

**PLUG VALVE
ACTUATORS
AND
POSITIONING
SYSTEMS**

**The state of the art
for catalyst control
valves.**

Bulletin HP

BAFCO, INC.

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DESCRIPTION, AND FEATURES

BAFCO PLUG VALVE POSITIONERS ARE LINEAR HYDRAULIC DRIVES ELECTRONICALLY CONTROLLED IN POSITION IN RESPONSE TO A CURRENT, VOLTAGE, DIGITAL OR PNEUMATIC COMMAND SIGNAL.

THESE POSITIONERS CAN BE INSTALLED ON NEW PLUG VALVES OF ANY MAKE, AND BE RETROFITTED TO ANY BASIC ORTHOFLOW VALVE.

ON RETROFITTING, THEY CAN BE INSTALLED WITHOUT REMOVING THE VALVE FROM THE FCC UNIT IF DESIRED.

The hydraulic cylinder with an internal position transducer is a complete assembly with the declutchable manual drive. This assembly is mounted to the flange of the plug valve yoke. The hydraulic power unit, manual hydraulic pump, storage accumulators, controls and indicators are mounted in a small console which can be located directly at the plug valve, or if more convenient with separation of 25 to 50 feet, connected by furnished flex lines.

The electronics which compare the command and valve position signals and direct the cylinder motion can be located at the console, or in the control room. The signals are simple, and any distance between electronics and plug valve is acceptable.

The control of flow to the cylinder is a proportional, bidirectional hydraulic valve. Flow volume and direction are controlled by signal level and polarity which are obtained from the difference between the command to and the position of the plug valve.

THESE POSITIONERS GIVE YOU AN EXTREMELY RELIABLE LOW MAINTENANCE DRIVE FOR YOUR PLUG VALVES, WITH –

- STRAIGHT LINE PROCESS CONTROL CAPABILITY
- IMMEDIATE VALVE RESPONSE TO CONTROL OR SHUTDOWN SIGNALS
- SMOOTH CONTROL WITH VERY HIGH RESOLUTION AND STIFFNESS FOR LOW POSSIBILITY OF VALVE STICKING

HOW?

- Bafco hydraulic control valves have extremely high dirt tolerance, designed specifically for refinery service. Internal positioning forces in these valves are much higher than general purpose servovalves, with large pilot stage clearances.
- Wide temperature range of operation – electronics are not temperature sensitive.
- Leakless cylinder rod seals which operate at no pressure to prevent leaks.
- The valve position sensor is located in the center of the hydraulic cylinder. It can not be damaged mechanically, and is not subject to ambient conditions. It is directly connected to the rod which drives the valve without linkages or cams.
- Firesafe oil, diester type, which does not require periodic testing or special seals, with a wide temperature range of use.
- A thrust control system to set both normal and emergency thrust levels. The absolute thrust limit under any failure mode is controlled by several redundant components.
- Dual hydraulic power system with a complete spare for auto startup. Spare system can be air operated. Separate hydraulic storage for normal and emergency operation.
- The ability to float with constant thrust thru the entire range of stroke of the valve, so that the thrust load at the seat cannot be exceeded however long the carrier line expansion or wear distance is.
- Several modes of manual operation to permit operation by either hydraulics, or by declutchable manual drive.
- Redundancy to permit repair or replacement of key parts while in normal operation, and essentially zero routine maintenance.
- Controls so arranged that no speed or thrust limit is affected by power failure, or electronics failure.
- Alarms are furnished to be used for troubleshooting, and which cause the positioner to hold last position until relieved or bypassed. This mode also from operator command.

- Declutchable manual drive remains with the valve for manual control even when cylinder and all hydraulics are removed. This drive can also be operated at 600 RPM by drill or air drive.
- Control from control room or field, with bumpless transfer to either mode.

