



ELECTRIC ACTUATOR INSTRUCTION & OPERATION MANUAL

1. General

All actuators manufactured by ABZ VALVE are thoroughly tested and checked before shipment to our customers. If an immediate installation is not possible, the actuator should be kept in a dry place. Please do not remove the plugs from the conduit entries until ready for wiring.

2. Operation

2.1 Auto/Manual Operation Auto/Manual

shift operation is as follows:

1) Manual Override

Turn the hand/auto declutching lever to engage (Handwheel may have to be turned slightly) clutch, turn the handwheel to either "Opened" or "Closed".

2) Auto Operation by Motor

After completion of wiring, motor operation is automatically and instantly restored by electrically energizing the motor.

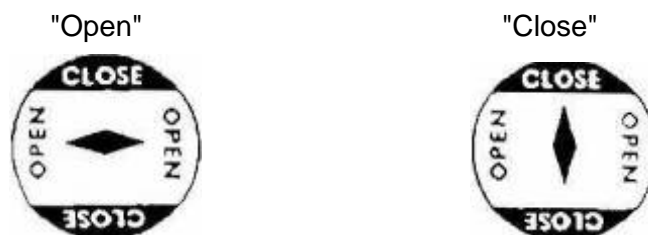
CAUTION READ BEFORE OPERATION

When the actuator is operated for the first time it is important to check the correct rotation of the motor. Otherwise serious damage may result.

- 1) Put the position of the valve at 45 degrees by turning the handwheel, energize the actuator to open or close and check for proper valve rotation.
- 2) If the rotating direction is reversed, stop immediately and recheck the wiring.

2.2 Indication of Valve Position

The indicator on the top of the actuator shows the valve to be "Opened" or "Closed"



3. Electrical Wiring

3.1 Removing Top Cover

Use a hex-key wrench to remove the 4 screws at the corners of the top cover. Then remove the top cover from the body and look for the wiring diagram in vinyl envelope

3.2 Wiring

Make power and control connections to the terminal strip in accordance with the wiring diagram. Be sure to connect the two ground lugs (internal one marked by sticker, outer is between two mechanical stop bolts). Be sure that the voltage of power supply is in accordance with specification on the name plate,

3.2 Sealing Conduit entries (3/4" NPT)

All conduit entries must be sealed even if not used.

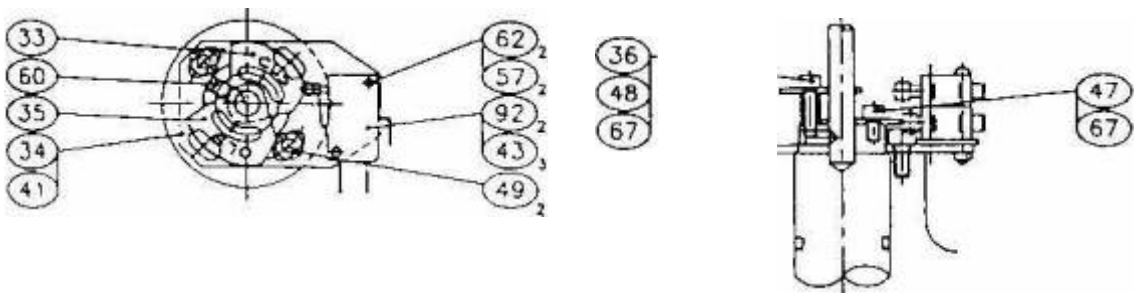
4. Travel Limit Switch Setting

4.1 Closed Limit Switch Setting

- 1) Pull the declutch lever and move the valve to the full "Closed" position by turning the handwheel clockwise.
- 2) Using a hex-key wrench, loosen the screw on the lower cam (Close Limit Switch).
- 3) Adjust the cam to trip the lower limit switch, and tighten the screw.

4.2 Open Limit Switch Setting

- 1) Pull the declutch lever and move the valve to the full "Opened" position by turning the handwheel counter-clockwise.
- 2) Using a hex-key wrench, loosen the screw on the upper cam (Open Limit Switch).
- 3) Adjust the cam to trip the upper limit switch, and tighten the screw.



**33 is the lower Cam for Closed Limit Switch • *35 is the upper Cam for Open Limit Switch*

4.3 Mechanical Travel Stops

- 1) For both ends of the travel limit, set the mechanical stop bolts one turn
- 2) If the stop bolts make contact before the Open/Close Switch trips rotate the stop bolts 2 turns counter clockwise

4.4 Switch Operation Test

After Open/Close limit switch setting and mechanical stop bolt checking, operate the valve to Open-Close, Close - Open several times with the switch in control panel in order to check Open/Close indication lamp.

5 Torque Switch

Generally speaking, it is not necessary to reset the torque switches because they are factory set to the rated torque of the actuator, If necessary to reset. However, please contact ABZ VALVE.

WARNING: The torque switches are set with special measuring devices to protect the actuator and valve. If the torque switches are reset without consulting ABZ VALVE, or authorized service centers. the warranty may be voided.

6. Adaption

6.1 Preparation of Drive Bushing

A drive bushing is supplied with the actuator, and it is assembled on the bottom of the center column with 4 retaining screws.

1) Removing Drive Bushing

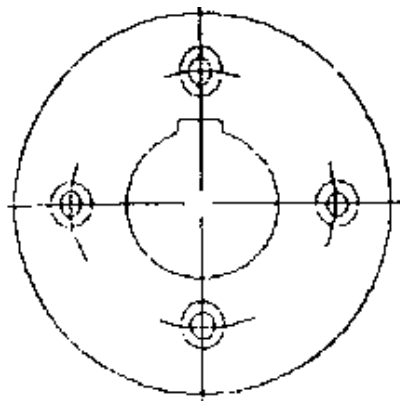
Using socket hex-key wrench, remove the drive bushing from actuator.

2) Machining of Drive Bushing

When matching the bore and keyway, the direction of keyway should be aligned with one of 4 screws holes of the drive bushing.

3) Reassembling the Drive Bushing

- Check that the actuator and valve are in the same relative position (Open or Closed) If not, rotate the actuator to the same position of valve.
- Line up the keyway in the drive bushing with the keyway on the valve shaft or coupler.
- *The actuator can mount in one of four quadrants which are determined by the position of the drive bushing in the actuator.
- Insert the drive bushing to center column and attach it with the 4 retaining screws.



7. Trouble Shooting

7.1 Mechanical Trouble

- 1) Move the valve using the handwheel after pulling the declutch lever,
- 2) Check the movement of mechanical position indicator.
- 3) If the handwheel does not move the valve is stuck. Valve needs to be disassembled and repaired.
- 4) If the handwheel moves well without any interruption, check the adaptor joining the actuator and the valve.
- 5) If the valve moves by the handwheel, check the electrical function.

7.2 Electrical Trouble

Check the function of control panel first and then actuator later.

- 1) Check the main power supply, relays, fuses, all lamps and switches.
- 2) If there is a problem in the control panel as listed above, replace the defective parts. If there is no electrical problem then check the actuator.
- 3) Check the installed motor and replace it, if necessary.
- 4) In case of the torque switch tripping, turn the main power off and follow the same procedure as mechanical troubleshooting. (Torque switch's trip suggests the actuator is working without any electrical trouble.)
- 5) If a faulty limit switch is found by electric circuit check, adjust or replace.
- 6) All other electrical problems can be solved by replacing the defective parts.

8. Maintenance

ABZ VALVE actuators are designed and manufactured for long life under normal operating conditions, however, it is recommended to make an operational check twice yearly.

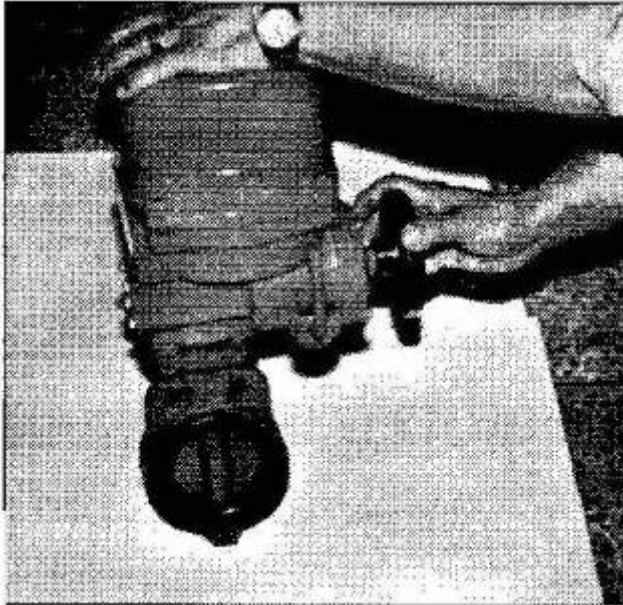
9. Warranty & Technical Assistance

ABZ VALVE INC. warrants its products to be 100% free of defects in workmanship and materials for one (1) year from the date of shipment. Technical assistance is available from ABZ VALVE and its authorized service centers.

