



Flo-Check[®] USB Hydraulic System Analyzer

The Flo-Check USB represents the next generation of hydraulic test equipment. The device simultaneously measures flow, pressure, temperature and power within a hydraulic system. This data is displayed and logged through a custom Windows[®]-based software application; data is received from the Analyzer through a standard USB cable (both software and cable are included with the unit). The Flo-Check USB is ideal for testing, troubleshooting and diagnosis in mobile and industrial hydraulic applications, and for setting hydraulic components such as pumps, valves and motors. The unit is bi-directional and includes a low-resistance load valve and internal pressure relief discs.



Flo-Check® USB

Hydraulic System Analyzer

Features

- Accuracy: $\pm 1\%$ of reading @ 32 cSt
- Field selectable US or metric readings
- High and low set point alarms for flow, pressure and temperature
- Captures pressure spikes up to 10,000 PSI (0.2 milliseconds duration)
- Exports saved data to Microsoft Excel® and other spreadsheet programs
- USB powered
- Easy to use, plug and play
- Calculates hydraulic power
- Select continuous data logging or capture data manually
- Logs up to 12 hours
- Records alarm history



Overview

The Flo-Check USB Hydraulic System Analyzer can be used as a stationary or portable tester for both industrial and mobile hydraulic system diagnostics, and analysis of the prognostic health of a hydraulic system. It features flow, pressure and temperature sensors that are monitored by a data acquisition module. This module records the operating parameters of the system and transfers them to the user's laptop via the USB port.

The custom software utility is a Windows®-based application which is compatible with Windows Vista®, Windows XP and Windows 2000. This intuitive software configures the displayed information into user-selected engineering units and provides real-time graphics with instantaneous readings and trends for all three measurement parameters. The software also permits the data to be saved for export into a spreadsheet program.

The Hydraulic System Analyzer is powered through the USB port of a PC, making it easy to setup and ideal for portable applications. Interfaced to the PC application, the Hydraulic Analyzer offers a straightforward method of monitoring system parameters complete with data acquisition.



Specifications

MATERIAL

Housing: 6013-T351 Anodized aluminum

Turbine Rotor: T416 Stainless steel

Rotor Supports: 6061-T6 Aluminum

Seals: Viton® standard; EPR optional

Ball Bearings: 440 C Stainless steel

Hub Cones: 6061-T6 Aluminum alloy

Temperature Probe: 12L14 Steel, electroless nickel plate

Valve: 12L14 Steel body with 303 SS stem

Spool/Sleeve: 12L14 Steel

Ports: SAE Straight thread O-ring boss, female, J1926/1; BSPP ISO1179

Magnetic Pick-up

Body: 12L14 Steel, electroless nickel plate

Nut: 12L14 Steel, electroless nickel plate

Electronic Case & Cover: Cold rolled steel, black zinc plate with clear seal

POWER

USB Power: +5 VDC (supplied through USB port of a PC)

USB Voltage Tolerance: +4.6 VDC min, +5.25 VDC max

Current: 100 mA, typ

ENVIRONMENTAL

Pressure Rating: 6000 PSI (414 Bar) maximum with a 3:1 safety factor; capable of 10,000 PSI transients

Operating Pressure: <6000 PSI (414 Bar, 41.4 MPa, 420 kg/cm²); capable of 10,000 PSI transients

Internal Valve By-pass: 7500 PSI DP

Pressure Drop: See ΔP charts on page 4

Fluid Temperature: -4 to +300 °F (-20 to +150 °C)

Ambient Temperature: +32 to +185 °F (0 to +85 °C)

Storage Temperature: -40 to +185 °F (-40 to +85 °C)

Humidity: 0-90%, non-condensing

PERFORMANCE

Flow

Accuracy: $\pm 1\%$ of reading @ 32 cSt

Repeatability: $\pm 0.2\%$

Pressure

Accuracy: $< \pm 0.5\%$ BFS (±50 PSI)

Stability: $< \pm 0.25\%$ of full scale (±25 PSI)

Zero Offset: $< \pm 2\%$ of full scale (±200 PSI)

Span Tolerance: $< \pm 2\%$ of scale (±200 PSI)

Temperature

Calibration Error (25 °C): ± 1 °C

Absolute Error (over full range of sensor, 0 to +150 °C)

Without Calibration: ± 3 °C

With Calibration: ± 1.6 °C

Nonlinearity: ± 0.4 °C

Repeatability: ± 0.1 °C

Data Acquisition

Sample Rate: 10 kHz

PC Screen Update/Record Rate

Flow: 1 second (average 10K samples)

Temperature: 1 second (average 10K samples)

Pressure: 1 second (min, max, average 10K samples)

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Software

The Flo-tech Analyzer software provides a real-time graphical and digital interface for monitoring and/or recording pressure, temperature, and flow rate parameters from the Hydraulic Analyzer. In addition to the graphical and digital displays, the main screen also consists of a menu bar, buttons with common functions, and alarm indicators.