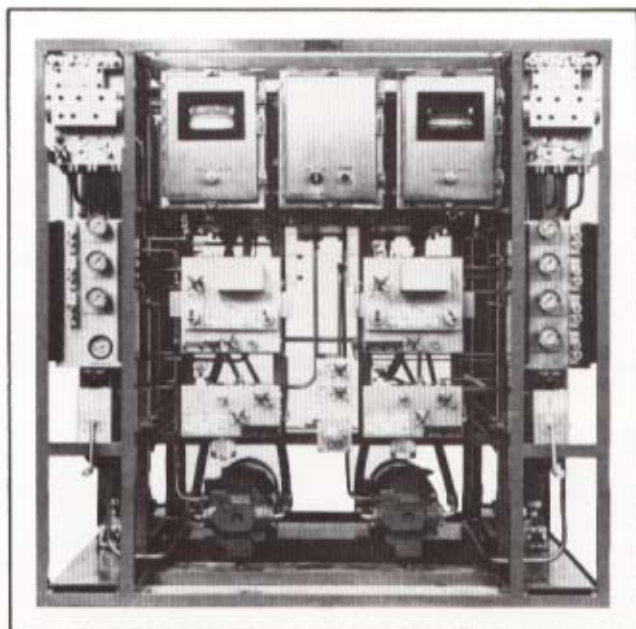
AND TO MAKE COMMISSIONING EASY -

- Installation lines and accessories are furnished – only customer supplied item is motor starters.
- Actuator is completely self-supporting from the valve mounting flange in the horizontal position for installation and handling, and in the vertical position for operation.
- A filter for oil addition is built into the tank. Oil is furnished in small clean containers. Units are sealed against atmospheric contamination of the oil system.
- Reservoir, lines, flanges and filters are of stainless steel, with all control components manifolded.
- All control functions except declutchable manual drive are from the power units which can be located where convenient to the operators.
- All positioners are completely shop tested with actual variable and max loads to completely simulate field operation. You are welcome at our plant to witness and train.
- Most of the components are the same as our slide valve and butterfly valve positioners, to minimize spares and training in your refinery.

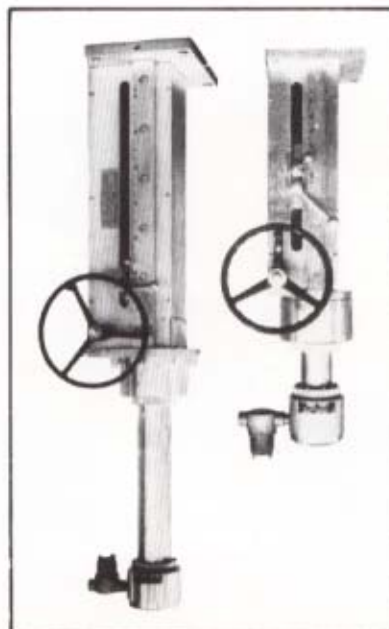
WHY HYDRAULICS?

The key technique in difficult process control is to make the control loop faster than the process. This requires final element positioning of high dynamic response. Hydraulic-electronic positioners have the basic high stiffness and precise and rapid reversal capabilities which produce infinite resolution of valve position with high frequency response. As a rule, the better these characteristics, the faster and more precise the return to control after an upset.

The equipment we provide furnishes you the hydraulic-electronic expertise within itself. As we furnish all test and installation accessories, you do not have to be an expert to use this class of system. The components described in this bulletin are all you need.



