

**SLIDE VALVE
ACTUATORS
AND
POSITIONING
SYSTEMS**

**For all
refinery
applications.**

Bulletin HS

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DESCRIPTION AND FEATURES

BAFCO SLIDE VALVE POSITIONERS ARE LINEAR HYDRAULIC DRIVES. THROTTLING MODELS ARE ELECTRONICALLY CONTROLLED IN POSITION IN RESPONSE TO A CURRENT, VOLTAGE, DIGITAL OR PNEUMATIC COMMAND SIGNAL. ON-OFF OR SAFETY MODELS ARE COMMANDED BY ELECTRICAL CONTACTS OR PNEUMATIC SIGNALS.

THESE POSITIONERS CAN BE INSTALLED ON NEW SLIDE OR GATE VALVES OF ANY MAKE, AND BE RETROFITTED TO ANY SLIDE OR GATE VALVE.

ON RETROFITTING, THEY CAN BE INSTALLED WITHOUT REMOVING THE VALVE FROM THE SYSTEM 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 valve yoke. In dedicated units the hydraulic power system, manual hydraulic pump, storage accumulators, controls and indicators are mounted in a small console which can be located directly at the valve, or if more convenient with separation of 25 to 50 feet, connected by furnished flex lines. In central power units, the controls are mounted on the actuator or in field panels which can be separated from the hydraulic power unit by any distance.

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 valves is acceptable.

In throttling models, 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 slide valve. In on-off or safety models this control is by a four-way hydraulic valve with a dedicated failsafe mode.

These positioners give you an extremely reliable low maintenance drive for your valves, with –

- Straight line process control capability
- Immediate valve reponse 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.
- A waveform generator is part of the control electronics. This superimposes a small oscillation on top of the command to the valve so that the valve is never stationary. The waveform, (triangle, square, sawtooth), amplitude, and frequency are field selectable. Of course this function can be switched out if not required.
- Wide temperature range of operation - electronics are not temperature sensitive.
- Very high hydraulic stiffness with precise and rapid reversal capability produces almost infinite resolution and high frequency response.
- 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.
- 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 -

- In dedicated units, installation lines and accessories are furnished - only customer supplied item is motor starters. Motor starters and standard pipe and fittings for central units are customer supplied. All matching flanges and fittings are supplied with the equipment.
- Actuator is completely self-supporting from the valve mounting flange in any position.

- 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 or field manifolds 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 plug 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.

Particularly in refinery valves, very high forces are needed to insure freedom from valve sticking. Hydraulic drives are required to obtain these forces in the long strokes used.

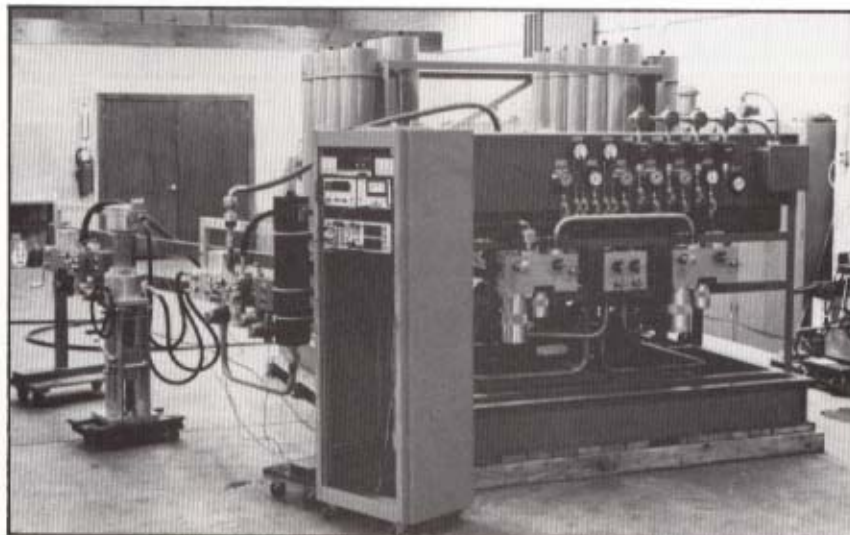
THE EQUIPMENT WE PROVIDE FURNISHES YOU THE HYDRAULIC-ELECTRONIC EXPERTISE WITHIN ITSELF. AS WE FURNISH ALL TEST AND INSTALLATION ACCESSORIES, YOU DO NOT HAVE TO BE AN EXPERT TO USE THIS CLASS OF SYSTEM. THE COMPONENTS DESCRIBED IN THIS BULLETIN ARE ALL YOU NEED.



Installation on double disc valve



Testing with slide valve

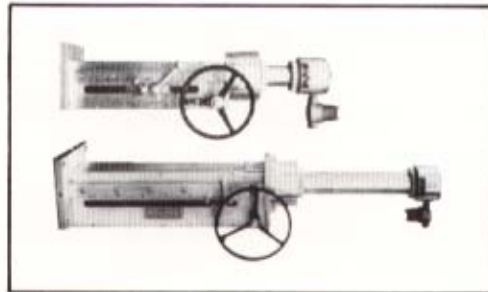


Testing of central HPU, field manifolds and actuators.

