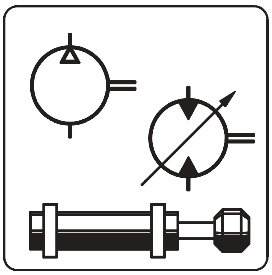
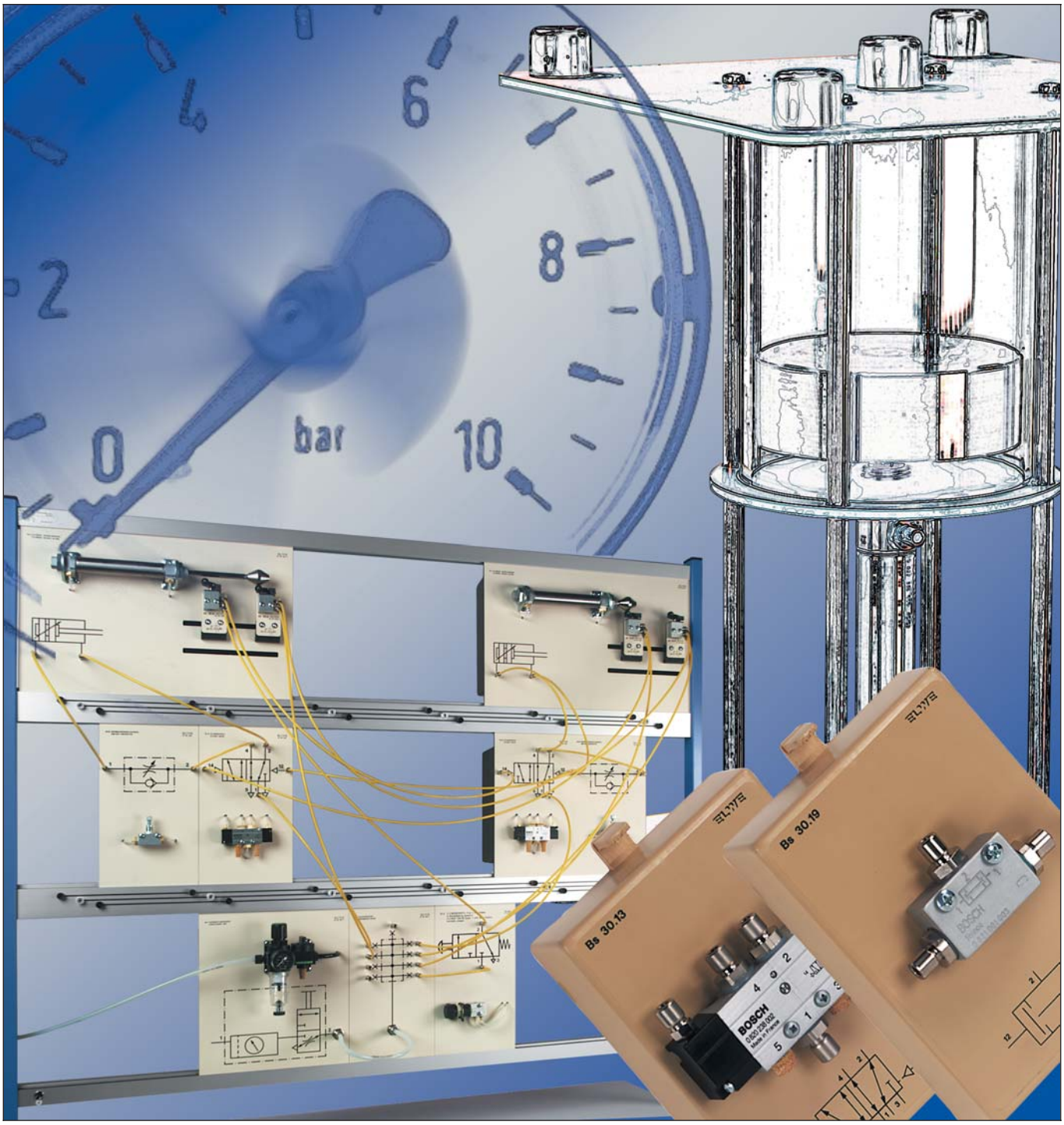
Training systems for basic and future oriented education in natural science and engineering

EN ISO 9001:2000 DNV Certified Company

Pneumatics Electropneumatics



Experimental Panel and Module System



07 / 2003

Contents

Pneumatics and Electropneumatics

Pneumatics and Electropneumatics are main subjects in the field of Automation Engineering. In order to use and maintain such systems properly it is necessary to have qualified experts with knowledge and skills covering several fields of technology. The training systems on Pneumatics and Electropneumatics designed by ELWE help to teach these skills easily and practically and to acquire them in a hands on manner.

ELWE provides **experimental panel systems**, **experimental module systems** and an **experimental case** to meet individual didactic requirements, methodical aims and room conditions.

The **experimental panel system** is mainly used by teachers to demonstrate and illustrate from a distance the operating principles of components and the functions of even extensive circuits during instruction and lectures.

Apprentices and students can study the operating principles of components and the methods of functioning of circuits, independently in practical exercises, with the **experimental module systems**.
The module system on Pneumatics and Electropneumatics is compatible with the modules of other ELWE module systems, such as the module system on electrical engineering / electronics, control engineering and drive engineering. This is also the case with the experimental panel system. Therefore ELWE provides complete directional solutions for the training and further education on automation technology and "mechatronics", covering all levels from initial professional training to university education and the intensive further education in the industry.

If a laboratory is not available for the exercises, the **pneumatic experimental cases** can be used instead of the experimental module system.

High-quality industrial components conforming to the newest international standards guarantee a high degree of realistic training. The equipment sets have been arranged in accordance with the practice books on pneumatics and electropneumatics from the Federal German Institute for Professional Training (BIBB) in Berlin.

The practice books on electropneumatics are based on the use of relay controls. These are still widely used and allow the student an easy and realistic start to the basics of electrotechnical control systems (e.g. dominating opening and closing operation, latching etc.). Therefore it is methodically a good idea to base exercises with programmable logic control (PLC) and bus systems on the acquired basic knowledge. ELWE offers a wide spectrum of state-of-the-art teaching equipment. Our new catalogues are available upon request.

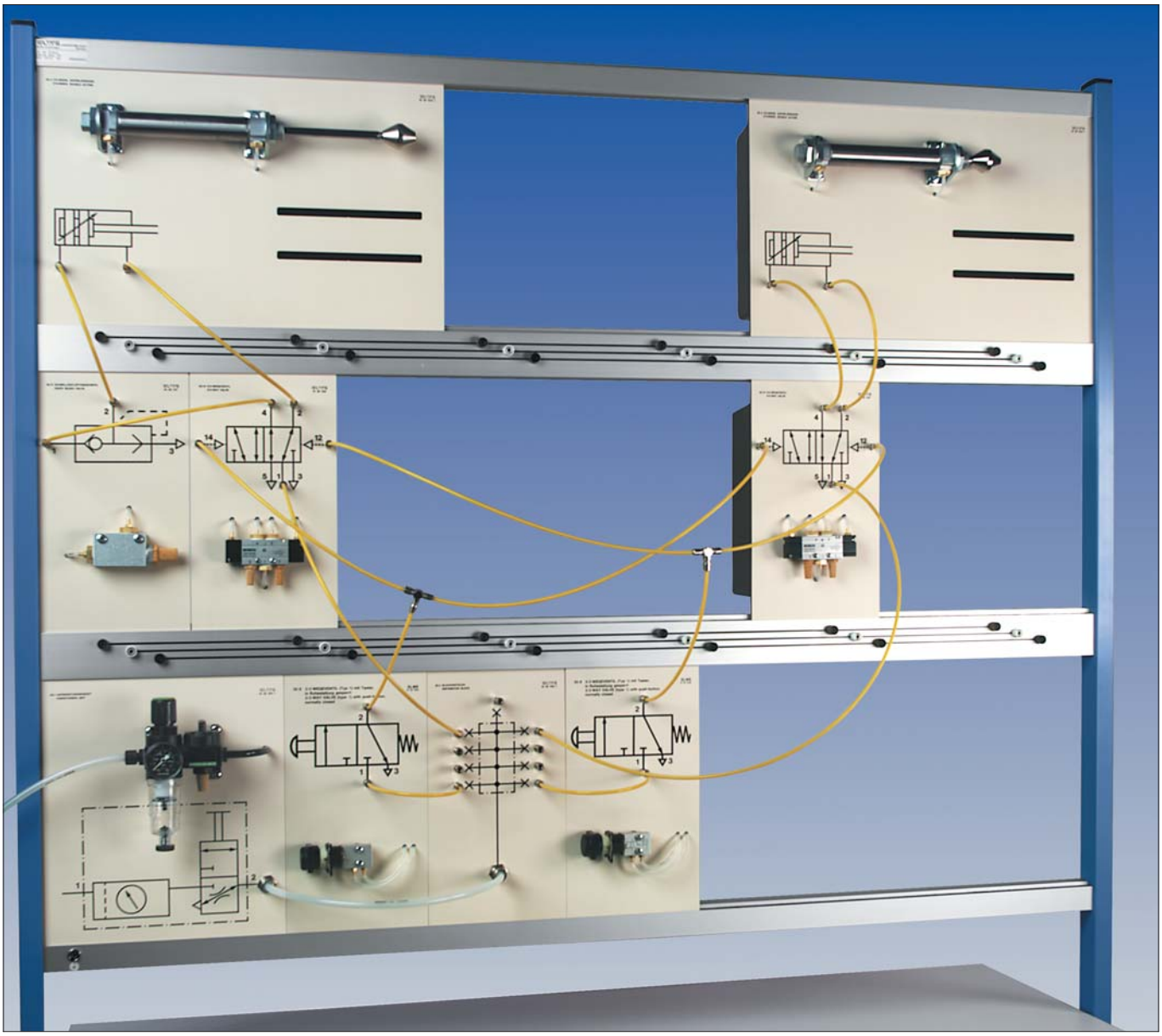
Further methodically prepared teaching and study material for a modern training round off the extensive experimental panel and module system. Symbol stickers facilitate the step by step development of circuit diagrams on the blackboard. Software packages enable the use of PCs for computer based learning as well as the computer based design of control circuits which will then be checked through simulation.

