PORTABLE HYDRAULIC VALVE TESTER

VALVETEST

User Manual

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OVERVIEW

VALVETEST is a portable hand-held self-powered hydraulic valve test unit. Capable of testing both servo and 24VDC proportional hydraulic valves, the unit's size is 6.9" x 6.3" x 4.5" and weighs 6.25 lb. An integral battery allows the tester to power both types of valves for extended periods of time. Valve test coil cords are supplied with the valve mating connector of your choice. The unit self-configures itself to output a current or a voltage command upon connection of the appropriate valve test coil cord to the unit. When testing proportional valves, an internal 24 VDC power source provides operating power to the valve's on-board electronics and a ±10V signal drives the valve spool. Servo valves are controlled in a similar fashion with a ±100mA signal driving the two valve coils, which can be operated in a series or a parallel electrical connection. The external power supply included with the unit operates from 120VAC and can operate the unit continuously or charge the internal battery.

CONTROLS

The front of the test unit includes all of the controls and indicators used in operation. An LCD meter displays the magnitude and sign of the output command being sent to the valve. A vertical LED array beside the LCD meter shows the output configuration of the unit: milliamps for servo valves and volts for proportional valves. A green LED shows that the unit is operating while red LEDs indicate a low battery charge condition, battery charging status and display of proportional valve current draw. User controls include a power switch to turn the unit ON or to CHARGE the battery, a servo valve coil SERIES/ PARALLEL connection switch, START and DISPLAY VALVE CURRENT momentary pushbutton switches and a single-turn VALVE COMMAND output control. The external power supply, valve test coil cords and a protection fuse are provided on the top face of the unit.

OPERATION

To test a valve, connect the appropriate coil cord to the valve in test and slide the eight conductor modular plug into the test unit's VALVE jack. To power the unit from the external power supply, connect the plastic circular connector on the power supply's output cord to the unit and plug the power cord into a 120VAC source. Move the power switch to the ON position and press the START switch. The unit turns on, automatically operating from the external power supply if powered and operating from the battery otherwise. The green power LED illuminates and the LCD meter shows the present valve command, determined by the position of the valve command knob. The appropriate red LED indicates that the unit is outputting a voltage or a current command to the valve, depending upon which valve test coil cord is attached. If a servo valve is being driven, set the series/parallel switch to the desired electrical configuration of the valve's coils. The valve command knob varies the magnitude and polarity of the current signal driving the coils. A precision current source maintains a steady output current to the servo valve, independent of the impedance of the valve's coils. If a proportional

valve is being driven, the valve command knob varies the magnitude and polarity of the voltage signal driving the valve. The internal power source provides the valve with 24VDC power at up to 2.0 amperes of operating current. The valve's current draw is monitored on the LCD meter by pressing and holding the DISPLAY VALVE CURRENT switch.

CHARGING

The LOW BATTERY LED glows when the unit's battery is near its discharged state. Several minutes after this LED illuminates, the unit turns off. The battery is charged with the external power supply. Connect the power supply to the unit, plug it into a standard wall outlet and move the power switch to the charge position. The FAST CHARGE LED lights, showing that the battery is being charged. When the battery attains an 80% charge level, the FLOAT CHARGE LED lights. A completely discharged battery requires about 5 hours to fully recharge and reaches an 80% recharge level after the first 3 hours. An internal fan operates to cool the unit's internal circuitry while charging and operating the unit. The fan operates automatically and its operation does not indicate that there is a problem with the valve tester.

EXTERNAL POWER

The external power supply operates the unit under full load indefinitely, regardless of the battery's state of charge. Operating times under battery power vary depending upon the valve-under-test's power requirements. A servo valve's power drain is small compared to that of a proportional valve. See the specifications table at the end of this manual for battery operating time estimates.

