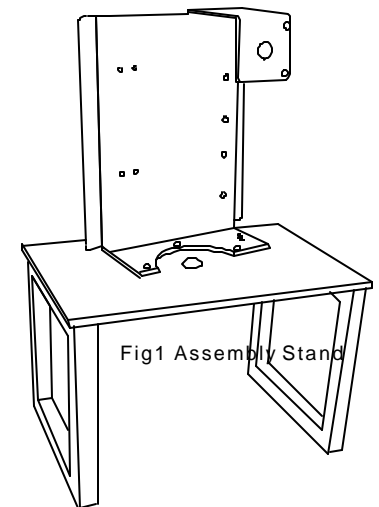


WN 2.2 Assembly Sequence

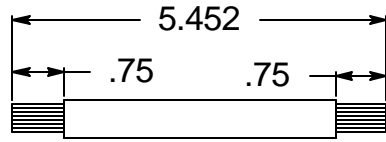
Read before beginning assembly

It's best to install the components in this sequence.

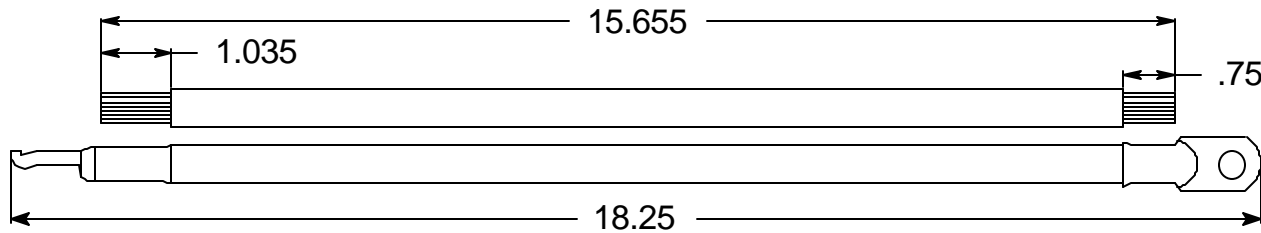
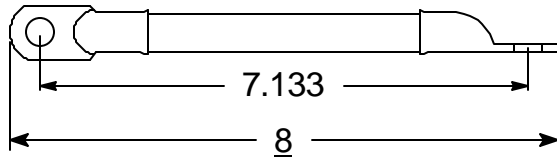
1. Attach battery connector body to switch bracket
2. Attach footswitch connector body to switch bracket
3. Install solenoid warning LEDs (if used)
4. Install "L" shaped copper buss bar to rotary disconnect switch
5. Install rotary disconnect switch
6. Install "U" shaped copper buss bar joining solenoids. Bend copper buss bar so solenoid mounting holes align with holes in winch frame.
7. Install solenoid "assembly" by inserting into hole in "L" copper buss bar and secure with solenoid mounting screws. Install solenoid grounding leads or brass strips under solenoids. Leave all screws/nuts loose.
8. Attach short cable to motor "power" stud but leave nut loose. Some motors come with a thin nut on the power stud that can strip and damage the soft copper stud threads so replace with full length nut. Some motors have an extra long stud so test fit and be sure the stud doesn't contact the frame. If necessary, put a nut on the stud and use a hacksaw to shorten.
9. Attach handle to motor with hose clamps. Position front clamp screw away from bottom 5/16" mounting hole so it won't interfere with installation of motor mounting bolt.
10. Install motor starting with top 3/8" bolts then install lower 5/16" bolt. Access to the 5/16" is limited so it is necessary to use a 1/2" box wrench and short movements to tighten bottom bolt. A work bench with a hole that the motor shaft can stick through (Fig.1) will make motor hole alignment easier. It may be necessary to loosen bolts and adjust motor position until all bolts align with holes in motor flange. Experience has shown there is a slight variation in the position of the bottom 5/16" hole from motor to motor so it may be necessary to enlarge it 1/64" to 21/64" with a drill or round file if the bolt won't screw in with finger pressure.
TAKE CARE NOT TO CROSSTHREAD MOTOR MOUNTING BOLTS.
11. After installing motor mounting bolts, rotate front handle clamp screw so it is on the bottom.
12. Attach motor cable to solenoid stud.
13. Remove 3/8" motor mounting bolt (side opposite solenoids) and install ground (Negative) battery cable.
14. Align all components then tighten all screws and nuts.
15. Install electrical wiring. Double check all connections.
16. Connect to battery and check motor operation.
17. Install brakearm. Do not over tighten brakearm pivot screw (B). Install V belt.
18. Before installing drum, use a file to remove any sharp edges, burrs or protrusions from the motor shaft especially near the end and around the drive pin hole. The drum should be 72 degrees or warmer. The motor should slide on the shaft with little effort. **DO NOT FORCE OR POUND THE DRUM ONTO THE MOTOR SHAFT.** Each drum is test fit on two different motors before shipping so if the drum won't slide on it is likely there is a protrusion or a bend in the motor shaft. If the drum becomes stuck heat the drum using a heat gun or similar.



