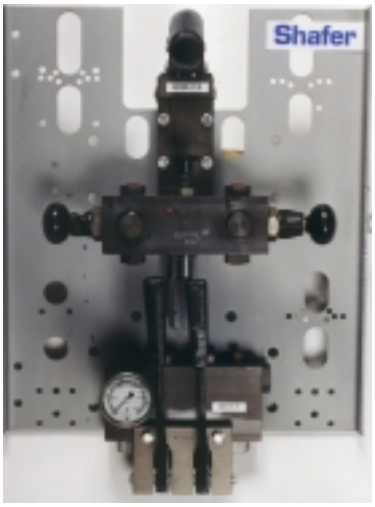
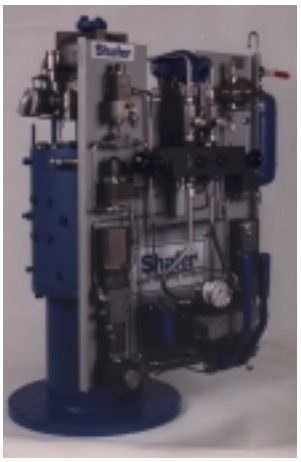
Shafer
valve operating systems

SHAFER CONTROL UPGRADES

The 50 year design life of the Shafer Rotary Vane and Linear actuators affords our customers the opportunity to upgrade the operational reliability of their actuators without the expense of purchasing a complete new unit !

Control upgrades are factory engineered upgrades to existing equipment. An upgrade package can be quite simple with just a few components required, or very complex depending on how the original equipment was configured and what changes are desired. There are several advantages to consulting Shafer Valve for equipment upgrades. Shafer Valve factory engineered Control upgrades insure that:





- Proper components are selected for use with the actuator
- Original drawing packages and Bills of Material are updated for accurate equipment records
- Desired control changes are compatible with the actuator

Why should you consider an upgrade?

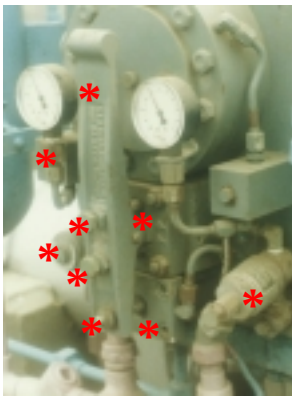
Often, older actuators require a high level of maintenance to keep them reliable. This is primarily due to the theories used in designing the obsolete controls and material of construction. All of the Shafer control components are now designed with simplicity in mind and manufactured from corrosion resistant materials. The serial number of the actuator and detailed control requirements are needed to engineer control upgrades. Let's take a look at the major components used in the controls and compare them to their predecessors.

POPPET BLOCK

The heart of Shafer controls is the double three-way directional control valve commonly referred to as the Poppet Block. There are two sizes of the poppet block, 1/4 and 1/2 inch, designated by the diameter of the poppet pin used in the block. The size difference is considerable and it would be difficult to confuse the two. Very few actuators require the massive flow capabilities of the larger 1/2" poppet block.

The most common problems associated with the old poppet block design are:

- misadjustment
- leakage, caused by internal corrosion
- sticky operation of moving parts due to corrosion



* ***Lubrication or adjustment points.***

Heavily corroded or misadjusted obsolete poppet controls will not provide reliable operation and can cause expulsion of oil from the gas/hydraulic tanks on the Rotary Vane Actuator. The standard poppet block improvements are :

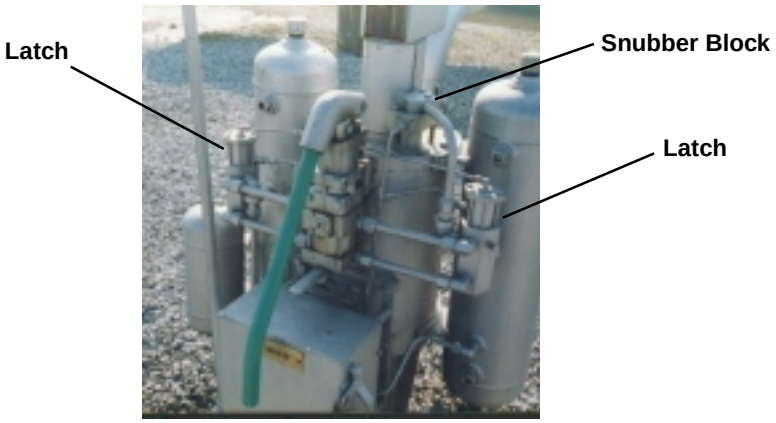
- manufactured from marine grade aluminum, anodized after machining
- bubble tight poppet design
- power and control gas filters are incorporated into the block
- self adjusting, no external adjustments required
- no external moving parts for automatic functions
- identical poppets for power and exhaust
- internal pilot system
- modular, no seals between block and backing plate
- exhaust check blocks out atmosphere
- no special tools required

