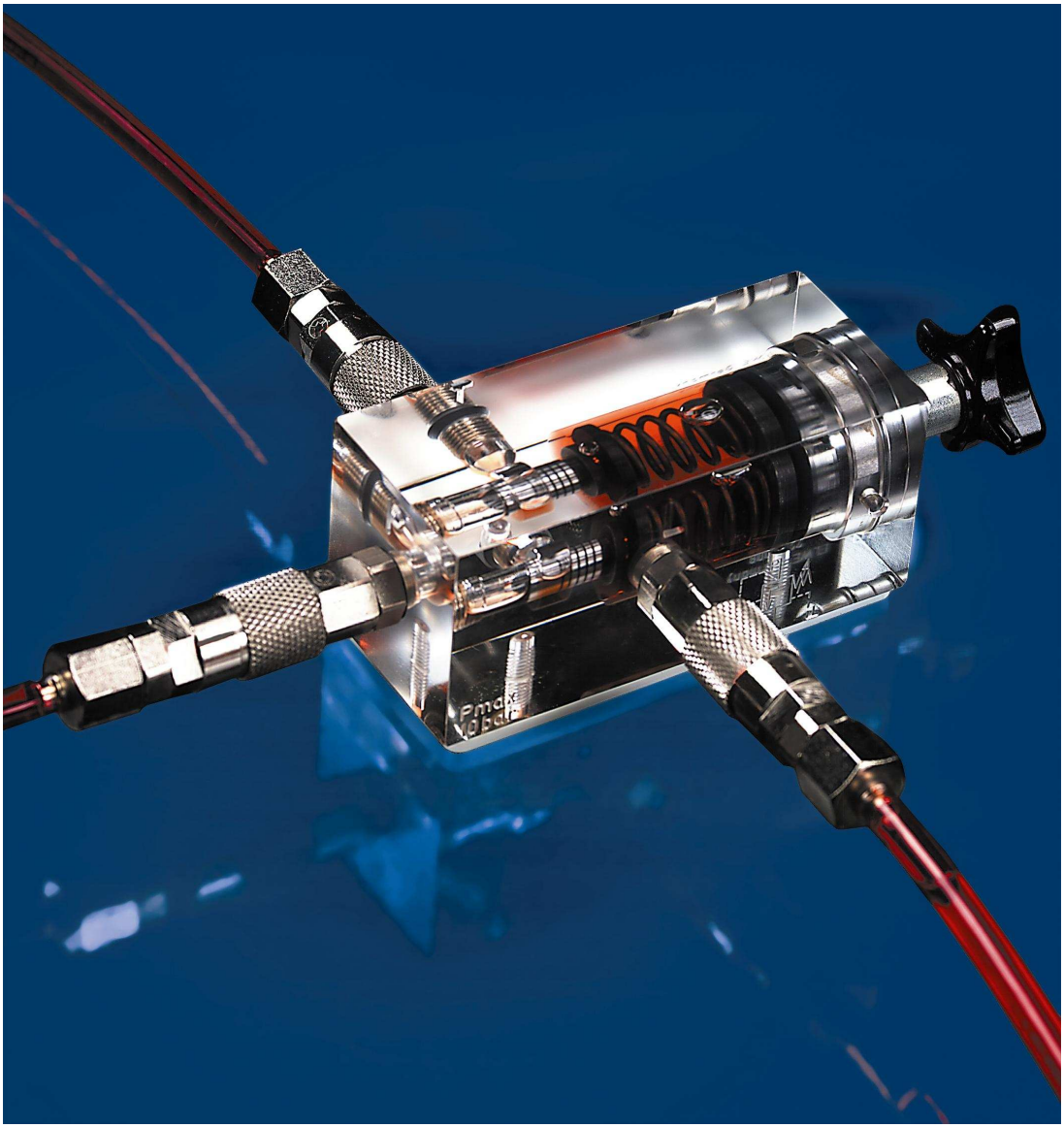
Hydraulik
Hydraulics

EN ISO
9001:2000
DNV
Certified
Company

ELWE® Technik

innovativ · *innovative*
zukunftsweisend · *future oriented*
leistungsstark · *high-performance*