Dimensions based on 1/0 cable
 Note angle of lugs



Pre-bend cable close to desired shape before crimping or soldering



Cable Size

1/0 is pretty heavy cable but insures less power loss due to cable resistance and is common on winches used in competition however smaller cable could be used if desired with slight degradation in power. Lug and battery connector size must match cable size.

Solder vs. Crimping

Solder makes the cable stiff a ways back from the lug but would probably have lower resistance and can be done in a home shop

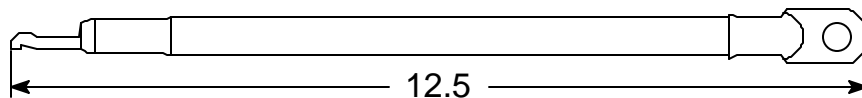
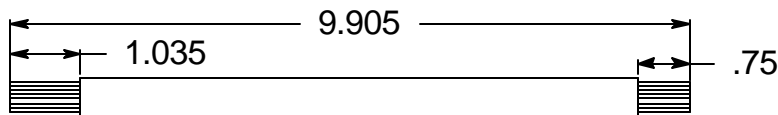
A crimped lug makes a more flexible cable but requires a special tool. Most welding supply stores will cut the cable and crimp the lug for little or no extra cost.

A piece of shrink tubing over the lug/cable joint improves the appearance.

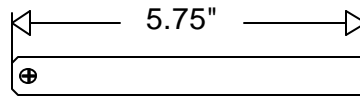
Cost (Aprox.)

1/0 cable \$2.00/ft. Lugs \$1.75 ea.

Note angle of lugs



Note: Some longshaft motors have shafts less than 5.75". Be sure to check the shaft length.



Ford Longshaft Starter Motor

#3110 6 Volt
#3115 12 Volt

3110 W/ 12 Volt=Hot
3115 W/ 12 Volt=Medium
3115 W/ 6 Volt= Mild

Custom Made Cables (Check with Welding Products Supplier)

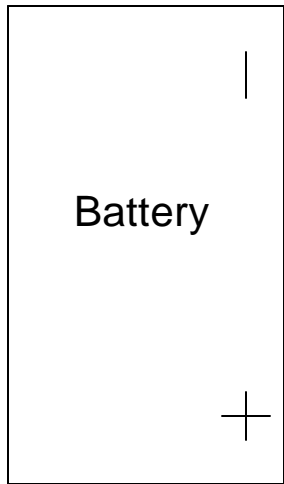
Solenoids
Cole Hersee 24037
(\$21 ea.) Check with Auto Parts or Marine Supplier

Use a jumper wire to connect solenoid frame to battery Neg

Foot Switch

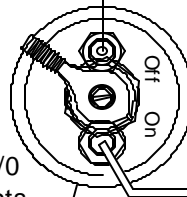
McMaster Carr
www.mcmaster.com
7024K11 (\$29), 7377K2 (\$13)
or Linemaster "Clipper"
www.linemaster.com

Industrial Battery Connector
2 Required
McMaster Carr www.mcmaster.com
7043K951(\$6 ea.) - 50 Amp, 10-12 Ga Wire (Awg), W/2 Contacts, Red or Anderson Power Products. Also frequently available from auto parts stores



