Valvcon™ ADC-Series Motor/Gearbox replacement instructions

Installation, maintenance and operating instructions

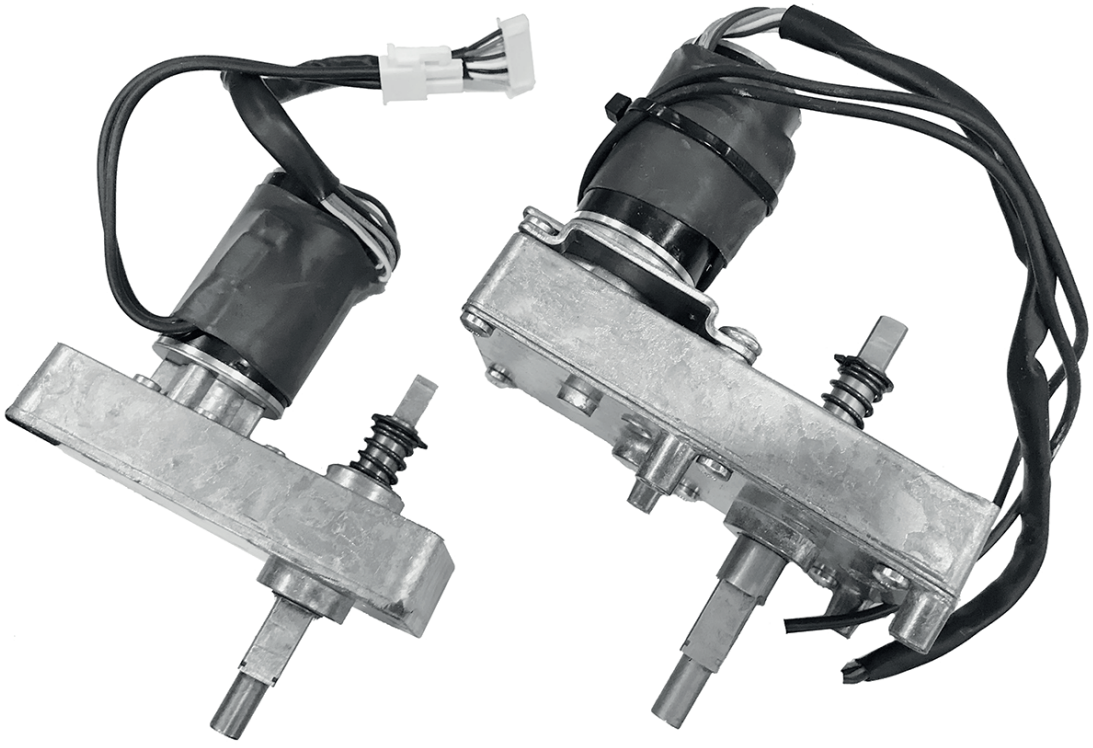


Table of contents

READ THESE INSTRUCTIONS FIRST!

These instructions provide information about safe handling and operation of the valve.

If you require additional assistance, please contact the manufacturer or manufacturer's representative.

SAVE THESE INSTRUCTIONS!

Addresses and phone numbers are printed on the back cover.

1. GENERAL

1.1 SCOPE OF THE MANUAL

This instruction manual contains important information regarding the replacement of the Motor/Gearbox used in the Valvcon™ ADC-Series electric actuator. Please read these instructions carefully and save them for future reference.

1.2 SAFETY PRECAUTIONS

WARNING

DANGEROUS VOLTAGES ARE PRESENT INSIDE THE ACTUATOR COVER UNLESS THE POWER SUPPLY TO THE ACTUATOR HAS BEEN SHUT OFF OR DISCONNECTED. USE EXTREME CAUTION WHENEVER WORKING ON THE ACTUATOR WITH THE COVER REMOVED.

WARNING

WHEN REMOVING DC SUPPLY POWER, THE POSITIVE LEAD MUST BE DISCONNECTED FIRST; FAILURE TO HEED THIS WARNING MAY RESULT IN A BLOWN FUSE IN THE PROTECTION CIRCUIT ON THE BOARD.

WARNING

WHENEVER WORKING INSIDE THE ACTUATOR BE SURE TO FOLLOW ALL GUIDELINES, AND HEED ALL WARNINGS IN THIS OPTION KIT MANUAL. AS WELL AS TO READ AND FOLLOW THE INSTRUCTIONS SUPPLIED WITH THE ORIGINAL PRODUCT CAREFULLY AND HEED ANY ADDITIONAL WARNINGS.

WARNING

BEWARE OF MOVEMENT OF THE FINAL DRIVE ELEMENT AND ANY LINKAGE BETWEEN IT AND THE ACTUATOR!

KEEP HANDS, OTHER PARTS OF THE BODY, TOOLS AND OTHER OBJECTS OUT OF THE WAY OF MOVING PARTS, FAILURE TO DO THIS MAY RESULT IN DAMAGE OR PERSONAL INJURY!

2. PARTS VERIFICATION

2.1 Verify that you have the correct motor for the actuator in question

For a 150 to 600 lb-in actuator, use Motor/Gearbox Kit part number VCK00016 (contains a VC006229 Motor/ Gearbox and replacement retaining ring).

For a 1000 to 2000 lb-in actuator, use Motor/Gearbox Kit part number VCK00017 (contains a VC006144 Motor/ Gearbox and replacement retaining ring).

For a 2500 to 3000 lb-in actuator, use Motor/Gearbox Kit part number VCK00018 (contains a VC006230 Motor/ Gearbox and replacement retaining ring).

3. TOOLS REQUIRED

Collect the tools required, refer to Table 1.

Table 1 Tools Required
5 MM Hex wrench (Small enclosure)
6 MM Hex wrench (Large Enclosure)
1/16-inch Hex wrench
#1 Phillips screwdriver
#2 Phillips screwdriver
9/64-inch Hex wrench
Retaining Ring pliers
Soft Mallet
Wire Cutters (to cut tie wraps)
Small Flat Blade Screwdriver

4. STEP BY STEP INSTRUCTIONS FOR MOTOR/GEARBOX REPLACEMENT

WARNING

WHENEVER WORKING INSIDE THE ACTUATOR BE SURE TO FOLLOW ALL GUIDELINES, AND HEED ALL WARNINGS IN THIS OPTION KIT INSTALLATION MANUAL. BE SURE TO READ AND FOLLOW THE INSTRUCTIONS SUPPLIED WITH THE ACTUATOR CAREFULLY, AND HEED ANY ADDITIONAL WARNINGS.

WARNING

DANGEROUS VOLTAGES ARE PRESENT INSIDE THE ACTUATOR COVER UNLESS THE POWER SUPPLY TO THE ACTUATOR HAS BEEN SHUT OFF OR DISCONNECTED. USE EXTREME CAUTION WHENEVER WORKING ON THE ACTUATOR WITH THE COVER REMOVED

WARNING

WHENEVER WORKING INSIDE THE ACTUATOR, CARE MUST BE TAKEN TO AVOID DAMAGE TO THE MACHINED FLANGE SURFACES ON THE COVER AND BASE CASTINGS. FAILURE TO DO SO CAN VOID THE ACTUATOR'S ENVIROMENTAL CERTIFICATION.

