# CVHE ELECTRIC VANE MOTOR

The electric vane actuator used on the CVHB and CVHE Model CenTraVacs is a worm gear type linear actuator. It is driven by a reversable electric motor and requires approximately 60 seconds to go full stroke when given constant power.

The vane actuator utilizes a limit switch mechanism to limit the travel of the actuator and provide a signal to the control panel that the vanes are completely closed. Figure 1 is a picture of the vane motor terminal box showing the terminal strip, capacitor and limit switch mechanism.

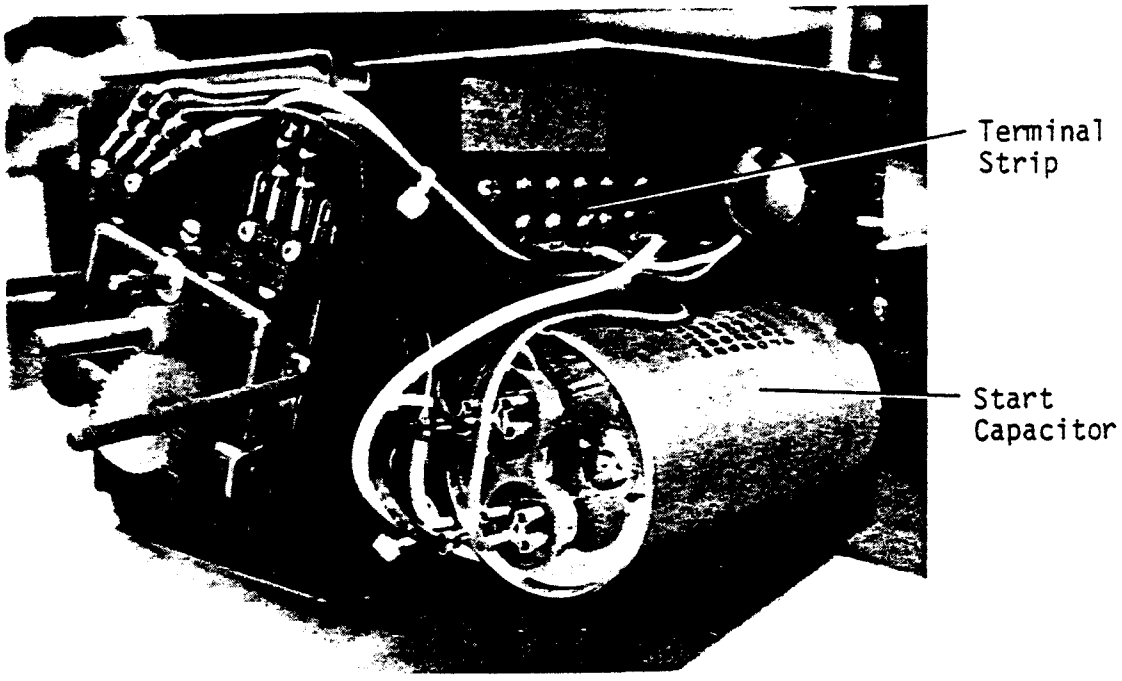


Figure 1: Electric Vane Motor Terminal Box

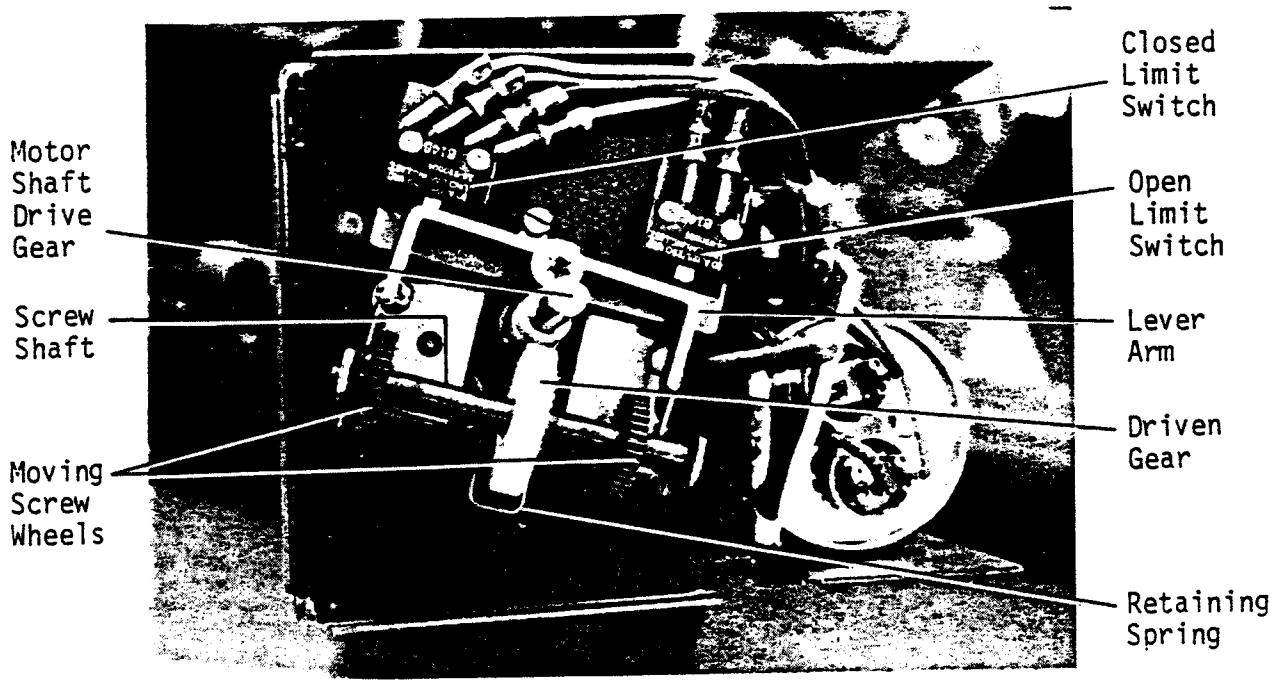


Figure 2: Limit Switch Mechanism

Limit Switch Operation

The limit switch mechanism operates as follows:

A worm drive gear is mounted on the end of the motor shaft(See Figure 2). As the motor turns the worm gear drives a screw shaft through another gear. As the screw shaft turns two moving screw wheels move back and forth on the shaft(See Figure 3). These screw wheels do not turn, they are kept from turning by a retaining spring. Their internal threading to the screw shaft is what causes them to move back and forth on the shaft. The moving screw wheels push a lever arm which in trun actuates a "full open" limit switch or "full closed" limit switch depending on the position of the actuator. (See Figure 2).

The full open limit switch breaks the open signal to the vane motor preventing it from over driving and jamming the van actuator.

