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SERVICE BULLETIN MAINTENANCE OF WAY EQUIPMENT

DATE: 2-11-2003 **BULLETIN NO:** 03-003

TITLE: LINING MASK LINEAR ACTUATOR SERVICE INFORMATION

RATING:

<input type="checkbox"/>	DIRECTIVE (Action Is Required)	<input type="checkbox"/>	ALERT (Potential Problem)
<input checked="" type="checkbox"/>	INFORMATION (Action Is Optional)	<input type="checkbox"/>	PRODUCT IMPROVEMENT (Enhance Product)

PRODUCT SERIES / MODEL: 6700 Tampers

SERIAL NO: All Models

SUMMARY: This Service Bulletin addresses reported problems with the lining mask linear actuator part # 431184-1; such as proper identification, servicing, installation, and calibration on the machine.

OPERATIONAL IMPACT: The information in this Service Bulletin should help correct reported field problems and extend the service life of the lining mask linear actuators.

ACTION: Review the information in this Service Bulletin to facilitate the identification, repair, servicing, installation, and calibration of the lining mask linear actuator.

CONTACT: If you have any questions or if we can be of any service, please contact Mickey VanBergen at the Ludington, MI. facility, (231) 843-3431.

SAFETY INFORMATION

- **FOLLOW APPLICABLE RAILROAD LOCKOUT - TAGOUT PROCEDURE TO REMOVE ALL ENERGY SOURCES FROM MACHINE. FAILURE TO COMPLY COULD RESULT IN SEVERE BODILY INJURY.**

REPORTED PROBLEM DESCRIPTIONS

Several problems have been reported regarding the lining mask linear actuators. Reported problems include; excessive hunting, calibration drift, internal contamination, premature failure of the outer tube, binding of the extension tube ball-screw assembly, and Lining Mask Actuator Calibration Problems.

PROBLEM CORRECTIONS**1. EXCESSIVE HUNTING** - See Figure 1

Verify that the actuator voltage rating is compatible with the design specification. HTT units are intended for operation on a 24 volts DC control circuit. Units rated for less than 24 volts will spin faster than intended, take longer to stop spinning when power is removed, and result in the mask "overshooting" the correct position. It then has to reverse direction to obtain the desired position, only to overshoot again. This overshoot and reverse cycling, called "hunting", causes premature gear and ball assembly wear, electric motor temperature rise, premature motor brush / armature wear, and potential motor burnout.

To check the actuator motor voltage rating, find the manufacturer's model code, located on the end cover (housing the feedback gears and potentiometer). On one side should be listed a 16 digit code, in groups of four, separated by spaces or dashes. The leading or 1st four digits designate the model and voltage rating, and should read "DP24" as shown in Figure 1.

Units that do not match the "DP24" model / voltage rating should be removed from service immediately.

Please note that the end covers are interchangeable, and all efforts should be made to keep the original cover with the original housing, to prevent inadvertent confusion about motor voltage ratings.

FIGURE 1



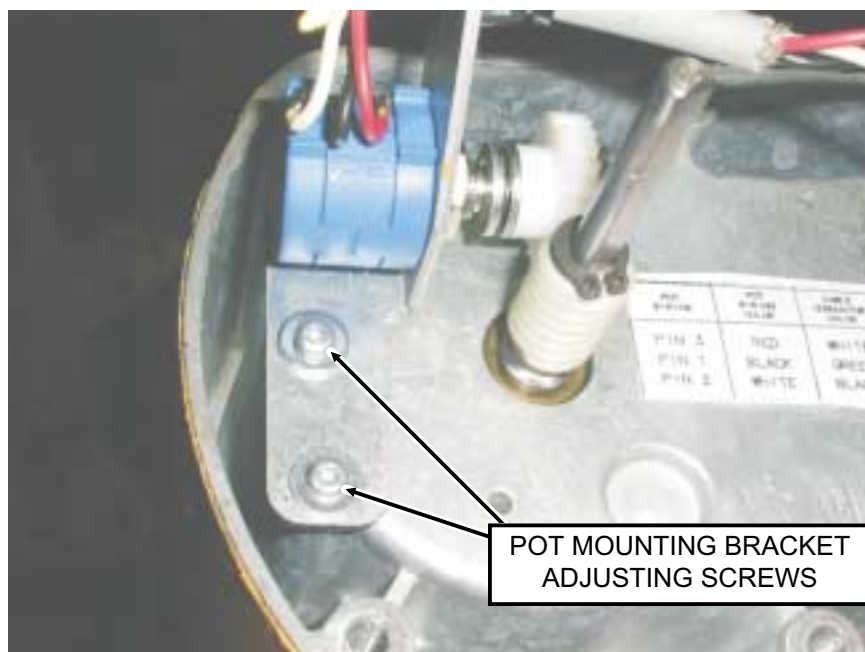
2. CALIBRATION DRIFT - See Figure 2, Figure 3 and Figure 4