WARNING

USE CARE WHENEVER WORKING WITH THE ACTUATOR COVER REMOVED, DAMAGE, SCRATCHES, OR DENTS ON THE MACHINED FLANGE SURFACES OF THE ENCLOSURE MAY VOID COMPLIANCE WITH NEMA, CSA, UL AND/OR IEC SPECIFICATIONS.

4.1 Ensure power, and any control signals, are disconnected from the actuator to be serviced.

4.2 Remove the actuator cover, using a 6mm hex wrench for LADC models, or the 5mm hex wrench for ADC models. The internals will look like Figure 1, (LADC model shown).

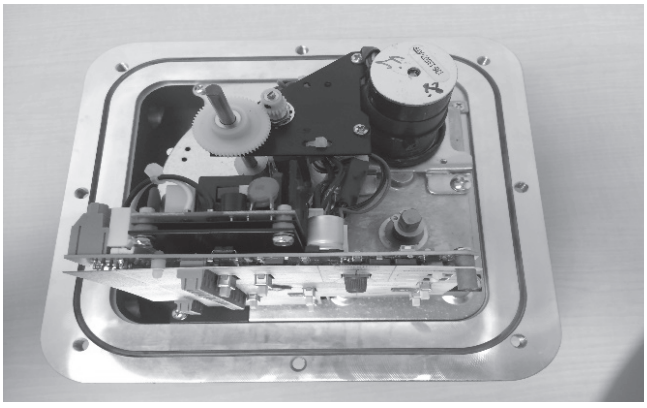


Figure 1.

4.3 Disconnect all power, and signal wires from the Universal Control board.

4.4 Remove the overlay from the VCB00010 Circuit Board, see Figure 2.

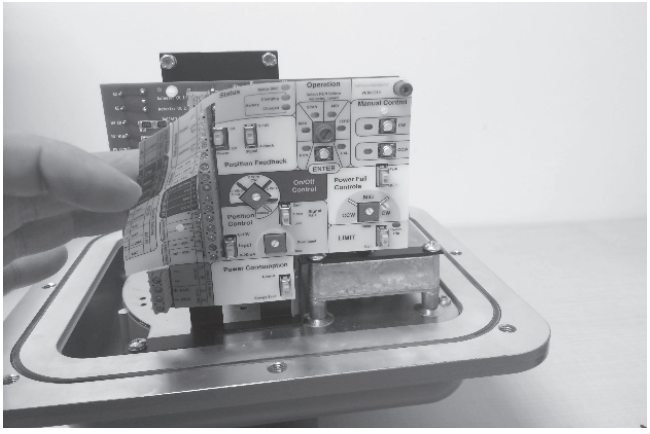


Figure 2.

4.5 Remove the three Philips screws that hold the Universal Control Board in place with the #1 Philips screwdriver, and save them for later use, see Figure 3.

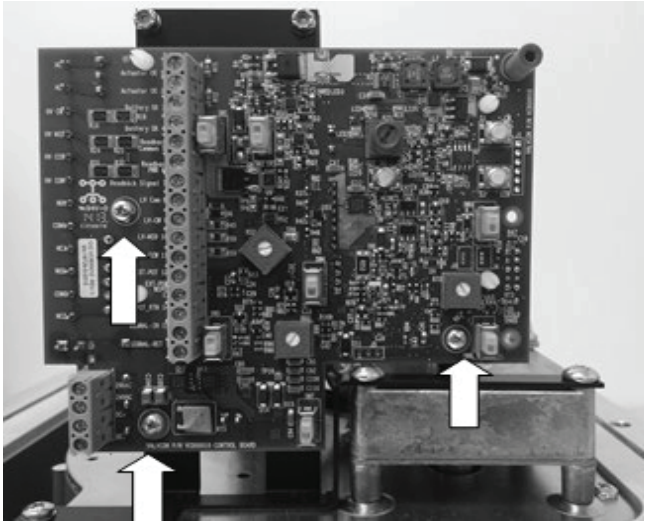


Figure 3.

4.6 Unplug all cables attached to the board and remove it, see Figure 4.

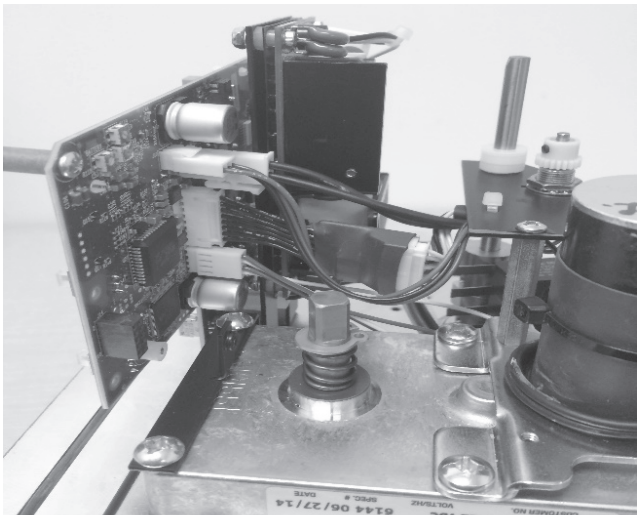


Figure 4.

4.7 Remove the two Philips screws that hold the board bracket in place and save them for later use, see Figure 5.

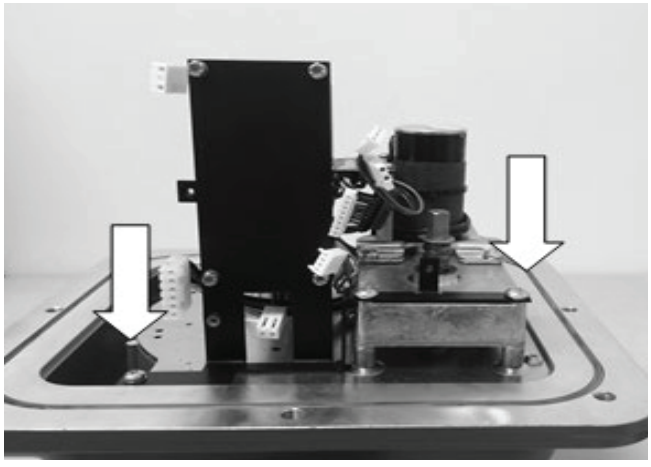


Figure 5.

4.8 Using the 1/16” hex wrench, loosen and remove the cam shaft gear and spacers, and retain for future use, see Figure 6.