Training System for Hydraulics with Transparent Components



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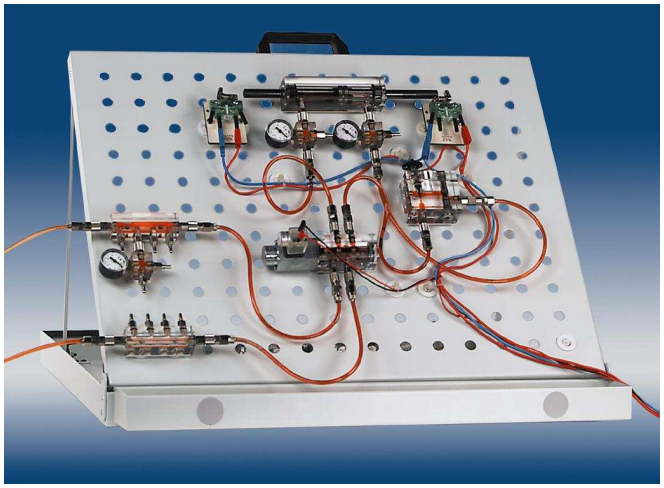
The Didactic Concept



The ELWE **transparent hydraulic modules** (Plexiglas housings, metal internal parts) offer excellent opportunities to examine and look into the functions of the hydraulic components and circuits.
Operative transparent devices are available for every essential hydraulic component starting with simple return valves up to complex pilot-operated proportional directional valves.

Main features:

- *The transparent Plexiglas housing gives an insight into the inner structure of the hydraulic modules and the internal movement.*

- *Red hydraulic oil and a white base plate increase the contrast between the outer housing and the internal parts.*

- *A maximum operating pressure of 10 bar enables almost 100 % safe testing.*

- *Transparent tubes and enclosed bubbles show the complete flow from the pressure connection of the pump to the tank connection.*

- *Leak-proof quick-fit couplings guarantee fast, clean and environmentally friendly set-ups of the installation.*

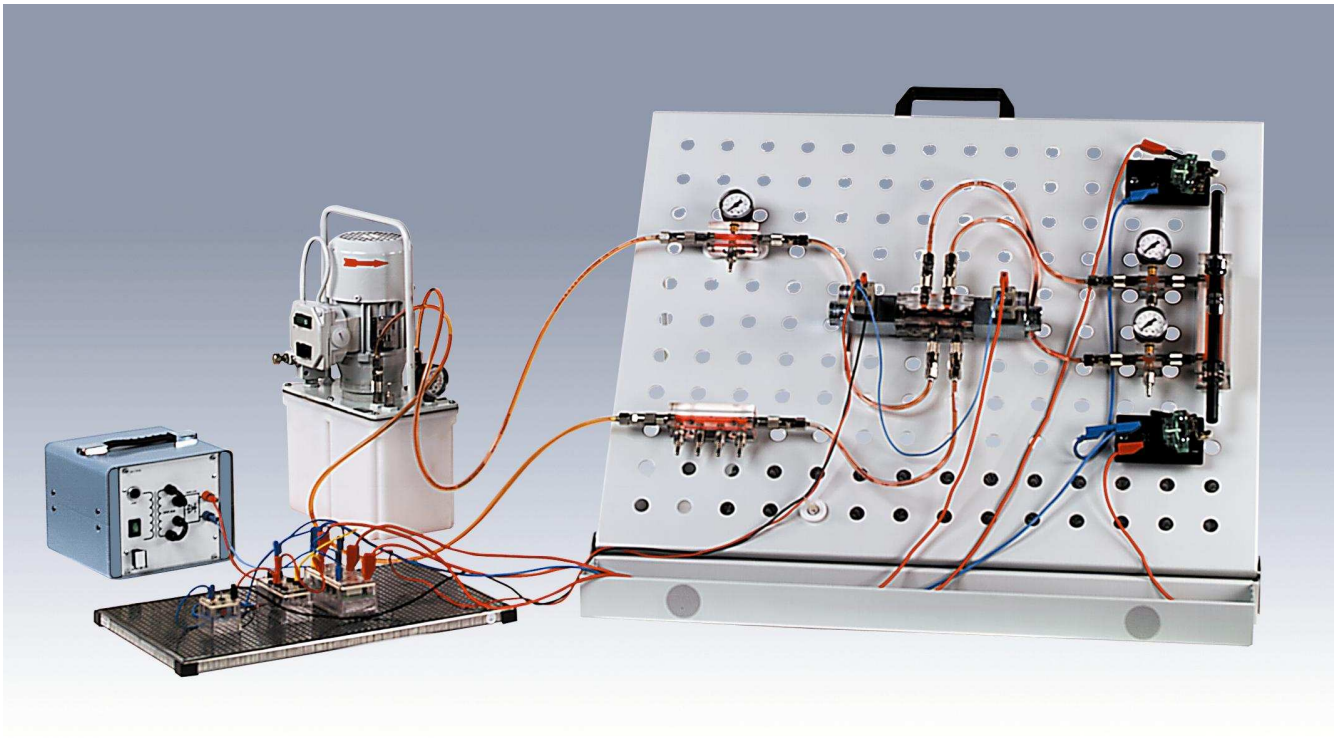
The **portable experimental case for hydraulics**, in com-bination with the portable hydraulic unit allows you to use the ELWE training system everywhere, so that a special technical room is not necessary.

