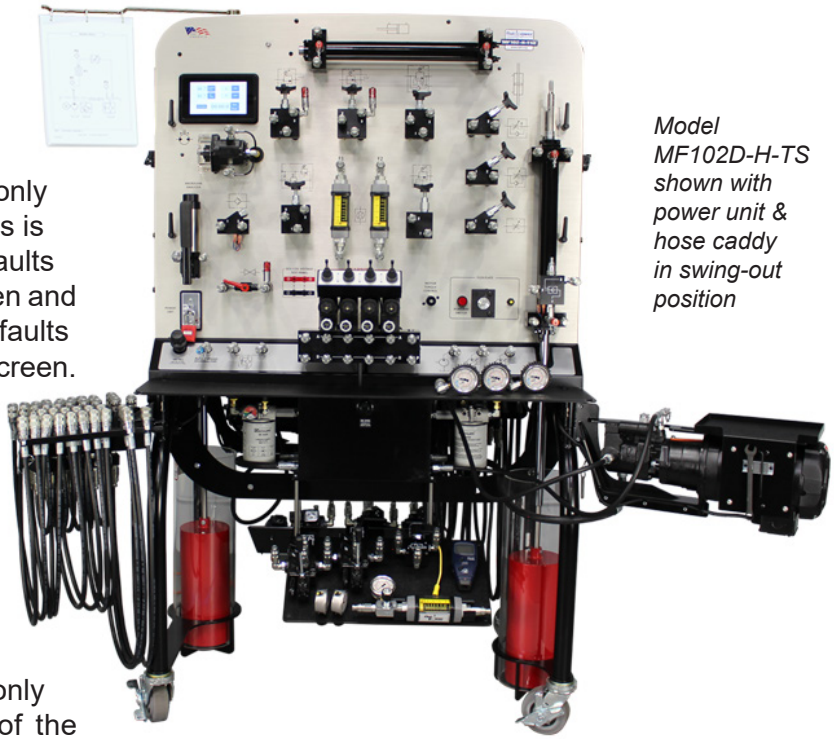
Hydraulic Training Systems

Teaching and learning hydraulics in real-time

MF102-H-TS Hydraulic Training System -

Handcrafted with pride in AMERICA

MF102-H-TS Training System -
The Model 102-H-TS has the same features and capabilities as the models MF102-H and MF102-H-TSE.



Model MF102D-H-TS shown with power unit & hose caddy in swing-out position

The letters “TS” denote troubleshooting. The only difference between the “TS” and “TSE” models is that the “TS” model has manually controlled faults which are entered on the panel-mounted screen and the “TSE” model has electronically controlled faults which are automatically entered via the touchscreen.

The “TSE” model is equipped with an on-board panel PC and a 22” (56cm) touchscreen. The MF102 series training systems are FPTI™’s flagship models and are undoubtedly our best-selling products.

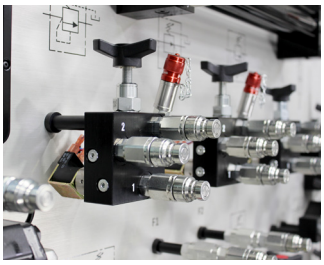
Over a decade of research -

- FPTI™’s founder and chief designer is not only a legendary teacher, but he is also one of the most respected hydraulic diagnostics technicians in the country. His contribution to safe and effective troubleshooting is remarkable:
- He conducted a ten-year study of leakage rates in hydraulic components.
- He developed a technique that makes it possible to test over 95% of the components in any hydraulic system with the power unit safely locked out. There is no need to remove or disassemble the components, and each test averages 15 minutes.
- He wrote a best practices manual on safe techniques for testing hydraulic components.
- He is aware of the critical shortage of hydraulic diagnostic technicians the USA, and indeed the world, faces.

In collaboration with industry and education FPTI™ developed a much-needed solution -
It took FPTI™ over ten years to develop the most effective hydraulic training system on the planet. In the hands of a properly trained teacher the model MF102-H-TS training system has the power to turn ordinary technicians into extraordinary hydraulic technicians because they will have the skillsets needed to revolutionize the industry.