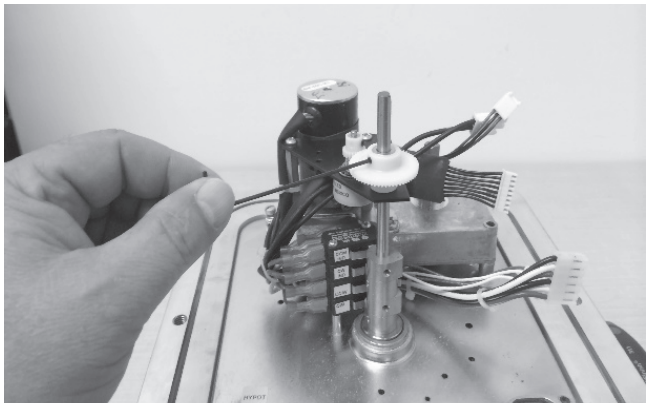


Figure 6.

4.9 Remove the cam shaft gear spacers and the 2 Philips screws that hold the potentiometer bracket in place and retain them for future use. Then remove the potentiometer bracket from the cam shaft, see Figure 7.

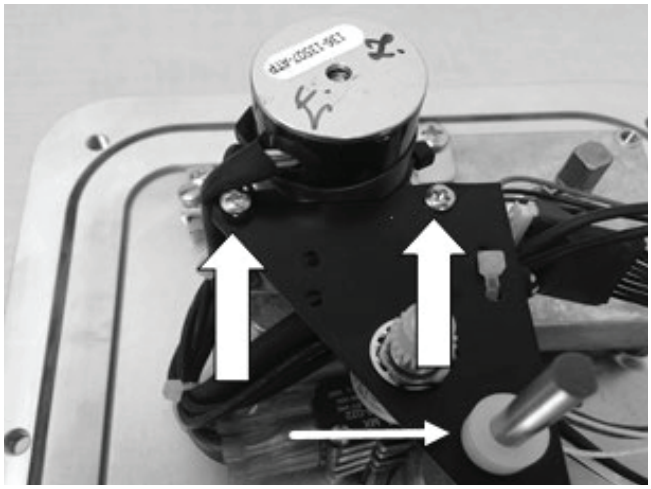


Figure 7.

4.10 Remove the 2 pot bracket standoffs from the motor/ gearbox and retain them for future use, see Figure 8.

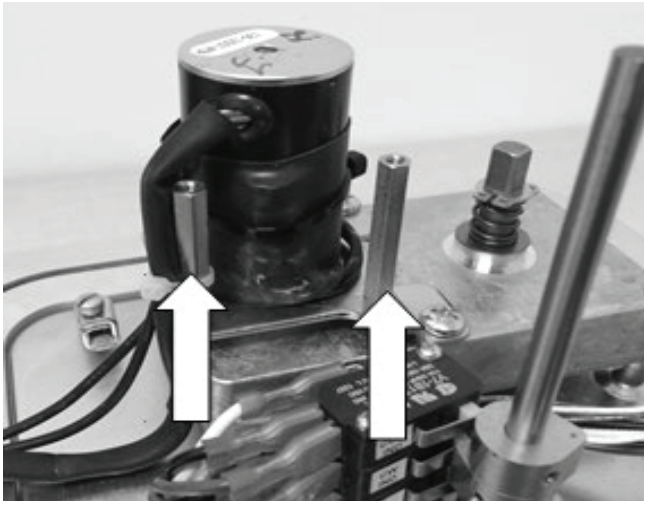


Figure 8.

4.11 Loosen the 2 Philips screws that hold the limit switches in place and remove the switches, including the wire harness, see Figure 9.

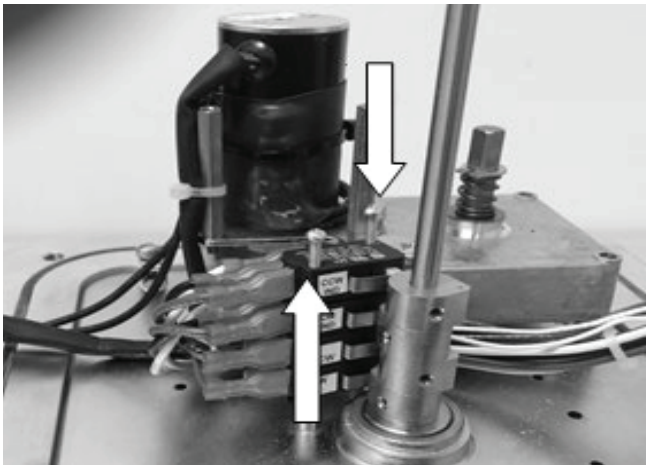


Figure 9.

4.12 Remove the remaining 3 Philips screws that hold the motor support plate in place, see Figure 10. (Note there will be 5 screws remaining in ADC actuators)

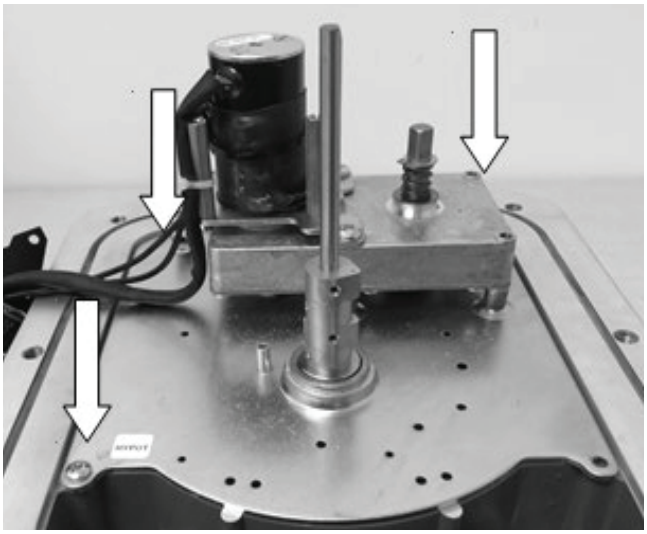


Figure 10.

4.13 Grasp the motor/gearbox and lift the support plate off the base casting, see Figure 11.

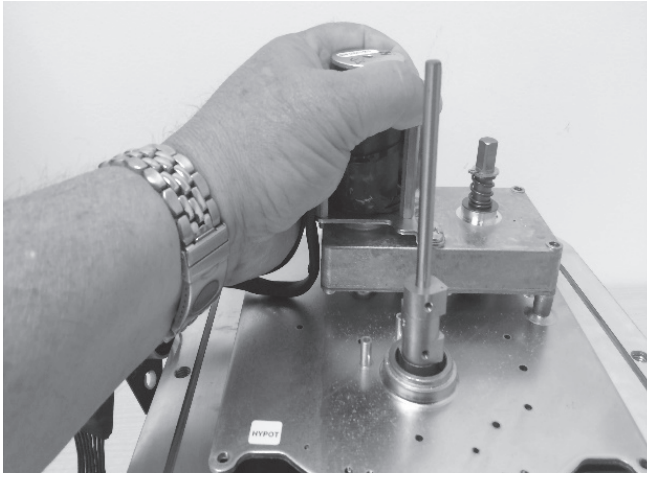


Figure 11.

