

Addendum

PAVC - simple valve and vacuum pump reference voltage test

Manual mode

In this mode up and down keys vary the voltage reference to the vacuum pump and move the valve. The function is the same whether the control is stopped or running so is useful as part of a test procedure prior to starting the machine.

Automatic mode

In this mode the valve no longer moves. It locks at the current position and all vacuum adjustments from here on are made by the vacuum pump only. The reference voltage is allowed to vary by about 6%. It should not be necessary to make further adjustments, as the PID system will maintain pressure at the set value.

Testing valve and vacuum pump reference voltage

Power up the machine. Allow the PAVC to complete initial tests. Do not start the pumps. (Vacuum Start zeros the set point).

Press and hold the coarse down key to fully open the valve. The valve may move smoothly or step during travel. Stepping is due to dead-band coarseness and is different for 100" H₂O and 200" H₂O controls.

Look at the valve aperture after the valve has completely stopped. The rotor cut out section should be fully visible. If required, the valve can be adjusted while in this position. Do this by loosening the small screw that holds the potentiometer and rotating the potentiometer by hand in the direction required. The PAVC, if still powered, will notice the change in feedback position and will drive the motor in the same direction that the potentiometer is being moved. Rotate slowly or you may cause a valve fault*.

Remember to lock the screw when the position is correct. Do not over-tighten as this may push the potentiometer shaft off center. The valve feedback potentiometer will read approximately 2-volts in this position (Position terminal). The vacuum pump output should be zero volts (Pump terminal).

Next, push and hold the coarse up key to close the valve. Only the small hole in the rotor should be visible in the closed position. A few degrees

further and it will be move out of view and the other end of the rotor will be seen. A fully closed valve reads approximately 8-volts (position). Re-adjust the valve if necessary. The Pump reference voltage should be about 9-volts (10-volts is possible in automatic mode if the PID needs extra pump drive). The preset to adjust output reference is on the main board (access requires PAVC lid to be removed). Do not adjust this unless absolutely necessary. It has been calibrated. If the reference voltage appears low, remove the wire to make sure it is not being heavily loaded or shorted.

Motor + and - terminals read the same voltage when the valve is not moving. With respect to each other, the reading will be 0-volts. With respect to 0-volts both terminals should read approximately 11 to 12-volts. When the motor moves towards the fully open position the Motor (-) terminal pulls low. When the motor moves towards the fully closed position Motor (+) pulls low. The voltages here are not critical.

* If a valve fault occurs the control continues to function but makes no further attempts to move the valve. 'VALV' or 'OPEn' will appear in the display. Pressing Set clears this message. The next time the power is cycled the PAVC control will attempt to operate the valve once more. If the valve is still not right, a similar message will appear.

Feedback potentiometer reference is 12-volts; the valve uses 180-degrees of travel - between 2 and 8-volts. Below 2-volts and above 8-volts is considered open circuit. The valve should not go out of range. If the valve is out of range, it will be necessary to use an external 12-volt DC source to move the valve back to correct position. Do not use the 12-volts that is supplied for feedback potentiometer. This is from a different supply and does not have enough power to drive the motor.

The valve position software expects a certain change of position within a certain time. These values are fairly sensitive in an attempt to avoid stripping gears inside the gearbox. A valve error can occur if the valve is too tight or too loose. Make sure there is no build up of dirt or dust inside the valve. Use cleaning instructions that are in the manual if required.