Experimental Manuals "Pneumatics / Electropneumatics

Experimental Manual
"Pneumatics" (on CD ROM) **51 30 101 0**

Experimental Manual
"Electropneumatics" (on CD ROM) **51 30 131 0**

The Pneumatics Experimental Panel System



The experimental panel system enables a clear and large experimental set-up. The experimental panels are equipped with original industrial parts as in real applications.
The pneumatic connections are established with PU hoses via quick-release couplings. Electrical connections of the individual experimental panels are established with respective safety connection cables via 4-mm safety sockets. All connections to the electrical components are on the front.

The printed standard symbols and the clearly arranged circuit diagram facilitate the tubing or the cabling and clarify the functional co-operation of the individual parts of the equipment.

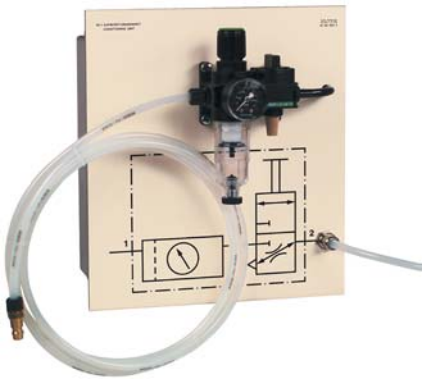
Due to the vertical arrangement of the experimental set-up in an experimental frame, it is possible to observe from a distance.

Since only the experimental panels that are required for the respective experiment are mounted to the experimental frame, it is possible to clearly show different installations. Corresponding to the learning progress, the experimental panel arrangement can be expanded as described in the experimental manual, or changed individually.

Basic Equipment "Pneumatics" TG 30.10 01 30 010

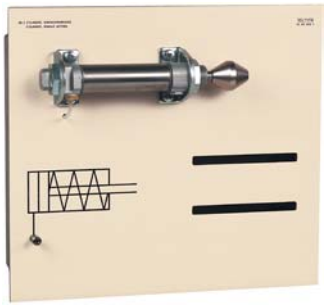
The following subjects can be studied with the basic equipment:

- Physical basics of pneumatics
- Preparation of pressure
- Design and use of single and double-acting cylinders
- Design and use of 3/2-way valves and 5/2-way valves
- Design and use of throttle, throttle stop and pulse valves
- Establishing logic functions (AND, OR) with pneumatic valves

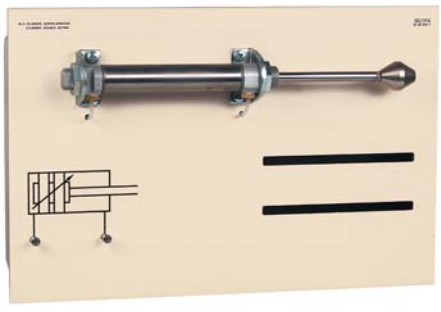


Pressure supply unit
P 30.1

Block distributor
P 30.2



Cylinder, single-acting
P 30.3



Cylinder, double-acting
P 30.4

The basic equipment consists of:

Pressure supply unit P 30.1 **10 30 001 1**

Service unit consisting of a filter pressure control valve (membrane pressure regulator) with manometer and a knob-operated 3/2-way shut-off valve. The filter cartridge can be exchanged. The adjuster of the pressure regulator can be turned and locked. The knob of the shut-off valve can be turned by 90° (open – shut).

- 2 m hose connection with plug-in nipple NW 7.2
- Inlet pressure $P_{imax.}$ 16 bar
- Pressure regulator 0 ... 10 bar, with manometer
- Filter with water separator
- Condensed water drain, half-automatic
- Outlet with 8-mm quick-release coupling

Dimensions in mm: 259 x 297 x 180 (W x H x D)
Mass: 1.68 kg

Block distributor P 30.2 **10 30 002 1**

10-fold distributor with 1 x 8 mm and 9 x 4 mm automatically closing quick-fit couplings.

Dimensions in mm: 159 x 297 x 130 (W x H x D)
Mass: 1.00 kg

Cylinder, single-acting P 30.3 **10 30 003 1**

with return spring.
Piston diameter of 25 mm, lift of 50 mm.
Exchangeable operating cams: 1 × steel, 1 × PVC.
Pneumatic and electric limit switches and sensors can be positioned quickly and safely without using tools. The positioning is freely selectable over the whole lift range of the piston.

Dimensions in mm: 319 x 297 x 90 (W x H x D)
Mass: 1.67 kg

Cylinder, double-acting P 30.4 **10 30 004 1**

(2 pieces per equipment)

Piston diameter of 25 mm, lift of 100 mm.
Exchangeable operating cams: 1 × steel, 1 × PVC.
Adjustable limit attenuation and non-contact signal input.

Pneumatic and electric limit switches and sensors can be positioned quickly and safely without using tools. The positioning is freely selectable over the whole lift range of the piston.

Dimensions in mm: 440 x 297 x 130 (W x H x D)
Mass: 2.28 kg

Pressure gauge P 30.5

3/2-way valve P 30.6

3/2-way valve P 30.7

Pressure gauge P 30.5 **10 30 005**

(2 pieces per equipment)

Display 0 ... 10 bar; class 1.6; Ø 63 mm.

Dimensions in mm: 319 x 297 x 100 (W x H x D)

Mass: 0.50 kg

3/2-way valve P 30.6 **10 30 006**

(2 pieces per equipment)

with pushbutton, locked when at "off" position.

Dimensions in mm: 159 x 297 x 140 (W x H x D)

Mass: 0.65 kg

3/2-way valve P 30.7 **10 30 007**

with pushbutton, open when at "off" position.

Dimensions in mm: 159 x 297 x 90 (W x H x D)

Mass: 0.60 kg

Limit switch 30.9

Limit switch 30.10

Limit switch 30.9 **22 30 009 1**

(3 pieces per equipment)

3/2-way valve with jockey roller, locked when at "off" position.

Dimensions in mm: 45 x 110 x 50 (W x H x D)

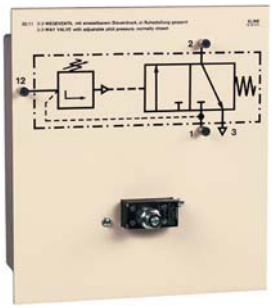
Mass: 0.14 kg

Limit switch 30.10 **22 30 010 1**

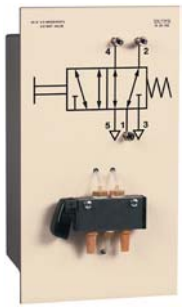
3/2-way valve with idle return travel tilting roller, locked when at "off" position.

Dimensions in mm: 45 x 110 x 50 (W x H x D)

Mass: 0.14 kg



3/2-way valve P 30.11



5/2-way valve P 30.12

3/2-way valve P 30.11 **10 30 011**

with pressure-controlled switch-over,
setting range of 1.8 ... 8 bar.

Dimensions in mm: 259 x 297 x 130 (W x H x D)

Mass: 1.00 kg

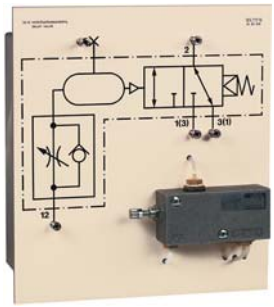
5/2-way valve P 30.12 **10 30 012**

with pushbutton.

Dimensions in mm: 159 x 297 x 130 (W x H x D)

Mass: 0.70 kg

5/2-way valve P 30.13



3/2--way delay valve P 30.15

5/2-way valve P 30.13 **10 30 013**

(3 pieces per equipment)

pneumatically operated (pulse valve).

Dimensions in mm: 159 x 297 x 80 (W x H x D)

Mass: 0.65 kg

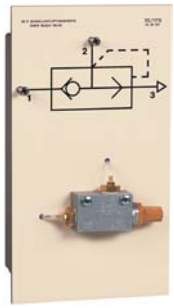
3/2-way delay valve P 30.15 **10 30 015**

with variable time delay of 0.15 ... 10 s,
connection for an additional capacity for a time extension ..