SPECIFICATIONS

SPECIFICATION	STANDARD UNITS	RANGE AVAILABLE
STROKE	TO 12" TO 24" TO 33"	TO 38" MAXIMUM IS 120"
THRUST	TO 3,000 POUNDS TO 10,000 POUNDS TO 40,000 POUNDS	TO 160,000 POUNDS
SPEED, FULL STROKE	TO 5" PER SECOND	TO 20" PER SECOND
COMMAND, THROTTLING	4-20 MA DC, ANY DC VOLTS, OR 3-15 PSI	YOUR SPECIFICATION
COMMAND, ON-OFF	DRY CONTACT 24 VDC 110 VDC 110 VAC PNEUMATIC	YOUR SPECIFICATION
RESOLUTION	≤ 0.1%	
REPEATABILITY	≤ 0.1%	
FAILURE MODES	FAIL IN POSITION FAIL OPEN FAIL CLOSED	YOUR SPECIFICATION
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 OPEN OR CLOSED POSITION.
MANUAL OPERATORS	MANUAL JOGGING FROM OIL SYSTEM MANUAL HYDRAULIC PUMP DECLUTCHABLE HANDWHEEL DRIVE MANUAL JOGGING FROM CONTROL ROOM	
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 OIL LEVEL	BLOCK AND BLEED VALVES WITH TEST PORT
REMOTE INDICATION	POSITION ALL ALARMS	
POWER, CONTROL	24 VDC, 100 W 115 VAC, 100 W	YOUR SPECIFICATION
HYDRAULIC PRESSURE	1800 PSI TYPICAL	400 PSI 600 PSI 2400 PSI 3000 PSI
ELECTRICAL CLASSIFICATION	CLASS 1 GROUP D DIV. 2	CLASS 1 GROUP D DIV. 1
ELECTRICAL ENCLOSURES	NEMA 4	NEMA 4 STAINLESS STEEL OR DIV. 1
AMBIENT TEMPERATURE	MINUS 15 TO 150°F MINUS 30 TO 150°F	MINUS 40 °F >150°F TO 180°F
OIL RESERVE	2 STROKES	AS SPECIFIED
POWER/CONTROL UNIT MODEL 790 MODEL 794 MODEL 798 MODEL 717	DEDICATED FOR EACH VALVE DEDICATED FOR TWO VALVES DEDICATED FOR THREE VALVES CENTRAL FOR ANY NUMBER OF VALVES	
HYDRAULIC POWER SYSTEM MODEL 790 MODEL 794 MODEL 798 MODEL 717	SINGLE SYSTEM DUAL SYSTEM DUAL SYSTEM DUAL SYSTEM	DUAL SYSTEM TRIPLE 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.
STOPS		ADJUSTABLE CLOSING ADJUSTABLE OPENING

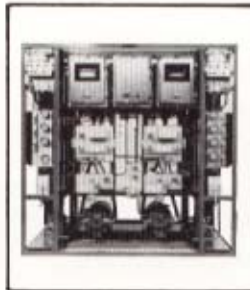
BASIC COMPONENTS



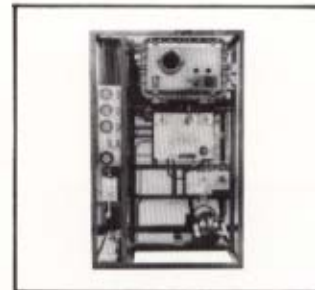
Model
764
Slide Valve
Actuators



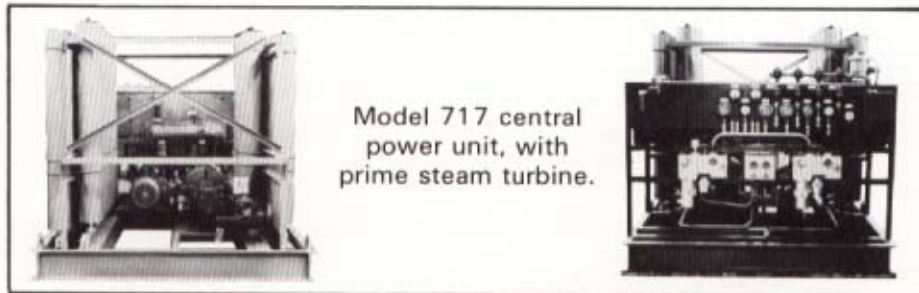
Model 790 for
one valve



Model 794 for
two valves

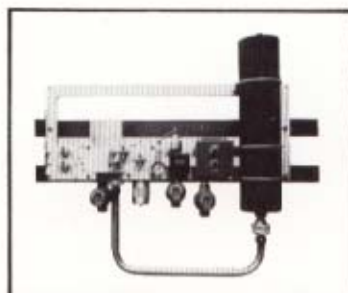


Model 790 with
single power system

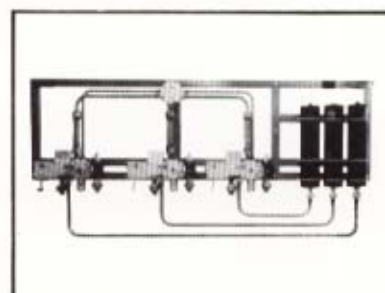


Model 717 central
power unit, with
prime steam turbine.