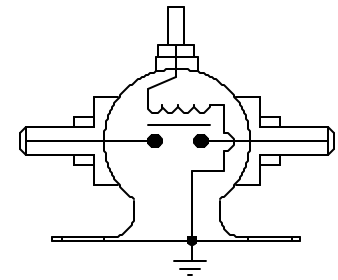
Battery Connector
2 Required
Available from McMaster Carr
www.mcmaster.com
7043K76 (\$11 ea.) Industrial Battery Connector 175 Amp, 1/0 Wire Gauge (Awg) W/2 Contacts, Gray
or
7043K231 (\$11 ea.) Industrial Battery Connector 175 Amp, 2 Ga Wire (Awg) W/2 Contacts, Gray
or
Anderson Power Products. Also frequently available from auto parts stores

Copper Buss Bar



"L" Copper Buss Bar

Battery Disconnect Switch (Short Shaft 1000 amps)
Frequently available at autoparts stores (About \$20) or 74ZX7827P www.jcwhitney.com or Cole Hersee 2484-09 or 75904 (82065 ON/OFF Faceplate)

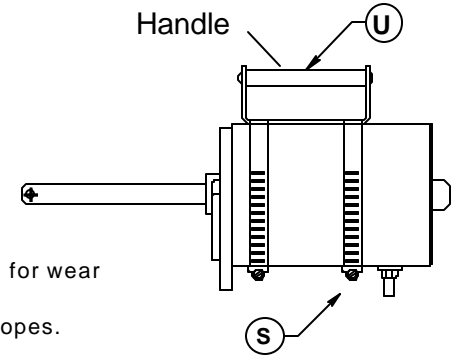
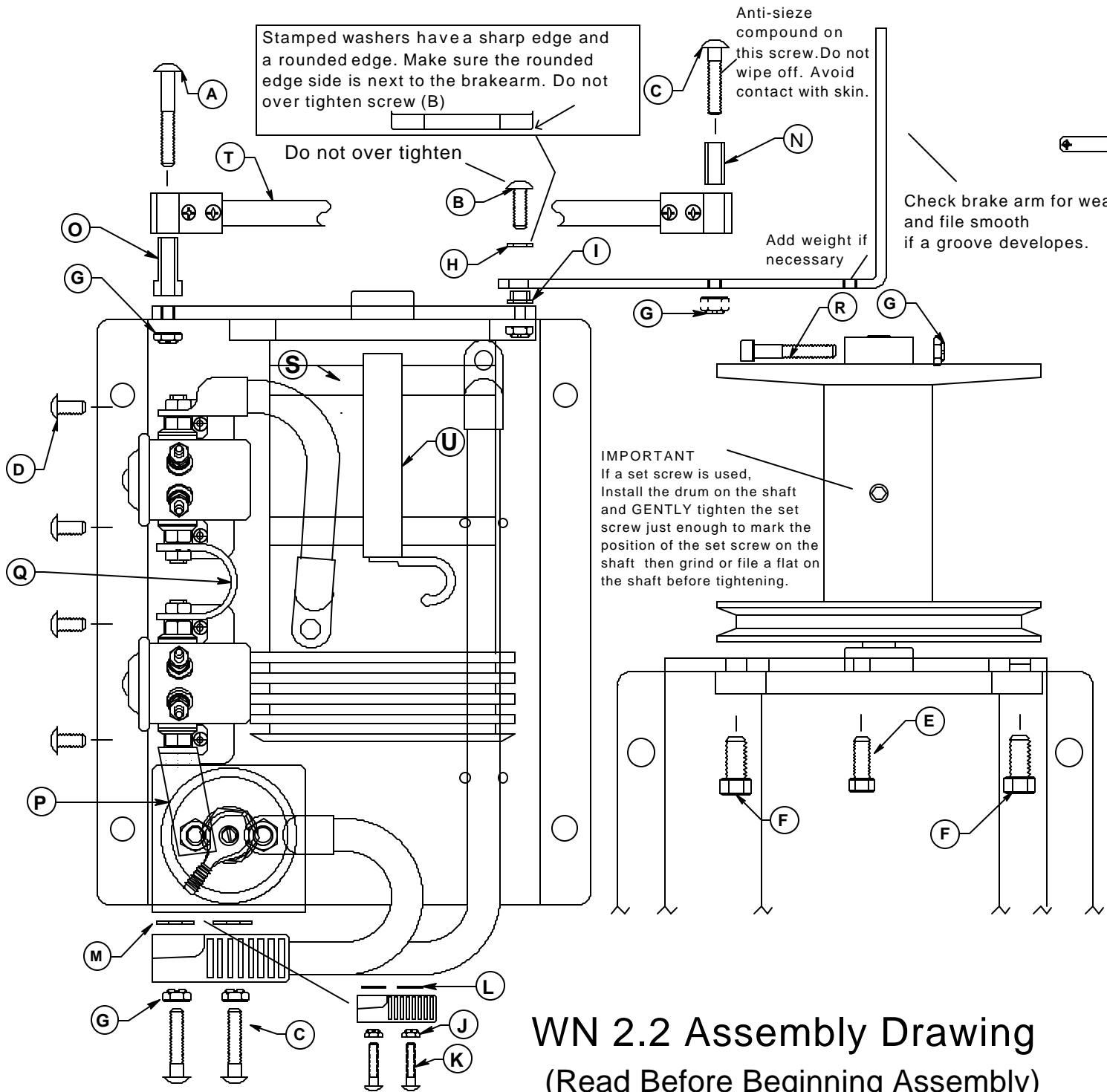