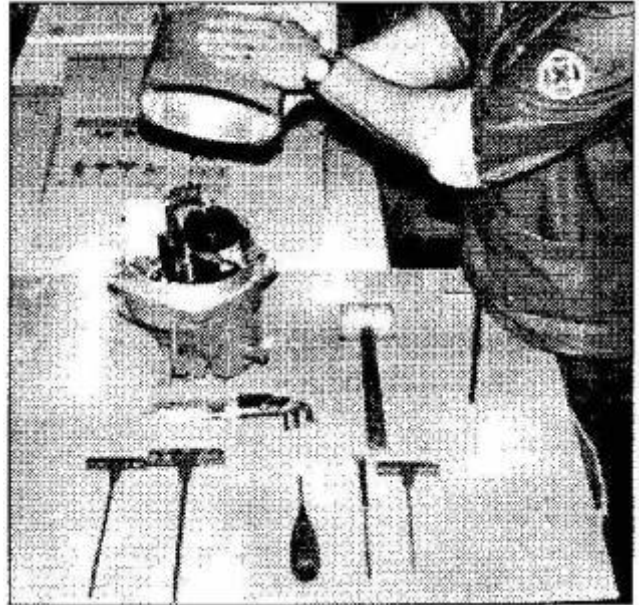
Dismantling Procedure for Replacement

Before dismantling the actuator, disconnect incoming power supply to actuator.

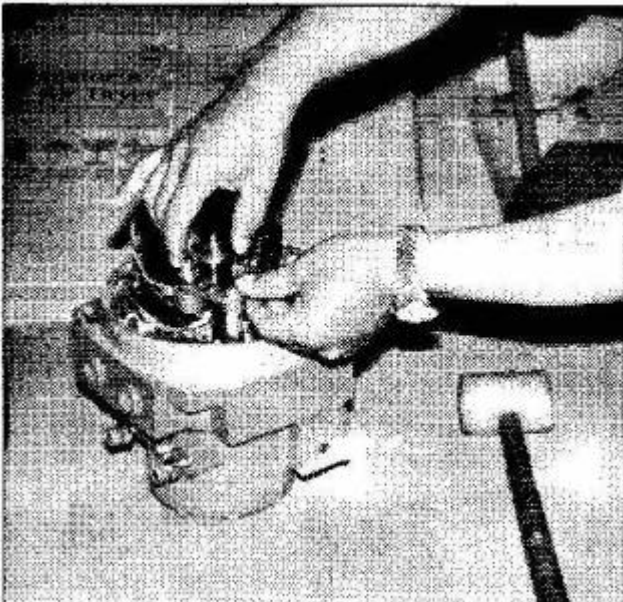
3)



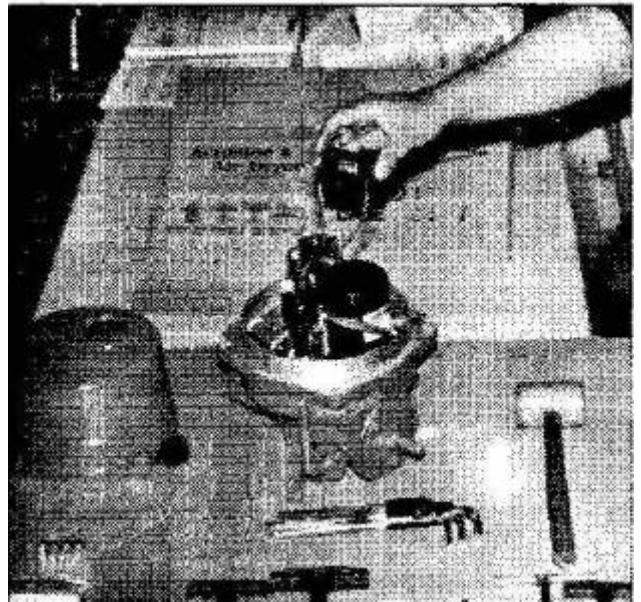
1) Put the valve closed position by turning the handwheel and remove the stud nuts below actuator. Lift actuator and separate it from valve.



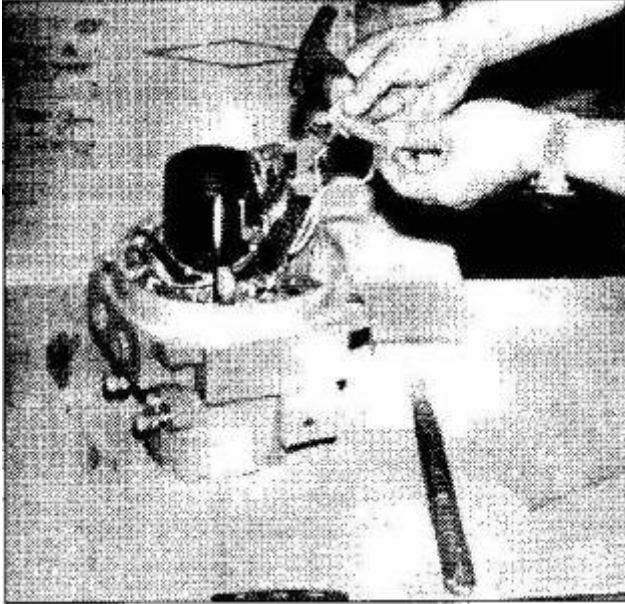
2) Remove the 4 retaining screws on the corner of top cover and pull off top cover squarely with both hands.



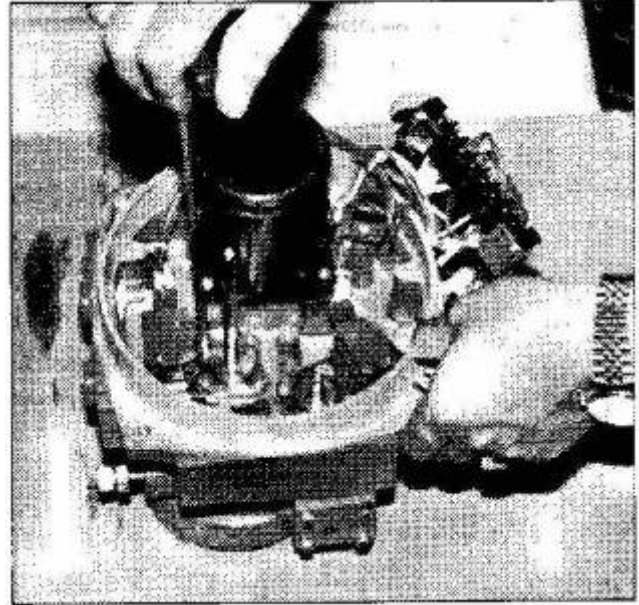
3) If the optional Potentiometer was fitted, remove the retaining screws and take off.



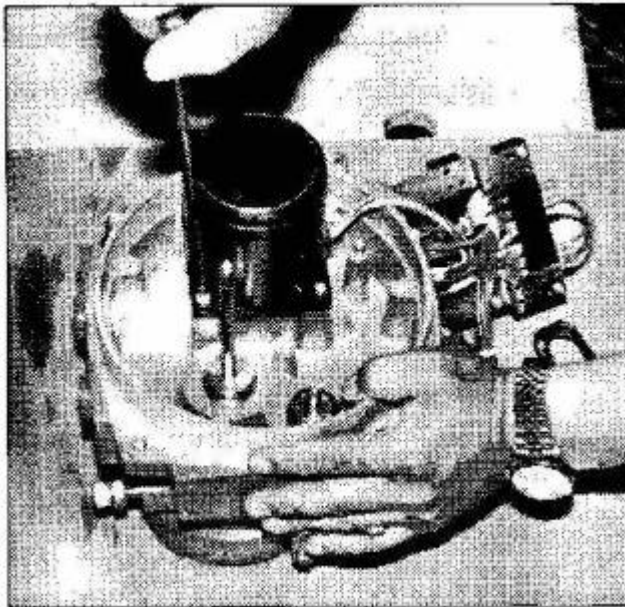
4) Condenser for single phase motor was fitted, remove the retaining screw and take it off.