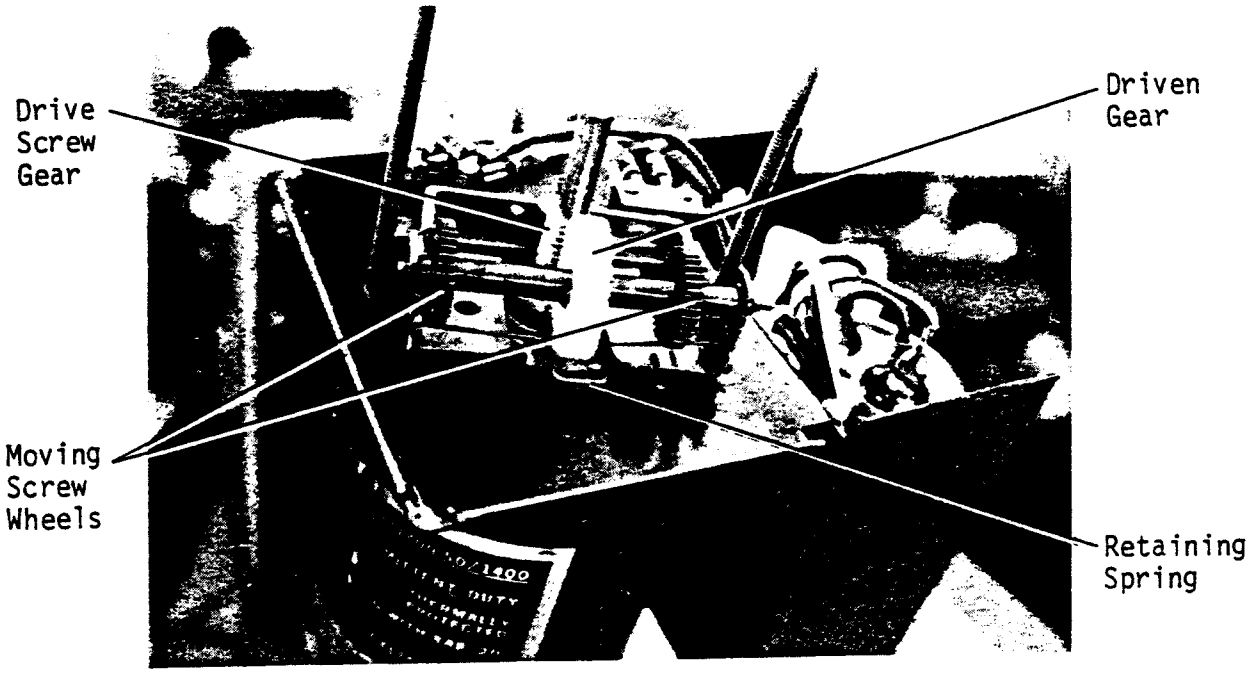


Figure 3: Limit Switch Mechanism

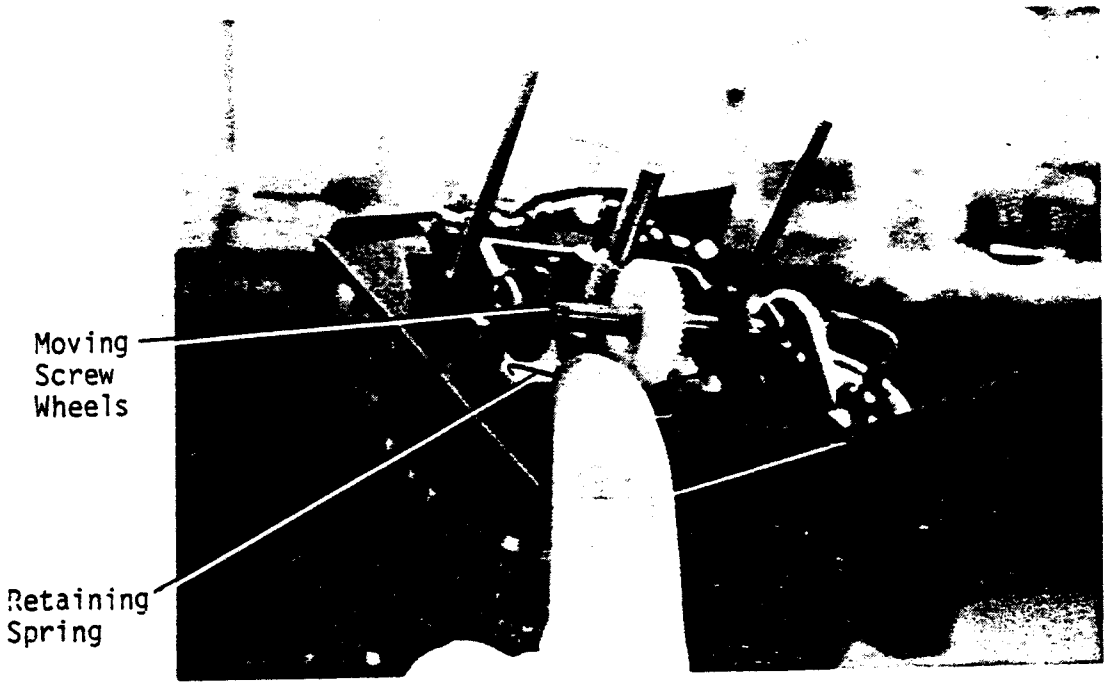


Figure 4: Limit Switch Mechanism Retaining Spring

The full closed limit switch breaks the close signal to the vane motor preventing it from overdriving and jamming the vane actuator shut. It also makes

a set of contacts which complete the control circuit allowing a start to occur(See Figure 5).

