Flo-Check® USB Hydraulic System Analyzer

Simultaneously Measures Flow, Pressure and Temperature

- Flow accuracy ±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 monitoring or capture data manually
- Logs up to 12 hours
- Records alarm history

The Flo-Check 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 set up 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

Performance

Flow:	
Accuracy	±1% of reading @ 32 cSt
Repeatability	±0.2%
Pressure:	
Accuracy	<±0.5% BFSL
Stability	<±0.25% of full scale
Zero Offset	<±2% of full scale
TC Zero and TC Span	<±1.5% of full scale
Response Time	0.2 milliseconds
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)

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 ΔP
Pressure Drop:	See ΔP charts on page 14
Fluid Temperature:	-40 to +300 °F (-40 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

Material

Housing:	6013-T351 Aluminum; anodized
Turbine Rotor:	T416 Stainless steel
Rotor Supports:	6061-T6 Aluminum alloy
Seals:	Viton® standard; EPR optional
Ball Bearings:	440C Stainless steel
Hub Cones:	6061-T6 Aluminum alloy
Temperature Probe:	T303 Stainless steel
Valve:	12L14 Steel body with 303 SS seat
Spool/Sleeve:	12L14 Steel
Magnetic Pick-up:	
Body	12L14 Steel; electroless nickel plate
Nut	12L14 Steel; electroless nickel plate
Electronic Case:	Cold rolled steel; black zinc plate with clear seal
Ports:	SAE Straight thread O-ring boss, female, J1926/1; ISO1179 (BSPP)

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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:

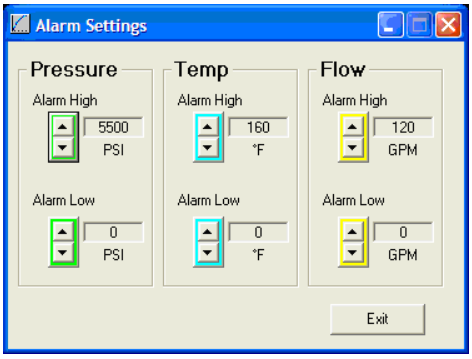
- View real time pressure, temperature, flow rate and power measurements
- Record all measurements to a file
- Choice of recording all measurement points or capturing points manually
- Selection of all measurement units, US or metric
- Ability to adjust display of graph data
- High/Low alarm indicators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

All measurements taken 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 which monitor pressure, temperature and flow rate. Alarm indicators flash if the current system measurements exceed the alarm limits set by the operator and 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.

ORDERING INFORMATION

MODEL NUMBER[1]	NOMINAL PORT SIZE	FLOW RANGE
F7160	SAE 16	3 - 85 GPM
F7161	SAE 24	7 - 199.9 GPM
F7162	G 1	15 - 321 LPM
F7163	G 1-1/2	26 - 757 LPM

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

ACCESSORIES

MODEL NUMBER	DESCRIPTION
F001109	5-Point Calibration Certificate [2]
F001110	10-Point Calibration Certificate [2]

MODEL NUMBER	DESCRIPTION
F1614-7500	Pressure Relief Disc, 7500 PSI (1 per Tester)

[2] Certificates are traceable to NIST, ISO 9001.