Model 794 dedicated hydraulic power/control unit for two valves

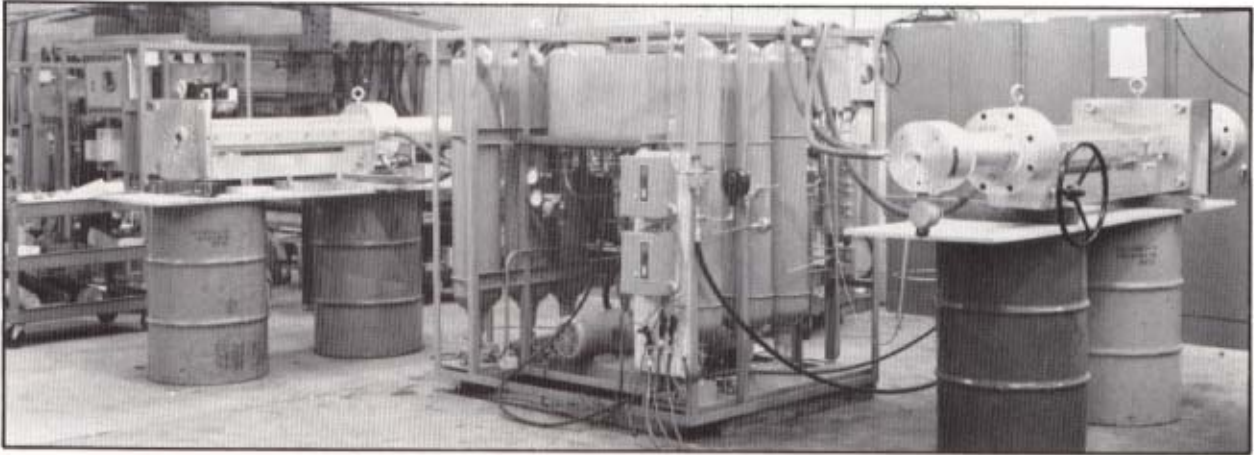


Model 764 Plug Valve Actuators

SPECIFICATIONS

SPECIFICATION	BASE UNIT OPTIONS	OPTIONS WITH COST IMPACT
STROKE NORMAL THRUST ADJUSTMENT	24" OR SHORTER 10,000-20,000 POUNDS, OR ANY 2:1 RANGE	STROKES FROM 25" TO 33" ANY RANGE OVER 2:1
MAX THRUST SPEED, NORMAL SPEED SAFETY SHUTDOWN COMMAND RESOLUTION REPEATABILITY FAILURE MODES	≤30,000 POUNDS 1 TO 15"/MINUTE 60"/MINUTE TO 80"/MINUTE 4-20 MA DC, OR ANY DC VOLTS ≤ 0.1% ≤ 0.1% FAIL IN POSITION FAIL CLOSED	60,000 POUNDS LIMIT > 80"/MIN TO 120"/MIN I-P AND P-I CONVERTERS
ALARMS:	HIGH OIL TEMPERATURE LOW TANK LEVEL LOW LOW TANK LEVEL LOW PRESSURE SIGNAL LOSS POWER SUPPLY LOSS POSITION SENSOR LOSS POSITIONING ERROR	BLOCK AND BLEED VALVES WITH TEST PORT. ALARM ON VALVE CLOSED POSITION. ALARM ON HIGH THRUST IN HANDWHEEL MODE.
MANUAL OPERATORS	MANUAL JOGGING FROM OIL SYSTEM MANUAL HYDRAULIC PUMP DECLUTCHABLE HANDWHEEL DRIVE.	
CONTROL TRANSFER	IN FIELD AND/OR CONTROL ROOM	KEYLOCK IN FIELD
INDICATION AT UNIT:	COMMAND POSITION MANUAL-AUTO ERROR FOR BUMPLESS TRANSFER. HYDRAULIC PRESSURE BOTH SIDES OF FILTERS. OIL TEMPERATURE NORMAL THRUST ON SEAT SHUTDOWN THRUST OIL LEVEL	BLOCK AND VALVES WITH TEST PORT
REMOTE INDICATION:	POSITION ALL ALARMS	THRUST LEVELS
POWER, CONTROL	EITHER 24 VDC OR 115 AC, 100W.	
HYDRAULIC PRESSURE ELECTRICAL CLASSIFICATION ELECTRICAL ENCLOSURES	1500 PSI CLASS 1 GROUP D DIV. 2 NEMA 4	CLASS 1 GROUP D DIV. 1 NEMA 4 STAINLESS STEEL, OR DIV. 1
AMBIENT TEMPERATURE	MINUS 15 TO 150°F OR MINUS 30 TO 150°F	MINUS 40°F, OR >150°F
OIL RESERVE POWER/CONTROL UNIT MODEL 790 MODEL 794 MODEL 798 MODEL 717	2 STROKES DEDICATED FOR EACH VALVE DEDICATED FOR TWO VALVES DEDICATED FOR THREE VALVES CENTRAL FOR ANY NUMBER OF VALVES	AS SPECIFIED
HYDRAULIC POWER SYSTEM MODEL 790 MODEL 794 MODEL 798 MODEL 717	SINGLE SYSTEM DUAL SYSTEM DUAL SYSTEM DUAL SYSTEM	DUAL SYSTEM
HPU PUMP DRIVE MODEL 790 MODEL 794 MODEL 798 MODEL 717	ELECTRIC ELECTRIC ELECTRIC ELECTRIC	AIR MOTOR FOR SPARE LINE AIR MOTOR FOR SPARE LINE AIR MOTOR FOR SPARE LINE AIR MOTOR OR STEAM TURBINE FOR PRIME OR SPARE.