The transparent hydraulic modules are equipped with white base plates with 5-mm pins and can therefore be easily plugged onto the front panel of the experimental case. This gives a clear and free arrangement.

All transparent components and tubes are clearly arranged and stored in the case.

The base plates of the transparent hydraulic modules can be disassembled quickly and easily. It is therefore possible to demonstrate the structure and function of individual hydraulic modules from a distance using an overhead projector.

The experimental case for hydraulics



Experimental case with experimental set-up on electro-hydraulics;
next to it the hydraulic unit, basic grid-panel with relay control system and power supply unit.

The experimental case is made from steel plate with a powder-coating.
The transparent components can either be arranged horizontally or vertically on the inclined front panel with a 50-mm grid according to the hydraulic diagram. This guarantees a simple and clear set-up for the tested installation.
The transparent components are clearly arranged and stored in the experimental case. It guarantees that the components required for the experimental set-up are easily reached and a clearly arranged installation can be set up quickly.
The transparent tubes with self-locking couplings on both sides are clearly arranged and stored in a tube container. To set up the experiment, the tube container can be removed from the case and hung in front of the experimental surface.
Special technical or storage rooms are not necessary for the testing process or for storing the experimental case.

Dimensions when closed in mm (L x W x H): 770 x 650 x 90
Weight (without transparent components): 15.2 kg

Storage of the transparent components and tube container.

Additionally required:
Set of plastic adapters, 25 pieces. 26 32 005
The plastic adapters are inserted into the front panel of the experimental case. These can be plugged on the hydraulic modules in order to avoid scratches on the front panel.

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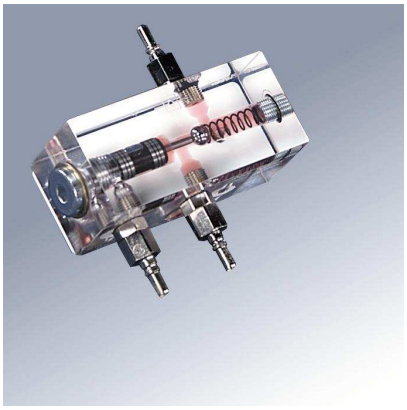
22 36 009
Cylinder, single-acting, 40 mm stroke

