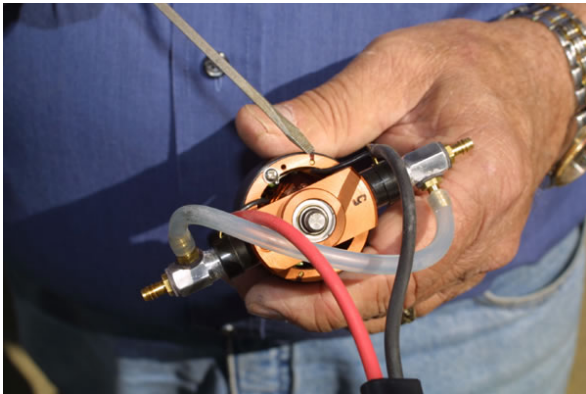


REVERSING MOTOR ROTATION ON THE ASTRO 325

Tools Needed: Digital multimeter capable of reading 0-20 Amps DC
2 fully charged 6-cell sub C battery packs
Test mount for the motor (Optional)
One 1/16" straight blade screwdriver
One indelible marking pen (sharpie)
One scriber

Out of the box, the ASTRO Marine #325 motor rotates counter-clockwise (when viewed from the output end (clockwise when viewed from the commutator or brush end). To be ready for use in an E-RCU hydro, the motors' rotation needs to be reversed and then motor must be re-timed.

First, look carefully at your motors output end bell, that's the gold colored part that the output shaft extends from. You will see two small brass screw heads about 180 degrees apart. These two screws go all the way through the motor to the commutator end bell and hold the motor



together. Now look at the commutator end bell and you will see two pairs of threaded holes also 180 degrees apart only one pair of which is in use by those two long brass screws. Mark one of these now with the sharpie and place a corresponding mark on the field ring. **DO NOT MARK THE OPEN HOLES.**

Begin by mounting the motor in a test mount that has holes that allow access to the through bolts.

Connect the motor and digital multimeter in series with at least a fully charged 6 cell battery pack.

Locate the factory timing marks between the field ring and the commutator end bell. They should be located behind the negative brush holder. Note the relative position of the end bell mark to the min and max field ring marks.

Run the motor and record the current draw registered on the multimeter. Then shut off the motor. Compute stock motor timing from your observations above using the 10% Rule which is to simply add 10% of the expected full load current draw (amps) to the no load current to obtain correct timing for the



expected load. Thus current draw minus the no-load current for the #325 marine motor of 4.5 amps x 10 = stock timing current.

Now remove the two screws holding the motor together and rotate the field ring about 180 degrees. This reverses the magnetic field polarity relative the electrical input polarity which will make the motor rotate in the opposite direction.

Replace the two screws but install them into the UNMARKED holes. This yields an initial advance for CW rotation to which we will add. Locate the factory timing marks on the field ring and with the screws loose enough to allow the field ring to move, rotate it first fully counterclockwise and then fully clockwise as viewed from the commutator end making a new reference timing mark on the commutator end bell using the scribe.

Start the motor and slowly rotate the field ring in the direction the motor turns (CW as viewed from the output end) until the same current reading is obtained as that taken earlier for the CCW rotation. Note also that the motor speed increases and the current draw increases as you advance the timing. This would also be a good time to verify that the motor is indeed rotating clockwise (CW) as viewed from the output (prop) end. The relationship between the timing marks should be similar but a mirror image of those observed earlier. Applying the 10% rule for an expected current draw of 40 amps, adding 10% of 40 (4) to 4.5 is 8.5 amps. This is the minimum for sparkless commutation. Additional advance will make the motor run faster but the current draw will also increase as well as the heat generated and accelerate brush wear. Operating at partial throttle settings on an over advanced motor can result in overheating and damage.

MOTOR TIMING DATA SHEET

| MOTOR ID: | | | |
|------------------|---------------|--------------|----------------|
| | Volts Applied | No Load Amps | |
| As Received: CCW | | | |
| | | | Min |
| | | | Max |
| | | | |
| Reversed: CW | | | Min |
| | | | Max |
| | | | Target: 11 Amp |
| | | | |
| | | | |