Dimensions in mm: 259 x 297 x 110 (W x H x D)

Mass: 1.05 kg

Throttle stop valve
P 30.16



Fast vent valve
P 30.17

Shuttle valve
P 30.18

Mixed pressure
valve P 30.19

Pressure control
valve P 30.20

Hose cutter

Filler plug, 4 mm

T-junction

Sound absorber

PU hose, Ø 4/2 mm

PU hose, Ø 8/6 mm

Throttle stop valve P 30.16 **10 30 016**
(2 pieces per equipment)
Opening pressure of 0.5 bar min.
Dimensions in mm: 159 x 297 x 90 (W x H x D)
Mass: 0.35 kg

Fast vent valve P 30.17 **10 30 017**
Dimensions in mm: 159 x 297 x 70 (W x H x D)
Mass: 0.40 kg

Shuttle valve P 30.18 **10 30 018**
Double check valve with OR function,
control pressure of 1 bar min.
Dimensions in mm: 159 x 297 x 120 (W x H x D)
Mass: 0.40 kg

Mixed pressure valve P 30.19 **10 30 019**
with AND function, control pressure of 1 bar min.
Dimensions in mm: 159 x 297 x 90 (W x H x D)
Mass: 0.40 kg

Pressure control valve P 30.20 **10 30 020**
Set pressure of 0.5 ... 10 bar.
Dimensions in mm: 159 x 297 x 150 (W x H x D)
Mass: 0.60 kg

Hose cutter **15 30 013**
Dimensions in mm: 45 x 9 x 130 (W x H x D)
Mass: 0.07 kg

Filler plug, 4 mm **15 30 014**
(25 pieces per equipment)
Dimensions in mm: 5 x 5 x 25 (W x H x D)
Mass: 0.01 kg

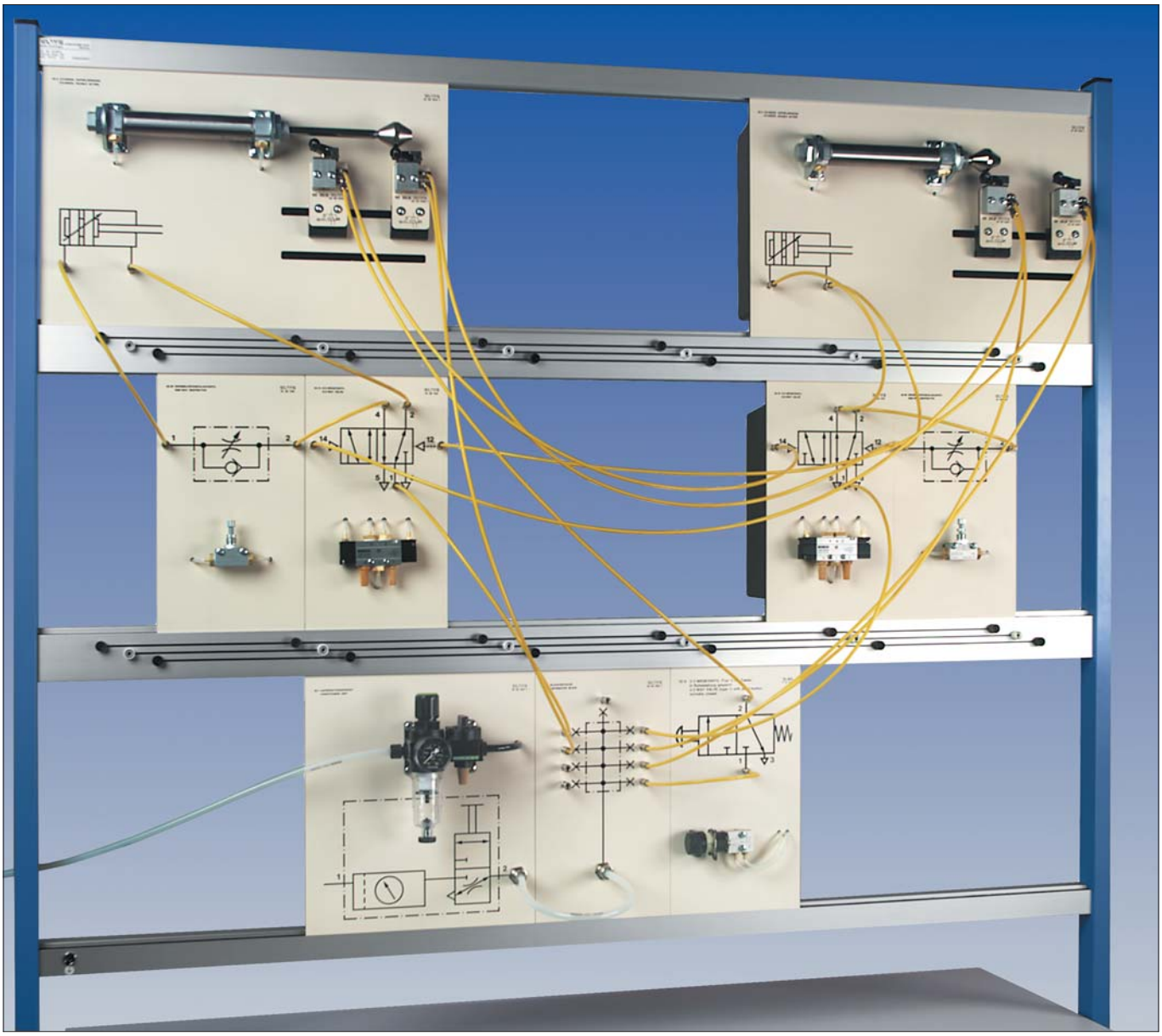
T-junction **26 30 002**
(5 pieces per equipment)
for PU hose Ø 4/2 mm.
Dimensions in mm: 30 x 22 x 9 (W x H x D)
Mass: 0.02 kg

Sound absorber with quick-release coupling **26 30 026**
(2 pieces per equipment)
Dimensions in mm: 15 x 15 x 50 (W x H x D)
Mass: 0.03 kg

PU hose **26 30 005**
Ø 4/2 mm, 25 m long.
Dimensions in mm: 4 x 4 x 25000 (W x H x D)
Mass: 0.17 kg

PU hose **26 30 007**
Ø 8/6 mm, 2 m long.
Dimensions in mm: 8 x 8 x 2000 (W x H x D)
Mass: 0.04 kg

Supplementary Equipment "Pneumatics" TG 30.20 01 30 020



The additional equipment, in combination with the basic equipment, enables the setting up of pneumatic control systems with different principles of action, such as

- the indirect control with unidirectional pressurised directional valves
- control systems with inlet and outlet air throttling
- pressure-controlled sequence control circuits
- position-dependent sequence control systems
- control systems with signal overlapping and signal disconnection
- sequence control systems with sequencer

Pressure gauge P 30.5

Limit switch 30.9

Limit switch 30.10

The supplementary equipment consists of:

Pressure gauge P 30.5 **10 30 005**

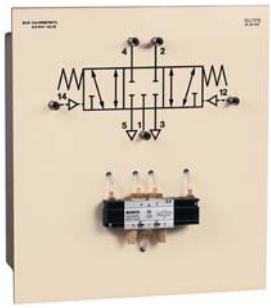
Display 0 ... 10 bar; class 1.6; Ø 63 mm.

Dimensions in mm: 319 x 297 x 100 (W x H x D)
Mass: 0.50 kg

For the specifications of the limit switches, please see the following page.

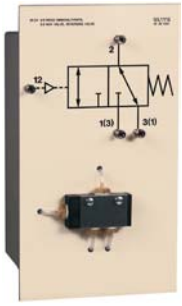
Shuttle valve
P 30.18

Mixed pressure
valve P 30.19



5/3-way valve
P 30.21

Stand for pulling
or pushing load



3/2-way reversing
valve P 30.34

Sequencer
P 30.91

T-junction

PU hose

Pressure indicator, optical

Limit switch 30.9 **22 30 009 1**
3/2-way valve with jockey roller, locked when at "off" position.
Dimensions in mm: 45 x 110 x 50 (W x H x D) Mass: 0.14 kg

Limit switch 30.10 **22 30 010 1**
3/2-way valve with idle return travel tilting roller, locked when at "off" position.
Dimensions in mm: 45 x 110 x 50 (W x H x D) Mass: 0.14 kg

Shuttle valve P 30.18 **10 30 018**
Double check valve with OR function,
control pressure of 1 bar min.
Dimensions in mm: 159 x 297 x 120 (W x H x D) Mass: 0.40 kg

Mixed pressure valve P 30.19 **10 30 019**
(4 pieces per equipment)
with AND function, control pressure of 1 bar min.
Dimensions in mm: 99 x 297 x 90 (W x H x D) Mass: 0.40 kg

5/3-way valve P 30.21 **10 30 021**
pneumatically operated, locked at center position.
Dimensions in mm: 259 x 297 x 90 (W x H x D) Mass: 1.00 kg

Stand for pulling or pushing load **15 30 002**
Stand for pulling or pushing load (3.5 kg), depending on the way of assembly. With finger guards.
Dimensions in mm: 260 x 400 x 300 (W x H x D) Mass: 6.15 kg

3/2-way reversing valve P 30.34 **10 30 034**
(3 pieces per equipment)
pneumatically operated, with spring return mechanism.
Dimensions in mm: 159 x 297 x 140 (W x H x D) Mass: 0.70 kg