22 36 002
Check valve

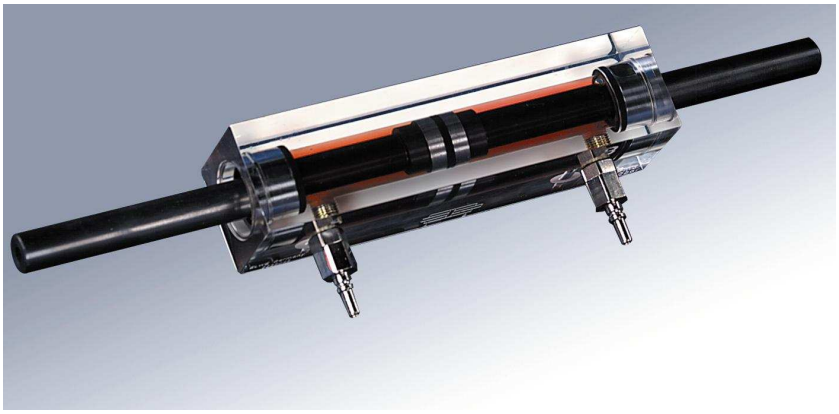


22 36 013
Check valve, pilot controlled

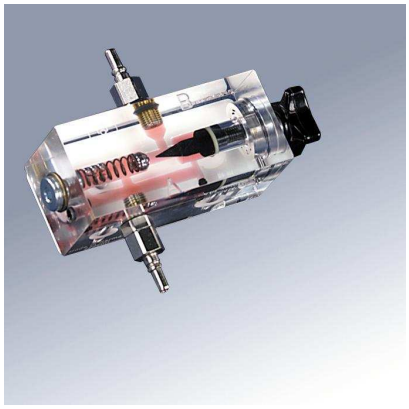
22 36 038
Cylinder, double-acting,
25/10 100 mm stroke

22 36 068
Double check valve, pilot controlled

22 36 005
Throttle



22 36 043
Cylinder, double-acting
Continuous piston rod, 100 mm stoke



22 36 011
Throttle check valve

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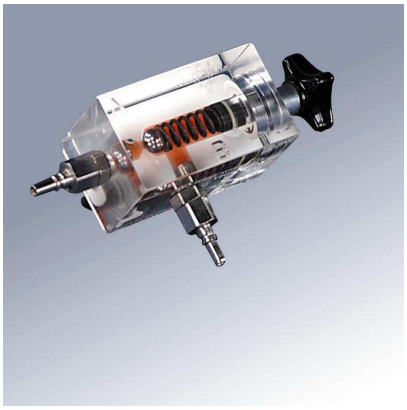
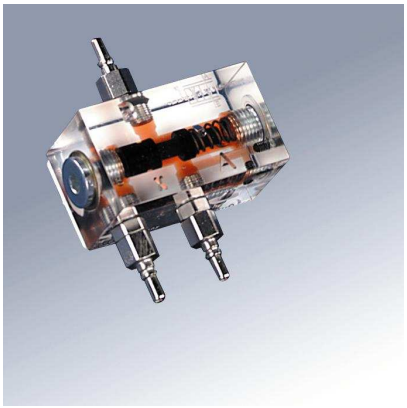


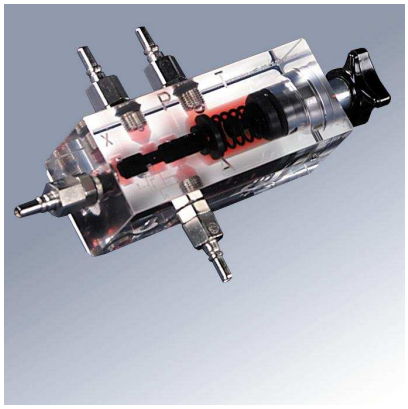
22 36 003
Pressure relief valve
Directly controlled (spherical seat valve)

22 36 008
Pressure relief valve
directly controlled, damped (Piston valve)