IMPORTANT:

Note to the Inexperienced:
If you are just learning to fly sailplanes, seek the help of an experienced R/C sailplane pilot for instruction in the proper and safe use of a winch. Become proficient launching with a rubber hi-start before attempting to use a winch.

The Builder is responsible for insuring safe operation. Check with experienced modelers for additional suggestions and safety considerations

WN 2.2 Electrical Drawing



- A 1 1/4-20 X1.5" Button Head
- B 1 1/4-20 X.75" Button Head
- C 3 1/4-20 X1.25" Button Head
- D 4 1/4-20 X.5" Button Head
- E 1 5/16-18 X .75" Hex Head
- F 2 3/8-18 X .75" Hex Head
- G 10 1/4-20 Friction Nut
- H 1 1/4" Washer
- I 1 Bronze Bushing
- J 2 6-32 Friction Nut
- K 2 6-32 X .875" Philips
- L 2 3/16" Washer
- M 2 1/4" Fender Washer
- N 1 Spacer 3/8 X 3/4
- O 1 Standoff 1/2 / 3/8 X1.025"
- P 1 "L" Copper Buss Bar
- Q 1 "U" Copper Buss Bar
- R 1 1/4-20 X 1.5" Socket Head
- S 2 # 72 Hose Clamp
- T 1 "A" V belt 14.125" Len.
- U 1 Handle

WN 2.2 Assembly Drawing (Read Before Beginning Assembly)

Paint Rust-oleum #7747
Sunburst Yellow (aerosol)

Cal Posthuma's Stuck Solenoid LED kit Instructions

(Reprinted with permission from Cal's webpage)
http://www.altelco.net/~calplsf/solenoid_led.htm

The typical winch situation is at the right. The positive (long) leg of the LED always is towards POS battery terminal. The LED negative (short leg) of the LED goes towards the motor terminal. This assumes you have battery negative grounded to the winch frame. The resistor can go on either leg of the LED but to keep it looking like the diagram put the resistor on positive leg of the first LED from battery positive terminal and on the negative leg of the second LED. To test the LED once resistor is on the leg, you just put across 12 volts. It will light if polarity is correct. You will not hurt it if resistor is in place.

A special thanks to Andrew E. Mileski for his technical help and picture.

Assembly Order:

1- Assemble LED into holder. Remove the rubber stopper, and put the LED legs through the hole in the stopper. Put the LED and stopper into holder from the threaded end. Once seated well put a small pin between the stopper and wall of the holder put in a small drop of thin CA.

