

MF101 SPECIFICATIONS & FEATURES

Introduction

The MF101 series simulators are the most technologically advanced hydraulic training systems currently available for teaching Basic Hydraulics through Advanced Troubleshooting Hydraulics.

They are designed to make the job of teaching hydraulics simple and straightforward while at the same time making the task of learning exciting, challenging, and, rewarding.

The MF101 series simulators offer a number of unique standard features:

1. *Turnkey Training System* – instructor's manuals, full-color, dynamic CD's (PowerPoint and interactive formats), student manuals and workbooks, on-line help, plus, we can train your instructor(s) – all you need to do is add the students!
2. *Integrated Loading* – the transition from classroom to field can be daunting if a student learns hydraulics in an environment consisting exclusively of "imagination" and "simulation." Also, learning hydraulics in a "no-load" environment is not conducive to a rewarding learning experience. The MF101 series simulators leave nothing to the imagination because the cylinder can operate with and without load.
3. *No Product Bias* – The FPTI™ is a respected professional training institution. Our training systems are built with products from a number of reputable manufacturers. The goal is to learn, not sell!
4. *No Industry Bias* – An instructor will feel as comfortable teaching mobile hydraulics as he/she will teaching industrial hydraulics.
5. *Environmentally Friendly* – The MF101 series simulators are designed to operate with either petroleum-based oils, or biodegradable, vegetable-based oils.
6. *Fixed Displacement Pump & Pressure Compensated Pump Environment on One Simulator* – this exclusive feature allows students to learn fixed displacement pump circuits and graduate seamlessly to pressure-compensated pump circuits..

Add the optional load-sensing package, and the simulator can operate seamlessly in all three modes: fixed displacement; variable displacement, pressure-compensated, and, load-sensing. The interaction between the outstanding full-color, PowerPoint presentation, which shows exactly how a load-sensing system works, together with the real-time load-sensing system makes load-sensing easy to teach and learn – there is no easier method!

7. *Teach both Practical Hydraulics and Troubleshooting Hydraulic Components and Systems with one training system (MF101-TS & TSE models only)* - the models MF101-TS & TSE transition seamlessly from a basic/advanced hydraulics trainer into a comprehensive troubleshooting hydraulic components trainer. To facilitate "one-on-one" pump

testing, the entire power-unit swings out into plain view – just another “real-world” feature designed into the MF101-TS & TSE model trainers which allows the student to learn how to execute-in-line pump flow testing, pump inlet restriction testing, and prime-move speed testing.

8. *Features components typically found in mobile and industrial hydraulic systems* – over 20 different components, and more than 6 diagnostic instruments (TS & TSE models only) make the MF101 series simulator one of the most well-equipped training systems available.
9. *Industry Standard Markings* – for safety purposes, all components feature port identification markings, which are industry standard. Absolutely no component is altered for the purpose of training.
10. *Flat-Faced Quick-Disconnects Mean Absolutely No Mess* - to enhance safety in the classroom the MF101 series simulators are equipped with state-of-the-art, flat-faced quick-connect-disconnect fittings. Unfortunately, quick-disconnects are notorious for locking if a student should make an error by connecting one end and not the other. No problem! We anticipated this and built in a quick-disconnect release system. Students never have to resort to executing hazardous practices, i.e. loosening a locked quick-connect/disconnect. At the push of a button, the pressure is released.

The MF101 series simulators are equipped with the following standard components (except as noted):

1. All-steel, uni-frame design with tubular construction
2. All non-flexible transmission lines made from stainless steel tubing with Swagelok-type connections
3. All steel parts finished in high-quality powder coating
4. Four-wheel, heavy-duty casters with wheel locks
5. 2.5 Gallon (9.5liter) hydraulic reservoir integrated in frame
6. 1HP, 120V, single-phase, electric motor – operates on a single 20-amp circuit
7.
 - a) Pressure-compensated, axial piston-type pump – 1 GPM, 1000 PSI
 - b) Fixed displacement pump
8. Pressure Control Valves:
 - a) Direct-operated pressure relief valve
 - b) Pilot-operated pressure relief valve with remote option
 - c) Sequence valve
 - d) Counterbalance valve
 - e) Pressure reducing valve
9. Directional Control Valves:
 - a) 3-position, 4-way, open-center, handlever-operated directional control valve
 - b) 3-position, 4-way, tandem-center, handlever-operated directional control valve with dual one-way flow control valve stacked module
 - c) 3-position, 4-way, tandem-center, solenoid-operated directional control valve
 - d) 3-position, 4-way, closed-center, solenoid-operated directional control valve
 - e) 3-position, 4-way, float-center, handlever-operated directional control valve
 - f) 3-position, 4-way, float-center, handlever-operated directional control valve