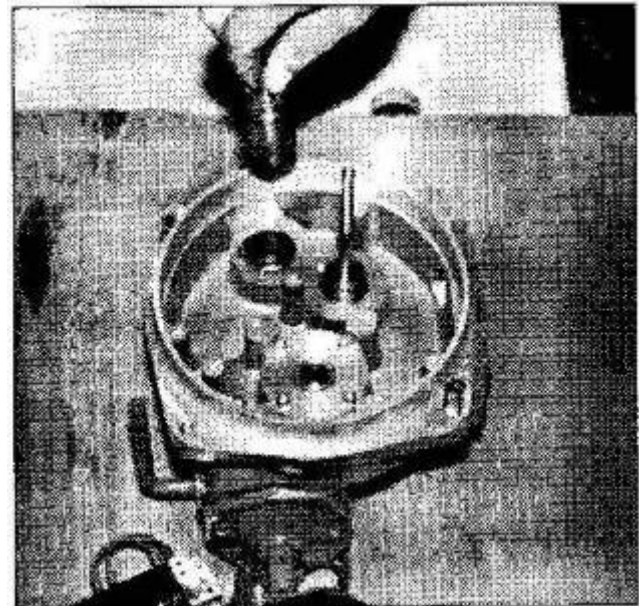
5) Remove the retaining screws and take off the terminal block and space heater.



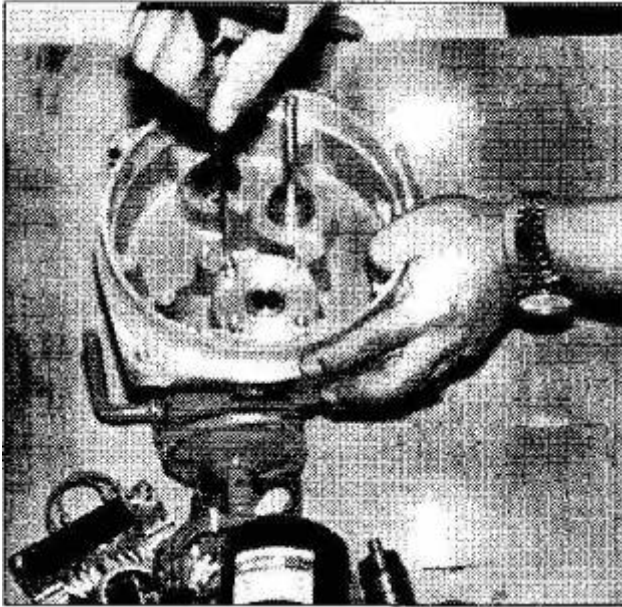
6) Remove retaining screws (M4x4, M5x4) and take off the limit and torque switch assembly.



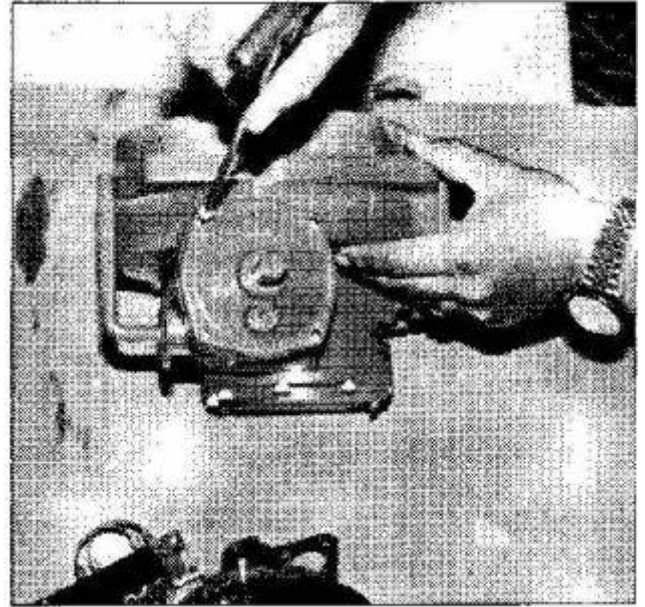
7) Remove the retaining screw and take off the motor.



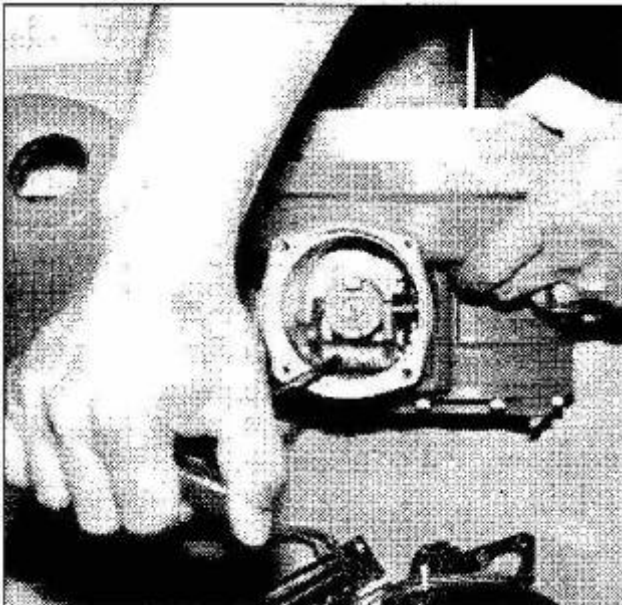
8) Remove the torque shaft.



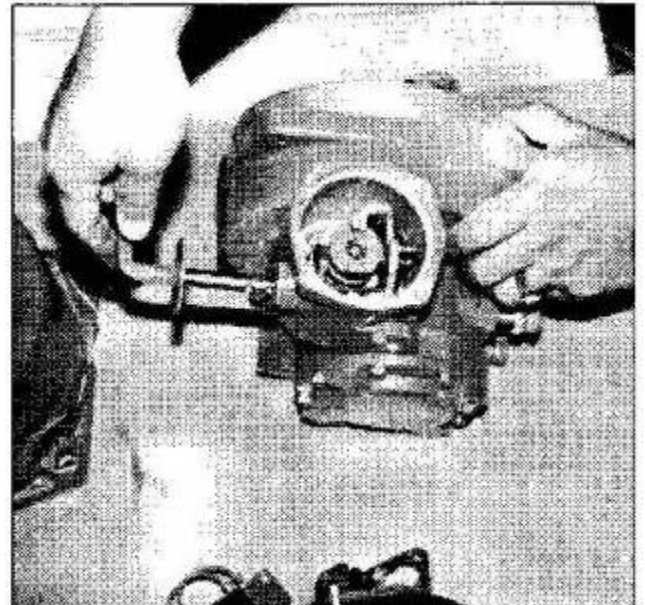
9) Remove the retaining screws and take off disk cover for 1st shaft.



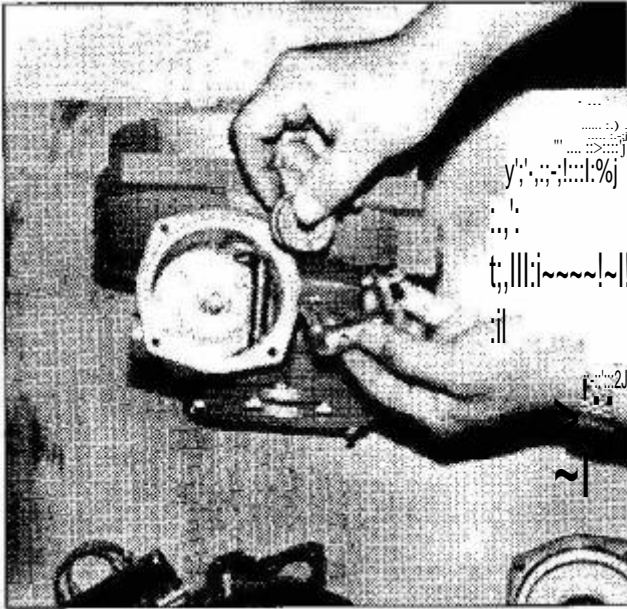
10) Remove retaining screws and take off handle cover assembly.