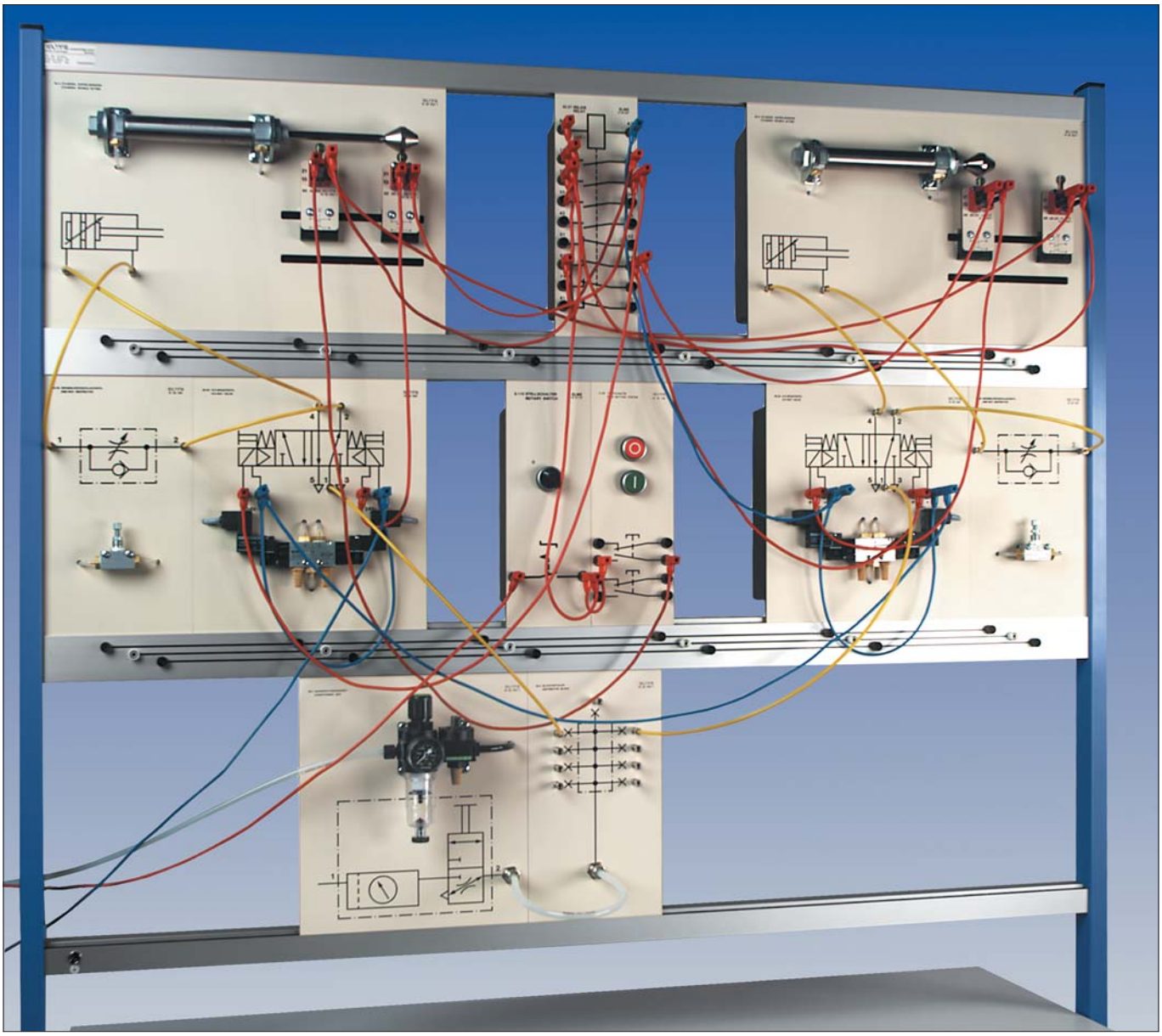
Sequencer P 30.91 **10 30 091**
Every cycle is assigned to one sequence step component. The individual cycles are interlocked and the states of the individual steps are visually indicated.
Sequence step components: 3 x TAA, 1 x TAB.
Dimensions in mm: 259 x 297 x 130 (W x H x D) Mass: 1.65 kg

T-junction **26 30 002**
(5 pieces per equipment)
for PU hose Ø 4/2 mm.
Dimensions in mm: 30 x 22 x 9 (W x H x D) Mass: 0.02 kg

PU hose **26 30 005**
Ø 4/2 mm, 25 m long.
Dimensions in mm: 4 x 4 x 25000 (W x H x D) Mass: 0.27 kg

Pressure indicator, optical **26 30 025**
(5 pieces per equipment)
with quick-release coupling.
Dimensions in mm: 12 x 12 x 50 (W x H x D) Mass: 0.03 kg

Supplementary Equipment "Elektropneumatics" TG 30.30 01 30 030



The basic equipment components for pneumatics are required for the exercises carried out with the additional equipment for electropneumatics.

The main subject matters of the experiments conducted with this equipment include:

- Basic knowledge on current circuits and Ohm's law
- Structure and operating principle of control systems with relays
- Operating principle and use of electromagnetically-operated directional valves
- Realisation of logic functions (AND, OR) with electropneumatic circuits
- Automatic control systems with limit switches and contact-free sensors
- Structure and operating principle of electropneumatic sequence control systems
- Structure and operating principle of time and pressure-operated electropneumatic control systems
- Structure and operating principle of electropneumatic control systems with boundary conditions (e.g. single scan, continuous scan, emergency stop)

Pushbutton switch
P 30.50

3/2-way valve
P 30.51

5/2-way valve
P 30.52

5/2-way valve
P 30.53

Relay
P 30.57

Time relay
P 30.58

Time relay
P 30.59

Pilot lamp
P 30.60

On/off switch
P 5.110

Pushbutton
P 5.116

Electrically-operated
sensor-switch

Limit switch
30.55

The supplementary equipment consists of:

Pushbutton switch P 30.50 **10 30 050 1**
Variable switching pressure of 0.5 ... 8 bar, 1 changeover contact.
Contact rating: 2 A DC max.
Dimensions in mm: 159 x 297 x 110 (W x H x D); Mass: 0.96 kg

3/2-way valve P 30.51 **10 30 051**
Magnetically operated, with spring return mechanism, locked when at "off" position (changeover valve).
Dimensions in mm: 159 x 297 x 110 (W x H x D); Mass: 0.90 kg

5/2-way valve P 30.52 **10 30 052**
(3 pieces per equipment)
Magnetically operated, with spring return mechanism (pulse valve).
Dimensions in mm: 259 x 297 x 100 (W x H x D); Mass: 0.65 kg

5/2-way valve P 30.53 **10 30 053**
(3 pieces per equipment)
Magnetically operated on both sides (changeover valve).
Dimensions in mm: 259 x 297 x 100 (W x H x D); Mass: 0.65 kg

Relay P 30.57 **10 30 057**
(6 pieces per equipment)
4 make contacts and 4 break contacts.
Dimensions in mm: 99 x 297 x 90 (W x H x D); Mass: 0.95 kg

Time relay, on-delay, 24 V P 30.58 **10 30 058**
Delay variable from 1 ... 10 s, 1 changeover contact.
Dimensions in mm: 99 x 297 x 70 (W x H x D); Mass: 0.35 kg

Time relay, off-delay, 24 V P 30.59 **10 30 059**
Delay variable from 1 ... 10 s, 1 changeover contact.
Dimensions in mm: 99 x 297 x 70 (W x H x D); Mass: 0.35 kg

Pilot lamp, 24 V P 30.60 **10 30 060**
Dimensions in mm: 99 x 297 x 80 (W x H x D); Mass: 0.35 kg

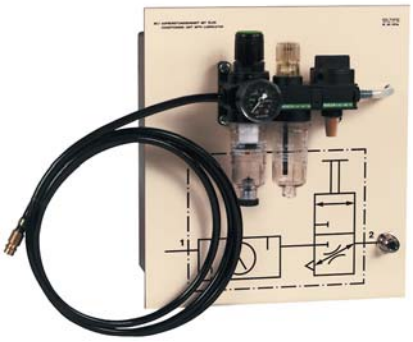
On/off switch P 5.110 **10 15 110**
(2 pieces per equipment)
Turn switch, on/off.
Dimensions in mm: 99 x 297 x 85 (W x H x D); Mass: 0.30 kg

Pushbutton 0-1 P 5.116 **10 15 116**
(3 pieces per equipment)
Two pushbuttons, each with 1 make and 1 break contact of 400 V, 10 A.
Dimensions in mm: 99 x 297 x 85 (W x H x D); Mass: 0.45 kg

Electrically-operated sensor-switch **26 30 030**
(6 pieces per equipment)
with LED, for cylinders of 25 mm diam.
Dimensions in mm: 30 x 60 x 20 (W x H x D); Mass: 0.13 kg

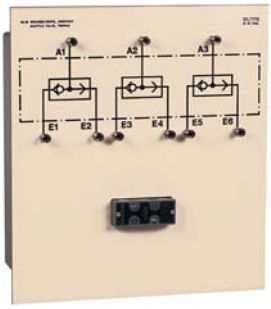
Limit switch 30.55 **22 30 055 1**
roller-operated, 1 make contact / 1 break contact.
Dimensions in mm: 45 x 100 x 70 (W x H x D); Mass: 0.15 kg

Optional Accessories

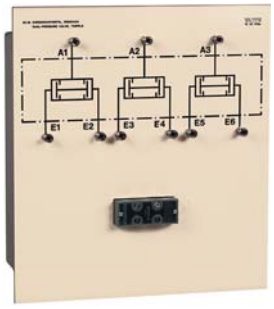


Pressure supply unit with oiler
P 30.1

5/2-way valve, reversing
P 30.14



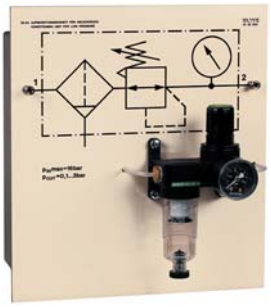
Shuttle valve, triple
P 30.18



Mixed pressure valve, triple
P 30.19

Two-stage amplifier
P 30.22

Reflex nozzle
P 30.23



Pressure supply unit
P 30.24

3/2-way valve
P 30.30

Limit switch
30.31

The additional equipment enables one to do more advanced exercises, thus meeting specific customer requirements, particularly in the field of further education. If further components are required, please do not hesitate to ask us.

