



MOBILE HYDRAULIC TEST EQUIPMENT



The PCT Hydrapro Mobile Hydraulic Test Units are designed specifically for the speedy diagnosis of hydraulic circuit faults in mobile, marine and industrial systems using the normal range of mineral oils.

Their rugged construction based mainly on mild steel, manganese bronze and acrylic materials makes them ideally suited for arduous use in the field.

- ▶ Fast diagnosis of hydraulic circuit faults
- ▶ Flows ranging from 5–600 lpm
- ▶ Measuring flow, pressure and temperature
- ▶ Fully portable – no power source required
- ▶ Designed for oil applications only



TEST EQUIPMENT
SOLUTIONS

PRECISION ENGINEERING

DESIGNED AND MANUFACTURED TO MEET MAINTENANCE STANDARDS



HydraPro system analyser should be part of your predictive maintenance programme, allowing strategised pump, valve, motor and cylinder rebuilding. HydraPro provides instantaneous readings from the Lake Monitors flow meter and meter-mounted pressure and temperature gauges.

Central to the functionality of the device is the balanced valve, which ensures ease of operation even under load conditions. The HydraPro valve is fitted with a safety blow-out disc to protect the device from overpressure.

The HydraPro system test analyser is small enough to fit in a tool box and built to withstand rigorous industrial use. Ideally suited to the mobile market, but equally at home in the workshop, the hydraulic system analyser will save time and money by testing discrete components within the system, eliminating trial and error approaches.



HydraPro features Lake Monitors flow meters



FEATURES AND BENEFITS

- ▶ Fully portable, supplied with carrying case
- ▶ Instantaneous flow pressure and temperature data on one device
- ▶ Flows from 5–600 lpm can be monitored
- ▶ Operating pressures to 350 bar
- ▶ No electrical power required
- ▶ Integral safety disc guards against overpressure
- ▶ Use in any plane, even directly after a bend

SPECIFICATIONS

- ▶ Flow meters manufactured from 303 stainless steel
- ▶ Available in port sizes of 0.5–1.5 inches, BSP or NPT
- ▶ Flows from 5–600 lpm
- ▶ Maximum operating temperature of 116°C
- ▶ Measuring accuracy: $\pm 2.5\%$ of full-scale in the centre third of the measuring range; $\pm 4\%$ in upper and lower thirds
- ▶ Repeatability: $\pm 1\%$ of full-scale
- ▶ Standard calibration fluids: oil monitors: DTE 25® @ 110°F (43°C), 0.873 sg.
- ▶ Recommended filtration requirements: 74 micron filter or 200 mesh screen minimum



Hydraulic system monitoring made easy with an effective, quality manufactured instrument from PCT



PRODUCTS



High Pressure HydraPro:
for all your testing needs



HydraPro Block:
for pressure and temperature monitoring



HydraPro Low Pressure:
for water and air applications

ORDERING INFORMATION

| Range LPM | Pressure & Temp Range | Inlet | Model No |
|-----------|-----------------------|-------------|-----------------|
| 5-56 | 350 Bar & 120°C | 0.5 inches | HP-03-S-015-TKV |
| 5-38 | 350 Bar & 120°C | 0.75 inches | HP-04-S-010-TKV |
| 10-78 | 350 Bar & 120°C | 0.75 inches | HP-04-S-020-TKV |
| 10-110 | 350 Bar & 120°C | 0.75 inches | HP-04-S-030-TKV |
| 5-38 | 350 Bar & 120°C | 1 inch | HP-14-S-010-TKV |
| 10-78 | 350 Bar & 120°C | 1 inch | HP-14-S-020-TKV |
| 10-110 | 350 Bar & 120°C | 1 inch | HP-14-S-030-TKV |
| 15-150 | 350 Bar & 120°C | 1 inch | HP-14-S-040-TKV |
| 20-190 | 350 Bar & 120°C | 1 inch | HP-14-S-050-TKV |
| 10-110 | 350 Bar & 120°C | 1.25 inches | HP-05-S-030-TKV |
| 20-190 | 350 Bar & 120°C | 1.25 inches | HP-05-S-050-TKV |
| 40-280 | 350 Bar & 120°C | 1.25 inches | HP-05-S-075-TKV |
| 50-380 | 350 Bar & 120°C | 1.25 inches | HP-05-S-100-TKV |

Alternative flow rates available – consult your dealer

FIVE HYDRAPRO TEST METHODS

A properly designed and maintained hydraulic system will perform dependably under extreme conditions, but as its components begin to wear overall efficiency of the system will suffer. This loss of efficiency can place a strain on the other components in the system, resulting in higher oil temperatures which tend to jeopardise the lubricating properties of oils. The other issue that results from improperly operating hydraulic systems is the increased energy consumption that can be expected.

THE TROUBLESHOOTING PROBLEM

Because a loss of efficiency can be attributed to a variety of component failures, a systematic approach to troubleshooting will locate the source of the failure quickly and positively. Simply replacing system components on a trial and error basis will waste time and money.

