

INTRODUCTION

These instructions are a supplement to the Kinetrol maintenance instructions TD76 / TD120 and explain how to check the EL units in case of failure including

- Failure to move when signal and air are connected
- Unit moves slower than expected up-scale or downscale

PART 1 will help to check the electrical parts.

PART 2 will help to check the pneumatic parts.

PART 3 will help to remove and replace the circuit board and angle retransmit.

Before starting the investigation on the positioner unit, first check that:

- Air pressure is above 50 psi / 3.5 bar
 - Signal is connected with correct polarity
 - Ensure signal is 4 – 20 mA
 - Air supply is clean , dry and oil free
- The EL positioner is factory set, the unit can be reset by applying the signal above 4 mA and pressing the SET, DOWN and UP buttons simultaneously. If the unit oscillates press SET & UP together and then SET to make PGAIN flash, press Down five times, then press SET to stop the led flashing and repeat with the DAMP button.

PART 1 – CHECKING ELECTRICAL PARTS

1.1 – Connect air pressure without signal to make sure that the actuator's vane is at its 0% end stop (the arrow points 0 on scale).



1.3 – Press the SET and UP buttons to enter the set-up mode. The LED 'PGAIN' lights continuously.



1.2– Disconnect air pressure, remove the lid and connect signal above 4mA.



If not, check the signal input and its polarity. If the LED fails to light, the circuit may have to be replaced (spare part = SP1007).

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1.4– Press UP button to select 'POT' LED.

Feedback potentiometer



If the 'POT' LED flashes it means that the feedback potentiometer is set correctly – go to section 1.6

If the 'POT' LED lights continuously then the feedback pot has to be reset.

1.5 - Resetting the feedback potentiometer

With the air supply turned off, loosen the the pot clamp screws.

Measure the voltage across these two wires and turn the potentiometer until the voltage reads 0.92v.

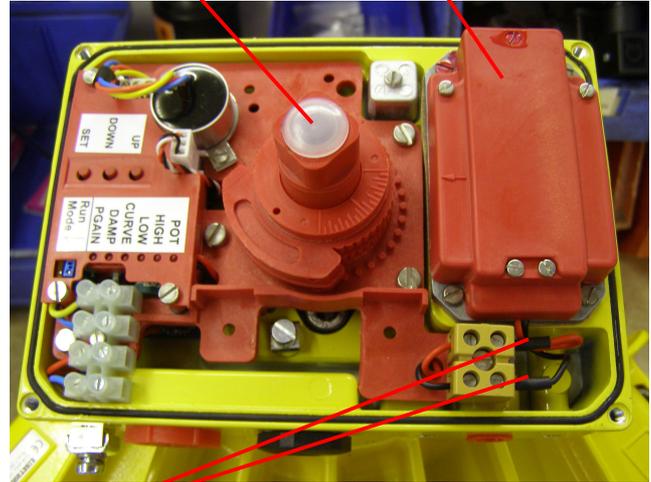


Rotate the potentiometer slowly until the 'POT' LED flashes. Re-tighten the clamp screws. Now the set-up mode can be left by pressing DOWN button until each LED is off.

1.6 – Checking the servo valve

Shaft

Servo valve



Measure the voltage across the contacts at 20mA you should get approximately 4.8 volts and the shaft should move.

If this is working proceed to check the pneumatic parts – see section 2.

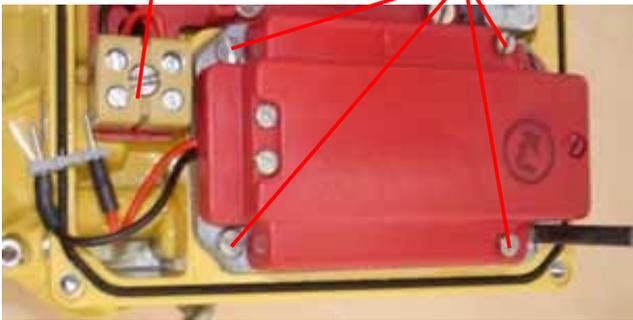
If not the servo valve will need to be replaced (spare part = SP942).

PART 2 – CHECKING PNEUMATIC PARTS

Remove the 4 servo valve's body screws and disconnect the wires from the terminal block. Then lift the servo valve from the positioner.