4.14 With the plate removed, the gears left in the (LADC) base will look like Figure 12. Note also, that for LADC models there will be a small thick spacer washer on top of the cluster gear, if it is missing it may be stuck to the bottom of the motor support plate. If it is put it back on the shaft as it is in the picture.

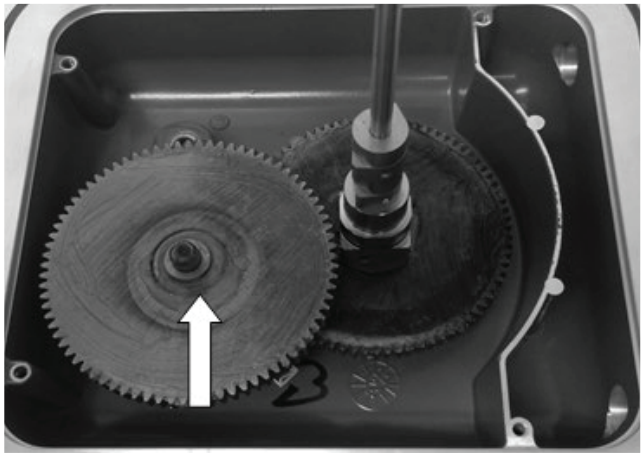


Figure 12.

4.15 For ADC models only the main gear on the center output/cam shaft will remain in the base casting, see Figure 13. (You may need to pull the output/cam shaft up as well depending on the gearing in the actuator, in order to get the motor support plate assembly “free”)

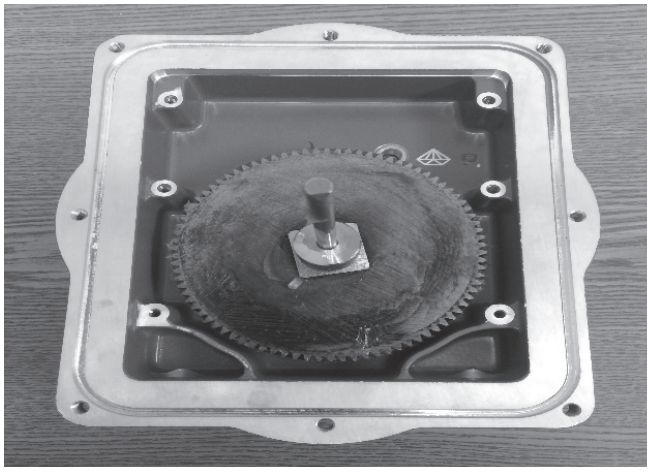


Figure 13.

4.16 Turn the motor support plate around and remove the retaining ring with retaining ring pliers, and then remove the pinion gear, see Figure 14.

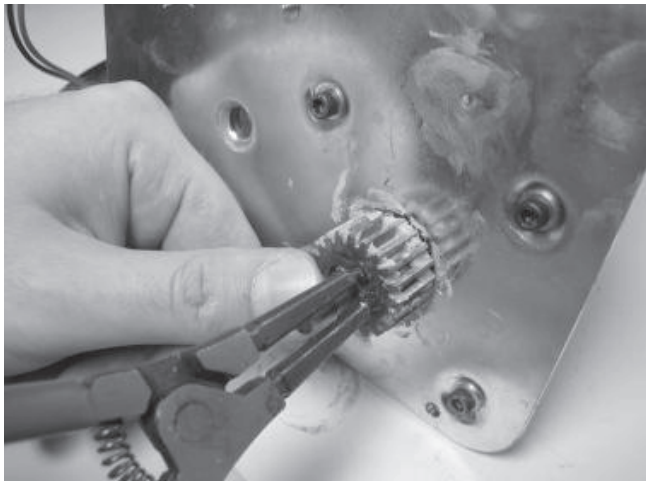


Figure 14.

4.17 After the last step you should have both the retaining ring and pinion gear shown in Figure 15.

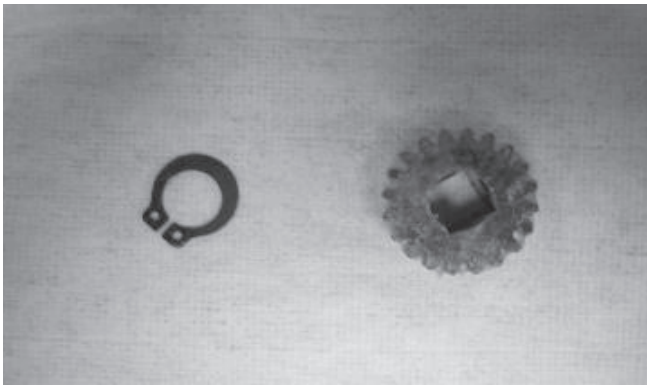


Figure 15.

4.18 Remove the four socket-head cap screws that retain the motor/gearbox, using a 9/64” hex wrench, see Figure 16.

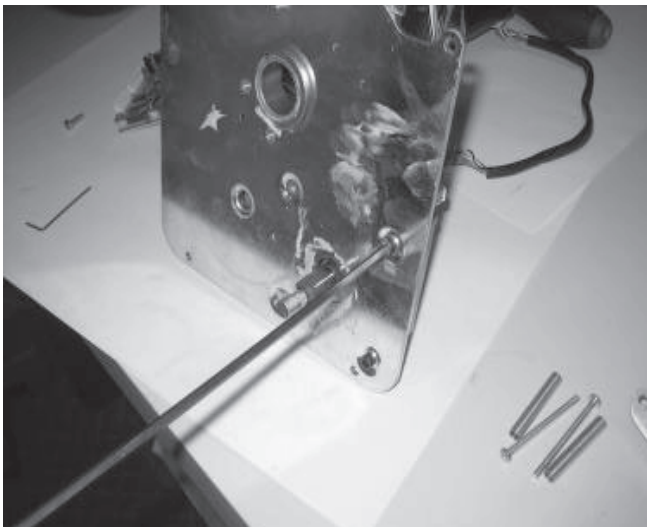


Figure 16.

4.19 Remove the old motor/gearbox and retain the 4 motor/gearbox screws and lock washers, as shown in Figure 17.

Figure 17.

4.20 Align the new motor/gearbox to the mounting holes and re-install the socket-head cap screws and lock-washers. Thread them in by hand if possible and do not tighten, at this point, see Figure 18.

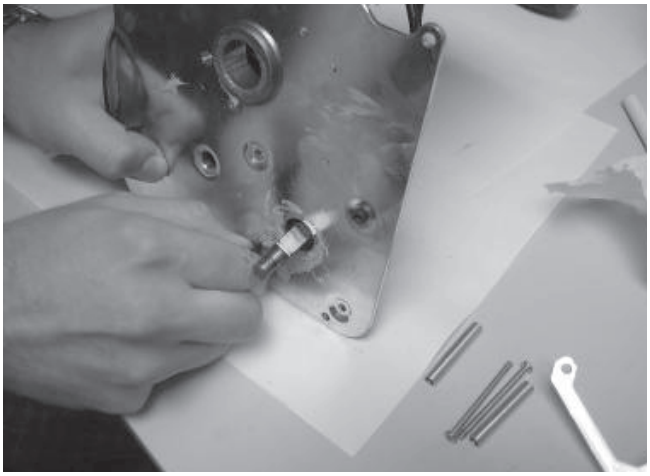


Figure 18.