Pressure supply unit with oiler P 30.1 **10 30 001 a**

Service unit with oiler consisting of a filter pressure control valve (membrane pressure regulator) with manometer and a knob-operated 3/2-way shut-off valve. The filter cartridge can be exchanged. The adjuster of the pressure regulator can be turned and locked. The knob of the shut-off valve can be turned by 90° (open – shut).

- 2 m hose connection with plug-in nipple NW 7.2
- Inlet pressure $P_{imax.}$ 16 bar
- Pressure regulator 0 ... 10 bar, with manometer
- Filter with water separator
- Condensed water drain, half-automatic
- Outlet with 8-mm quick-release coupling

Dimensions in mm: 259 x 297 x 180 (W x H x D); Mass: 1.90 kg

5/2-way valve, reversing P 30.14 **10 30 014**

pneumatically operated, with spring return mechanism (changeover valve).

Dimensions in mm: 159 x 297 x 130 (W x H x D); Mass: 0.65 kg

Shuttle valve, triple P 30.18 **10 30 018 a**

with OR function, control pressure of 1 bar min.

Dimensions in mm: 259 x 297 x 90 (W x H x D); Mass: 1.00 kg

Mixed pressure valve, triple P 30.19 **10 30 019 a**

with AND function, control pressure of 1 bar min.

Dimensions in mm: 259 x 297 x 90 (W x H x D); Mass: 1.00 kg

Two-stage amplifier P 30.22 **10 30 022**

Input pressure of 12 ... 500 mbar.

Dimensions in mm: 159 x 297 x 130 (W x H x D); Mass: 1.01 kg

Reflex nozzle P 30.23 **10 30 023**

Ø 3 mm.

Dimensions in mm: 159 x 297 x 150 (W x H x D); Mass: 0.65 kg

Pressure supply unit P 30.24 **10 30 024**

for low pressure, variable from 0.1 … 3 bar.

Dimensions in mm: 259 x 297 x 160 (W x H x D); Mass: 1.45 kg

3/2-way valve P 30.30 **10 30 030**

with lever, latched ON-OFF.

Dimensions in mm: 159 x 297 x 70 (W x H x D); Mass: 0.60 kg

Limit switch 30.31 **22 30 031 1**

5/2-way valve with jockey roller.

Dimensions in mm: 90 x 160 x 60 (W x H x D); Mass: 0.29 kg

5/3-way valve
P 30.33

Compressed-
air storage
P 30.4

Pressure control
valve P 30.42

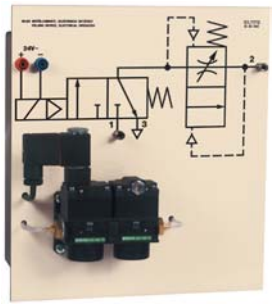
5/3-way valve
P 30.54

Limit switch
30.55

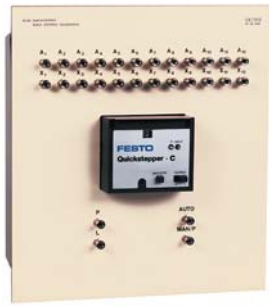
Sensor, capacitive
30.60

Sensor, inductive
30.61

Sensor, optical
30.62



Filling unit, electrically operated
P 30.63



Quick stepper
P 30.90

Sequencer with 4 steps
P 30.91

Counter
P 30.92

5/3-way valve P 30.33 **10 30 033 1**
lever with latching.
Dimensions in mm: 319 x 297 x 210 (W x H x D) Mass: 1.40 kg

Compressed-air storage, 100 cm^3 P 30.40 **10 30 040**
Capacity of 100 cm^3, max. pressure of 7 bar.
Dimensions in mm: 99 x 297 x 120 (W x H x D) Mass: 0.50 kg

Pressure control valve P 30.42 **10 30 042**
for an optimum pressure adjustment directly where required (energy-saving valve).
Dimensions in mm: 159 x 297 x 175 (W x H x D) Mass: 0.67 kg

5/3-way valve P 30.54 **10 30 054**
Magnetically operated on both sides, locked at center position.
Dimensions in mm: 319 x 297 x 110 (W x H x D) Mass: 1.50 kg

Limit switch, roller-operated 30.55 **22 30 055 1**
1 make contact, 1 break contact.
Dimensions in mm: 45 x 100 x 70 (W x H x D) Mass: 0.15 kg

Sensor, capacitive 30.60 **22 30 060**
Dimensions in mm: 120 x 60 x 70 (W x H x D) Mass: 0.13 kg

Sensor, inductive 30.61 **22 30 061**
Dimensions in mm: 120 x 60 x 70 (W x H x D) Mass: 0.13 kg

Sensor, optical 30.62 **22 30 062**
Dimensions in mm: 120 x 60 x 70 (W x H x D) Mass: 0.13 kg

Filling unit, electrically operated P 30.63 **10 30 063**
to slowly build up pressure in pneumatic systems, i.e. to prevent sudden pressure build-up. When re-starting after power pressure failure or emergency switch off, hazardous sudden cylinder movements do not occur.
Dimensions in mm: 259 x 297 x 135 (W x H x D) Mass: 1.88 kg

Quick stepper P 30.90 **10 30 090**
Pneumomechanical stepper to set up a simple sequence control with 12 cycles. Cycles that are not required can be skipped by closing the respective output and check-back connections.
Dimensions in mm: 259 x 297 x 150 (W x H x D) Mass: 1.50 kg

Sequencer with 4 steps P 30.91 **10 30 091 a**
Every cycle is assigned to one sequence step component. The individual cycles are interlocked and the states of the individual steps are visually indicated.
Sequence step components: 4 × TAA.
Dimensions in mm: 259 x 297 x 130 (W x H x D) Mass: 1.65 kg

Counter, electrical P 30.92 **10 30 092**

Display:	LCD, 8-digit, digits 7 mm high
Counting method:	adding
Counting range:	0 ... 99999999
Input:	5 … 48 V AC, leading to 4-mm safety sockets
Frequency:	18 Hz max.
Voltage supply:	built-in lithium battery

Dimensions in mm: 99 x 297 x 83 (W x H x D) Mass: 0.40 kg

Presetting counter P 30.93

Presetting counter P 30.94

Presetting counter, electrical P 30.93 **10 30 093**

Functions:	adding counter, subtracting counter
Display:	LCD, 8-digit, digits 7 mm high
Counting range:	0 ... 999999
Input:	12 … 250 V AC, leading to 4-mm safety sockets
Frequency:	25 Hz max.
Reset input:	12 ... 250 V AC, leading to 4-mm safety sockets
Output:	relay contact, programmable as make or break contact, max. switching capacity of 30 V DC, 2 A; 230 V AC, 0.5 A, leading to 4-mm safety sockets
Voltage supply:	built-in lithium battery
Dimensions in mm:	99 x 297 x 83 (W x H x D)
Mass:	0.45 kg

Voltage supply unit
24 12 470 1

Presetting counter, pneumatic P 30.94 **10 30 094**

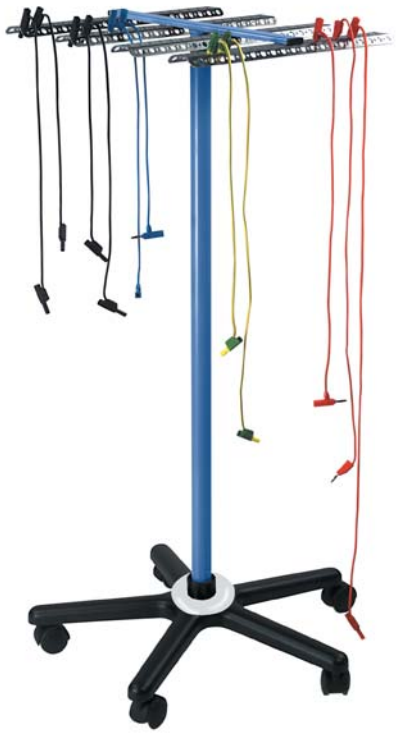
Pneumomechanical counter, subtracting.

Display:	5 digits
Counting range:	0 ... 99999
Nominal pressure:	2 ... 8 bar
Frequency:	max. 20 Hz
Dimensions in mm:	259 x 297 x 130 (W x H x D)
Mass:	1.02 kg

Voltage supply unit 24 V DC; 6.5 A **24 12 470 1**

Stabilised voltage supply unit with little residual ripple; input voltage range of 220 … 240 V AC.