Put the servo valve and its cover in a safe, clean, dry, oil-free place and do not lose the cork gasket which sits under the servo valve Rim.

Terminal block Screws



Observe the rubber gasket at the bottom of the frame and check whether it is clean. If not, replace it or clean it with ethanol and clean rag.

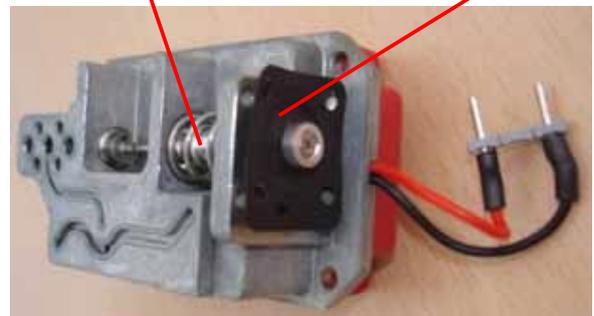


Top cork gasket Servo valve base gasket

Remove the 4 countersunk screws from the plate and remove the plate.



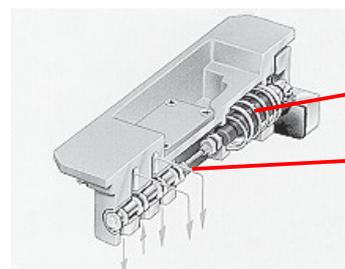
Spring Diaphragm



Remove the bobbin valve assembly complete with its rubber diaphragm by pulling it out axially from the diaphragm end (observe the diaphragm orientation). Do not lose the spring.



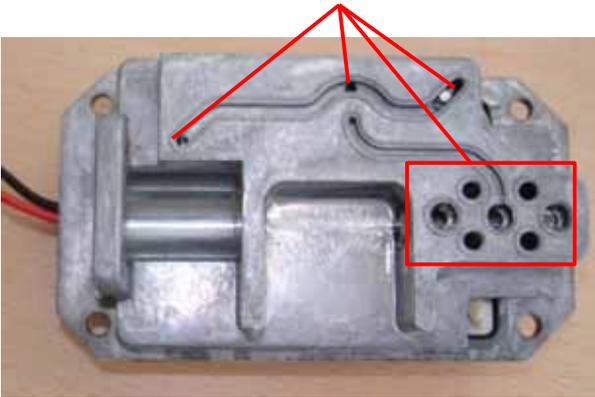
Clean the valve liner sleeve (in situ in the servo valve block) and the bobbin valve, using plenty of ethanol. Clean out the air channels as far as they are visible.



Spring Bobbin valve

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Blow clean air with an air gun at medium pressure into the holes and channels of the servo valve to dry it.



Hold a clean rag inside the servo valve recess, and blow clean air at low pressure into the supply connection of the positioner, to clear any contaminants from the internal supply port.

Do not do this with high pressure air, or without the rag in place, to avoid injury by possible flying contaminants.



Replace the bobbin assembly complete with spring, replace the cover plate, and hold in place with the four countersunk screws, tightened and Loctited into position.



Replace the complete servo valve in its recess in the positioner body, taking care that the cork gasket under the servo valve rim is in place, fit the 4 screws with Loctite, screw them all down finger tight, and then tighten them down hard.



The complete unit can now be tested with 4-20mA signal.

If it still does not work, it may be necessary to replace the servo valve assembly (SP942).

If it starts working well, it is worth testing it during 15 min. or more in order to drain the channels.

The next section of this trouble shooting guide explains how to replace the main circuit and/or the angle retransmit circuit.

If you did not have to replace any circuit, you can ignore the next section.

PART 3 - REMOVING AND REPLACING THE CIRCUIT BOARD AND SHAFT

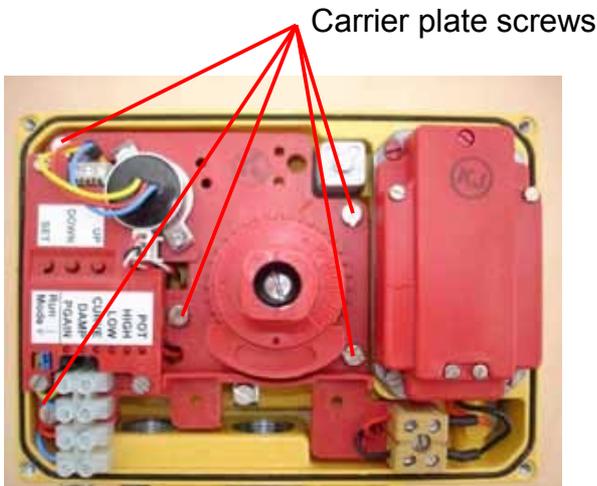
It is necessary to remove the carrier plate and shaft before replacing the main circuit and/or the angle retransmit circuit.