4.21 Once all the screws are hand-tight, fasten securely with a 9/64” hex wrench, see Figure 19.

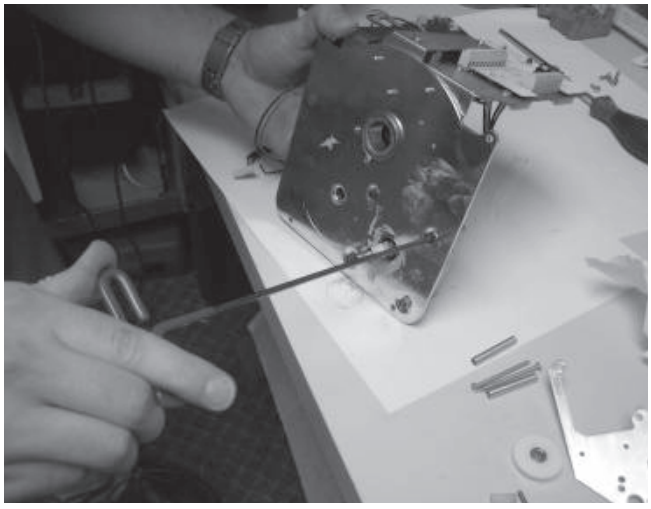


Figure 19.

4.22 Place the pinion gear on the motor/gearbox output shaft, see Figure 20.

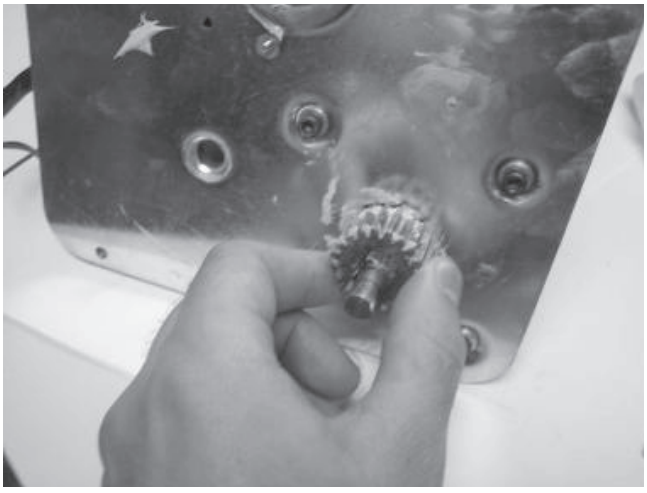


Figure 20.

4.23 Using retaining ring pliers, replace the retaining ring, see Figure 21.

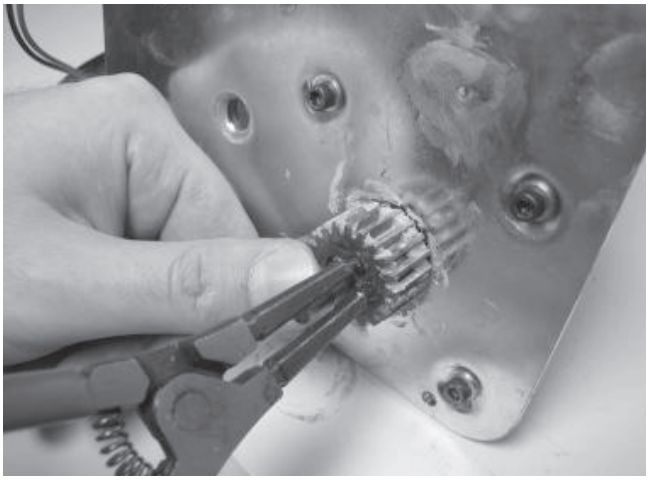


Figure 21.

4.24 Grasp the motor and re-install it onto the actuator base, see Figure 22.

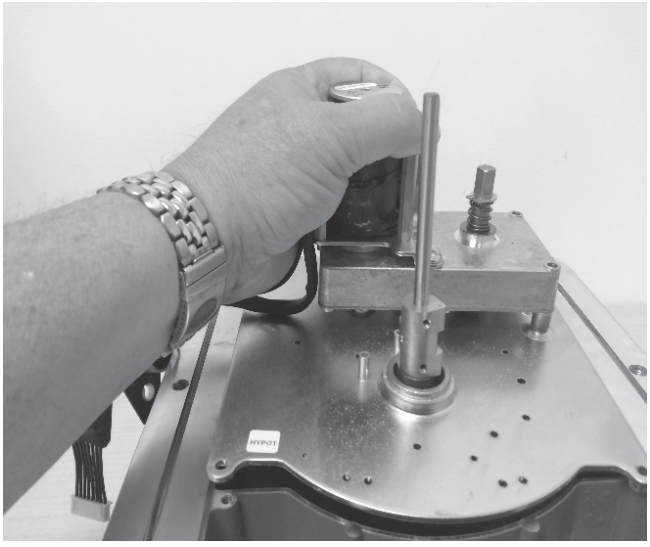


Figure 22.

4.25 Install the 3 motor support plate screws for LADC models, or 5 screws for ADC models, to secure the motor support plate back onto the base casting, see Figure 23 (note that LADC model is shown).

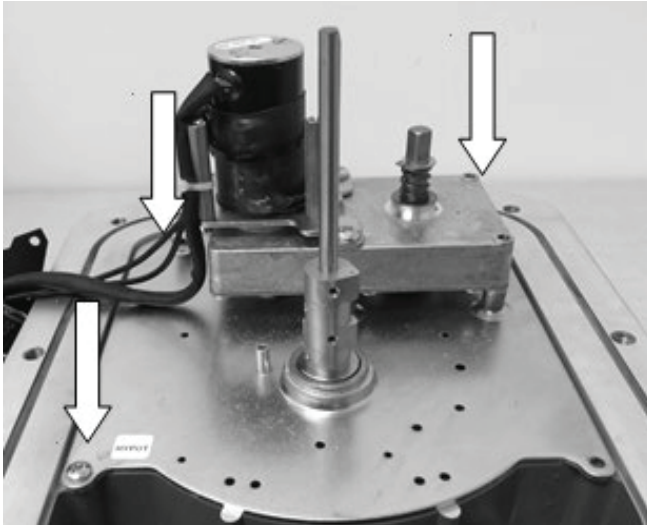


Figure 23.

4.26 Reinstall the limit switch stack as follows from top to bottom:

CCW IND

CW IND

CCW

CW

Secure the two mounting screws, see Figure 24.