Output voltage:	24 V DC, stabilised (SELV, safety extra-low voltage), resistant to continuous short-circuit and idle run
Residual ripple:	< 150 mV_{PP}
Output current:	6.5 A max.
Voltage supply:	220 ... 240 V AC, 50/60 Hz
Dimensions in mm:	159 x 297 x 135 (W x H x D)
Mass:	1.74 kg



Mobile cable holder

Voltage supply unit 24 V DC; 6.5 A **24 12 470 2**

Data as with 24 12 470, but for 110 … 120 V AC.

Recommended connection cables with 4-mm plugs:

10 Connection cable, red, 2.5 mm^2, 10 cm	56 00 510
32 Connection cable, red, 2.5 mm^2, 35 cm	56 00 535
9 Connection cable, red, 2.5 mm^2, 45 cm	56 00 545
3 Connection cable, red, 2.5 mm^2, 100 cm	56 00 600
1 Connection cable, red, 2.5 mm^2, 150 cm	56 00 601
10 Connection cable, blue, 2.5 mm^2, 10 cm	56 00 410
15 Connection cable, blue, 2.5 mm^2, 35 cm	56 00 435
4 Connection cable, blue, 2.5 mm^2, 45 cm	56 00 445
3 Connection cable, blue, 2.5 mm^2, 100 cm	56 00 500
1 Connection cable, blue, 2.5 mm^2, 150 cm	56 00 501

Mobile cable holder **70 00 215 01**

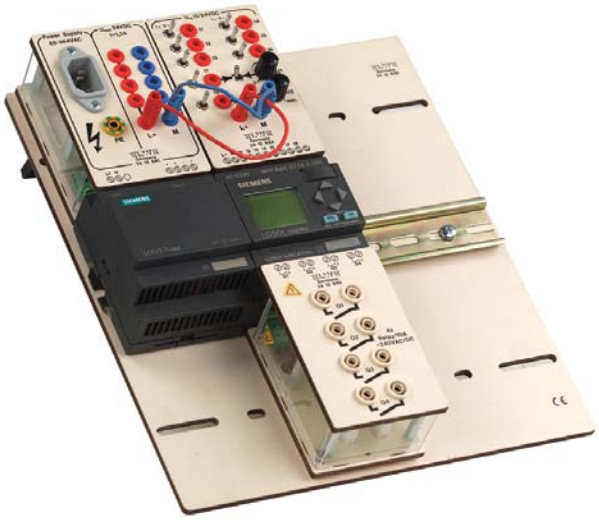
(without cables)

178 connection cables with 4-mm plugs (or safety plugs) and 88 19-mm connectors can be clearly arranged and stored on four perforated rails. Support area of 470 mm x 430 mm. Plastic coated steel tube stand, colour RAL 5014 pigeon blue, with 5 castors, swivelling top with 4 perforated chromate rails.

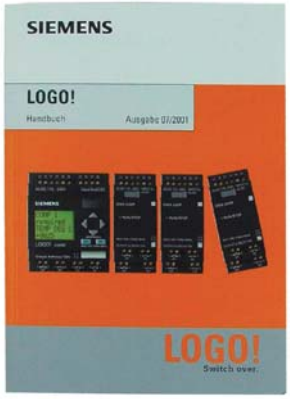
Dimensions in mm:	470 x 430 x 1125 (L x W x H)
Mass:	6.3 kg

Universal Logic Module LOGO! 24RC

With the universal logic module it is possible to conduct all exercises on electropneumatics as a programmable control instead of the wired-program design. This is done cost-effectively and quickly using examples.



Logic Module LOGO!



Manual for logic module

PC connection cable

Program module

Software LOGO!Soft Comfort

Universal Logic Module LOGO! 24RC **02 12 120**

with input signal simulation. The Siemens logic module LOGO! is the compact, convenient and cost-effective solution for simple control problems in the field of installation and switching cabinet as well as mechanical engineering. The module can be easily operated via an integrated keyboard and LCD display panel. The switching programs can also be set up, duplicated, documented and archived with the software LOGO!Soft at the PC. The logic module LOGO! has the following special features:

- Easy establishment of switching programs by combining basic and special functions
  Basic functions: AND, OR, NOT, NAND, NOR, XOR
  Special functions: ON delay, latching ON delay, OFF delay, current impulse relay, pulse generator, counter (up and down), timer
- Flexibility by recombining the functions
- Failure-safe storage of switching programs and setpoints (e.g. times) through integrated EEPROM
- Convenient saving, duplicating and transport of the switching program via an optional program module.

The trainer LOGO! has the following special features:

- All inputs and outputs lead to 2 resp. 4-mm safety sockets.
- One rocker switch per input can be connected via jumper plugs to simulate the input signals.
- Hinged feet also enable the use of the experimental panel as a table-top unit with inclined worktop.

Inputs:	8
Input voltage:	24 V DC, at signal "0": 5 V max. at signal "1": 15 V min.
Input current:	3 mA at 24 V DC
Outputs:	4 relays, 230 V AC max.
Output current:	10 A max. at resistive load 2 A max. at inductive load
Switching frequency:	2 Hz max. at resistive load 0.5 Hz max. at inductive load
Voltage supply:	24 V DC

Manual for logic module LOGO! 24RC **52 12 122**

Dimensions in mm:	150 x 10 x 210 (W x H x D)
Mass:	0.16 kg

Recommended accessories:

PC connection cable for LOGO! 24RC **24 12 891**

Dimensions in mm:	125 x 35 x 185 (W x H x D)
Mass:	0.11 kg

Software LOGO!Soft - D,GB,F,E,I,P-Comfort 3.0 **50 12 890 1**

Dimensions in mm:	105 x 10 x 105 (W x H x D)
Mass:	0.05 kg

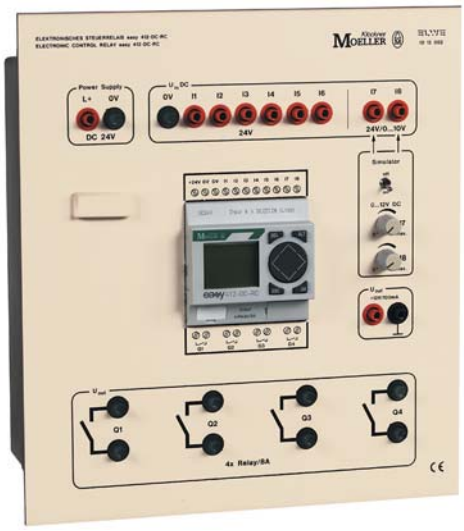
Software Upgrade LOGO!Soft Comfort 2.0 to 3.0 **50 12 890 2**

Dimensions in mm:	105 x 10 x 105 (W x H x D)
Mass:	0.05 kg

Program module for LOGO! 24RC **24 12 892**

Dimensions in mm:	8 x 14 x 20 (W x H x D)
Mass:	0.01 kg

Electronic control relay "easy"



Electronic control relay

Electronic control relay "easy" 412-DC-RC **10 12 002**

Apart from contactor, time relay and switching functions, the Moeller control relay easy is also able to perform counting functions and to process analog signals.
The circuit diagram is entered directly using keys. When checking the functions, the active current flow is indicated on the display.
The circuit diagrams can be set up and tested at the PC with the aid of the software "EasySoft".
The control relay has 8 digital 24-V inputs, two of which can be used as analog inputs, 4 relay outputs and a real time clock. All inputs and outputs lead to 4-mm safety sockets.
Two voltages variable from 0 … 10 V DC can be connected selectively to the analog inputs. A 12-V-DC voltage is available at sockets to supply voltage to external analog adjusters.
Cards with circuit diagrams can be attached to the front side to make clear the programmed control function.

Voltage supply: 24 V DC

Dimensions in mm: 259 x 297 x 90 (W x H x D)
Mass: 1.25 kg

PC connection cable

PC connection cable for easy **23 12 001**
Dimensions in mm: 95 x 35 x 125 (W x H x D)
Mass: 0.07 kg

Programming software

Programming software easySoft for easy - D, GB, F, E, I - **50 12 641**
Dimensions in mm: 95 x 13 x 95 (W x H x D)
Mass: 0.03 kg