10. Flow Control Valves and Flow Dividers:
 - a) Needle valve
 - b) Flow control valve
 - c) Restrictor-type pressure-compensated flow control valve
11. Check valves:
 - a) Conventional in-line
 - b) Pilot-operated (pilot-to-open)
 - c) Shuttle valve (with load-sense option only)
12. Actuators:
 - a) Bi-directional hydraulic motor with load capability
 - b) Double-acting, single-rod cylinder
 - c) Double-acting, double-rod cylinder with load/no-load capability (model MF100-B does not include load capability)
13. Hydraulic hoses with quick-disconnect fittings:
 - a) Six (6) 24" hoses - Twelve (12) 40" hoses
 - b) Two (2) hose connectors - to extend hose length
14. Six (6) "T" assemblies
15. Two (2) in-line flow meters
16. Three (3) Glycerine-filled, Bourdon tube pressure gauges (0 – 1000 PSI)
17. Digital tachometer
18. Digital oil temperature gauge
19. Digital ambient temperature gauge
20. Electronic stopwatch with auto retract
21. Ammeter
22. Return-line, spin-on/off filter with by-pass indicator
23. Oil level sight glass
24. Oil reservoir filler/breather located in drip tray to prevent spilling
25. Integrated load with solenoid-operated load engagement mechanism
26. Illuminated load select and de-select switch
27. Motor on/off switch with thermal protection
28. Two (2) joystick controllers for solenoid-operated directional control valves
29. All moveable parts are covered with transparent protective covers
30. Two (2) lined work trays are located on motor housing to hold diagnostic instruments and tools for pump set-up, adjust, and test (if applicable)
31. Integrated, swing-out paper towel holder
32. Swing-out/stow-away hose caddy, which holds all hydraulic hoses and "T's" neatly. Quick-disconnects are conveniently held in upright position to prevent oil leakage.
33. Front panel is fabricated out of 3/16" brushed aluminum. All components are clearly marked with their respective symbols silkscreened onto the aluminum panel for a lifetime finish.
34. Four (4) 24 VDC receptacles (model MF101D - *double-station unit*)
35. Valve Docking Plate (VDP) allows the addition of numerous optional valves to be used on the simulator.

The MF101-TSE (touchscreen-operated troubleshooting) models are equipped with the following additional components:

1. On-board, programmable computer with 19" touchscreen monitor
2. All valve bodies are modified to accept leak tubes
3. Double-rod cylinder is modified to accept leak tubes
4. Pump is modified to facilitate internal leakage feature
5. Directional control valve manifold is modified to accept leak tubes
6. Integrated Δ pressure/leak test pump
7. In-line flow meter with integral load cell and pressure gauge
8. Glycerine-filled, vacuum gauge with direct adapter
9. Digital, non-contact laser, hand-held tachometer

Δ Pressure/leak testing is a method for testing hydraulic components, which was developed by the Fluid Power Training Institute™. The objective of pressure/leak testing is to teach students how to test the vast majority of hydraulic components in a hydraulic system while the power source is completely locked out.

The MF101 series simulators also include the following (except as noted):

One (1) set of CD's (Power Point format) covering the following topics:

- Safety with Hydraulics
- Basic Hydraulics
- Pressure Control Valves
- Hydraulic Pumps
- Check Valves, Accumulators, and Actuators
- Reservoirs, Coolers, Hoses, and Connectors
- Directional Control Valves
- Flow Control Valves
- Proactive Maintenance and Filtration
- Practical Hydraulics Trainer Activities
- *Troubleshooting Hydraulics Trainer Activities (not included on model MF101-PH)
- Closed-Loop Oil Systems – Hydrostatic Transmissions
- Highly interactive, self-tutorial CD – How to Interpret ANSI & ISO Fluid Power Symbols

Books and other items included per simulator (quantities listed are for a single-sided unit):

Qty.	Part#	Description
4	HC-R008B	Practical Hydraulics Student Workbook with filtration book
4	HC-R004	*Troubleshooting Hydraulics Student Workbook
4	HC-R014	*Troubleshooting Hydraulic Components using LPA Methods
4	HC-R016	How to Interpret Fluid Power Symbols book
4	HC-R015	A Pocket Guide for ANSI and ISO Symbols booklet
4	HC-SDT-010	Fluid Power Symbol Drawing Template
4	HC-R-8470	Flange Identification Template
4	HC-R005	Introduction to Closed-Loop (hydrostatic) Transmissions

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