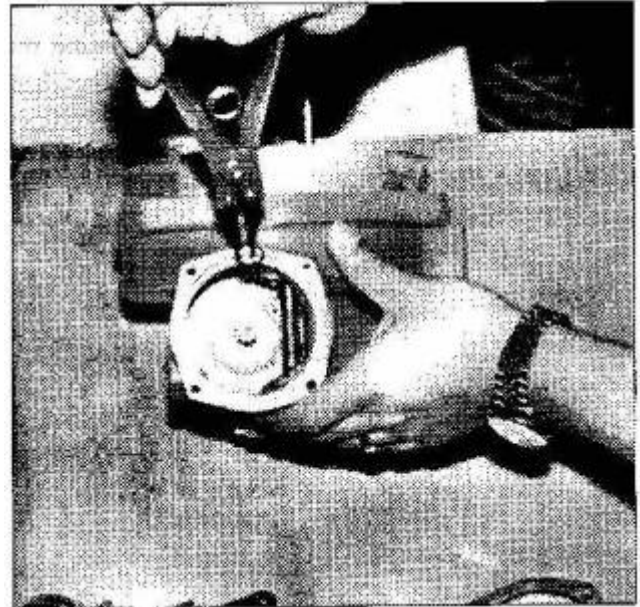
11) To take off the declutching lever, clutch A and auto / hand yoke, loose the retaining screw.



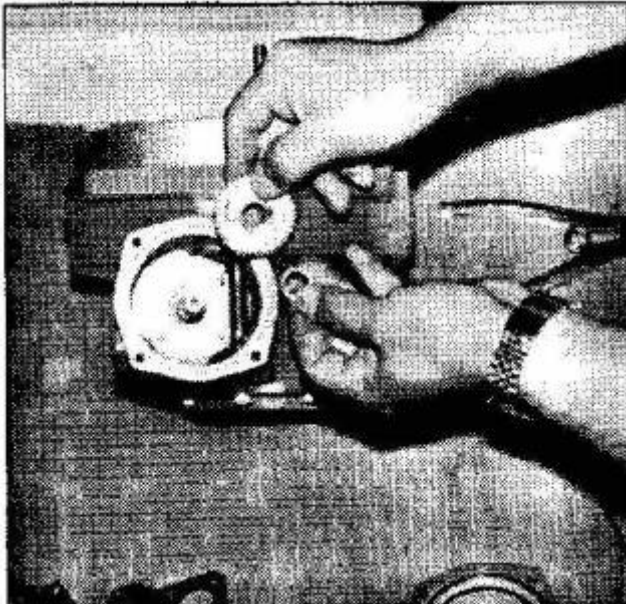
12) Remove the lever.



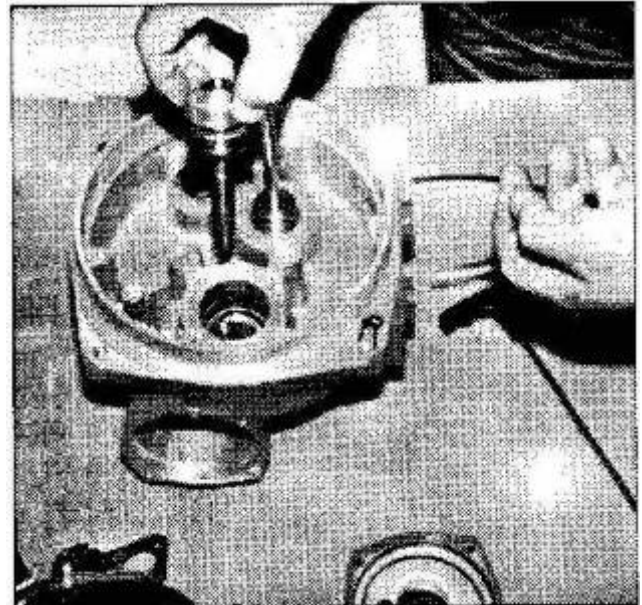
13) Remove clutch A and auto /hand yoke.



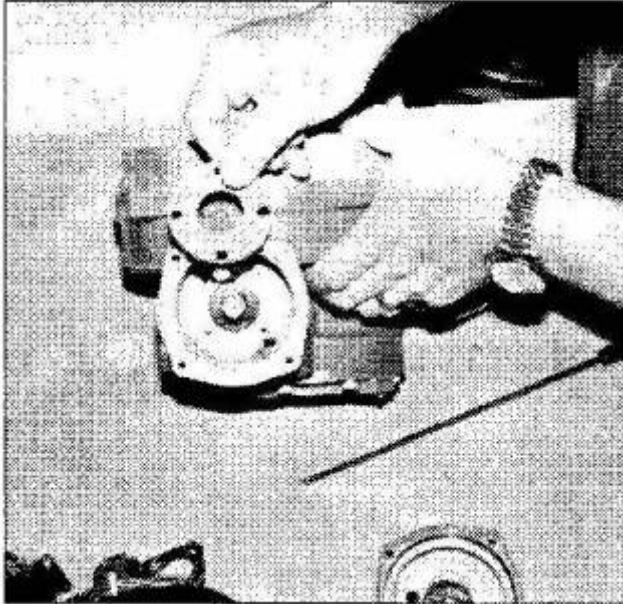
14) Remove the snap ring. 4)



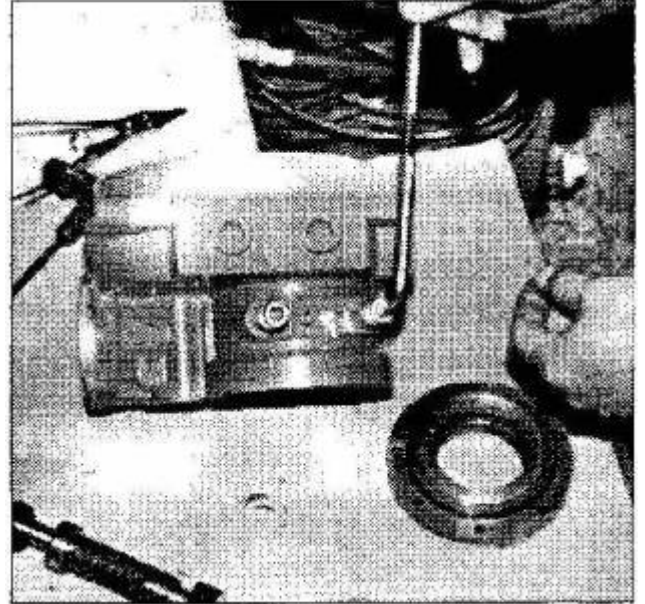
15) Take off the 1st worm wheel.



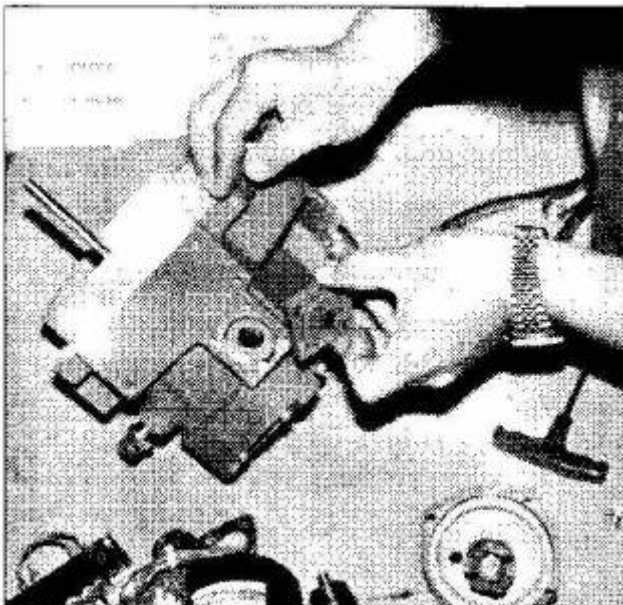
16) Pull off the 1st worm gear together with bearing.