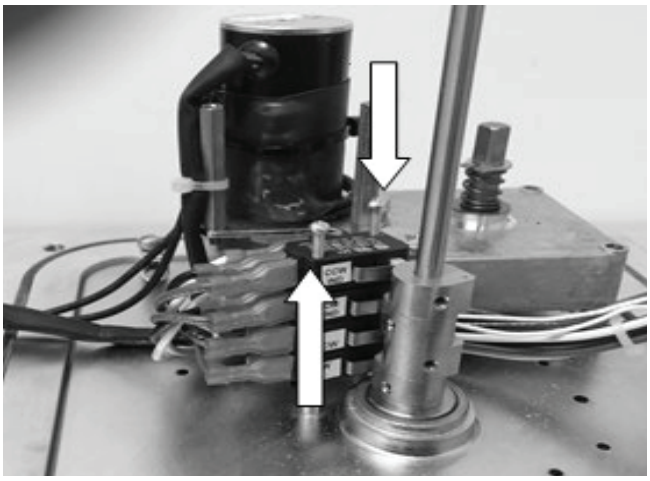


Figure 24.

4.27 Re-install the standoffs for the potentiometer bracket to the motor/gearbox, see Figure 25.

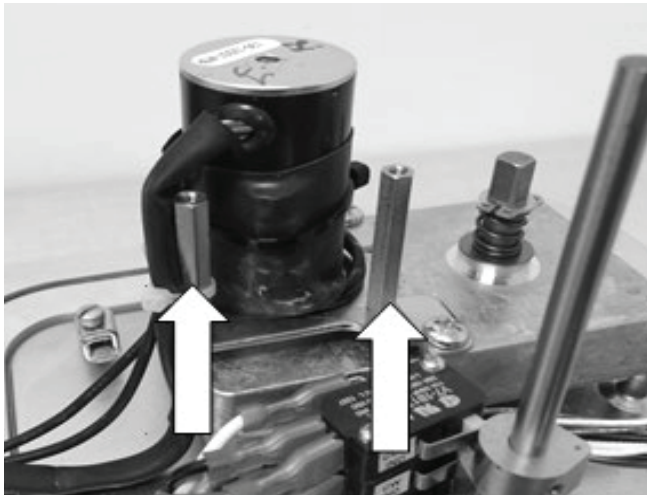


Figure 25.

4.28 Re-install the potentiometer bracket on the standoffs, and replace the two Philips screws, see Figure 26.

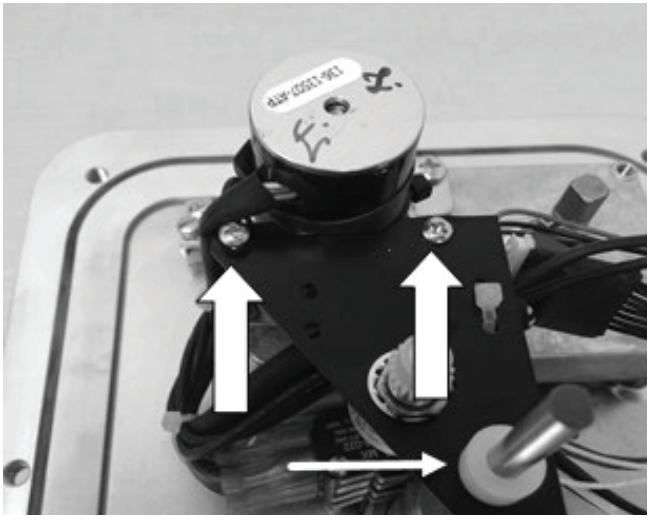


Figure 26.

4.29 Re-place the 4 spacers on the camshaft (2 thick, 2 thin), see Figure 27

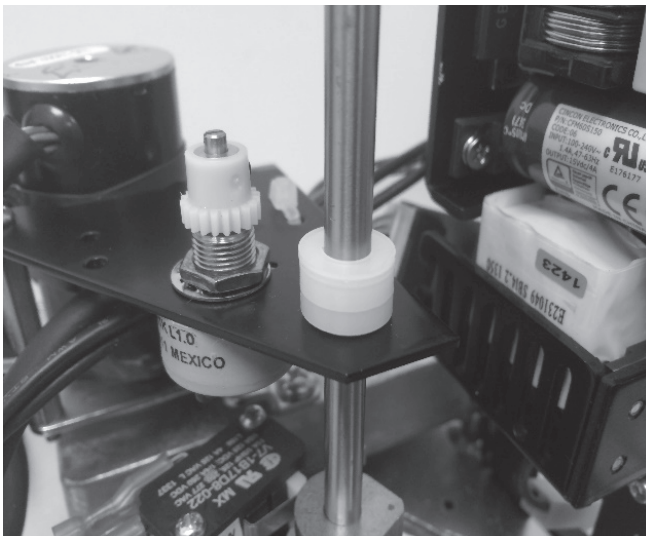


Figure 27.

4.30 Re-install the cam shaft gear, see Figure 28. (Do not tighten securely yet, as the potentiometer will require calibration)

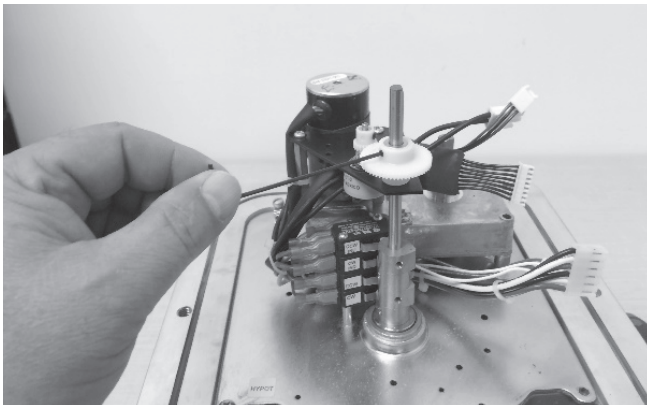


Figure 28.

4.31 Re-install the board bracket to the base. Make sure you replace the lock washer under the screw indicated in Figure 29.

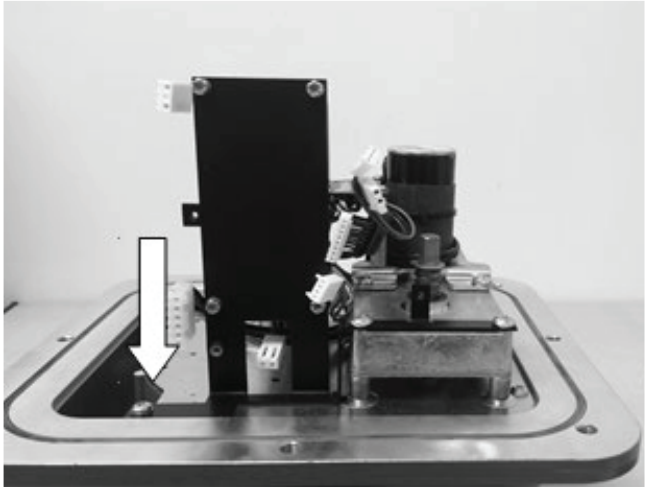


Figure 29.

