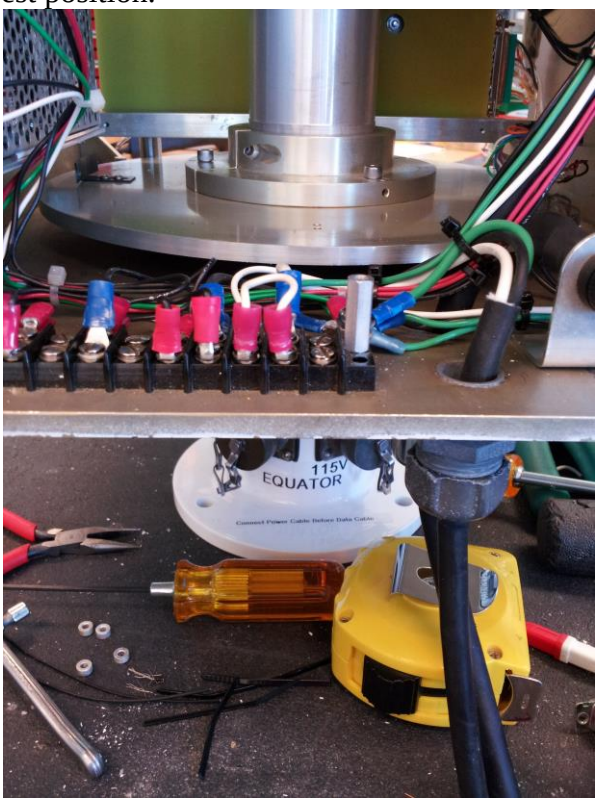






Drive Plate Alignment

- Align the drive plate such that the connectors on the shaft of tracker orient south while the drive plate reference flag is in the west position.



- When fastening the drive plate clamp, hand tighten the bolts that connect to the drive plate.

- Once in position, secure the clamp to the tracker shaft by tightening the bolts on either side of the clamp. Ensure the bolts are tightened such that the gap between the front and back clamp plate is even on both sides

- Tighten securely the clamp to the drive plate

Addition of Auxiliary Power

- Measure $1\frac{1}{2}$" from the side of the brewer and $1\frac{1}{8}$" from the Power bulkhead and mark
- At that mark, use a center punch to make a starting depression
- Place a Kimwipe on the inside of the tracker to catch filings
- Drill a hole using $\frac{1}{8}$" bit and A-9 Aluminum cutting fluid
- Clear Shavings
- Re-drill hole using $\frac{5}{16}$" bit and A-9 Aluminum cutting fluid
- Clear Shavings
- Re-drill the hole using a step drill to enlarge hole to the full $\frac{3}{4}$" of the bit. Again, use A-9 Aluminum cutting fluid while drilling.
- Clear Shavings
- Thread the hole using the $\frac{1}{2}$" NPT tap and A-9 Aluminum cutting fluid.
- Clear Shavings
- Place Teflon Tape on the Strain Relief Bushing Threads and insert into Tracker
- Cut 11" of cord from the receptacle end of the 10' Coleman Cable, "Polar Solar" extension cord for the auxiliary power plug.
- Strip 4" of outer insulation
- Place through Strain Relief Bushing into the tracker leaving between 4"-5" outside the case.
- Attach a ring terminal on the black wire and connect to the primary power terminal shorten the ground and neutral wires appropriately, add ring terminals and connect to the primary power terminal
- Secure with the strain relief.
- Refer to the Wiring Section of the document for terminal contacts.

Replacement of Azimuth Cable

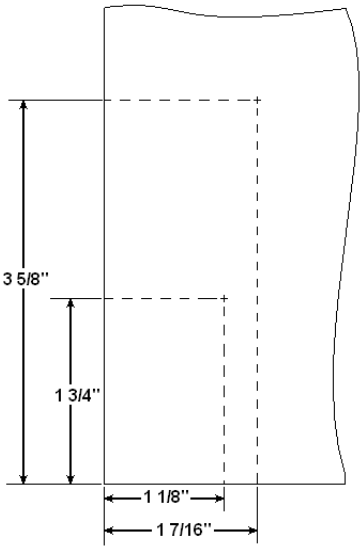
- Inspect Azimuth cable if the insulation is compromised or damaged in any way, it should be replaced
- The Azimuth cable should be replaced with Alpha Wire- P/N 45125 5PR 22 AWG XtraGuard4 (UL) Type PLTC 105C or AWM 20237 or equivalent.
- The wiring diagram of this cable can be found in the Brewer Maintenance Manual – Fig. 7.7.1-2
- The cable will be about 58". This will allow about 20" inside the tracker and about 38" outside the tracker.
- Strip 3" of outer insulation, and attach female DB pins as indicated in the Brewer Maintenance Manual – Fig. 7.7.1-2
- Strip $1\frac{1}{8}$" of outer insulation off the other end and attach a 90° MS3108E18-1P Azimuth connector c/w rubber strain relief.