MAINTENANCE AND STORAGE

Before storing the valve tester, charge the battery for at least 5 hours to ensure that the battery is in a fully charged state. During long-term storage, charge the battery for at least 5 hours every 6 months. Maintaining a charged battery is critical to ensuring a long life. The battery included in this unit lasts 2-4 years if properly maintained, or provides approximately 100 or more full discharge-charge cycles. Charging the battery after each use extends the battery's life. The battery in this unit does not have discharge level "memory" like some batteries and partial discharge-charge cycles actually extend the battery's life. The battery is not harmed if the charger is left on for long periods of time.

TROUBLESHOOTING

Should the unit fail to operate, first check the fuse on the top side of the unit. A small flat-bladed screwdriver is required to remove the cap from the fuse holder. A blown fuse will have a break in the wire inside, which is visible through the glass. If the fuse is ok, the battery may be discharged to a level below that required for unit turn-on. Try connecting the external power supply and turning the unit on. If the battery is fully

discharged, move the power switch to the "CHARGE" position and allow the battery to charge for at least 5 hours. If the unit still fails to operate after performing these checks, return the entire unit to the manufacturer for evaluation and repair.

BATTERY REPLACEMENT

The battery is easily replaced by loosening the four recessed Phillips head screws located in the corners of the underside of the unit. With the unit sitting upright, carefully lift and remove the top half of the case and set it upside down beside the bottom half of the case. The four wires connecting the top and bottom halves of the unit do not have to be disconnected. Carefully remove the 1/4" wide receptacles connecting the red and black wires to the battery. Pliers may be required to help pull the receptacles from the battery tabs. With a steady upward force applied to the battery, separate the battery from the case. A flat-blade screwdriver or similar tool may be required to pry the battery from the case as it is attached to the case bottom with RTV silicone rubber. Slide the replacement battery into the case and connect the red and black wires onto the battery terminals.

Attach the black wire to the "**-**" terminal and attach the red wire to the "**+**" battery terminal. Before installing the top cover, ensure that the nylon screw retaining washers are in place on the case screws. Connect the external power supply and charge the new battery for several hours before use.

Electrical Specifications

Servo Valve Driving Capability:	
Output Current	±100 mA
Coil Impedance (at 100 mA output)	0 – 95 Ω
Coil Impedance (at 40 mA output)	0 – 250 Ω
Max output voltage	11 V
Proportional Valve Driving Capability:	
Output Voltage (command)	±10V
Valve Command Input Impedance	2.0 kΩ minimum
Power Supply Voltage to Valve	22 - 29 VDC
Power Supply Current to Valve	0 – 2.0 A
Power Supply Power to Valve	58 W maximum
Internal Battery:	
Type	Sealed Lead-Acid
Capacity	12 V, 5 Ahr @10 hr rate
Charging time, from full discharge	5 hr
Charging time, from full discharge to 80% charged	3 hr
Charging voltage, Fast Charge	14.8 V
Charging voltage, Float Charge	13.8 V
Charging current	2.9 A maximum
Run time (approximate):	
Driving a proportional valve drawing 0.5 A	3.5 hr
Driving a proportional valve drawing 1.75 A	45 min
Driving a servo valve drawing 40 mA	100 hr
Driving a servo valve drawing 100 mA	40 hr
Expected Life:	
Shelf life	2-4 years
Cyclical use-100% depth of discharge	100+
Circuit Protection Fuse	1/4” x 1 1/4” time delay fuse
Fuse Model	Bussmann MDL 6 1/4
External Power Supply:	
Power Output	80 W maximum
Voltage Output	18 VDC
Input Voltage	90-120 VAC
Input Current	2.1 A maximum
Input Frequency	47 – 63 Hz

Mechanical Specifications

Valve Tester:	
Length	6.9 in
Width	6.3 in
Height-to top of enclosure	3.9 in
Height-overall	4.5 in
Weight	6.25 lb
External Power Supply:	
Length	7.0 in
Width	3.8 in
Height	2.6 in
Weight	2.1 lb
Cable Lengths:	
Power Input	6.5 ft
Power Output	3.8 ft
Valve Coil Cord Length:	
Retracted	2 ft
Extended	5 ft
Unit package size	11.5 in x 9.25 in x 6.75 in
Unit package weight	11 lb