TP 800 Mobile Hydraulics
From industrial hydraulics to mobile systems

Mobile hydraulics learning system from Festo Didactic
Mobile hydraulics has many specific features which differ from conventional hydraulics. This subject is generally explained and taught directly on the vehicles concerned. But what about the cases in which hydraulic components or the vehicles themselves are not accessible or a complete system is too complex for didactic use?

Festo Didactic is now closing the gap between the fundamentals of hydraulics and complete hydraulic systems installed on vehicles with its new learning system for mobile hydraulics. Components which are often grouped together on vehicles into highly-integrated control blocks are presented in this new training package as separate individual components with their own symbols and clearly-marked connections. Festo has succeeded in identifying the common denominator between many mobile hydraulic applications and presenting this in a way which is not specific to any one industry or vehicle type.

The package also takes account of the needs of experienced hydraulics technicians by featuring standard interfaces and a modular design which also allows the assembly of complete complex systems. All the mobile hydraulic components in the package are of course compatible with the current Festo Didactic equipment sets for the fundamentals of hydraulics, electrohydraulics, proportional hydraulics and closed-loop-controlled hydraulics. At the heart of the perfect training workstation which the package offers is a hydraulic power pack with a load-sensing-controlled variable displacement pump (consumption-controlled pressure and volumetric flow) and a pressure-limited constant-displacement pump.
Training course levels  
From fundamentals to a working machine

Mobile Hydraulics, Basic Level
This basic level course is aimed at systematic teaching of the fundamentals of mobile hydraulics and focuses on practical work with this technology.

Contents:
- Flow control using directional control valves
- The various valve mid-positions and their energy balances
- Exercises on holding and lowering loads
- Controlling two actuators with 6/3-way valves
- Serial, parallel and tandem circuits

As preparation for the advanced level course, students assemble and analyse a simple open-centre load-sensing control system using the constant-displacement pump.

Hydrostatic Steering System
In most mobile hydraulics applications, steering systems form a major sub-system of many vehicles.

The mobile hydraulics learning system offers a steering system of this kind as a supplement to the basic level course. This allows training to focus on the design and mode of operation of a hydrostatic steering system with typical anti-shock and anti-surge valves and on the principle of a equal-stroking-speed cylinder.

Other contents:
- Effect of load on the steering cylinder
- Combination of mobile hydraulics and steering system, with provision for priorities
- Effect of steering activity on downstream mobile hydraulics components

Mobile Hydraulics, Advanced Level
In the advanced level course, the main emphasis is on a consumption-dependent pressure and volumetric flow control system with a variable displacement pump.

Contents:
- Design, mode of operation and adjustment of a variable-displacement pump with a load-sensing controller and a control block.
- Comparison and evaluation of energy balances of flow control systems, open-centre load-sensing systems and closed-centre load-sensing systems with a variable-displacement pump.
- Remote control and hydraulic piloting of control blocks.

It is also possible to study the characteristics of pressure compensators connected upstream and downstream.

Plenty of power for workstations
The ideal environment in which to carry out all the course experiments is a Learnline workstation with a slotted assembly board for the Quick Fix® mounting system. This allows all equipment to be positioned quickly, secured safely and operated easily and conveniently.

The ON/OFF switch for the hydraulic power pack can be positioned within easy reach on the worksta-tion. The hydraulic connections for the power pack, constant-displacement pump, variable-displacement pump, load-sensing system and tank are linked by hoses to distributors on the workstation.

Hose clips ensure a tidy layout and protect the couplings from dirt. The bench attachment provides additional space, for example for a laptop with simulation, measurement and diagnostic software.

By the way:
Our Learnline workstations can be configured to any individual requirements. They are equally suitable for use in hydraulics training and in the fields of pneumatics or automation. Use our Learnline configurator on: www.festo-didactic.de
Cylinder load simulator

In practical applications of mobile hydraulics, it is necessary to work with unknown and constantly-changing loads to produce the desired result. How can situations of this kind be reproduced in a learning system? Answer – with a cylinder load simulator!

In this combination device, a differential or equal-stroking-speed cylinder is pressurised with a hydraulic counter-force. This cylinder combination allows many different load situations to be assembled and studied. The fact that the device operates without large moving masses and the presence of an integrated pressure relief valve makes the cylinder-load simulator not only very versatile but also very safe to use and very convenient to work with.

Measuring and visualisation

A hydraulic system can be set up successfully only if the right measured data is available at the right places. Only then will servicing or maintenance personnel receive the crucial information they need to carry out their work.

Fluid Lab®-M is the right measuring tool for Festo Didactic's mobile hydraulics training packages. It allows the acquisition and visualisation of measured data, the comparison of eg setpoints and actual values, the storage of measured values and export of these.

Fluid Lab®-M allows any desired number of sensors with a voltage output to be connected up to record measured values.

Equipment:
• Max. 4 analogue In, 2 Out
• Max. 4 digital In and Out
• Recording of up to two different physical measured variables as a function of time, or one variable as function of another.

Special feature

Important to have: a measuring procedure, reproducible and controlled to compare the setpoints and actual values of a hydraulic system. Fluid Lab®-M is able to program and store sequence programs!

Not too little, not too much

As with all Festo Didactic training packages, all the components of "Mobile Hydraulics" form part of a universal system:

Quick-Fix®

This patented quick-lock system for the slotted assembly board speeds up assembly and dismantling operations, freeing up time for the actual contents of the training course.

Universal hose connectors

The connector system for "Mobile Hydraulics" is the same, for example, as for the "Fundamentals of Hydraulics" or "Proportional Hydraulics" training packages. TP 800 is therefore compatible with other packages and can be combined with these.

Level by level

Everything you buy for the basic level course can also be used for the advanced level. The anti-shock and anti-surge valve for mobile hydraulics can of course also be used for the steering system exercise. Invest just once, use the equipment many times over!

Training course documentation

The "Mobile Hydraulics" workbook also includes all the documentation needed: theoretical fundamentals, exercises, solutions and data sheets.

Seminars and workshops

Festo Didactic also offers appropriate training workshops for personnel from the areas of maintenance, system design and servicing and for trainers and teachers working in vocational training schools and technical universities.

Contents:
• Components of a mobile hydraulic circuit diagram
• Circuits for hydrostatic transmissions, mobile hydraulics and steering systems
• Load-sensing functions and other efficiency measures
• Adjusting and measuring the necessary operating variables in mobile hydraulic systems
• Fault-finding and maintenance
• Safety measures for mobile hydraulic systems

Previous knowledge required

Basic knowledge of hydraulics and electrohydraulics as provided by our seminar „Fundamentals of Hydraulics and Electrohydraulics (H511)“.

Further information and booking places on seminars via the Internet.