The actuator calibration is dependent on proper feedback from the actuator position feedback potentiometer. This "pot" incorporates a drive pinion gear that meshes with a worm gear attached to the end of the ball screw. The drive pinion gear seated on the "pot" is a slip-clutch design to prevent potentiometer damage in the event that the gear is rotated beyond the limits of the pot stroke.

FIGURE 2



FIGURE 3

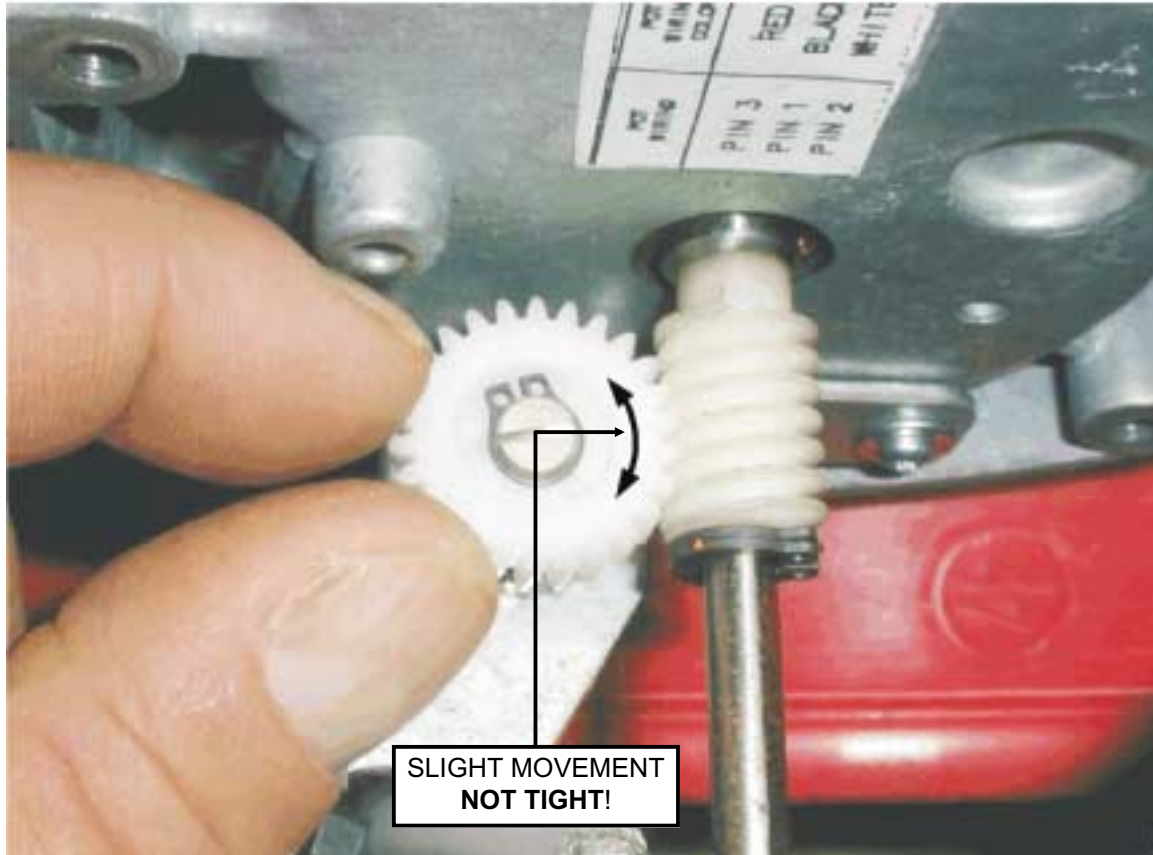


2. CALIBRATION DRIFT - See Figure 2, Figure 3 and Figure 4

There have been instances where the clutch mechanism has exhibited slip (and subsequent loss of calibration) when in side-loaded conditions. This can be caused when the mounting bracket has been adjusted to remove all backlash, and then tightening the mounting screws forces the gear even closer, so that there is excessive side load on the gear. The side load can bind the pot shaft enough to exceed the clutch slip force, so the pot gear turns, but not the shaft. This throws off the actuator calibration.