TYPICAL TESTING AND INSTALLATION



Plant testing with variable load to duplicate actual installation conditions.



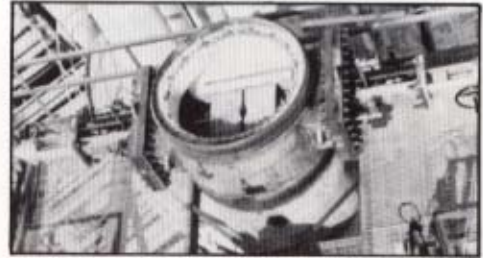
Model 794
hydraulic
power/control unit
and model
764 actuators
in operation.



OTHER PRODUCTS FOR REFINERIES

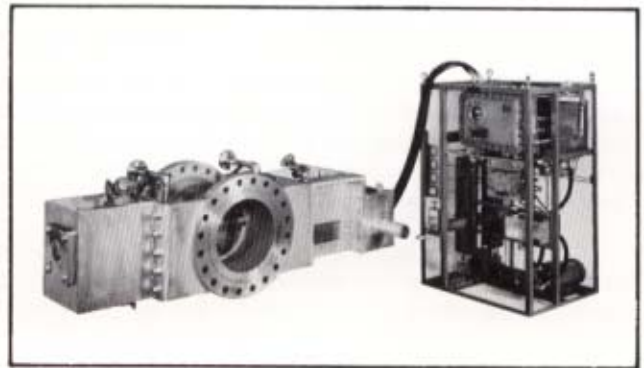
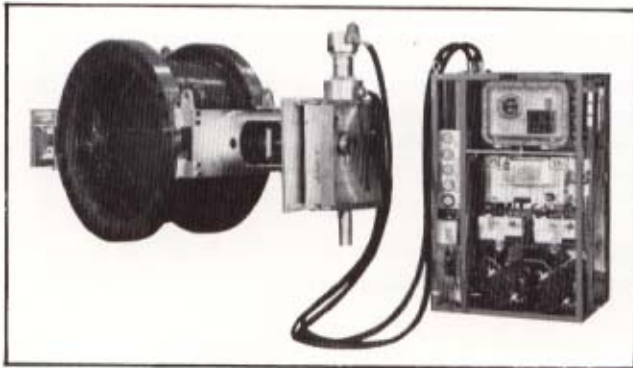
SLIDE VALVE ACTUATORS

Request Bulletin HS



BUTTERFLY VALVE ACTUATORS

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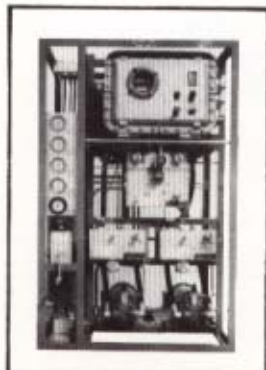
WEDGE GATE VALVE ACTUATORS

Call Bafco direct

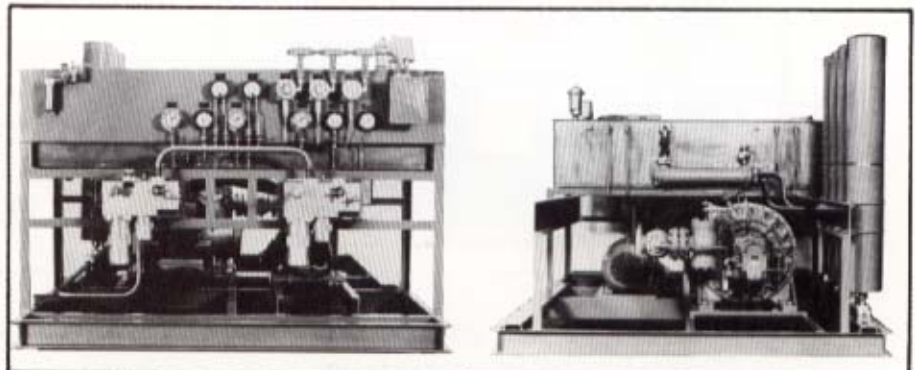


HYDRAULIC POWER UNITS

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Dedicated



Central