Here are just a few of the MF102-H-TS’s most outstanding and exclusive features:

• ***Safety*** **–** the MF102-H-TS is equipped with the same lockout system used in industry. It also has FPTI™’s exclusive Safe-T-Bleed® system for de-energizing and air-bleeding hydraulic systems and components. Almost every page in the brilliant textbooks, every Power-Point™ slide, and every trip to the training system is designed to remind students of their most important responsibility – safety.



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• ***Load-cycle capable –*** At the push of a lever the cylinder lifts an onboard load into the air, and the bi-directional hydraulic motor has infinitely variable torque capability for a realistic training and trouble-shooting experience.

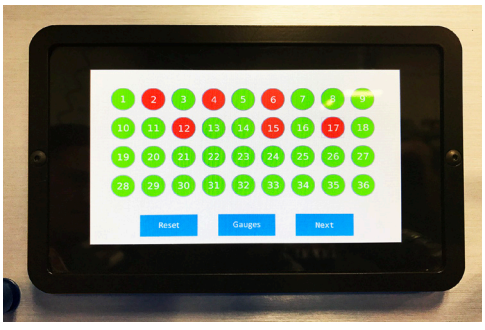
• ***Pressure/leak Testing –*** this revolutionary technique, developed by FPTI™, will teach students how to test 95% of the components in a hydraulic system with the power unit safely locked out. There is no need to remove or disassemble components, and each test averages 10 to 15 minutes. Quite frankly, there is no other way to test these components.

• ***Button-activated fault insertion –*** activating a button on the panel-mounted touchscreen makes it possible for almost every component on the MF102-H-TS to automatically "wear out."

FPTI™ studied wear patterns in hydraulic components for a decade and designed the identical wear patterns into the components on the training system.

• ***Student-driven troubleshooting activities –*** Usually when fault switches or buttons are manually operated they are concealed and the teacher needs to tell the students to "disappear" while a fault is being introduced.

To keep the student's minds on the topic and to avoid undue stress on the teacher, FPTI™ put the fault buttons in clear sight and easily accessible for the students on the panel-mounted touchscreen.



When a student conducts a troubleshooting activity located in their Simulator Student Activity workbook he/she simply activates the specified buttons and proceeds with the activity. Upon completion of the activity the student records which component(s) was defective and then resets the buttons for the next activity.

Additional random buttons are specified in each activity to prevent the students from learning which buttons fault each component.

• ***Masterfully develops thinking skills –*** the single most important skill technicians must learn is to think. The MF102-H-TS teaches this skill masterfully.

When a student is given an assignment, timely and satisfactory completion of the task is determined by how much "thinking" the student applies to the problem. The student starts out with a "chief complaint" and one, or more symptoms: identical to a real world situation.

The training system activities are designed to let students practice what they are taught about theory, protocols, and practical demonstrations performed by their teachers. In no time at all you will have your students challenging each other as to who can troubleshoot a problem in the least amount of time, with the least number of attempts, and having replaced the least number of components:
Isn't that exactly what industry is crying for?

• ***Learn in real time on real systems –*** You can achieve a level of training on the MF102-H-TS that's almost impossible to achieve on an actual machine: if, for no other reason than safety.

You can give the student a copy of the hydraulic schematic for any type of machine. Then, while it's operating in real time under actual load cycles, the students can learn to troubleshoot it – in the safety and comfort of
the classroom.

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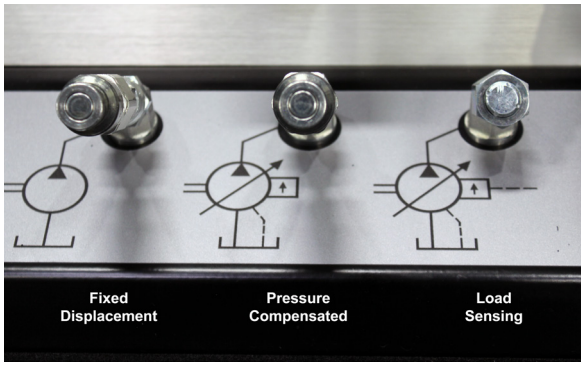
Teach any type of system or component -

- Fixed displacement pump - standard
- Pressure-compensated pump – standard
- Load-sensing pump – optional

Students advance from fixed displacement pump circuits, to pressure-compensated pump circuits, and, if the curriculum permits, load-sensing circuits, on one training system.