HTT recommends that the pot mounting bracket be adjusted so that the pot gear has a very minimal amount of backlash, with no axial force generated on the pot shaft. You should be able to rotate the pot gear a very slight amount when rocking it by hand while it is meshed with the worm gear. This will prevent side loading of the shaft, which can cause the pinion gear to turn on the pot shaft during normal operation, and affect the calibration of the lining mask actuator. To adjust, loosen the two mounting screws holding the pot bracket, and position the pot gear on the worm gear so there is slight backlash (making sure the pot gear is also centered over the worm gear). Then, carefully tighten the screws, and re-check for the slight amount of backlash when completed.

FIGURE 4



3. INTERNAL CONTAMINATION - See Figure 5

Some Linear Actuators returned to HTT for service have exhibited signs of contamination due to moisture ingress, resulting in rust buildup and grease contamination. One common thing noticed on the units returned that show the moisture contamination is that the factory-installed grommet, located on the base of the center section of the motor end, had not been removed, allowing condensation and gasket failures to permit moisture buildup internally. HTT supplies the linear actuator with this grommet removed, so as to allow the drainage and evaporation of any moisture entering the housing. Lining Actuators in the field that have this grommet installed should have them removed.

FIGURE 5



4. ACTUATOR COVER TUBE FAILURES - See Figure 6 and Figure 7

In June of 2001, HTT Engineering implemented a change in the purchase specification for the Lining Mask Actuators. This was done to correct problems reported where the cover tubes were bending, cracking, and/or breaking at the mounting flange. (Bending has been attributed to extreme side force, such as mask follower derailment). The new specification calls for a thicker wall material to be used, making the flange area structurally more robust. The new thicker-wall cover tube (HTT Part # 2004471) is not directly compatible with older units (rod seal diameter is different than older units), and both the screw assembly and the cover tube must be replaced at the same time when rebuilding. See the Service Parts List included in this Service Bulletin for the "Kit Option" part number to use when rebuilding older lining mask actuators.

Cover Tubes may be inspected and replaced by removing the 4 flange mounting plate bolts, and then sliding the tube off the extension rod assembly. Inspect the flanges for cracks at the bend on the inside corner of the flange, and also for signs of bending or distortion of the flange itself. Replace any cover tube showing any signs of damage. When re-installing the cover tube, make sure the gasket is in place and properly seated under the flange mounting plate.

FIGURE 6

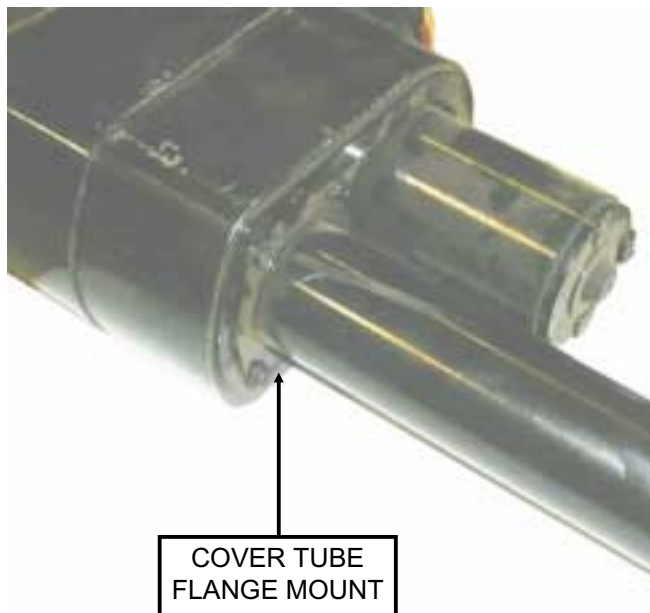


FIGURE 7



4. ACTUATOR COVER TUBE FAILURES - See Figure 8 and Figure 9

Note: All actuators of HTT origin distributed with the thick-wall cover tube after June 2001 can be identified by the presence of the letters "12PJ" in the 3rd group code stamped on the actuator cover as shown in Figure 8.