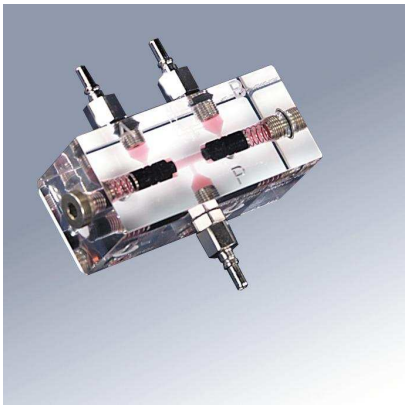
22 36 010
Pressure reducing valve



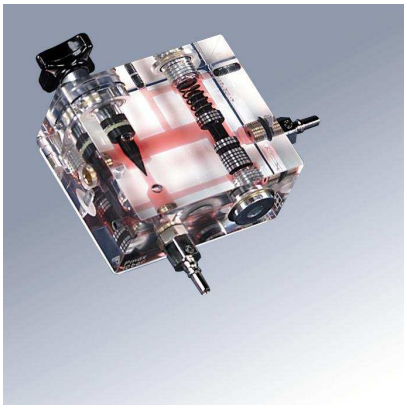
22 36 020
Differential-pressure valve



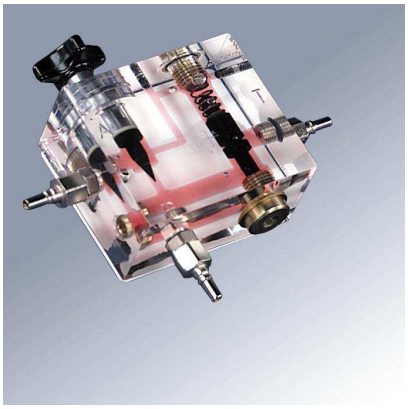
22 36 051
Pressure-operated valve



22 36 072
Flow divider

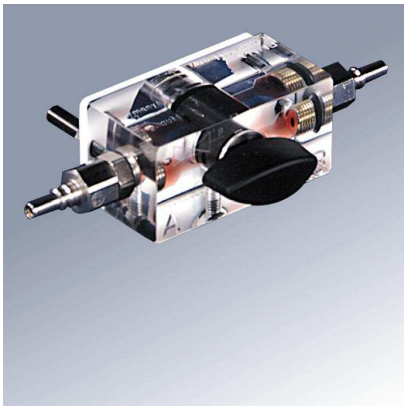


22 36 015
2-way flow control valve

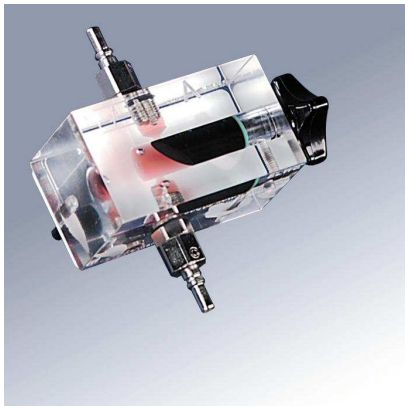


22 36 036
3-way flow control valve

22 36 022
Shuttle valve
(OR element)

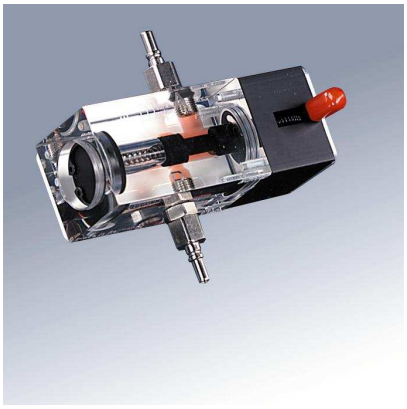


22 36 012
Stop valve, manually operated
(Shut-off valve)

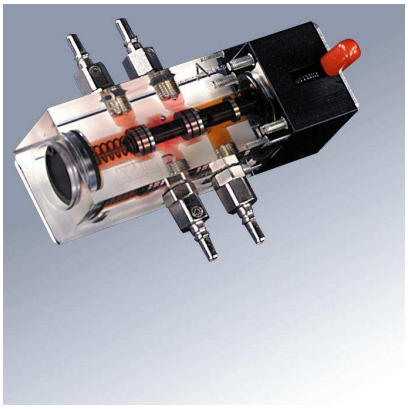


22 36 062
Orifice valve

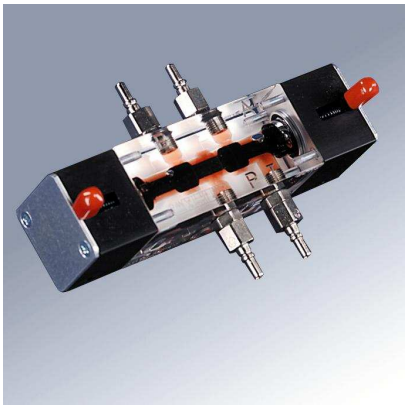
22 36 029
Pressure switch



22 36 061
2/2-way valve, manually operated



22 36 004
4/2-way valve, manually operated



22 36 018
4/3-way valve, manually operated

22 36 031
5/3-way valve, manually operated

22 36 019
3/2-way valve, manually operated

22 36 001
Operating cam for cylinder rod
of the single-acting and double-acting
cylinder