Why this feature is important:
The most logical learning path for a student is to begin with fixed displacement pumps, and then advance to pressure-compensated pumps and then to load-sensing pumps.

The MF102-H-TS training system provides instructors the opportunity to teach all of these popular systems.



Unprecedented student retention -
MF102-H-TS training system achieves the highest student retention of any hydraulic training system currently available – bar none!

Hardware in perfect harmony with the software -
The MF102-H-TS training system works in perfect harmony with the equally as well engineered curriculum, visual aids, textbooks, PowerPoint™ presentations, animations, and support. Why does our course teach pressure control valves before pumps? Because a pressure compensator is a pressure relief valve. Why does it teach flow control valves before load sensing systems? Because the flow compensator in a load-sensing pump is a pressure-compensated flow control valve.

Six directional control valves -

- Three (3) industrial-type (parallel)
- One (1) industrial-type (series)
- One (1) mobile-type (cylinder spool center)
- One (1) mobile-type (motor spool center)

Why these features are important:
Students graduate from learning simple, single-valve/single actuator, circuits to constructing the types of circuits they will see in any plant or on any construction machine. There is almost no limit to the number and variety of circuits students can construct on the MF102-H-TS training system.

The MF102-H-TS –
A winner that begets winners
When well-trained technicians can troubleshoot hydraulic systems safely, effectively, and time efficiently everyone wins.

The technicians win because they are safe, productive and proud. Their company wins because problems are solved safely, efficiently and cost effectively. Teachers win because they provided students with the tools they needed to become brilliant technicians.

And finally, schools win because they fulfilled their responsibility to the teachers, students, industry, and society.

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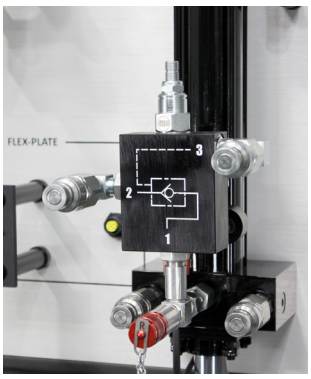
Port identification consistent with industry standards -

It is absolutely critical that students learn how important it is to make proper transmission line connections when installing hydraulic components or reconnecting transmission lines. An error can result in severe injury or death.

Component manufacturers typically use letters and/or numbers for port identification. All components on FPTI™ training systems are marked with the appropriate identification. Also, all hydraulic schematics in the student activities manuals show the appropriate markings.



Not just a training simulator, an entire turn-key training system -

Not only do you get the most advanced hydraulic training simulator in the world, you also get everything you need to conduct a world-class course:

- Textbooks - written and produced by one of the most successful and renowned hydraulics instructors in the industry - FPTI™'s founder Rory S. McLaren.

Every topic is to the point and safety-based.

- Student workbooks - well written and superbly illustrated with need-to-know information.
- PowerPoint™-based CD's covering at least 40 hours of instruction in hydraulics and another 40 hours of advanced diagnostics.
- Instructor answer books.
- Student workbook and Instructor answerbook available for purchase.

Everything you need to conduct a "world-class" course is included

It's limits? - Your imagination -

Teach any pump/system – fixed displacement, pressure compensated, load-sensing. Teach any type of component - even the one's it doesn't have – with the optional Flex-Plate modules.

Simply fasten your unique component to a universal mounting plate (available from FPTI™) and when needed clip it on the FlexPlate - no hardware needed.

There is also a convenient 24VDC power supply and illuminated on/off switch for electric valves. Many of the add-on valves are available - ready-to-use - from FPTI™. See the entire assortment at:

www.fpti.org

If you don't see what you are looking for on our website let us know and we will build it for you - ready to use.