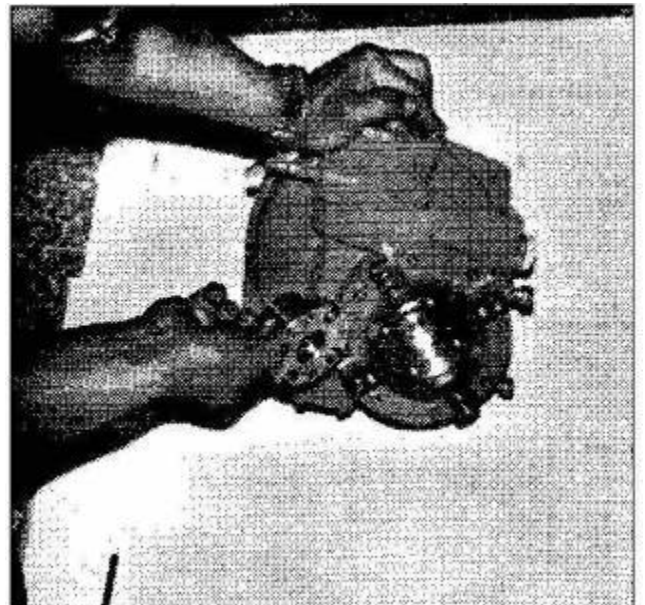
17) Remove the retaining screws of thrust cover and take off the thrust cover.



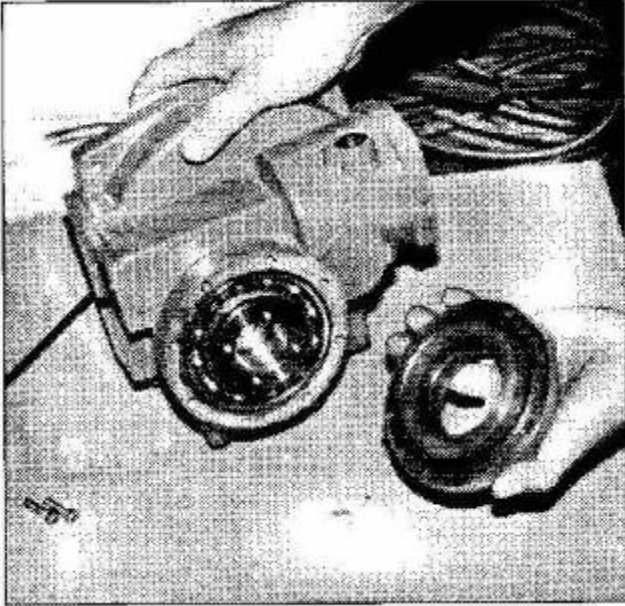
18) Remove the mechanical stop (stopper for opening and closing direction).



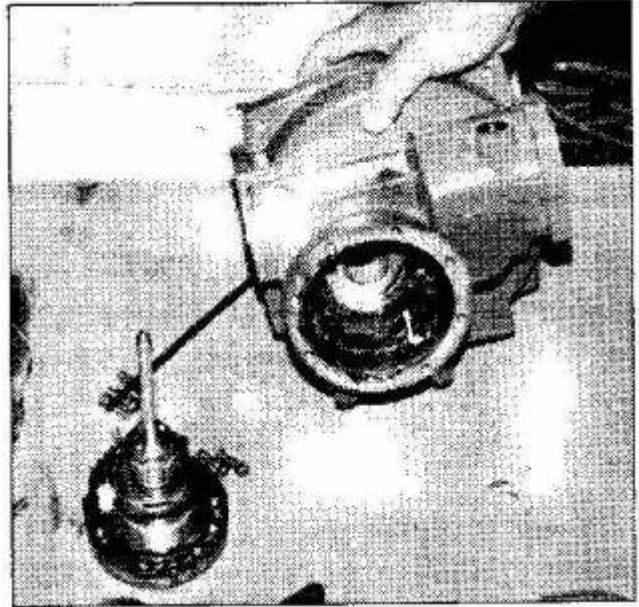
19) Remove the retaining screws of end cover and take off the end cover.



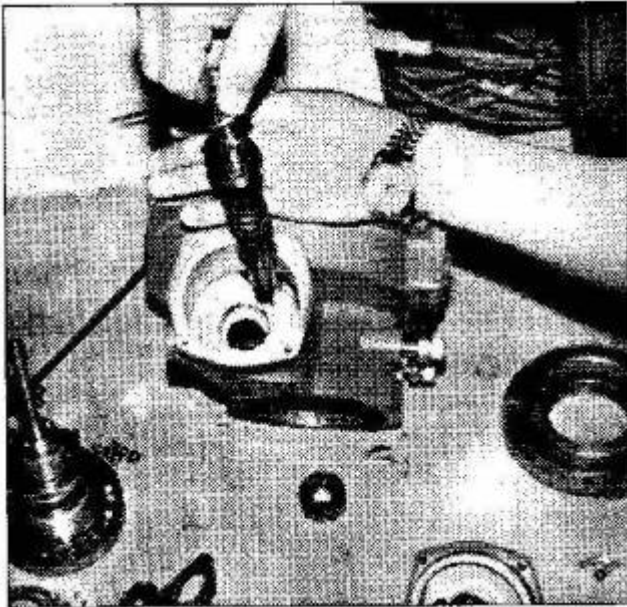
20) Remove the retaining screws of drive bushing and take off the drive bush.



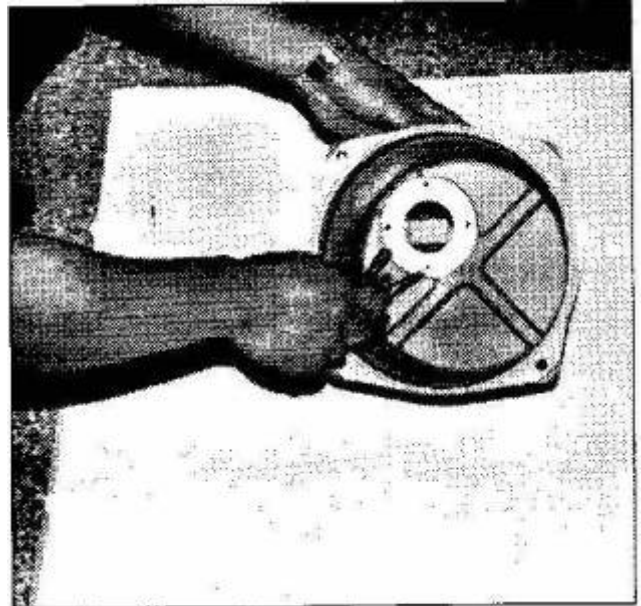
21) Remove the retaining screws of base and take off the base assembly.



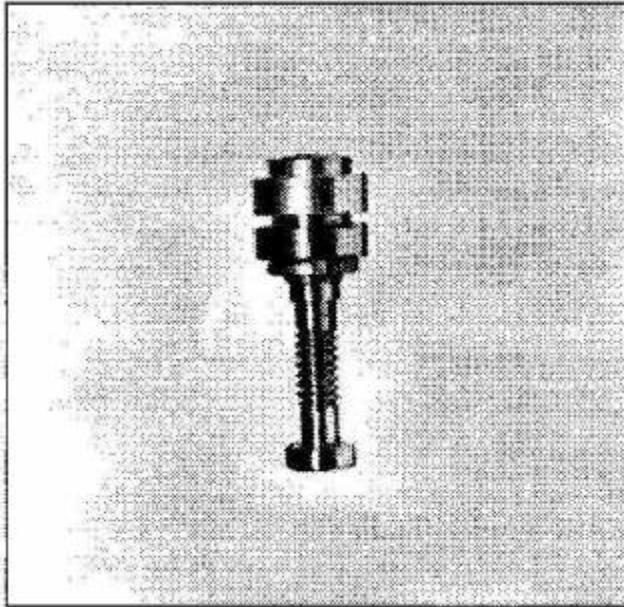
22) Push the center column from top side and take off center column assembly.