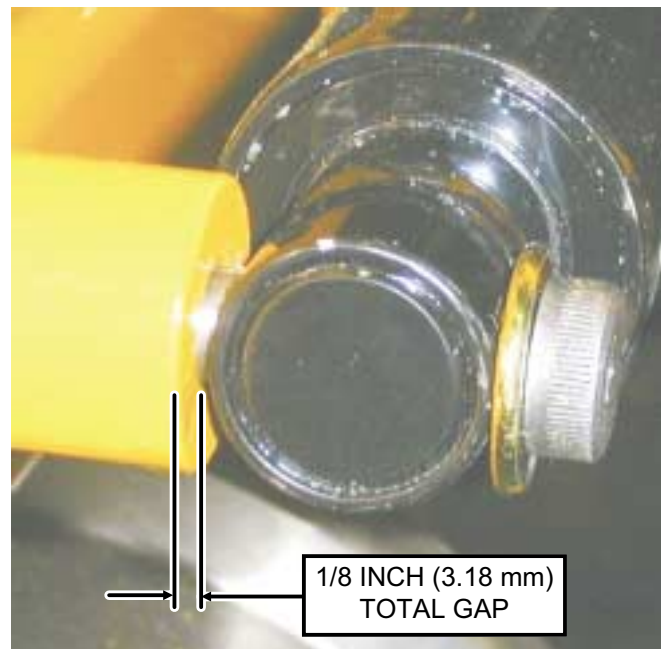
Also noted during investigation of tube failures was the potential for binding the extension rod when mounting the units to the mask assembly. The original design called for a flat washer to be used on both sides of the extension rod when installing the shoulder bolt that holds the rod to the mask assembly. This can, in some instances, captivate the extension rod, causing binding that can help contribute to tube failures. Current design specifies only one washer to be used. This allows some free play (float) in the lateral direction, and keeps the end of the extension rod from being "clamped" in position during extend/retract cycles.

With the washer installed on the bolt head side, the actuator rod should be centered on the shoulder bolt diameter, and free to move about 1/16 inch (1.59 mm) in either direction, and not pressed to one side in either direction. If the actuator is pressing against the flat washer installed toward the head of the shoulder bolt, and cannot freely move toward the mounting post, remove the shoulder bolt, install the flat washer on the post side of the rod, then re-install the shoulder bolt using Loctite 242 (Blue). Check the alignment of the rod on the shoulder bolt diameter, making sure it has freedom to move the 1/16 inch (1.59 mm) in each direction, for a total movement amount of 1/8 inch (3.18 mm).