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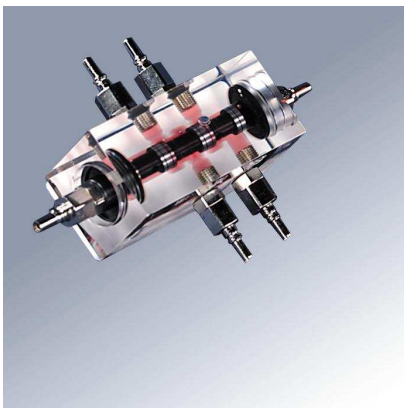
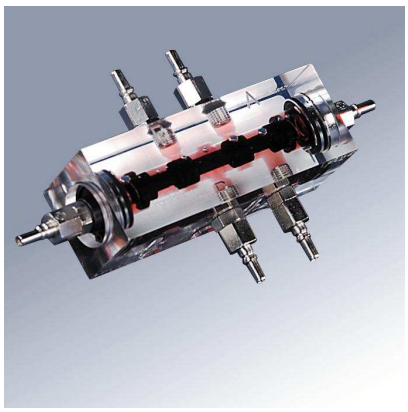
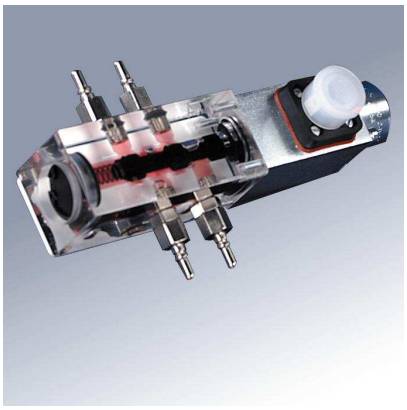