3.1 - If possible, place the actuator vane at its mid-position (45° on scale).

3.2 – It is advisable to mark the position of the actuator's vane.

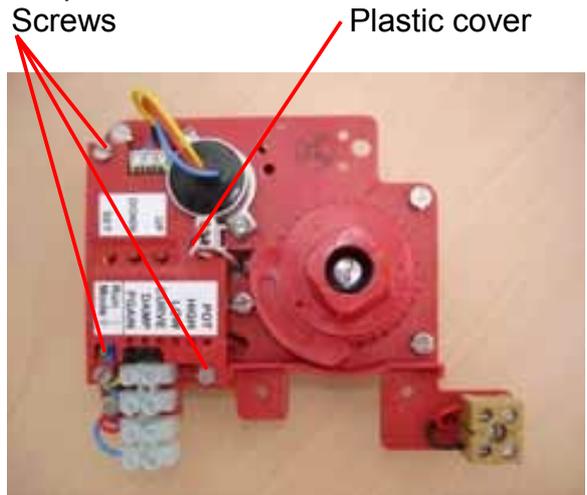


Undo the 5 screws securing the carrier plate assembly and remove the white plug from top of the shaft.



Carrier plate screws

To replace the main circuit, first undo the 3 screws and remove the plastic cover to expose the circuit.



Screws

Plastic cover

Undo the central screw inside the shaft to release the shaft coupling from the actuator shaft. Disconnect the servo valve wires from the terminal block.

To remove the angle retransmit circuit, turn the carrier plate over and remove the 2 screws

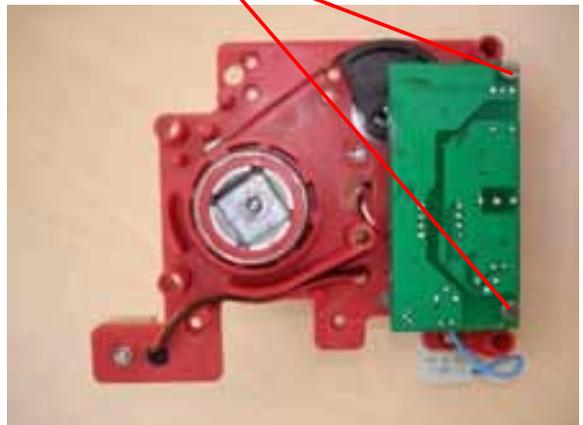


Lift out the carrier plate with the shaft.

Central screw



Servo valve wires / terminal block



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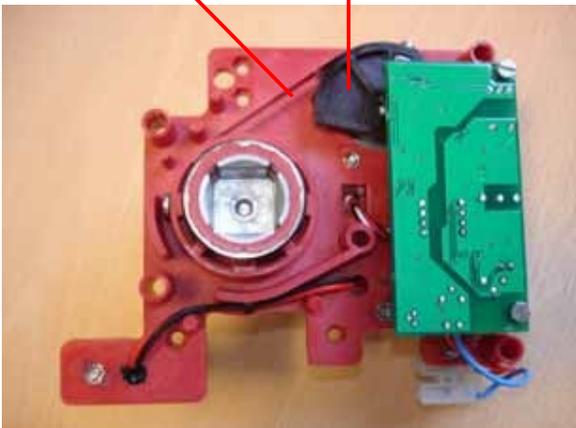
3.3 - Orientating the positioner shaft - actuator mid travel.

When the main circuit and/or the angle retransmit circuit are replaced, the circuit board and the shaft have to be put back into the positioner body.

You have to make sure that the positioner and actuator shafts are correctly oriented relative to each other.

If they are 90 degrees out, the quadrant wheel and the stainless steel strap can be forced too far and damaged during subsequent actuator movements.