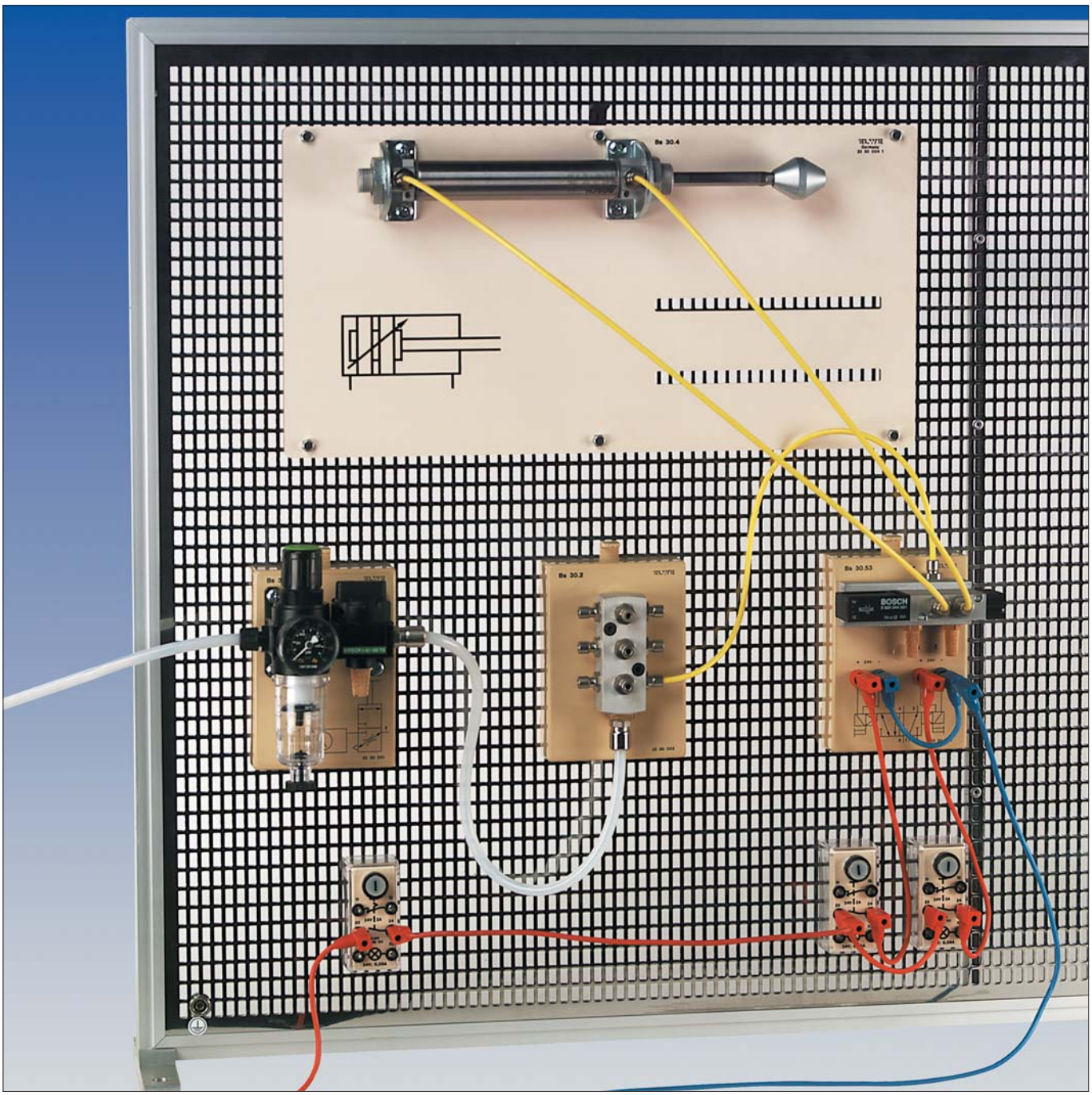
Set of practising cards

Set of practising cards for easy 412-DC-RC **23 12 002**
Dimensions in mm: 85 x 54 x 4 (W x H x D)
Mass: 0.01 kg

Manual for the control relay

Manual for the control relay easy **52 12 562**
Dimensions in mm: 150 x 6 x 210 (W x H x D)
Mass: 0.13 kg

The Pneumatics Experimental Module System



The experimental module system consists of handy to use solid experimental modules, which can be freely and clearly arranged on a mounting wall according to the circuit diagram.

An elastic catch latches when a module is attached to the mounting wall so that it cannot fall off when the connections are plugged in.

The components are directly connected pneumatically with PU hoses and quick-fit couplings.

The electrical components are connected with 4-mm connection cables, directly to the respective sockets of the industrial components.

With this experimental module system, the student can study the contents of the curriculum hands-on, that means practically and almost independently.

The system is very easy to handle and safe to operate.

The standardised symbols are printed on the front.

For a better overview, the modules are coloured and stored clearly arranged on trays formed to hold the individual devices.

Basic Equipment "Pneumatics" U 30.10 02 30 010

Pressure supply unit
BS 30.1

The following subjects can be studied with the basic equipment:

- Physical basics of pneumatics
- Preparation of pressure
- Design and use of single and double-acting cylinders
- Design and use of 3/2-way valves and 5/2-way valves
- Design and use of throttle, throttle stop and pulse valves
- Establishing logic functions (AND, OR) with pneumatic valves

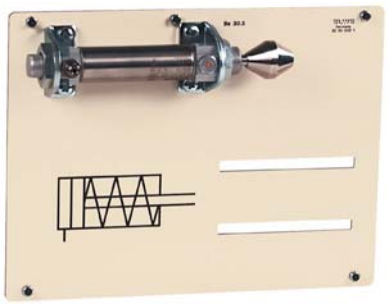
The basic equipment consists of:

Pressure supply unit BS 30.1 **22 30 001**
Service unit consisting of a filter pressure control valve (membrane pressure regulator) with manometer and a knob-operated 3/2-way shut-off valve. The filter cartridge can be exchanged. The adjuster of the pressure regulator can be turned and locked. The knob of the shut-off valve can be turned by 90° (open – shut).

– 2 m hose connection with plug-in nipple NW 7.2
– Inlet pressure $P_{imax.}$ 16 bar
– Pressure regulator 0 ... 10 bar, with manometer
– Filter with water separator
– Condensed water drain, half-automatic
– Outlet with 8-mm quick-release coupling

Dimensions in mm: 140 x 180 x 130 (W x H x D)
Mass: 0.86 kg

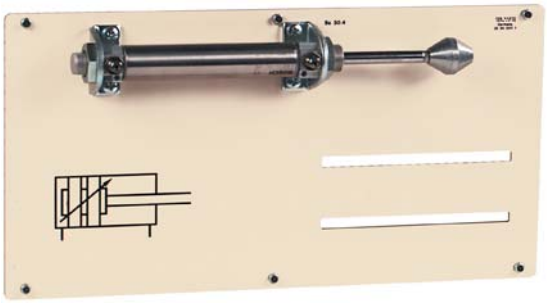
Block distributor
BS 30.2



Cylinder, single-acting
BS 30.3

Block distributor BS 30.2 **22 30 002**
10-fold distributor with 1 x 8 mm and 9 x 4 mm automatically closing quick-fit couplings.
Dimensions in mm: 100 x 150 x 80 (W x H x D)
Mass: 0.44 kg

Cylinder, single-acting BS 30.3 **22 30 003 1**
with return spring, Piston diameter of 25 mm, lift of 50 mm.
Exchangeable operating cams: 1 × steel, 1 × PVC.
Pneumatic and electric limit switches and sensors can be positioned quickly and safely without using tools. The positioning is freely selectable over the whole lift range of the piston.
Dimensions in mm: 300 x 210 x 70 (W x H x D)
Mass: 1.15 kg



Cylinder, double-acting
BS 30.4

Cylinder, double-acting BS 30.4 **22 30 004 1**
(2 pieces per equipment)
Piston diameter of 25 mm, lift of 100 mm.
Exchangeable operating cams: 1 × steel, 1 × PVC.
Adjustable limit attenuation and non-contact signal input.
Pneumatic and electric limit switches and sensors can be positioned quickly and safely without using tools. The positioning is freely selectable over the whole lift range of the piston.
Dimensions in mm: 440 x 220 x 70 (W x H x D)
Mass: 1.45 kg

Pressure gauge
BS 30.5

3/2-way valve
BS 30.6

3/2-way valve
BS 30.7

Limit switch
30.9

Limit switch
30.10

3/2-way valve
BS 30.11

5/2-way valve
BS 30.12

5/2-way valve
BS 30.13

3/2-way delay valve
BS 30.15

Throttle stop valve
BS 30.16

Pressure gauge BS 30.5 **22 30 005**

(2 pieces per equipment)

Display 0 ... 10 bar; class 1.6; Ø 63 mm.

Dimensions in mm: 100 x 150 x 70 (W x H x D)
Mass: 0.21 kg

3/2-way valve BS 30.6 **22 30 006**

(2 pieces per equipment)

with pushbutton, locked when at "off" position.

Dimensions in mm: 100 x 150 x 70 (W x H x D)
Mass: 0.20 kg

3/2-way valve BS 30.7 **22 30 007**

with pushbutton, open when at "off" position.

Dimensions in mm: 100 x 150 x 70 (W x H x D)
Mass: 0.13 kg

Limit switch 30.9 **22 30 009 1**

(3 pieces per equipment)

3/2-way valve with jockey roller, locked when at "off" position.

Dimensions in mm: 45 x 110 x 45 (W x H x D)
Mass: 0.14 kg

Limit switch 30.10 **22 30 010 1**

3/2-way valve with idle return travel tilting roller, locked when at "off" position.

Dimensions in mm: 45 x 100 x 45 (W x H x D)
Mass: 0.14 kg

3/2-way valve BS 30.11 **22 30 011**

with pressure-controlled switch-over,
setting range of 1.8 ... 8 bar.

Dimensions in mm: 100 x 150 x 110 (W x H x D)
Mass: 0.36 kg

5/2-way valve BS 30.12 **22 30 012**

with pushbutton.

Dimensions in mm: 100 x 150 x 80 (W x H x D)
Mass: 0.22 kg

5/2-way valve BS 30.13 **22 30 013**

(3 pieces per equipment)

pneumatically operated (pulse valve).

Dimensions in mm: 100 x 150 x 60 (W x H x D)
Mass: 0.23 kg

3/2-way delay valve BS 30.15 **22 30 015**

with variable time delay of 0.15 ... 10 s, connection for an additional memory for a time extension.