22 36 017
4/2-way valve, hydraulically operated

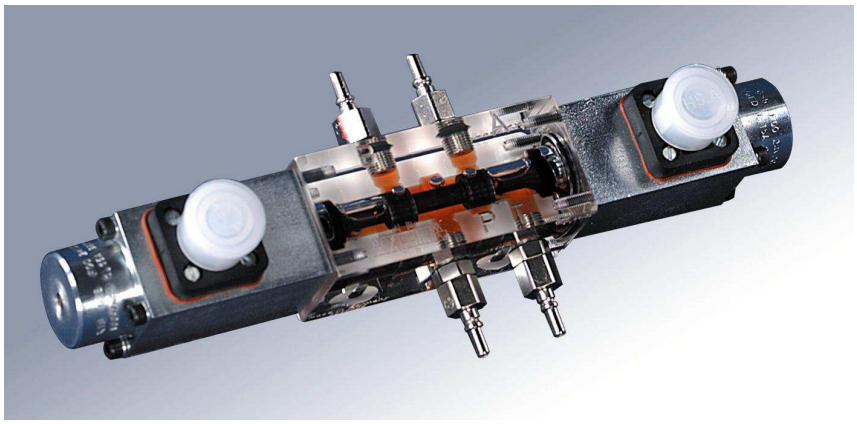


22 36 016
4/3-way valve, hydraulically operation

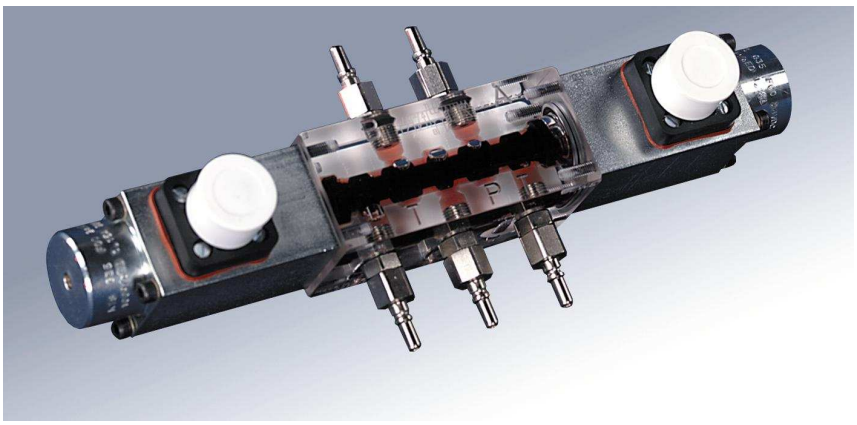
26 32 057
Electro-power adapter



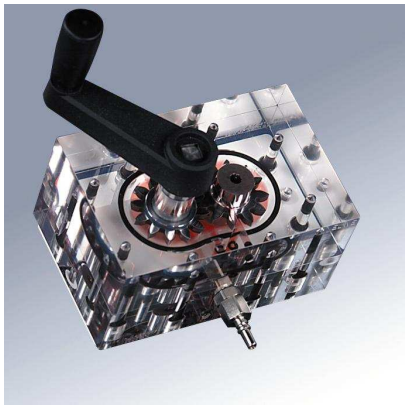
22 36 023
4/2-way valve, magnetically operated



22 36 025
4/3-way valve, magnetically operated



22 36 034
5/3-way valve, magnetically operated

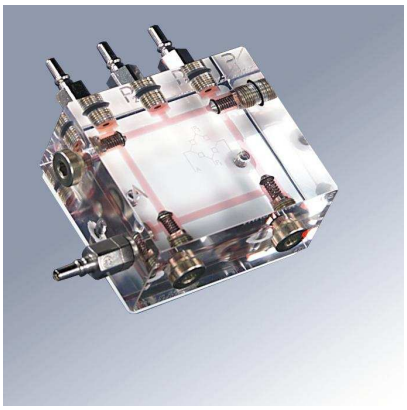


22 36 056
Gear pump

22 36 053
Diaphragm accumulator

22 36 054
Bubble accumulator

22 36 055
Piston-type accumulator



22 36 039
Rectifier

22 36 071
Switch-off circuit

22 36 006
Manometer, with housing 0 ... 10 bar

22 36 021
Manometer without housing
(transparent)

22 36 014
Distributor, 4-fold

22 36 007
Distributor, 6-fold

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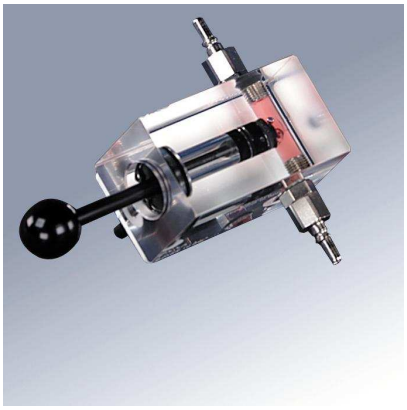

22 36 044
Piston lever - to demonstrate pressure/power transmission

22 36 045
Pressure propagation model

22 36 063
Viscometer

Transparent tubes with self-locking couplings on both sides, nominal width of 3 mm.
Length: 350 mm 26 36 004
Length: 520 mm 26 36 003
Length: 1000 mm 26 36 008

Hydraulic unit 26 36 005
P = 10 bar, Q = 1 l/min.
Voltage supply of 230 V, 50 Hz
Includes: operating instructions, electrical cable, hydraulic oil (3 l in a canister), oil funnel tube

For refilling:
3-l canister with red hydraulic oil 26 36 016

Recommended:
Cover for overhead projector . . . 15 36 001
Made of plexiglas to protect the glass plate of the overhead projector from dirt. Holding pins prevent the transparent components on the projector from moving due to loose tubes.
Dimensions in mm: 315 x 295 x 5

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Equipment „Electrical System“ 02 36 030

The safe handling of electrohydaulic controls, e.g in case of maintenance works, presupposes basic knowledge of hydraulic as well as electrotechnical control engineering. This equipment makes it possible to study the basics of electrical control engineering in an independent and cost-effective way within a relatively short period of time. It is also possible to examine the functions of the individual electrically operated transparent components and to set up fully functional electrohydraulic control systems.