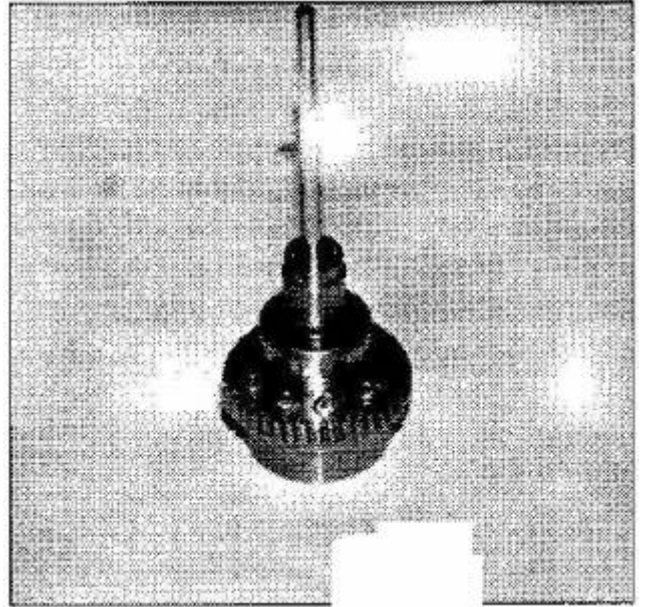
23) Pull off the 2nd worm assembly with disc spring and bearing.



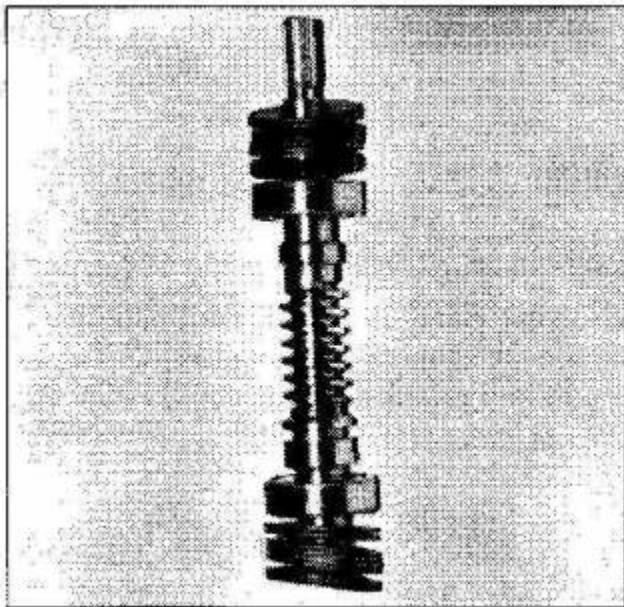
24) Remove the retaining screws and take off the window cover assembly.



