

HYDROSTATIC TRANSMISSION & HYDRAULIC STEERING SYSTEMS

DESCRIPTION

The Model MF300-VCLS 2-in-1 training simulator features a fully functional, “build-and-drive” hydraulic steering system on the front-end, and a fully functional “build-and-drive” hydrostatic transmission on the rear-end.

Hydraulic Steering System

The steering system employs every hydraulic component found in a typical articulated vehicle’s steering system, including dual steering cylinders.

Hydrostatic Transmission System

The hydrostatic transmission or, closed-loop system, is arguably one of the most challenging systems to both teach, and learn , , , not any more! The MF300-VCLS “build-and-drive” hydrostatic transmission simulator will have students understanding exactly how these unique hydraulic transmissions work in no time at all.

Featuring an over-center pump and dual, independent wheel-drive motors, students will not only assemble the circuit, but they will virtually see the oil flow through the loop, in both forward and reverse, through a pair of bi-directional, in-line flow meters, as they move the pump’s displacement control lever back and forth.

Plus, another FPTI™ exclusive: students generally have difficulty grasping the concept of exactly how moving a pump’s displacement control mechanism overcenter causes the flow to reverse - we solved this problem by installing two identical overcenter pumps, one above the other, and linking their displacement control levers together. One is fully functional, while the other is cutaway so students can see inside.

Target Client

Technical colleges, universities, high schools, military training facilities, machine and equipment manufacturers, and corporate training facilities.

Target Audience

Students who plan a career in the following areas: component rebuild technicians, diagnostic technicians, drafting personnel, engineers, field service technicians, maintenance planners, multi-craft technicians, sales personnel, system designers, technical writers.



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LEARNING OBJECTIVES – Hydraulic Steering System

The MF300-VCLS training simulator will aid an instructor in teaching students the following:

1. How a priority flow divider functions (bypass-type, pressure-compensated flow control).
2. How a steering orbitrol valve functions.
3. How a steering system's main pressure relief valve functions.
4. How to set the steering system's main pressure relief valve.
5. How a dual cross-port relief valve functions.
6. How to set dual cross port relief valves.
7. How steering cylinders function.
8. How to interpret symbols for the components in a typical hydraulic steering system.
9. How to read the schematic for a typical hydraulic steering system.
10. How to properly construct a typical steering system and make all the necessary pressure settings.
11. How a steering pump with integral pressure relief and priority flow control functions.
12. How dual, single-rod, double-acting steering cylinders function.
13. Safety features include: safety pressure relief valve; breakaway rear wheels; breakaway steering



The “build-and-drive” hydraulic steering system consists of the following components:

1. Self-contained, fixed-displacement pump with 1HP, single-phase motor.
2. Orbitrol steering valve – open-center.
3. Control console with steering wheel.
4. Main Pressure relief valve.
5. Priority flow divider.
6. Dual, single-rod, double-acting steering cylinders.
7. Dual, cross-port relief valves with mono-block body.
8. Safety relief valve.
9. 0-1000 PSI (0-69 bar) pressure gauge.
10. Digital temperature gauge.
11. *Spin on/off filter with by-pass indicator.
12. *Transparent reservoir with isolator mountings.
13. All-steel frame with powder-coat finish.
14. Four (4) wheel casters with brakes.



*Common to both systems

LEARNING OBJECTIVES – Hydrostatic Transmission System

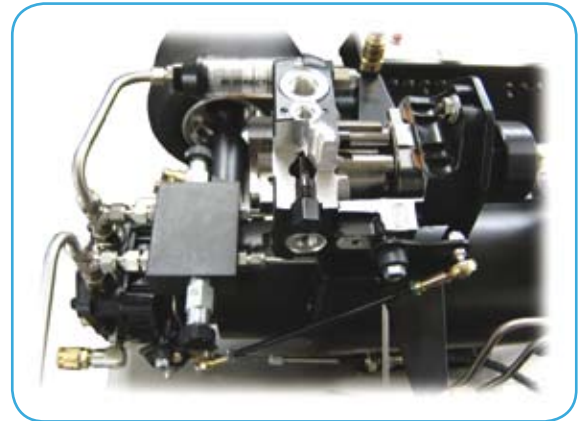
The MF300-VCLS training simulator will aid an instructor in teaching students the following:

1. Advantages and disadvantages of hydrostatic drives.
2. Typical applications for hydrostatic drives – industrial and mobile.
3. How to interpret the hydraulic symbols for components in a typical hydrostatic transmission.
4. How to read the hydraulic schematic for a typical hydrostatic transmission.
5. Safety practices for operating, servicing, repairing, maintaining and troubleshooting hydrostatic transmissions.
6. How a variable displacement, over-center pump works.
7. Pump displacement controllers – manual, manual over hydraulic, and electronic over hydraulic.
8. Proper external drain pump and motor pre-start-up and post start-up procedures.
9. The function and purpose of a charge pump.
10. The function and purpose of a charge pressure relief valve.
11. How to properly set a charge pressure relief valve.
12. The function and purpose of the dual charge check valves.
13. Operation of a typical hydrostatic transmission:
 - System start-up
 - Charge circuit - neutral
 - Charge circuit - forward and reverse
 - Forward operation
 - Reverse operation
 - Low pressure loop operation
 - Dynamic braking
 - Case drain circuit
 - Cooling and filtering circuit
 - High-pressure relief valve operation
14. Proper and safe towing procedures for vehicles equipped with hydrostatic wheel drive systems.
15. The advantages and disadvantages of dual, parallel motors.
16. The advantages and disadvantages of dual, series motors.
17. How the “dynamic braking” in a hydrostatic drive functions.
18. How to construct a dual-parallel drive circuit.
19. How to construct a dual-series drive circuit.
20. Common pitfalls which lead to start-up failures on hydrostatic transmissions.
21. Common pitfalls which lead to premature failure of hydrostatic transmissions

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The “build-and-drive” hydrostatic transmission system consists of the following components:

1. 1.5 HP electric motor: 115V single-phase, C-frame, 1750 RPM.
 2. Variable-displacement, over-center, axial-piston pump with manual operator.
 3. Cut-away of identical pump, which operates in tandem with the drive pump (allows students to study how an over-center pump works while it is operating).
 4. Dual, fixed-displacement, bi-directional, gerotor-type hydraulic motors.
 5. Control console with manual pump displacement control lever.
 6. Panel-mounted 0-100 PSI (0-6.9 bar) charge pressure gauge.
 7. Dual, in-line, bi-directional flow meters.
 8. *Spin on/off filter with by-pass indicator.
 9. *Digital temperature gauge.
 10. *Transparent reservoir with isolator mountings.
 11. Rear wheels are designed to move independently of axles to prevent safety hazards.
- *Common to both systems.



NOTE: All components are fitted with flat-face, “zero-leak” quick-connect/disconnect fittings for ease of use