FIGURE 8



FIGURE 9

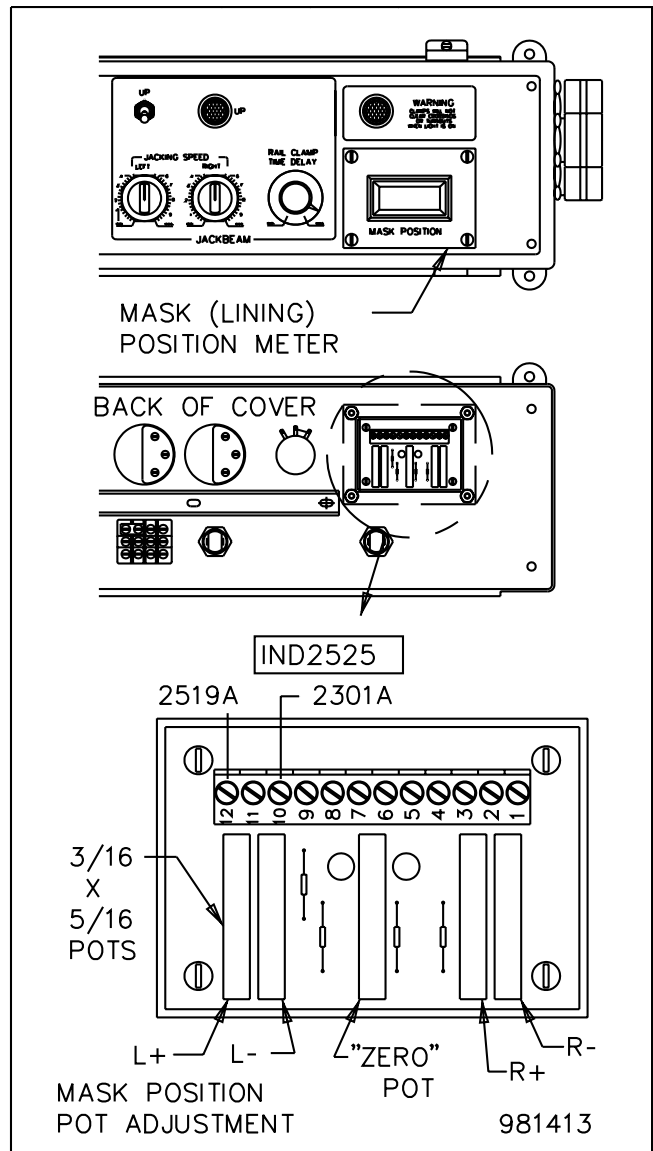


5. LINING MASK ACTUATOR CALIBRATION - See Figure 10

Full calibration details of setting lining unity and calibration can be found in Section 6 of the Operator's Manual. A brief description of setting the actuator calibration is included here only for reference. **Please ensure that the machine is set up per the procedures outlined in the Operator's Manual prior to attempting Lining Mask Actuator and Lining Mask Position Meter calibration!**

- 5.1 Disconnect rod end of actuator from mask assembly.
- 5.2 Run actuator to full extension, then allow rod to rotate for approximately 10 seconds to set pot gearing and pot stroke correctly. (This sets the pot at full travel position with full screw extension, and sets the total pot adjustment range to be within total actuator screw stroke).
- 5.3 Re-connect rod end to mask assembly, then retract rod fully. **Do not let the rod rotate during retraction by not mounting it up first!** (This would change the pot setting from the full-extension value just set, and make calibration very difficult, if not impossible, without repeating the entire procedure).
- 5.4 Using mask position switch, position mask at 8.00 inches from "Unity" mark established during Lining Unity Calibration (See Section 6.5.4 of the Operator's Manual). Accurately measure (to the nearest tenth of an inch) the position using a tape measure or scale.

FIGURE 10



- 5.5 Calibrate the Lining Mask Position Meter by measuring the actuator feedback with a voltmeter, reading between terminals 10 and 12 (wires #'s 2301A and 2519A), located on the back of the lining mask position meter. Adjust the "Zero" pot to read the same as the feedback voltage to the nearest tenth of a volt.
- 5.6 Retract mask 1.5 inches from the Unity mark, by accurately measuring (nearest tenth) the distance from the "Unity" mark with a tape measure or scale.

5. LINING MASK ACTUATOR CALIBRATION - See Figure 10

- 5.7 Adjust the "R-" or "L-" pot (depending on which lining actuator calibration you are doing - Right side or Left side) so that the meter reading corresponds to the 1.5 inch retracted travel position (A 1.5" retracted position should read "-15" on the meter - meaning "fifteen tenths of an inch (1.5 inches) less than Unity" (toward gauge).
- 5.8 Extend mask 9.5 in. from the Unity mark, by accurate measurement (to the nearest tenth).
- 5.9 Adjust the "R+" or "L+" pot (depending on which side is being calibrated) so that meter readout corresponds to the actual measured travel position (A 9.5" extended measurement should read "95" on the meter - meaning "ninety-five tenths of an inch (9.5 inches) greater than Unity" (toward field).
- 5.10 Because the adjustment of one pot affects the calibration of the other (you are changing the voltage setting at each end of the stroke of the actuator feedback pot), the process of extending and retracting the mask, and adjusting the pots so the meter reflects the actual position, must be repeated until both positions read correctly with no further pot adjustments (9.5" = 95 on Mask Pos. Meter, and -1.5" = -15 on Mask Pos. Meter).
- 5.11 Repeat the calibration procedure for the other side, if necessary.