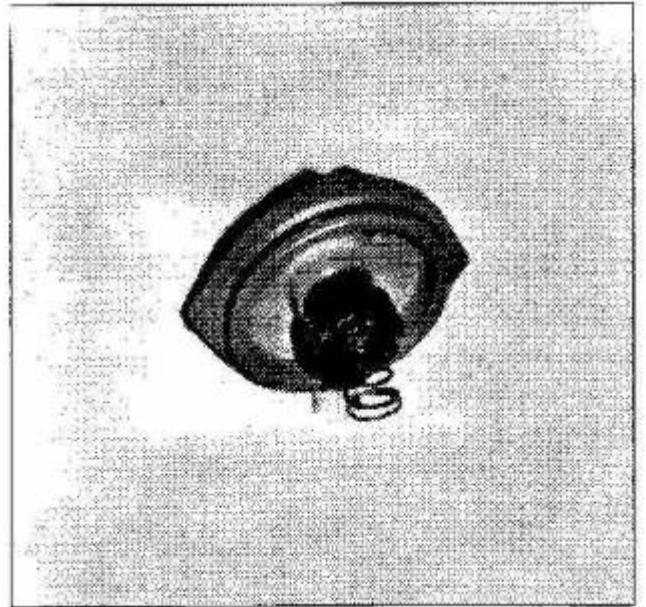
1st Shaft Assembly



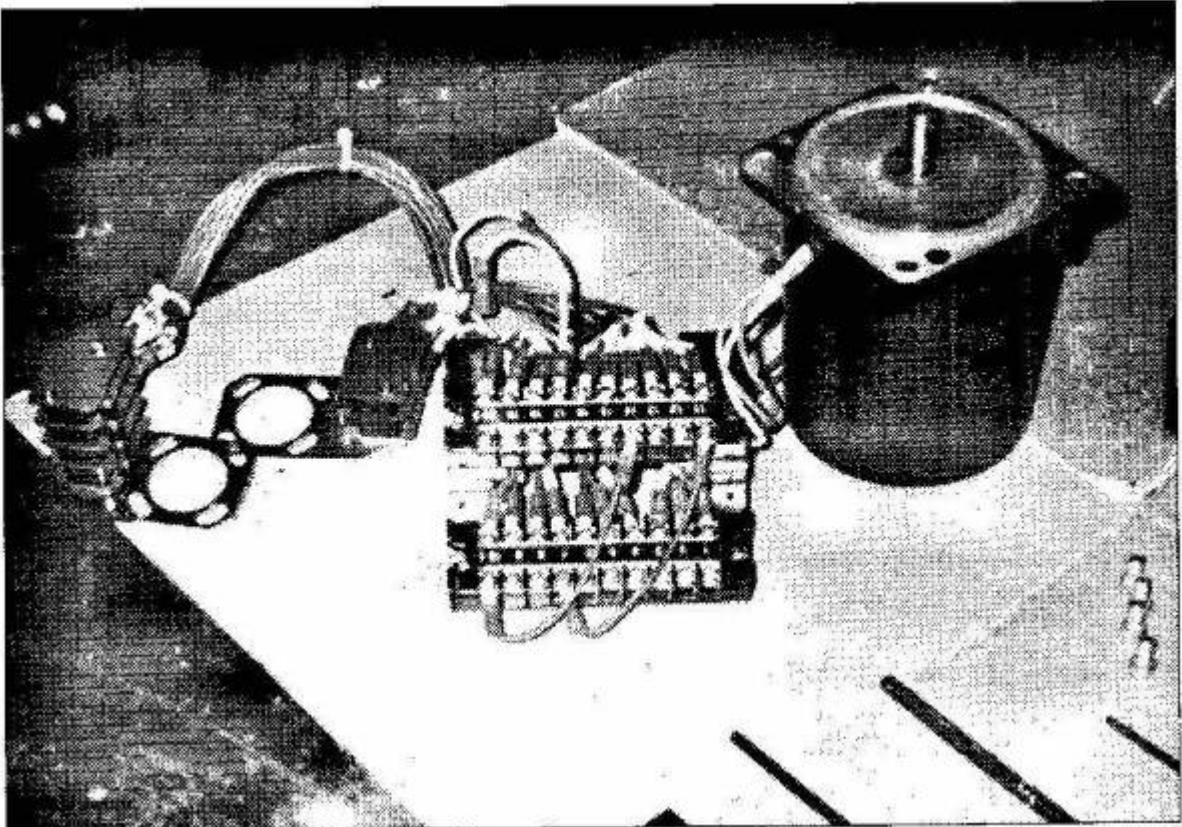
Center Column Assembly



2nd Shaft Assembly



Handle Cover Assembly

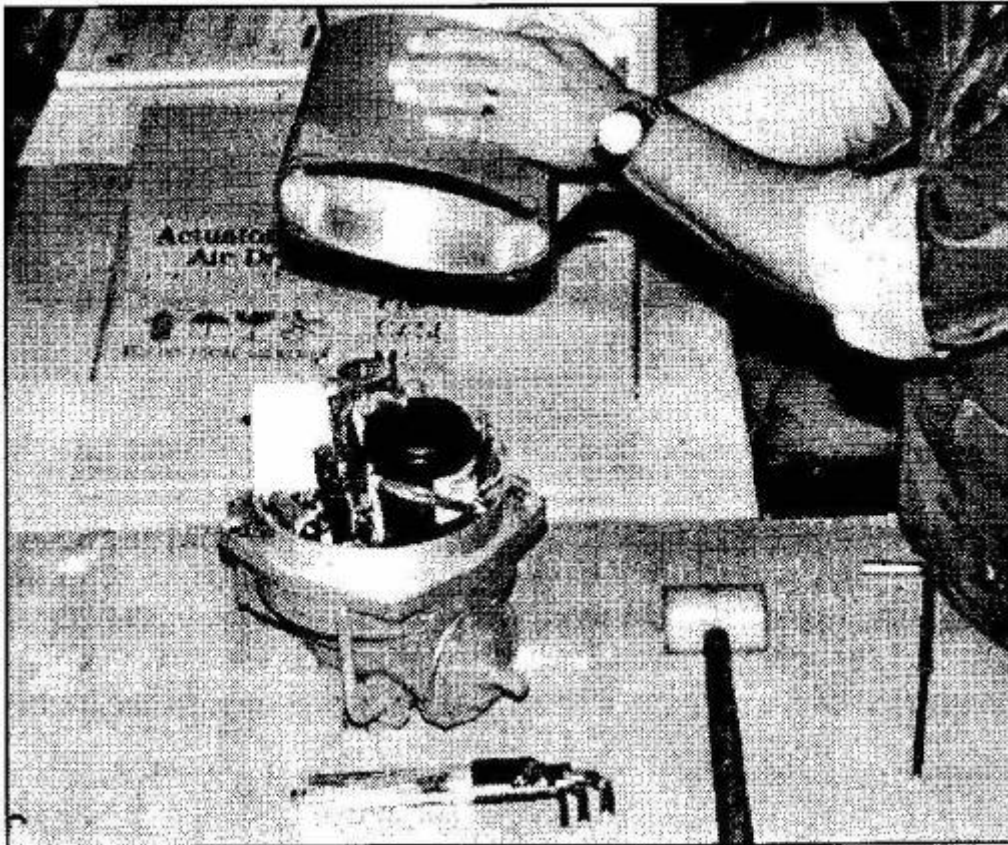


Electrical Module (Motor, Terminal, with Limit Switches)

Electrical Wiring

Wiring

- 1) Removing Top Cover
Using Allen wrench, remove 4 screws at the corners of the top cover. Then remove the top cover from the body and look for wiring diagram in vinyl envelope.
- 2) Wiring
Make power and control connections to the terminal strip in accordance with the wiring diagram. Be sure that the power supply voltage is in accordance with voltage indicated on the name plate.
- 3) Sealing Conduit Connections (3/4" NPT)
Conduit connections must be sealed whether or not they are used.





Construction

- 1) Sealing
The standard enclosure with a-ring seals is watertight conforming to IP67 NEMA 4 & 6.
The actuator is available with optional explosion proof enclosure.
- 2) Manual Override
Manual declutch lever for handwheel engagement.
The power drive is automatically restored by starting the motor.
- 3) Self - locking
The roller steel worm and aluminum bronze worm gear provides self-locking feature to maintain valve position and prevent valve back driving on loss of control signal or power failure.
- 4) Motor
Squirrel cage motor is totally enclosed type with high stall torque and low inertia to facilitate seating / unseating of the valve. Integral thermal protection prevents damage to the motor.
- 5) Limit Switch
The limit switches are activated by means of a simple, reliable cam mechanism mounted and driven by the center column. The valve position can be accurately and easily set with the simple adjustable switch mechanism. The set position is permanent and is not affected by manual operation.
- 6) Torque Switch
Torque switches activated by cams are adjustable to provide mechanical over-load protection. Refer to paragraph 3.3.
- 7) Heater
The space heater inside the actuator prevents condensation due to temperature and weather changes. Standard 20W Heater keeps all electrical components in the actuator clean and dry.
- 8) Indicator
The indicator is directly mounted on the center column to provide a clear visual indication of the valve position.
- 9) Adaption
The drive bushing is removable for machining to valve stem requirements.
Four bolt holes in the drive bushing allow actuator to be rotated 90° increments on valve shaft.
- 10) Wiring
Electric wiring of control unit is standardized for single and three phase power supply in a single module. Additional dry terminals are provided for requirements such as auxiliary contacts for DCS, interlocking and other options.
- 11) Component Arrangement
Mechanical and Electrical Modules are easily isolated to improve assembling, maintenance, and electrical modifications. Actuator has adequate internal space for optional accessories.

Operation

Auto/Manual Operation

Auto/Manual shift operation is simple as follows:

Manual Override

Move the manual declutch lever toward the handwheel. After engaging the clutch, turn the handwheel to "Open" or "Close", as required.

Automatic Operation by Motor

Motor operation is automatically and instantly restored by electrically energizing the actuator.

Indication of Valve Position

Indicator on the top of the actuator shows the valve position throughout its travel. The shape of the indicator is similar to the disc of a butterfly valve so it can provide a clear indication even from a distance.



Trouble Shooting

Mechanical Trouble

- Move the valve using the handwheel after pulling the declutch lever.
- Check the movement of mechanical position indicator.
- If the handwheel does not move, the valve is jammed and needs to be checked.
- If the valve strokes with the handwheel, check the electrical power/wiring as follows.

Electrical Trouble

Check the function of control panel first, and then actuator later.

- Check the main power supply and control power supply.
- Check the relay and fuse.
- Check all lamps and switches.

* If there is a problem in the control panel as listed above, replace the defective parts. If not, the actuator should be checked.

- Check the installed motor and replace it, if necessary.
- If a torque switch has tripped, shut the main power off and follow the same procedure as mechanical Trouble Shooting.
- If a faulty limit switch is found by electric circuit check, depending on the cause, adjust or replace it.
- All of other electrical problems can be solved by replacing the defective parts.

Mechanical Stop Bolt

- For both ends of travel limit, adjust the mechanical stop bolts with an Allen wrench.
- If the stop bolts interfere with setting of the Open/Close switches, loosen the stop bolt counter-clockwise two turns.

CAUTIONS BEFORE AUTO (MOTOR) OPERATION:

Do not position valve in a full "Opened" or "Closed" position before checking the correct rotation of motor. When the actuator is operated for the first time, it is necessary to check phase direction of power supply as follows.

- Using the handwheel, position rotating member at approximately 45 degrees~
- Energize close or open switch to check the rotation direction of the valve.
- Clockwise: Valve closes
- Counterclockwise: Valve opens
- If the rotation direction is reverse, stop immediately and check the wiring (motor connections may be reversed). The valve could be damaged if the limit switches are not set.

Switch Operation Test

After setting Open/Close limit switches and mechanical stop bolts, cycle the actuator full stroke several times electrically in order to confirm Open/Close switch settings.

Torque Switch

Generally speaking, it is not necessary to reset the torque switches because they are factory set to the rated torque of the actuator.

WARNING:

The torque switches are set with special measuring devices to protect the actuator and valve. If the torque switches are reset without consulting ABZ, the warranty may be voided.

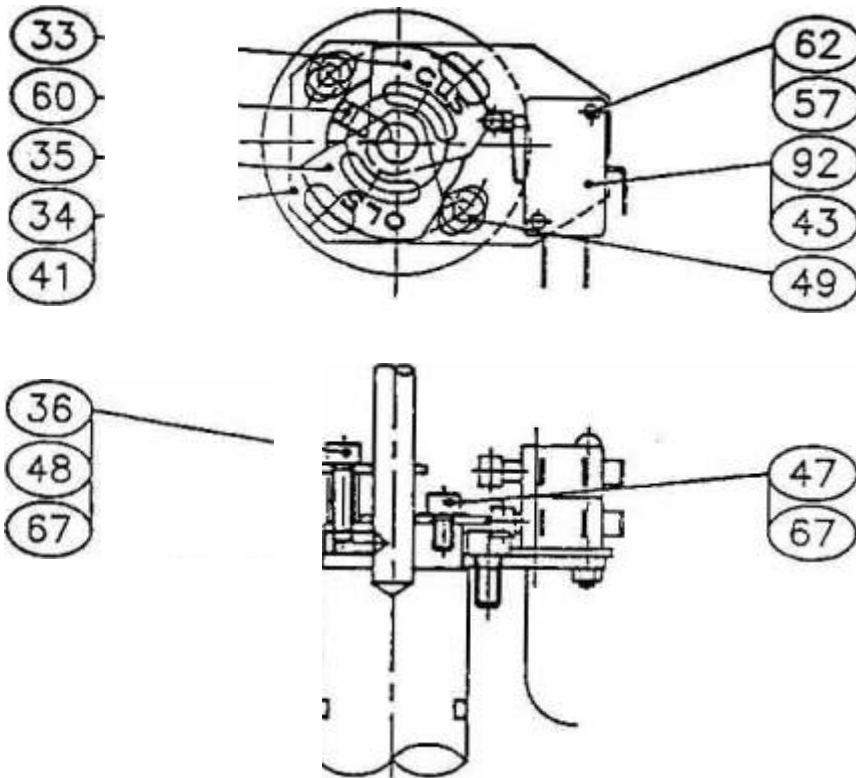
Travel Limit Switch Setting

Close Limit Switch Setting

- Pull the declutch lever and move the valve to the full "Closed" position by turning the handwheel clockwise.
- Using an Allen wrench, loosen the screw on the lower earn (Close Limit Switch).
- Adjust the cam to trip the lower switch, and tighten the screw.