4.32 Install the other screw to the motor/gearbox, as shown in Figure 30.

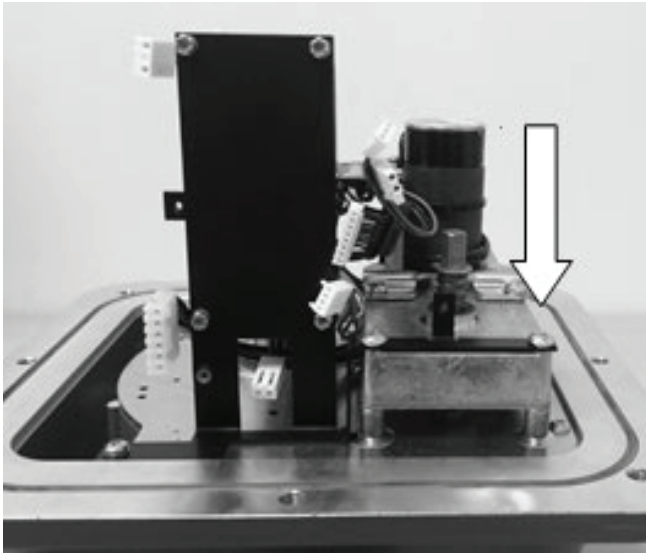


Figure 30.

4.33 Adjust/re-install the board insulator on the bracket as shown in Figure 31.

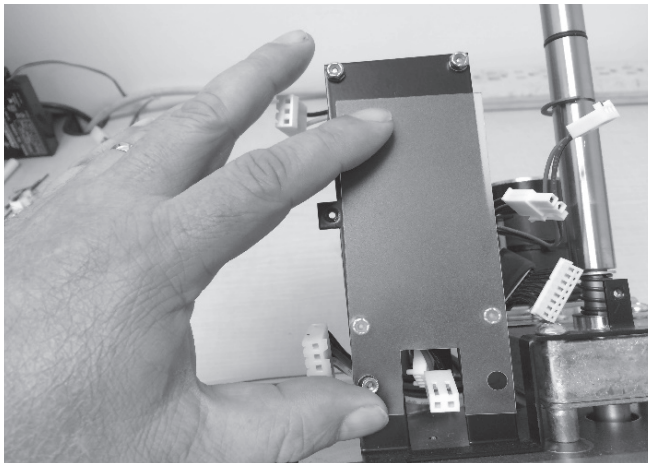


Figure 31.

4.34 Connect the lower Power supply cable to the Universal Control Board, see Figure 32.

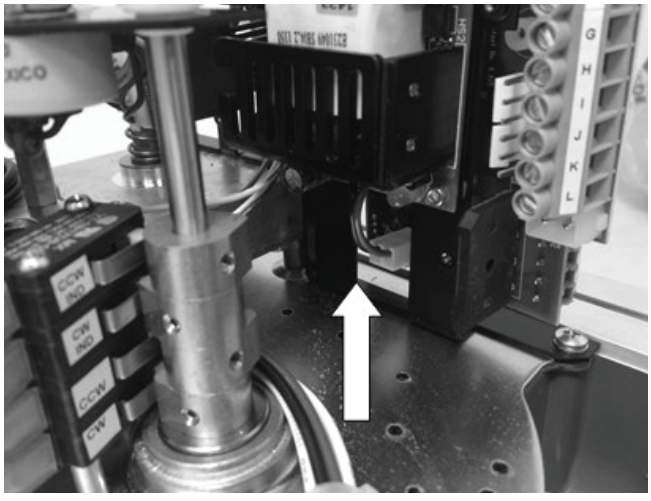


Figure 32.

4.35 Connect the potentiometer, thermal overload harness, motor harness, and limit switch harnesses as shown in Figure 33.

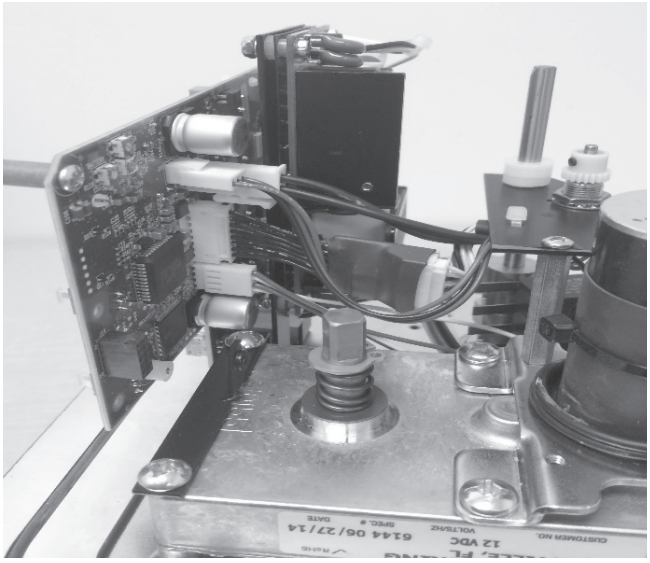


Figure 33.

4.36 Connect the upper power supply cable and the auxiliary limit switch harness, see Figure 34.

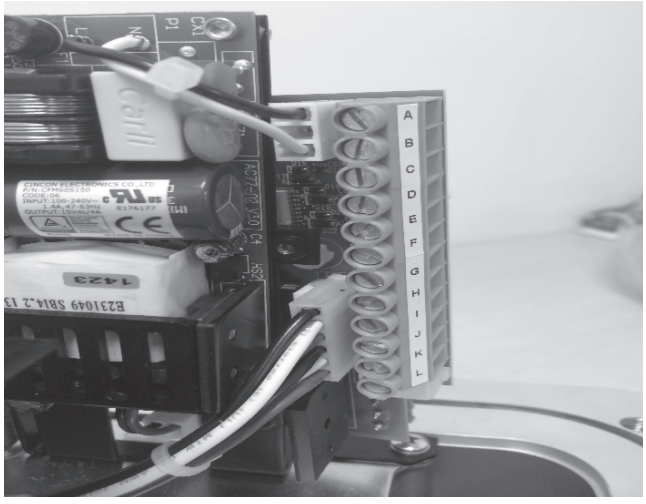


Figure 34.