SERVICE GROUP PARTS LIST

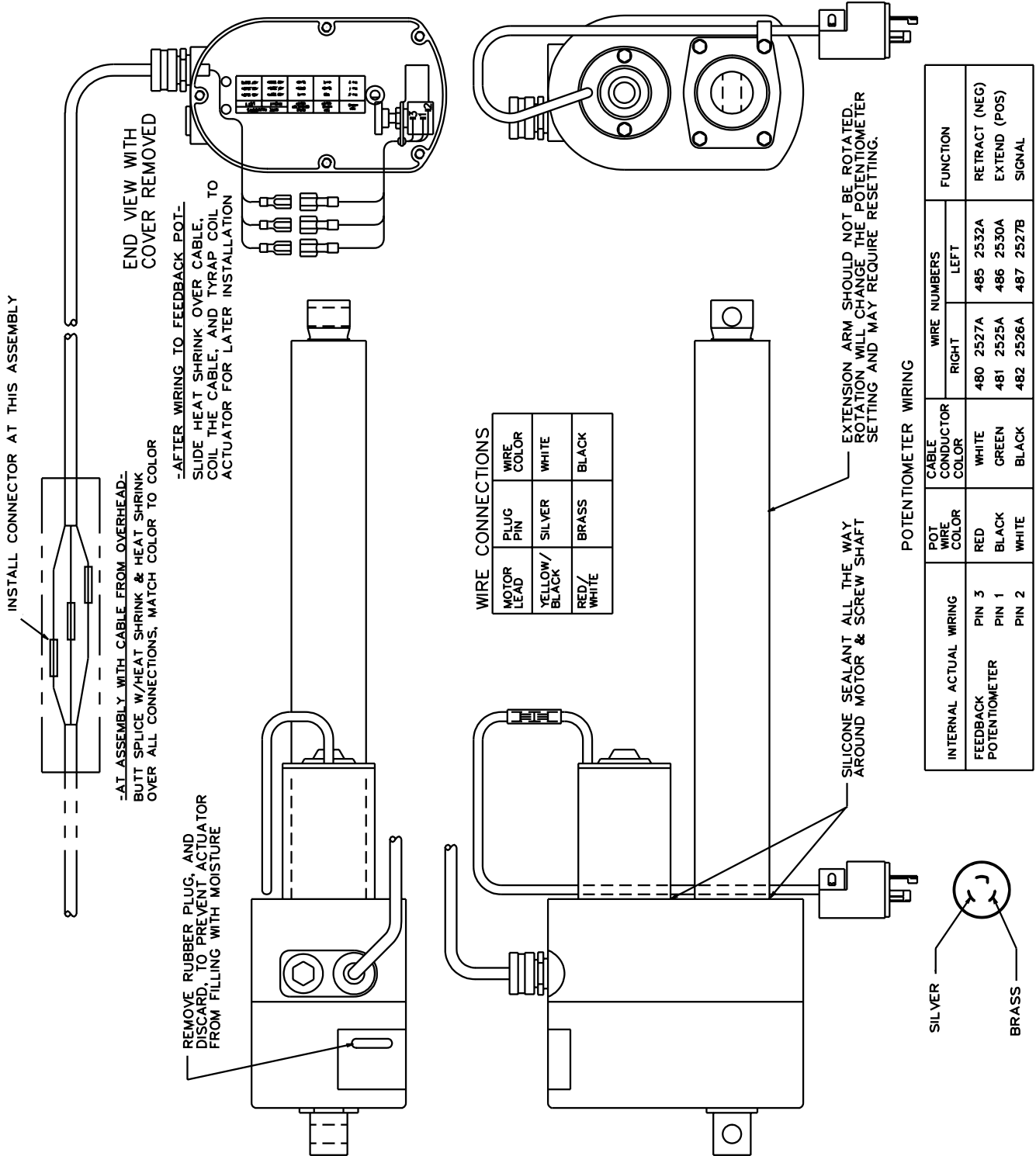
The following Service Parts are available for Lining Mask Linear Actuator Repairs:

PART NO	DESCRIPTION	QTY
171648-1	REAR HOUSING	1
171648-2	MOTOR	1
171648-3	CLUTCH ASSEMBLY	1
171648-5	INTERNAL HOUSING ASSEMBLY	1
171648-6	GEAR ASSEMBLY	1
171894-1	POTENTIOMETER ASSEMBLY	1
2004471	COVER TUBE ASSEMBLY (HEAVY WALL).	1
2004472	SCREW ASSEMBLY (FOR HEAVY WALL COVER TUBE) . . .	1
2004473	COVER TUBE AND SCREW ASSEMBLY KIT (Updates actuator design to thicker wall cover tube) Includes (1) # 2004471 COVER TUBE, and (1) # 2004472 SCREW ASSEMBLY	1

Installation Notes

Refer to Figure 11 for wiring and connection information.

FIGURE 11
ACTUATOR WIRING AND CONNECTION INFORMATION



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