Open Limit Switch Setting

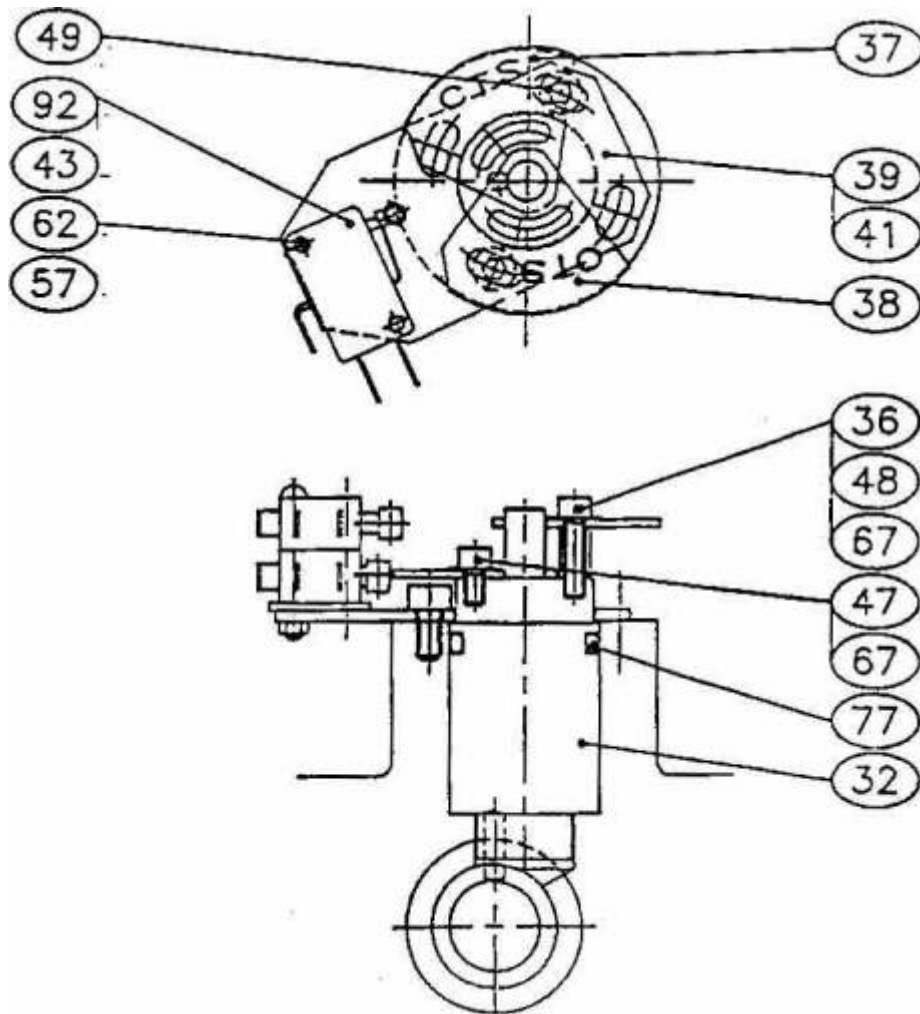
- Pull the declutch lever and move the valve to the full "Open" position by turning the handwheel counter-clockwise.
- Using an Allen wrench, loosen the screw on the lower earn (Open Limit Switch).
- Adjust the cam to trip the upper switch, and tighten the screw.



*33 is the Lower Cam for Close Limit Switch

*35 is the upper Cam for Open Limit Switch

*92 is Limit Switch



- *37 is the lower Cam for Close Limit Switch
- *38 is the upper Cam for Open Limit Switch
- *92 is Limit Switch

Maintenance

ABZ electric actuators are designed and manufactured for long life under normal operating conditions, however, it is recommended to make an operational check twice annually.

Disassembly for Replacement

Before disassembling the actuator, disconnect the incoming power supply to the actuator.

Disassembly should be done as follows.

1. Remove the actuator from the valve.
2. Push off top cover (ref. #2) evenly with both hands.
3. Remove the potentiometer or condenser (ref #96) if any.
4. Remove the terminal block (ref. #94) and space heater (ref# 93).
5. Remove the limit switch assembly (ref# 33,34,35,36,& 92) and torque switch assembly (ref. #36, 37,38,39 & 92).
6. Remove the motor (ref#44).
7. Remove the indicator (ref#17) and torque shaft (ref#32).
8. Remove disc A for the 1st shaft (ref#8).
9. Remove the handwheel (ref # 19) separate handle cover assembly (ref#6,23,24,66,71, 76,80).
10. Remove the declutching lever (ref #26), clutch A (ref #22) and declutch yoke (ref #2 1).
11. Remove the first worm wheel (ref#12).
12. Remove the first worm gear assembly (ref#11 & 29) together with the bearing.
13. Remove the thrust cover (ref #9).
14. Remove the mechanical stop bolts (ref#55).
15. Remove the end cover (ref #7).
16. Remove the drive bushing (ref #5).
17. Remove the base assembly (ref#4).
18. Remove the center column assembly (ref#14, 15,16,91).
19. Remove the 2nd worm gear assembly (ref#13,87,99).
20. Remove the window cover assembly (ref#3,18).

Re-assembling

Reverse of disassembling procedure.

*Please refer to attached photographs for disassembly.

Re-assembling

Reverse of disassembling procedure.

*Please refer to attached photographs for disassembly.

Drawings

Mechanical Assembly

Assembly for ABZ-04,-06,-09 (Dwg. # M006-101-A)

Assembly for ABZ-15,-19 (Dwg. # M015-101-A)

Assembly for ABZ-28,-38,-50 (Dwg. # M028-101-A)

Assembly for ABZ-60,-80,-1PO (Dwg. # M060-101-A)

Assembly for ABZ-150,-200,-250 (Dwg. # M200-101-A & M200-102-A)

ELECTRICAL WIRING

DWG #: NU-11000-A FOR IPH WIRING DIAGRAM

DWG #: NS-11000-A FOR IPH WIRING DIAGRAM

DWG #: NT-31000-A FOR 3PH WIRING DIAGRAM

DWG #: NS-31000-A FOR 3PH WIRING DIAGRAM

ABZ 6 thru 9

On/Off & Control

Amc 101

1. Power up actuator per wiring schematic, remembering actuator is in full CCW position (open), power to reach full CW position (closed).
2. M9Unt actuator to valve, valve must be In closed position.
3. Set open & closed limit switches, when completed return to closed position.

Control

1. Install potentiometer with valve in closed position set pot 0178 ohms.
2. Use black ground & white positive.
3. Install positioner board with actuator closed wire per spec.
4. Connect **4-20mA** signal; **make** sure to be at 4mA.
5. Connect source power to actuator, if wired property the actuator shouldn't move.
6. Give actuator 20mA signal; make sure actuator travels to open position. Return to 4mA to close.
7. Adjust zero pot (closed) on positioner board until green light goes out.
8. Give actuator 20InA signal when open position is reached adjust span pot (open) on positioner board until red light goes out.
9. Return to 4mA check closed position. (make adjustments as needed)

ABZ 15 thru 250

On/Off & Control

Amc 101

1. Power up actuator per wiring schematic remembering that the actuator is in the full CCW position (open), to reach full CW position (closed).
2. Mount actuator to valve, valve must be in closed position.
3. Set open & closed limit switches, when completed return to closed position.

Control

1. Install potentiometer with valve in closed position set pot 0378 ohms.
2. Use black ground & white positive.
3. Install positioner board with actuator closed wire per spec.
4. Connect 4-20mA signal; make sure to be a 4mA.
5. Connect source power to actuator, if wired properly the actuator shouldn't move.
6. Give actuator 20mA signal; make sure actuator travels to open position. Return to 4mA to close.
7. Adjust zero pot (closed) on positioner board until green light goes out.
8. Give actuator 20mA signal when open position is reached adjust span pot (open) on positioner board until red light goes out.
9. Return to 4mA check closed position (make adjustments as needed).