Flex-Plate modules expand the capability of your MF102 series training system

Plug-and-Play modules give the MF102 series unlimited training flexibility -

Want to teach mobile directional control valves; proportional direction/flow control valves; stacked valves; orbitrol steeringsystems; logic valves; etc? Simply purchase an affordable plug-and-play module, which easily attaches to either side of the MF102 series simulator. The modules are designed to integrate seamlessly with the components on any model MF102 Most plug-and-play modules are available with diagnostics capability.

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Specifications (Model MF102-H-TS) -
The model MF102-H-TS training systems are equipped with the following components:

1. ***Pump -*** Axial piston-type, variable volume, pressure-compensated; 1.0 GPM (3.78 Lpm); 1000 PSI (69 bar); adjustable pressure compensator; adjustable flow
2. ***Electric motor -*** Single-phase; 115V; TEFC; 1750 RPM; C-face; thermal overload protection
3. ***Electric motor on/off switch -*** Lockout/tagout mechanism; thermal overload protection with manual reset
4. ***Hydraulic reservoir -*** capacity 4.5 gallon (17 liter)
5. ***Filtration -*** 10 micron, spin on/off element w/by-pass gauge
6. ***Directional control valves -*** seven (7) total;
   - One (1) DO3-type; tandem-center; 3-position; 4-way; spring-centered; solenoid-controlled; 24V coils. Also includes sandwich-mounted, knob-adjustable pump port flow control valve
   - Two (2) DO3-type; closed-center; 3-position; 4-way; spring-centered; solenoid-controlled; 24V coils. Also includes sandwich-mounted, dual, knob-adjustable flow control valves
   - One (1) DO3-type; float-center; 3-position; 4-way; spring-centered; solenoid-controlled; 24V coils. Also includes sandwich-mounted, knob-adjustable pump port flow control valve
   - One (1) Monoblock type valve; cylinder spool; 3-position; 4-way; spring-centered; hand-lever operated w/pressure relief valve
   - One (1) Monoblock type valve; motor spool; 3-position; 4-way; spring-centered; hand-lever operated w/pressure relief valve
   - One (1) 2-position, 3-way, solenoid-operated, cartridge type, directional control valve
7. ***Pilot-operated pressure relief valve w/knob adjustment***
8. ***Direct-operated pressure relief valve w/knob adjustment***
9. ***Sequence valve w/knob adjustment***
10. ***Pressure reducing valve w/knob adjustment***
11. ***Counterbalance valve with internal reverse flow check w/knob adjustment***
12. ***Needle valve w/knob adjustment***
13. ***Flow control valve w/knob adjustment***
14. ***Pressure-compensated flow control valve*** restrictor-type; reverse flow bypass; w/knob adjustment
15. ***Check valve***
16. ***Pilot-operated check valve w/manual override***
17. ***Cylinder -*** single-rod; double-acting; 14” (36 cm) stroke
18. ***Cylinder -*** double-rod; double-acting; 14” (36 cm) stroke; w/load engage/disengage mechanism
19. ***Motor -*** bi-directional; gear-type; w/infinitely variable torque capability
20. ***Flow meters -*** two (2); 0-2.0 GPM (7.56 Lpm)
21. ***Tachometer -*** hydraulic motor shaft speed (displayed on the panel-mounted touchscreen)
22. ***Ammeter -*** (displayed on the panel-mounted touchscreen)
23. ***Dual scale temperature gauge -*** Oil temperature & ambient temperature (displayed on the panel-mounted touchscreen)
24. ***Stopwatch -*** (displayed on the panel-mounted touchscreen)
25. ***Pressure gauges -*** three (3); 0-1500 PSI (103 bar); PSI and bar scales; 2.5” (6.35 cm); glycerine-filled; Bourdon tube type; w/flat-face type quick-connect/disconnect type valves
26. ***Load -*** 100 lb (45 Kg); Engage/disengage with mechanical latch. Entire weight is contained within a transparent safety enclosure.
27. ***Hose storage caddy -*** stow-away/swing-out
28. ***Hoses*** (per side) ***-***
    - Four (4) - 60” (152 cm)
    - Eight (8) - 46” (117 cm)
    - Six (6) - 26” (66 cm)