FIELD STATIONS FOR CENTRAL HPU



Model 713-12 field station
for throttling
valve.

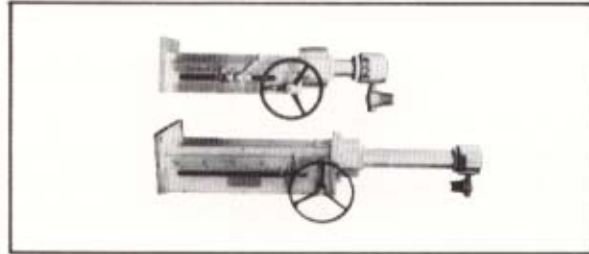
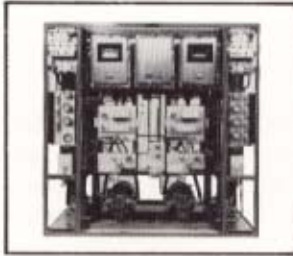


Field hydraulic station
for 3 on-off valves, with
auxiliary manual pumps.

OTHER PRODUCTS FOR REFINERIES

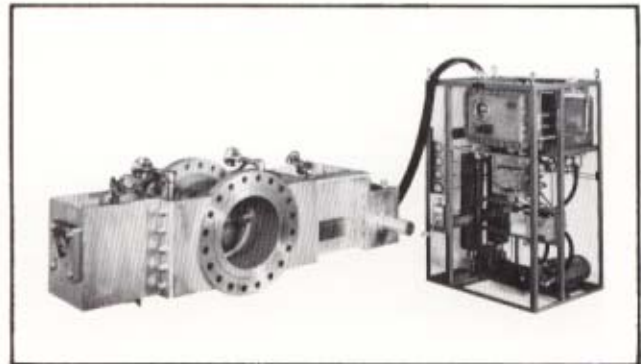
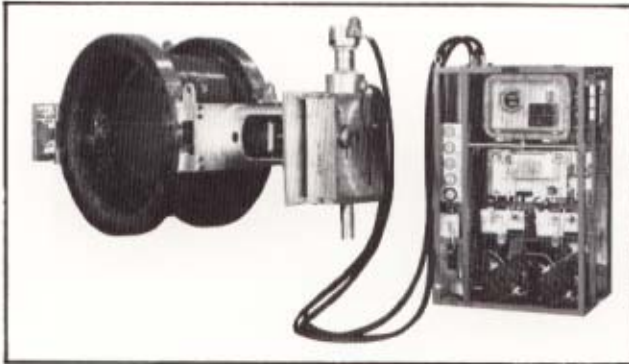
PLUG VALVE ACTUATORS

Request bulletin HP



BUTTERFLY VALVE ACTUATORS

Request Bulletin HB



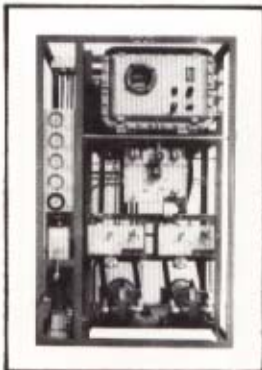
WEDGE GATE VALVE ACTUATORS

Call Bafco direct

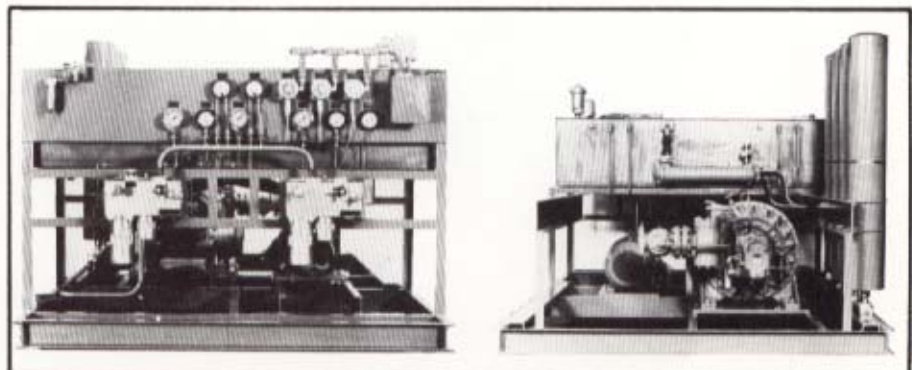


HYDRAULIC POWER UNITS

Request Bulletin HC



Dedicated



Central