The equipment contains:

Base grid plate 21 00 010
for an clear arrangement of the SB plug-in elements. Made of stainless steel, perforated with 5 mm x 5 mm holes to attach the plug-in elements, non-skid with plastic feet.
Dimensions in mm: . . . . . .412 x 252 x 23 (L x W x H)
Weight: . . . . . .0.9 kg

3 SB plug-in elements Push-button 20 49 122
1 make contact, 1 break contact
1 SB plug-in element Latched push-button 20 49 124
1 make contact, 1 break contact
4 SB plug-in elements Relay 12 ... 24 V 20 49 418
4 changeover contacts
1 SB plug-in element Relay 12 ... 24 V 20 13 030
2 with ON delay
1 SB plug-in element Relay 12 ... 24 V 20 13 040
2 with OFF delay
4 SB plug-in elements Diode Si, 1 N4007 . . . . . 20 47107
1000 V, 1 A
1 SB plug-in element Resistor 100 Ω 20 40 310
2 W, 2 %
1 SB plug-in element Electrolytic capacitor. 20 44 421
2200 µF, 40 V
1 SB plug-in element Electrolytic capacitor. 20 44 451
4700 uF, 40 V
3 SB plug-in elements Lamp socket E10 . . . . . 20 49 010
3 Incandescent lamps E10, 24 V, 80 mA, 1.9 W 59 50 240
1 Storage box 21 00 110 01
Set of connection cables on storage tray
14 Connection cables 7.5 cm, red 58 00 507
13 Connection cables 7.5 cm, yellow 58 00 207
5 Connection cables 7.5 cm, blue 58 00 407
6 Connection cables 15 cm, red 58 00 515
27 Connection cables 15 cm, yellow 58 00 215
3 Connection cables 15 cm, biue 58 00 415
3 Connection cables 30 cm, red 58 00 530
6 Connection cables 30 cm, yellow 58 00 230
3 Connection cables 30 cm, blue 58 00 430
5 Connection cables 60 cm, red 58 00 560
5 Connection cabies 100 cm, red 58 00 600
5 Connection cables 60 cm, blue 58 00 460
5 Connection cables 100 cm, blue 58 00 500
1 Cable storage GSL 76 13 012 01
Additionally required:
Power supply unit 12 V DC, I_{max} approx. 2 A
e.g. Power supply unit 65 15 315 01

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Sets with transparent Components

Quantity	Art.-No.	Description	Page
Equipment „Basic Level“		***02 36 001***	
1	22 36 038	Cylinder, double-acting, 100 mm stroke	4
1	22 36 002	Check valve	4
1	22 36 003	Pressure relief valve (spherical seat valve)	5
1	22 36 004	4/2-way valve, manually operated	6
1	22 36 005	Throttle	4
1	22 36 006	Manometer 0 ... 10 bar	8
1	22 36 007	Distributor, 6-fold	8
1	22 36 020	Differential-pressure valve	5
6	26 36 003	Tube with quick-fit couplings NW3 x 520	9
4	26 36 004	Tube with quick-fit couplings NW3 x 350	9
Equipment „Secondary Level“		***02 36 002***	
1	22 36 009	Cylinder, single-acting	4
1	22 36 008	Pressure relief valve (Piston valve)	5
1	22 36 010	Pressure reducing valve	5
1	22 36 011	Throttle check valve	4
1	22 36 013	Check valve, pilot controlled	4
1	22 36 015	2-way flow control valve	5
1	22 36 012	Stop valve, manually operated	6
1	22 36 014	Distributor, 4-fold	8
5	26 36 003	Tube with quick-fit couplings NW3 x 520	5
Equipment „Electro-Hydraulics“		***02 36 002***	
1	22 36 023	4/2-way valve, magnetically operated	7
1	22 36 025	4/3-way valve, magnetically operated	7
1	22 36 029	Pressure switch	6
1	22 36 006	Manometer, 0 ... 10 bar	8
2	22 37 081	Limit switch with idle return castor	9
1	26 36 001	Operating cam for cylinder rod	6
3	26 32 057	Electro-power adapter with LEDs	