Strap Quadrant wheel



When it has been possible to place the actuator vane at its mid-position (see 3.1), it is easy to avoid a mistake since there is no ambiguity.

Observe the range of motion available to the positioner shaft, which is limited by the stainless steel strap.

Fit the carrier plate / shaft assembly back running of the potentiometer quadrant wheel, into the positioner box with the shaft near mid-range, “feeling” the female square in the positioner shaft onto the male actuator square while maintaining its position near mid range.

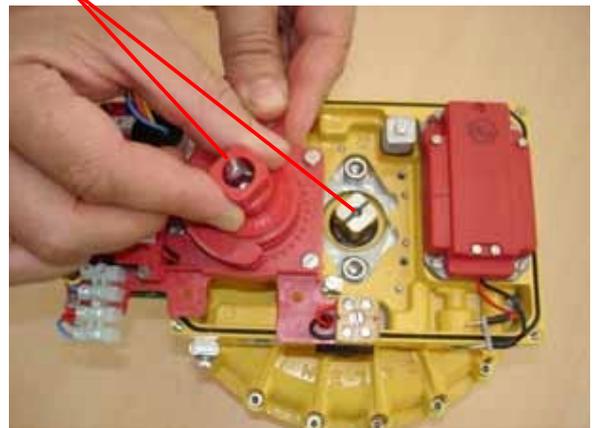


3.4 – Orientating the positioner shaft - actuator end of travel.

It is possible to fit the circuit board correctly with the actuator square at one end of its travel, but experience indicates a high probability of mistaking the direction of movement of the actuator.

The picture below shows the position of the positioner shaft when the actuator vane is at its 0% end stop for an anti-clockwise unit. (For a clockwise unit, the position would be opposite).

There is a moulded mark on top of the positioner shaft. This mark must coincide with the position of the actuator vane.



3.5 – When the carrier plate and the shaft are back into the positioner body, re-tighten the shaft screw first, then the 5 screws that secure the carrier plate.

Shaft screw



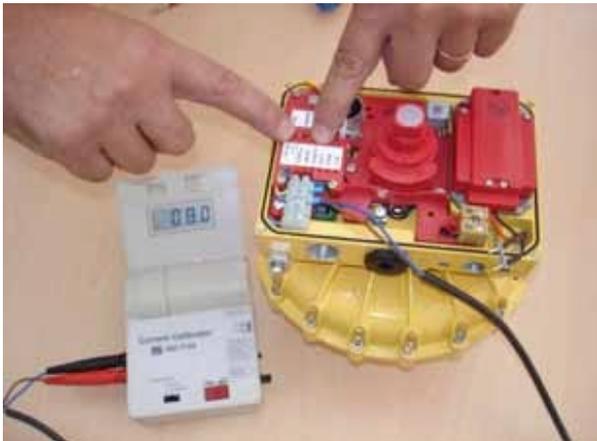
Carrier plate screws

It may be necessary to reset the positioner.

3.6 - Resetting the feedback potentiometer

Connect the air pressure without a signal to make sure that the actuator's vane is at its 0% end stop (the arrow points 0 on scale). Then disconnect air pressure and connect a signal above 4 mA.

Press the SET and UP buttons to enter the set-up mode.



Now set the feedback potentiometer (this procedure is described on page 2 section 1.4).

3.7 - Automatic end stop finding procedure: The positioner can automatically calibrate itself to range between any mechanical end stops (either the built-in actuator stops, or any external stops built into the application).

Re-connect air pressure.
Keep the signal above 4 mA.
Reset the unit by pressing the SET, DOWN and UP buttons simultaneously.

Enter the set-up mode again by pressing the SET and UP buttons.

Press UP button to select the 'POT' LED. The LED lights continuously.



Press the SET and UP buttons: the LED flashes while the actuator's vane moves toward its 100% end stop. When its movement is stopped by the physical end stop, the positioner waits briefly, then moves the actuator steadily downscale until it runs against the bottom physical end stop, where again it waits briefly, and finally moves quickly back to the original position.

The calibration data are written to non-volatile memory.

3.8 - When the setting procedure is achieved, put the lid back to the positioner. It may be necessary to put some grease on the shaft seal before engaging the lid.



3.9 – For more information about the EL positioner, see our IOM instructions TD120 or contact KINETROL.