

Selecting A Schroeder Hydraulic Test Bench

Introduction

Hydraulic power systems are power transmission systems. The only purpose of the components, and of the circuit itself, is the controlled transfer of power from prime mover shaft to the point of effective work.

The factors of any hydraulic component efficiency, barring mechanical effects, are flow and pressure. When new hydraulic components have some slippage (internal leakage), this slippage will become evident when pressures are brought to operating levels. As wear increases component clearances, more and more available flow is lost before it gets to the circuit's working end. This is wasted power. Temperature affects the amount of slippage by increasing or decreasing the ease with which the fluid flows between working clearances.

Considerations

Schroeder test benches are designed for general shop testing of hydraulic pumps, valves, motors, and cylinders as individual components. Utilization of a Schroeder test bench enables the operator to conveniently simulate a component's function in its circuit and perform a realistic test, thereby providing the necessary quality control before any repaired component is replaced on a machine.

Component performance is determined by comparing test results of the component loaded with a manufacturer's specifications to an unloaded condition. When considering a bench for use in your shop, consideration should be given to the following factors:

1. The largest pump in terms of GPM at a given RPM, and its operating pressure?
2. The highest pump rating in terms of operating pressure and its rated output at a given RPM?
3. Do you have pumps running in two directions?
4. Do you have hydraulic motors, and what are their ratings in terms of output torque or cubic inch displacement and operating pressure?
5. How are your pumps and motors mounted i.e. foot, flange or both?
6. What type of valves and cylinders do you have, and what are their pressure ratings and port sizes?
7. Will you require two pressure sources for certain valves?
8. What is the capacity of your shop power source in type of service and capacity?

Application Considerations and Formulas

Pumps may be realistically tested at as low as 1000 RPM because pump slippage is not affected by speed. To determine if the Schroeder test bench you select has adequate horsepower to test pumps, the following rule of thumb formula using the answers to #1 and 2 above applies:

$$\frac{\text{GPM} \times \text{PSI}}{\text{HP} = \text{RPM}}$$

In Schroeder HTB's, a hydraulic motor drive with variable speed is used and drive specifications are given in terms of maximum available torque on the individual bench specification sheets. To determine if an HTB has adequate power to test your pumps, the following formula using the answers from #1 and 2 above applies:

$$\text{Bench Torque (ft. lbs.)} = \frac{\text{GPM}}{\text{RPM} \times \text{PSI} \times 3.5}$$

Larger pumps can be tested on any Schroeder bench by reducing the pressure at which the pump is to be tested.

Schroeder benches test hydraulic motors by measuring their slippage at operating pressure. This is accomplished by applying a load to the motor shaft and taking comparative tachometer (RPM) readings of the motor shaft speed under no load conditions. To determine the motor test requirements for any bench, apply the answers to #4 above to the following rule of thumb formula. It is applicable to standard hydraulic motors.

$$\text{Torque (ft. lbs.)} = \frac{\text{Displacement (cubic inches)} \times \text{PSI}}{75}$$

In determining the required GPM input to the motor to be tested, the motor shaft speeds can be as low as 250 RPM. Cylinder and valve testing are normally within the power requirements as determined above.

Schroeder
INDUSTRIES

Advanced Fluid Conditioning Solutions®

580 West Park Road | Leetsdale, PA 15056
ph. 724.318.1100 | fax 724.318.1200

www.schroederindustries.com