4.37 Secure wires with cable ties, as shown in Figures 35 and 36, to avoid contact with moving parts.

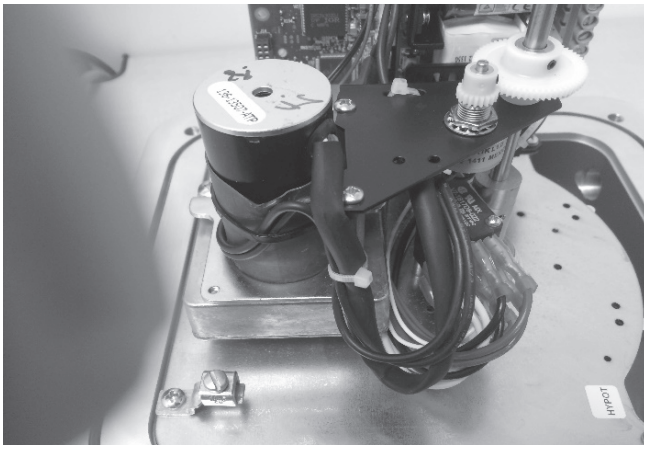


Figure 35.

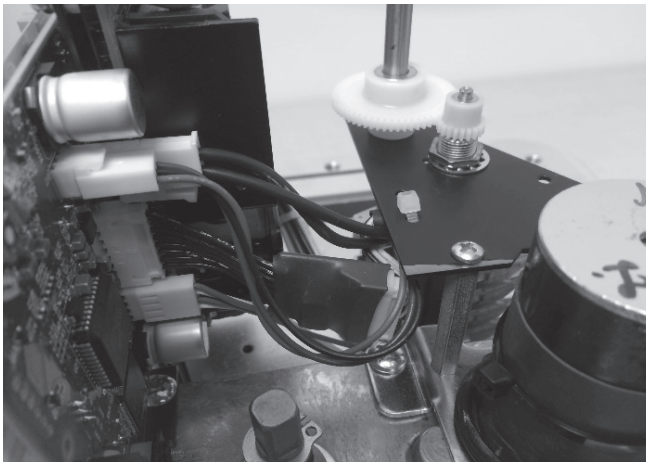


Figure 36.

4.38 Re-install the three screws that secure the board to the bracket, see Figure 37.

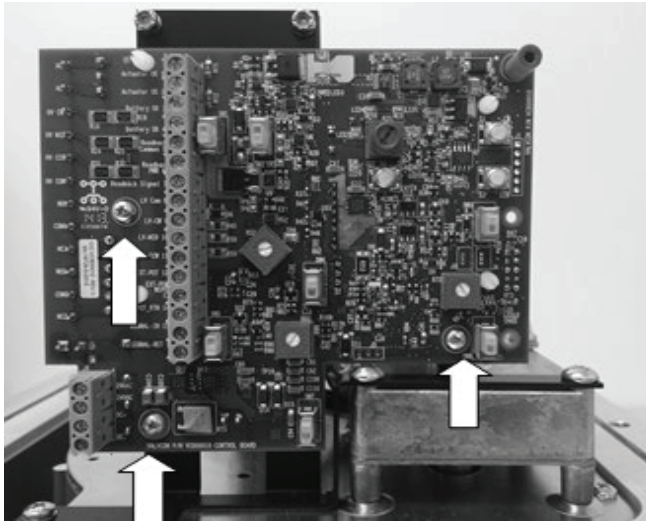


Figure 37.

4.39 Re-install the board overlay, see Figure 38.

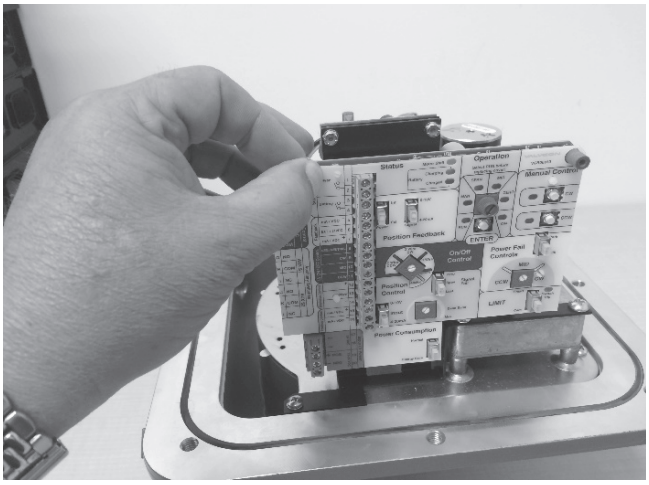
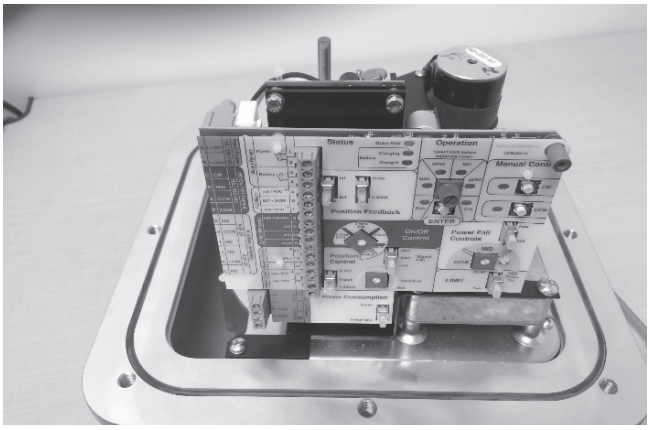


Figure 38.

4.40 The actuator is now ready to be re-calibrated and set up for your application. Please refer to IMO-I7300, or IMO-I4900 for calibration and set up procedures.



4.41 Once the actuator is calibrated and set for the application you need to re-install the cover. Locate and remove the override shaft from the cover, and install it on the square shaft of the motor (if actuator is equipped with a handwheel override, place the bottom half of the two-piece shaft on the motor, and then the top half onto the bottom half before installing cover), see Figure 39.

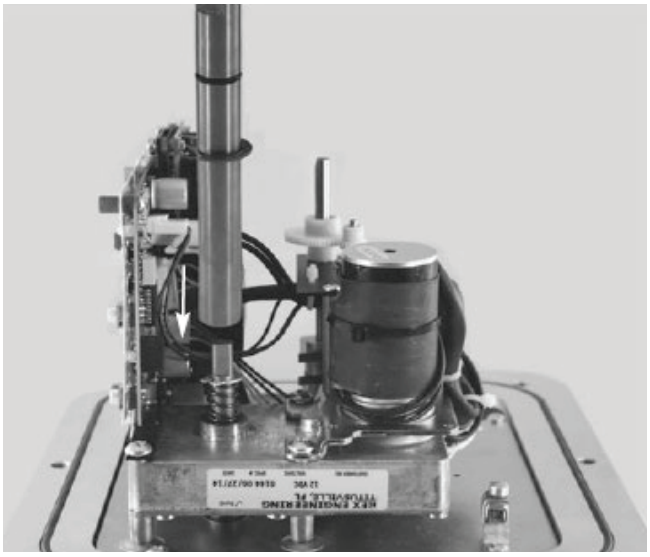


Figure 39.

4.42 Use the shaft to guide the cover onto the base and secure it with the screws that were previously loosened. Take care to ensure o-ring remains in groove and that it and any wires are not pinched when securing cover, see Figure 40.

Figure 40.

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