Replacement of Power Cable

- Inspect Power cable if the insulation is compromised or damaged in any way, it should be replaced
- The Power cable should be replaced with Coleman Cable P/N 22356 16/3 SEOOW Polarflex -70C to 105C 600V cable.
- The wiring diagram of this cable can be found in the Brewer Maintenance Manual – Fig. 7.1-6
- The cable will be about 48". This will allow about 8" inside the tracker and about 40" outside the tracker.
- Strip 5" of outer insulation, cut 3" off the Green wire and attach ring terminal connectors on all wires on one end
- Strip 1 $^{1}/_{8}$" of outer insulation off the other end and attach a 90° MS3108E18-12S Power connector c/w rubber strain relief.
- Connect the Power leads to un-fused AC power at the terminal strip
- Make a stop cable by attaching crimp connect ring terminals to braided copper wire and covering with heat shrink
- Attach the stop cable to a standoff and the other end to the tracker fuse bracket bolt.

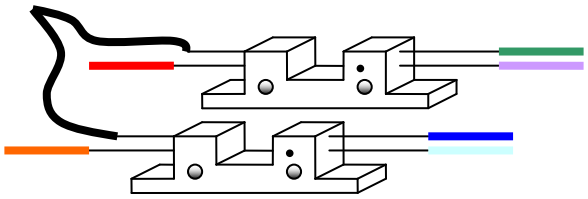
Addition of Primary Power Terminal

- Installed on Tracker wall opposite the tracker power supply.
- Use tracker terminal jig to locate, mark and center punch positions for the new primary power terminal.
- Place a Kimwipe on the inside of the tracker to catch filings
- Drill #28 (or 9/64") holes using A-9 Aluminum cutting fluid.
- Countersink for #6x 82 ° taper head screws.
- Use ¼" x ¾" long #6-32 threaded standoffs to mount terminal strip.



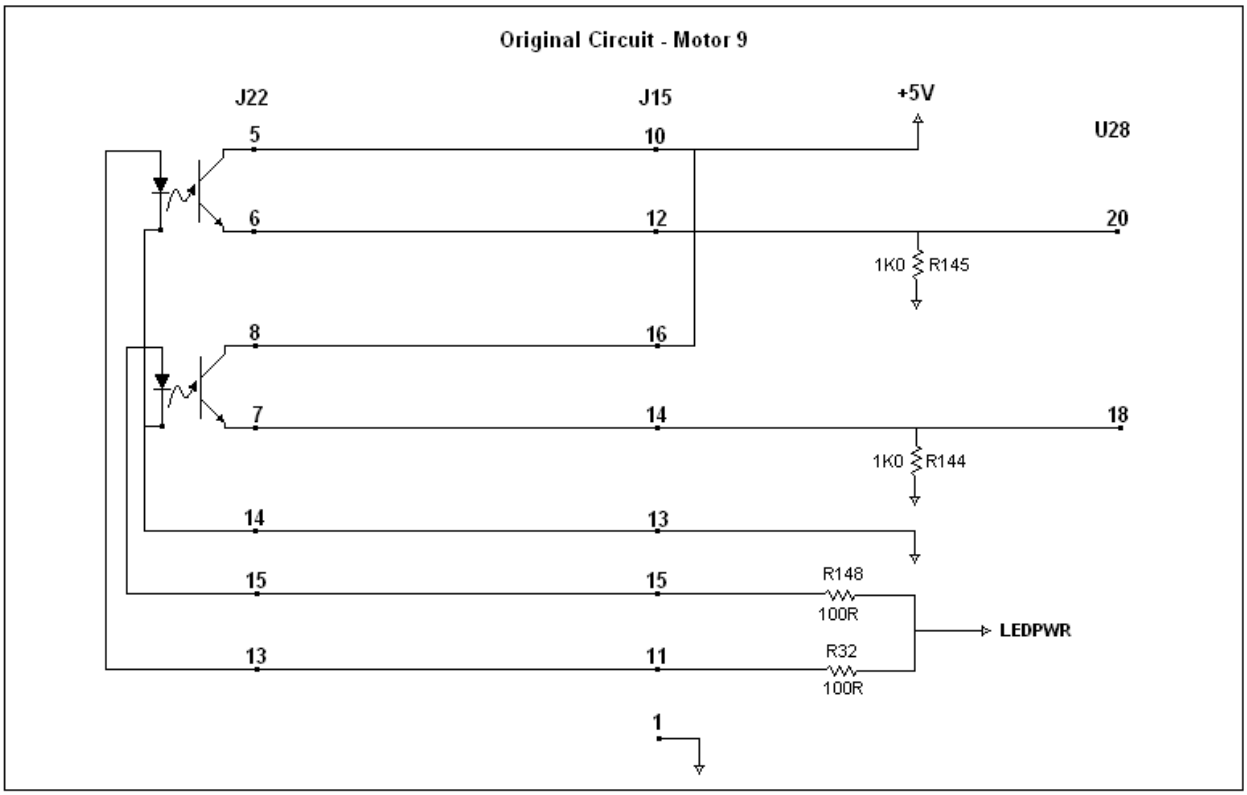
LED Replacement

- LED's are marked with a "Dot" indicating the side opposite the diode of the LED. Solder the blue/white and green/violet wires on this side. Solder the orange and red to the diode side with the other contacts going to a common black.



Optical Switch Example:

Figure 3



Black supplies ground to the light emitting diode

Red and Orange provides power for the light emitting diode for the tracker but both would be orange for the motor 9 circuit.

Blue and Green provide power for the optical switch for the tracker but both would be blue for motor 9 circuit.

White and Purple transmit power when triggered with light and stops transmitting when light is no longer detected. In the motor 9 circuit, both wires are normally green.