THE TROUBLESHOOTING SOLUTION

To assure proper operating characteristics of hydraulic system components, HydraPro offers its proven product and a five-step method to systematically perform hydraulic troubleshooting. As with all test equipment, users should be knowledgeable with their system operating characteristic.

STEP 1: Basics

Before any extensive troubleshooting procedures are started, the following two items need to be verified:

- ▶ Ensure that the suction strainer, located either in the line between the reservoir and pump or inside the reservoir, is clean. Restrictions in the pump's suction line will cause pump cavitation and loss of high pressure and can cause excessive pump noise.
- ▶ Ensure that the suction line within the reservoir is covered with at least three inches of oil. Failure to maintain a flooded suction line can also lead to the conditions stated above.

STEP 2: Pump output

To measure the hydraulic horsepower that is being generated by the system's pump, the HydraPro should be plumbed directly in-line between the system's pump outlet and relief valve. Be sure to orient HydraPro so that its flow direction arrow corresponds with the actual flow direction.

Open the flow control valve fully counter clockwise (CCW), start the system and bring the oil temperature to standard operating temperature.

With the pump operating at the RPM recommended by the manufacturer, note the indicated flow rate. Adjust the load valve clockwise (CW) until the pressure indicated is just below the relief valve setting. Note the flow rate. A drop of more than 10% in flow rate (flow rate under pressure/flow rate at no pressure = less than 0.9) or an indication lower than what is specified by the pump manufacturer indicates a need for pump service.

STEP 3: Relief valve

To test for proper operation of the system's relief valve, install HydraPro immediately downstream from the valve, ensuring proper orientation. Open the valve fully CCW, start the system and operate until it reaches normal operating temperature.

With the pump operating at the RPM recommended by the manufacturer, gradually close the load valve, noting the pressure that the flow rate drops off at. If that pressure differs from the system's design pressure, the valve may need to be adjusted or replaced.

STEP 4: Testing hydraulic cylinder leakage

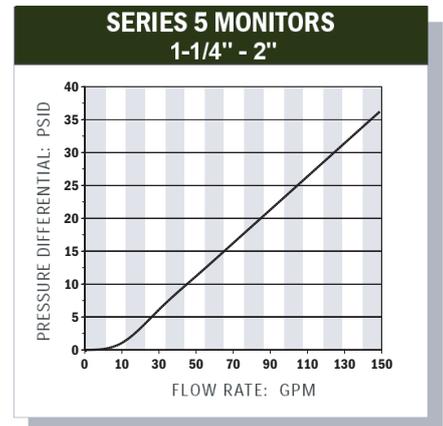
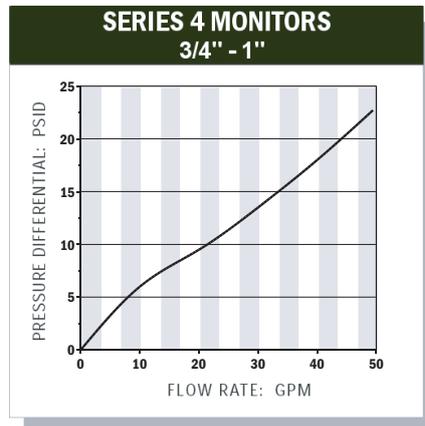
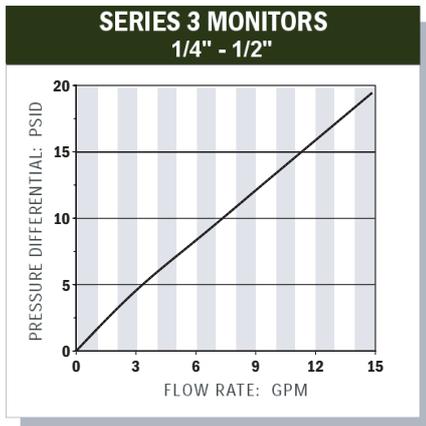
If steps one through three are acceptable, the problem lies downstream from those components. One source of poor system performance can be faulty seals in hydraulic cylinders. To test the cylinder's seals, run the piston to one end of its stroke and leave it installed in this position under pressure. Crack the fitting on the same end of the cylinder and check for fluid leakage. After checking, tighten the fitting, run the cylinder to the opposite end of the barrel and repeat the test. This test can be repeated at the mid-point of the stroke by blocking the cylinder and testing for leakage at that point. Leaking seals should be replaced as needed.

STEP 5: Directional control valve

To test for leakage in a directional control valve, disconnect the flow line exiting the control valve and connect the line to the HydraPro inlet. Connect the outlet to a line returning to the reservoir. Fully open the load valve by turning it completely CCW. Start the system's pump and allow the oil to reach proper operating temperature.

To test the valve, shift the valve to allow flow to pass through the HydraPro. Operate the system's pump at its rated RPM – note the flow rate indicated. Gradually increase the system pressure by turning the load valve CW until system pressure is just below the relief valve setting. Note the indicated flow rate. If the flow rate has dropped more than it did in step two, the valve needs servicing.

PRESSURE DROP CURVES



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