    SAE 100-R1; w/flat-face type quick-connect/disconnect type valves
29. ***T’s -*** eight (8) (per side) w/flat-face type quick-connect/disconnect type valves
30. ***Pressure/leak test pump w/quick-connect/disconnect valve***

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Shipping Specifications - *(Subject to change)*
Ship weight (does not include pallet or packaging):
Double unit: 900 lbs (408 kgs)
Single unit: 750 lbs (340 kgs)

Shipping dimensions (all models):
84” (213cm) H x 54” (137cm) W x 42” (106cm) D

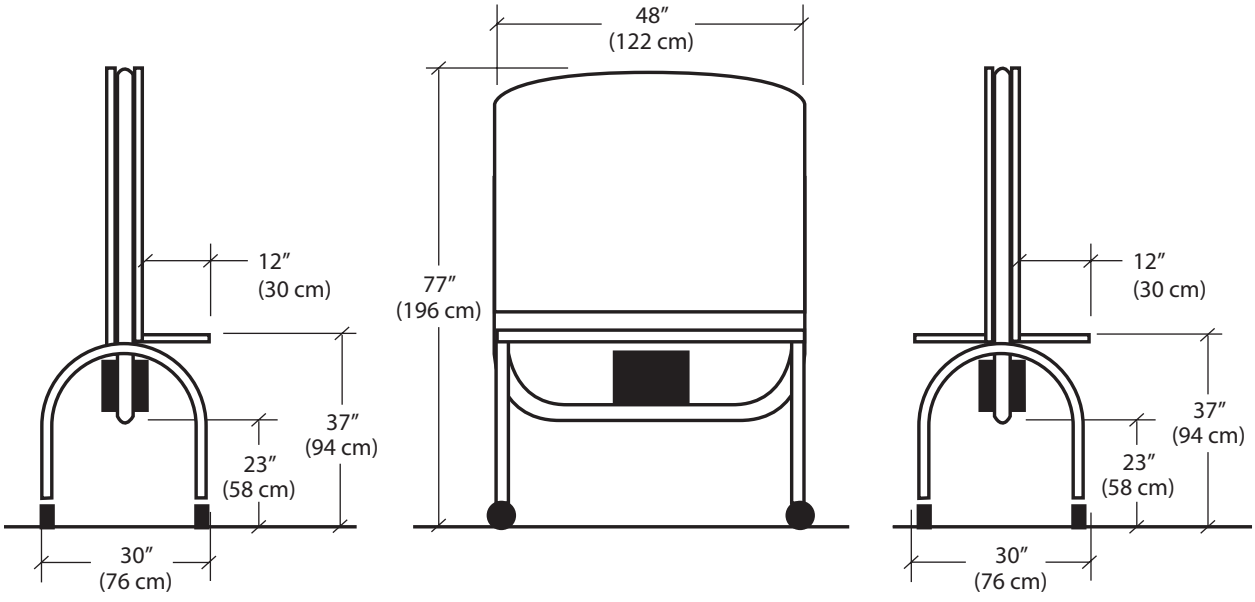
Warranty -
FPTI™ warrantees it’s products against defect in materials or workmanship for a period of two (2) years from date of delivery.

Electrical Requirements for Operation -
110 VAC, 20 Amp dedicated circuit per workstation (panel). If an extension cord is used, it must be 12-gauge wire or larger, 3-conductor (neutral, hot, ground), 50-foot (15.24m) length max.

Optional Diagnostic Accessories -
1. Inline flow meter - 2.0 GPM (7.6 Lpm); with integrated load cell and pressure gauge 0-1500 PSI (103 bar).
2. Tachometer - digital; laser-guided; contact and non-contact; with storage case.
3. Pressure gauge - case pressure testing; 0-100 PSI (6.9 bar); with test connector.
4. Vacuum gauge - 0-30” (76 cm) Hg (mercury); with test connector.

Optional diagnostic accessories package - PART #: MF102-DA

Simulator Dimensions



All FPTI™ training systems are available for operation at any voltage or frequency

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