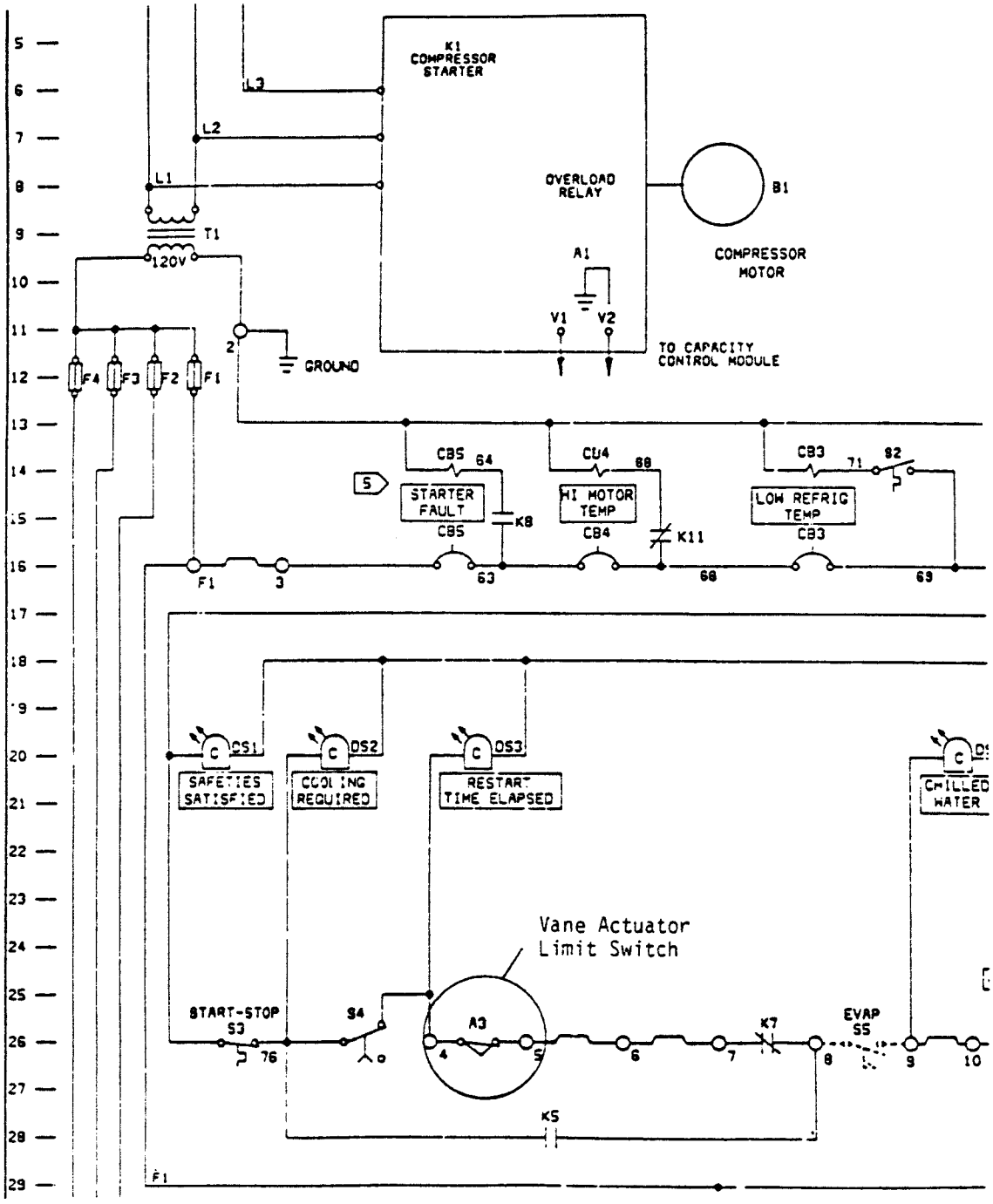


Figure 5: CVHE Schematic Diagram

Limit Switch Adjustment

To adjust the limit switch make and break points the retaining spring must be pushed down so that it disengages the moving screw wheel.(See Figure 4). The screw wheel may then be rotated as required to adjust the limit switches. These switches should be set so that the power to the motor is broken approximately 1/8 to 1/4 inch before the actuator is completely retracted or extended. If the limit switches are not properly adjusted, the vane motor may continue to be powered in the fully retracted or extended position causing the motor to heat up and cycle on its thermal overload and ultimately fail.

Maintenance

Every six months a few drops of light machine oil(SAE-20) should be applied to the vane operator shaft and spread into a light film. This will protect the shaft from moisture and rust.

The actuator motor bearings must also be lubricated by inserting a long nozzle into the lubrication points on the actuator as shown in Figure 6. Several drops of SAE-20 oil is sufficient.

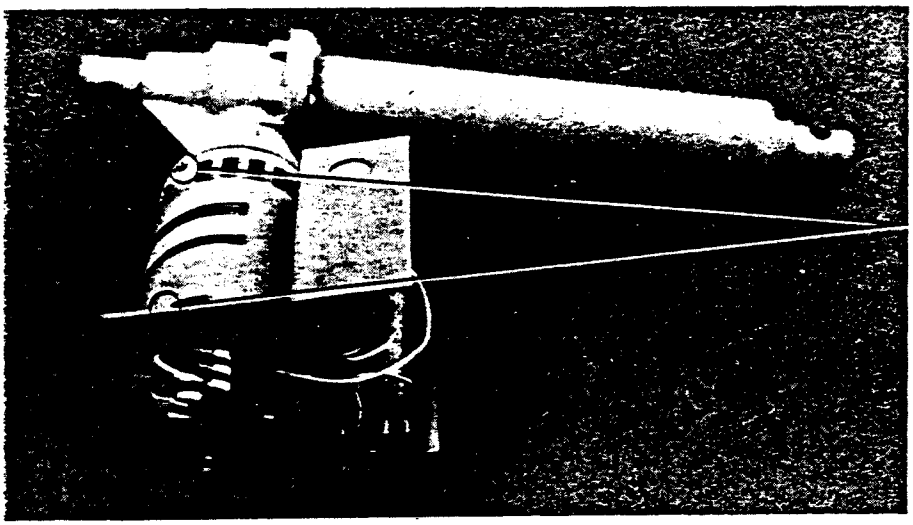


Figure 6: Compressor Inland Vane Actuator Motor