The software offers the following options:

- View real time pressure, temperature, flow rate and power measurements
- Record all measurements to a file
- Choice of recording all measurement points or capturing points manually
- Selection of all measurement units, US or metric
- Ability to adjust display of graph data
- High/Low alarm indicators set by the operator



Table 1

All measurements taken (as shown in Table 1) can be saved once per second to a comma separated value (.csv) file for export into a spreadsheet program. For example, recording for 2 minutes would yield 120 points of data. Even though data points are only recorded once per second, pressure spikes and dips are captured by recording the maximum or minimum pressure during each measurement period. Therefore, the precise shape of the pressure spike is not recorded but its amplitude and the time it occurred are both recorded.

Measurement (over a 1 second time period)	Color Indication	Alarm Indication	Digital Indication	Graphical Display	Record to File
Average Pressure	Green	●	●	●	●
Minimum Pressure	Dark Green	●	●	●	●
Maximum Pressure	Dark Green	●	●	●	●
Average Temperature	Blue	●	●	●	●
Average Flow Rate	Yellow	●	●	●	●
Average Power	Orange	●	●	●	●

Graphs

The graph on the main screen contains more than 60 points of data. Previous data points are saved in memory and can be viewed at any time. Adjustments can be made to optimize data that is displayed by hiding individual graph plots, adjusting the scale of each plot or adding horizontal gridlines to the graph.

Alarms

There are three sets of High/Low alarm indicators on the main screen that monitor pressure, temperature, and flow rates. Alarm indicators flash if the current system measurements exceed the alarm limits set by the operator; they continue to flash when the current system measurements return to normal, to alert the operator that an alarm condition occurred. Alarms must be reset manually to acknowledge the alarm condition.

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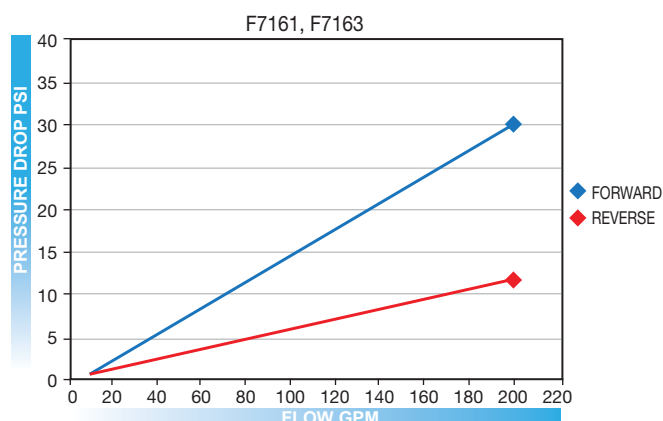
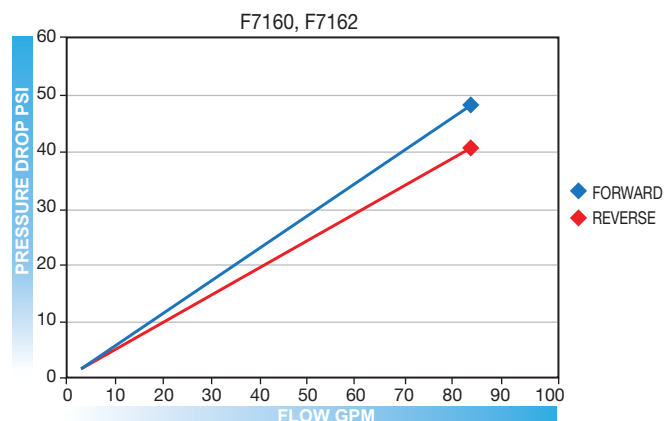
Ordering Information

MODEL NUMBER ¹	NOMINAL PORT SIZE	FLOW RATE
F7164	SAE 12	2-30 GPM
F7160	SAE 16	3 - 85 GPM
F7161	SAE 24	7 - 199.9 GPM
F7165	G 3/4	7.5 - 113.6 LPM
F7162	G-1	15 - 321 LPM
F7163	G-1-1/2	26 - 757 LPM

¹Each Flo-Check Hydraulic System Analyzer includes a 16.4 ft. (5 M) USB, A male to B male (IP 68) connection cable, CD-ROM software utility, and complete operating instructions packaged in a protective carrying case.



Flow vs Pressure Drop Charts — ΔP Captured Using Loading Valves



Note: For Flow vs Pressure Drop information on the F7164 and F7165 models, consult the factory.



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