HAND PUMP

The Shafer manual hydraulic hand pump is a means of providing hydraulic power to move the actuator when no power gas is available. There are two standard sizes, 4 and 12 cubic inch displacement per stroke, with variations of the two as needed for Linear or Central Hydraulic applications. Also, a 1.3 cubic inch displacement pump is available when pressures above 1440 psi must be generated.

Pumps are selected by the volume of oil required to stroke the actuator. The hand pump technical bulletin explains the functional limitations and safety concerns connected with the original design hand pumps. Note that when replacing hand pumps on linear actuators, the latches will also be replaced when the Pump/Double Holding Valve combination is installed on the unit. Hand pumps can be replaced as a unit by themselves, but are a better value for the customer when priced into a complete control upgrade. The hand pump upgrades come with a universal mounting bracket and mounting hardware. Stainless steel tubing and fittings are available as an option if the serial number can be confirmed. Some Linear actuators also require replacement snubber port blocks if the original actuator was equipped with socket welded piping instead of tubing. The standard hand pump improvements are:

- manufactured from marine grade aluminum, anodized after machining
- self neutralizing
- balanced ram design
- improved mechanical leverage

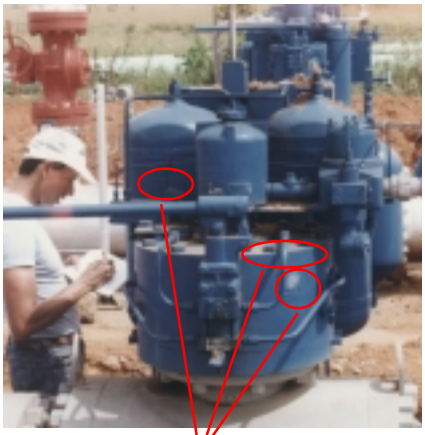


SERIAL NUMBER IDENTIFICATION

Correctly identifying the actuator by serial number is a very important part of the Upgrade quotation process. While it is possible to identify the actuator without the Serial Number, it is much easier for everyone involved if the extra time is spent during the unit inspection to find the serial number. The serial number on old units (that predate ASME tags on the actuator tanks) was usually stamped into the upper head, to the right of the hand pump. This typically is mounted opposite of the control. However, if the actuator was not equipped with a pump, the stamped serial number was usually stamped to the right of the control in the upper head. Some of the older actuators may also have a small serial tag riveted to the body in the same area. Old linear actuators usually had a tag riveted to the upper head on top. Older serial numbers actually included the size of the actuator. Later serial numbers were sequenced with the year of manufacture, serial number, and number in series. Current serial numbers have year of manufacture, job number with purchase order line item and number in series. Actuators with ASME certified tanks have this information on the tag welded to the tank.

Serial Number Examples:

93102:	denotes the actuator as a 9 x 3, number 102 in series, serial number to be determined from shipping records
61-1254-87:	denotes a 12.5 x 4 actuator, number 87 in series, manufactured 1961, serial number to be determined from shipping records
73-15376-1:	no actuator size, serial number 15376, number 1 in series, manufactured in 1973
99-1044101-1:	no actuator size, serial number 10441, item 01 on purchase order, number 1 in series, manufactured in 1999 .



Serial tag or stamping location

A helpful tip when trying to see serial numbers on aged equipment is to scratch off the paint that may be covering the number. Once the number is visible, take a black marker and mark over the indentation then immediately wipe it off before it dries. Any numbering marks made when the serial number was stamped will the be more readily visible.

Photos of the equipment will also assist the engineer in determining if there are any special considerations he must make. Digital photos are useful as they can be sent via Internet. The Shafer website, WWW.SHAFERVALVE.COM has options for sending requests for Control Upgrades or Spare Parts directly to the factory.