2- I bend over the short negative leg slightly to remind me it is negative. Working on the first LED closest to battery positive cut the negative leg down to about $\frac{1}{4}$ ". Solder a length of hookup wire to it (black). Slip some green heat shrink ($\frac{3}{32}$ ") over the wire and

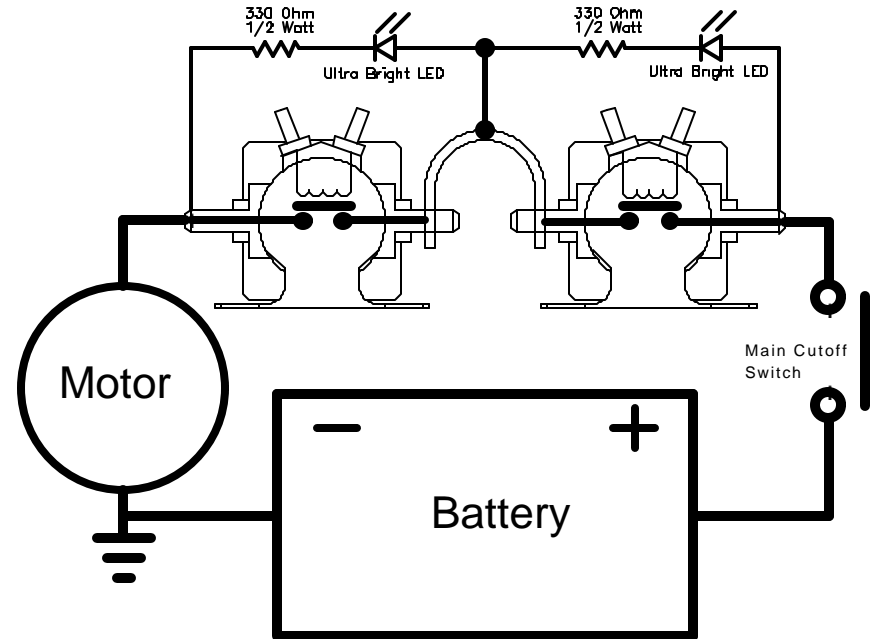
up to the base and shrink it with heat gun. Working on the second LED closest to motor terminal, cut the positive leg down to $\frac{1}{4}$ ". Solder length of hookup wire (red). Slip some green heat shrink over it and up to the base and shrink it.

3- If you are going to mount the LED holders on metal or wood plate now is the time. Drill plate with a $\frac{21}{64}$ ths drill. Slip the LED holder in the correct hole and tighten nut onto lock washer.

4- Shorten remaining leg of each LED to $\frac{1}{4}$ ". Solder resistor to it. Solder the appropriate color hookup wire to it. If you have heatshrink use your judgment as to whether you need it over the resistor. I just put yellow ($1\frac{1}{2}$ ") over both wires up over the end of the holder and shrank it. I gave each one drop thin CA at heat shrink to keep it on the holder as a strain relief.

5- Check length of hookup wire and solder a $\frac{5}{16}$ " lug on the first LED from battery positive to the red wire. Solder a lug to second LED nearest motor terminal to its black wire. Take the negative (black wire) from the first LED and the positive (red wire) of the second LED from battery positive and solder both to center lug. Bolt all lugs to appropriate solenoid terminals as shown in the diagram above. Lugs maybe crimped as well if you have the tool to do it.

6- If all else fails, email me at: calplsf@altelco.net I would appreciate feedback and pictures.



Parts in the kit:

- 2- Clear LED's short leg is (-)
- 2- LED Holders use a $\frac{21}{64}$ ths drill for mounting holes
- 2- 330 Ohm $\frac{1}{2}$ Watt Resistors
- 3- $\frac{5}{16}$ ths Mounting Lugs for the solenoid

Other items you may need and not supplied:

- 18 gauge hookup wire red and black 2' of each depending on your winch
- Heat Shrink: Yellow and Green Dubro worked for me
- Low Watt soldering Iron, electrical flux, and Rosin Core electrical solder