Dimensions in mm: 100 x 160 x 80 (W x H x D)
Mass: 0.60 kg

Throttle stop valve BS 30.16 **22 30 016**

(2 pieces per equipment)

Opening pressure of 0.5 bar min.

Dimensions in mm: 100 x 150 x 60 (W x H x D)
Mass: 0.18 kg

Fast vent valve
BS 30.17

Shuttle valve
BS 30.18

Mixed pressure valve
BS 30.19

Pressure control valve
BS 30.20

Hose cutter

Filler plug

T-junction

Sound absorber

PU hose, 4/2 mm

PU hose, 8/6 mm

Fast vent valve BS 30.17 **22 30 017**
Dimensions in mm: 100 x 150 x 70 (W x H x D)
Mass: 0.16 kg

Shuttle valve, single BS 30.18 **22 30 018**
Double check valve with OR function,
control pressure of 1 bar min.
Dimensions in mm: 100 x 150 x 70 (W x H x D)
Mass: 0.17 kg

Mixed pressure valve, single BS 30.19 **22 30 019**
with AND function, control pressure of 1 bar min.
Dimensions in mm: 100 x 150 x 70 (W x H x D)
Mass: 0.14 kg

Pressure control valve BS 30.20 **22 30 020**
Set pressure of 0.5 ... 10 bar.
Dimensions in mm: 100 x 150 x 145 (W x H x D)
Mass: 0.47 kg

Hose cutter **15 30 013**
Dimensions in mm: 45 x 9 x 130 (W x H x D)
Mass: 0.07 kg

Filler plug, 4 mm **15 30 014**
(25 pieces per equipment)
Dimensions in mm: 5 x 5 x 25 (W x H x D)
Mass: 0.01 kg

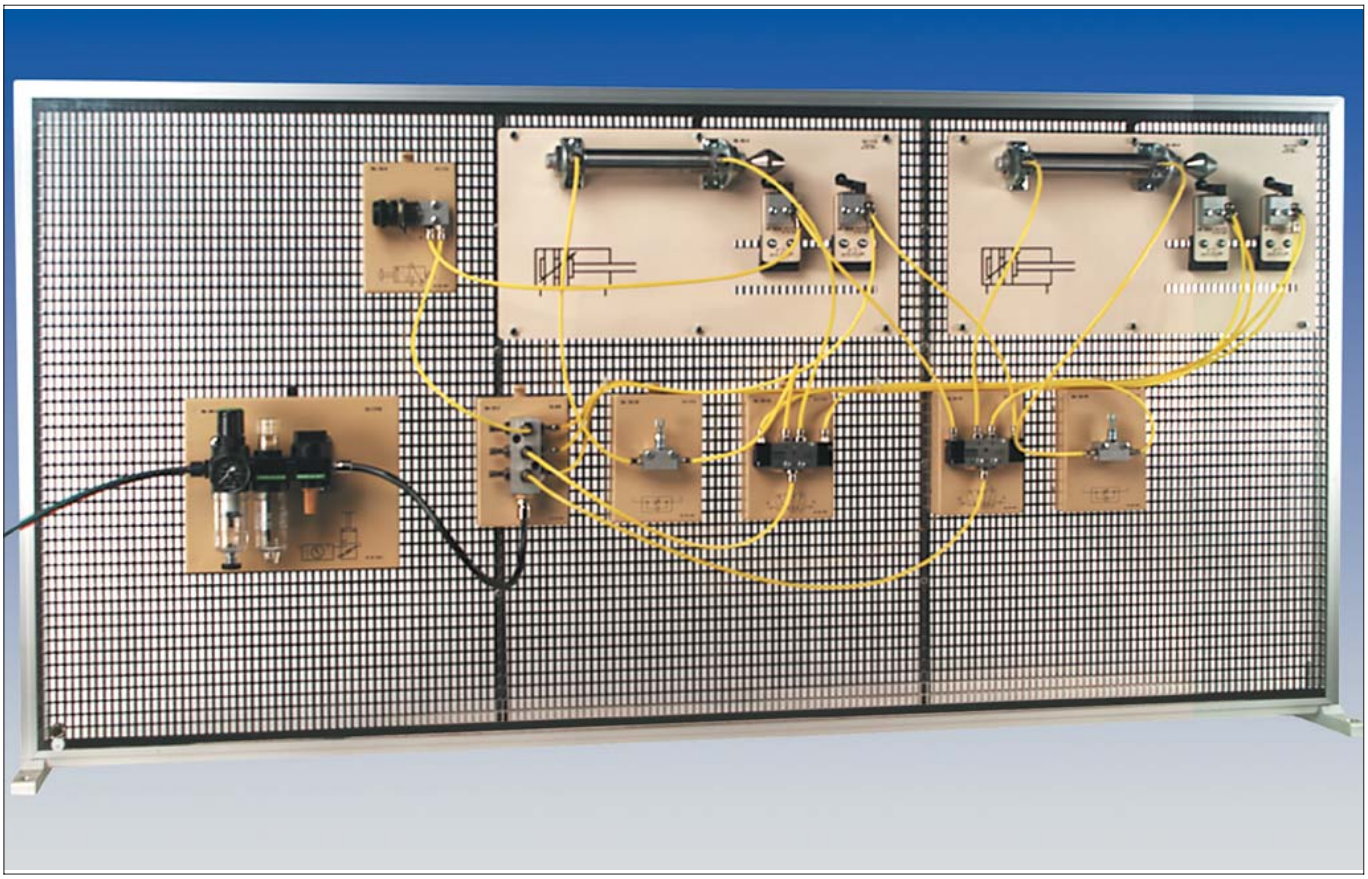
T-junction **26 30 002**
(5 pieces per equipment)
for PU hose Ø 4/2 mm.
Dimensions in mm: 30 x 22 x 9 (W x H x D)
Mass: 0.02 kg

Sound absorber **26 30 026**
(2 pieces per equipment)
with quick-release coupling.
Dimensions in mm: 15 x 15 x 50 (W x H x D)
Mass: 0.03 kg

PU hose **26 30 005**
Ø 4/2 mm, 25 m long.
Dimensions in mm: 4 x 4 x 25000 (W x H x D)
Mass: 0.17 kg

PU hose **26 30 007**
Ø 8/6 mm, 2 m long.
Dimensions in mm: 8 x 8 x2000 (W x H x D)
Mass: 0.02 kg

Supplementary Equipment "Pneumatics" U 30.20 02 30 020



The additional equipment, in combination with the basic equipment, enables the setting up of pneumatic control systems with different principles of action, such as

- the indirect control with unidirectional pressurised directional valves
- control systems with inlet and outlet air throttling
- pressure-controlled sequence control circuits
- position-dependent sequence control systems
- control systems with signal overlapping and signal disconnection
- sequence control systems with sequencer

The supplementary equipment consists of:

Pressure gauge BS 30.5 **22 30 005**

Display 0 ... 10 bar; class 1.6; Ø 63 mm.

Dimensions in mm: 100 x 150 x 70 (W x H x D)
Mass: 0.21 kg

Limit switch 30.9 **22 30 009 1**

3/2-way valve with jockey roller, locked when at "off" position.

Dimensions in mm: 45 x 110 x 45 (W x H x D)
Mass: 0.14 kg

Limit switch 30.10 **22 30 010 1**

3/2-way valve with idle return travel tilting roller, locked when at "off" position.

Dimensions in mm: 45 x 100 x 45 (W x H x D)
Mass: 0.14 kg

Pressure gauge BS 30.5

Limit switch 30.9

Limit switch 30.10

Shuttle valve
BS 30.18

Mixed pressure valve
BS 30.19

5/3-way valve
BS 30.21

Shuttle valve, single BS 30.18 **22 30 018**
Double check valve with OR function,
control pressure of 1 bar min.
Dimensions in mm: 100 x 150 x 70 (W x H x D)
Mass: 0.17 kg

Mixed pressure valve, single BS 30.19 **22 30 019**
(4 pieces per equipment)
with AND function, control pressure of 1 bar min.
Dimensions in mm: 100 x 150 x 70 (W x H x D)
Mass: 0.14 kg

5/3-way valve BS 30.21 **22 30 021**
pneumatically operated, locked at center position.
Dimensions in mm: 100 x 150 x 70 (W x H x D)
Mass: 0.25 kg

Stand for pulling
or pushing load

Stand for pulling or pushing load **15 30 002**
Stand for pulling or pushing load (3.5 kg), depending on the way of assembly. With finger guards.
Dimensions in mm: 260 x 400 x 300 (W x H x D)
Mass: 6.15 kg

3/2-way reversing
valve BS 30.34

Sequencer with 4 steps
BS 30.91

3/2-way reversing valve BS 30.34 **22 30 034**
pneumatically operated, with spring return mechanism.
Dimensions in mm: 100 x 150 x 60 (W x H x D)
Mass: 0.21 kg

Sequencer with 4 steps BS 30.91 **22 30 091**
Every cycle is assigned to one sequence step component. The individual cycles are interlocked and the states of the individual steps are visually indicated.
Sequence step components: 3 × TAA, 1 × TAB.
Dimensions in mm: 220 x 195 x 150 (W x H x D)
Mass: 1.46 kg

T-junction

Pressure indicator, optical

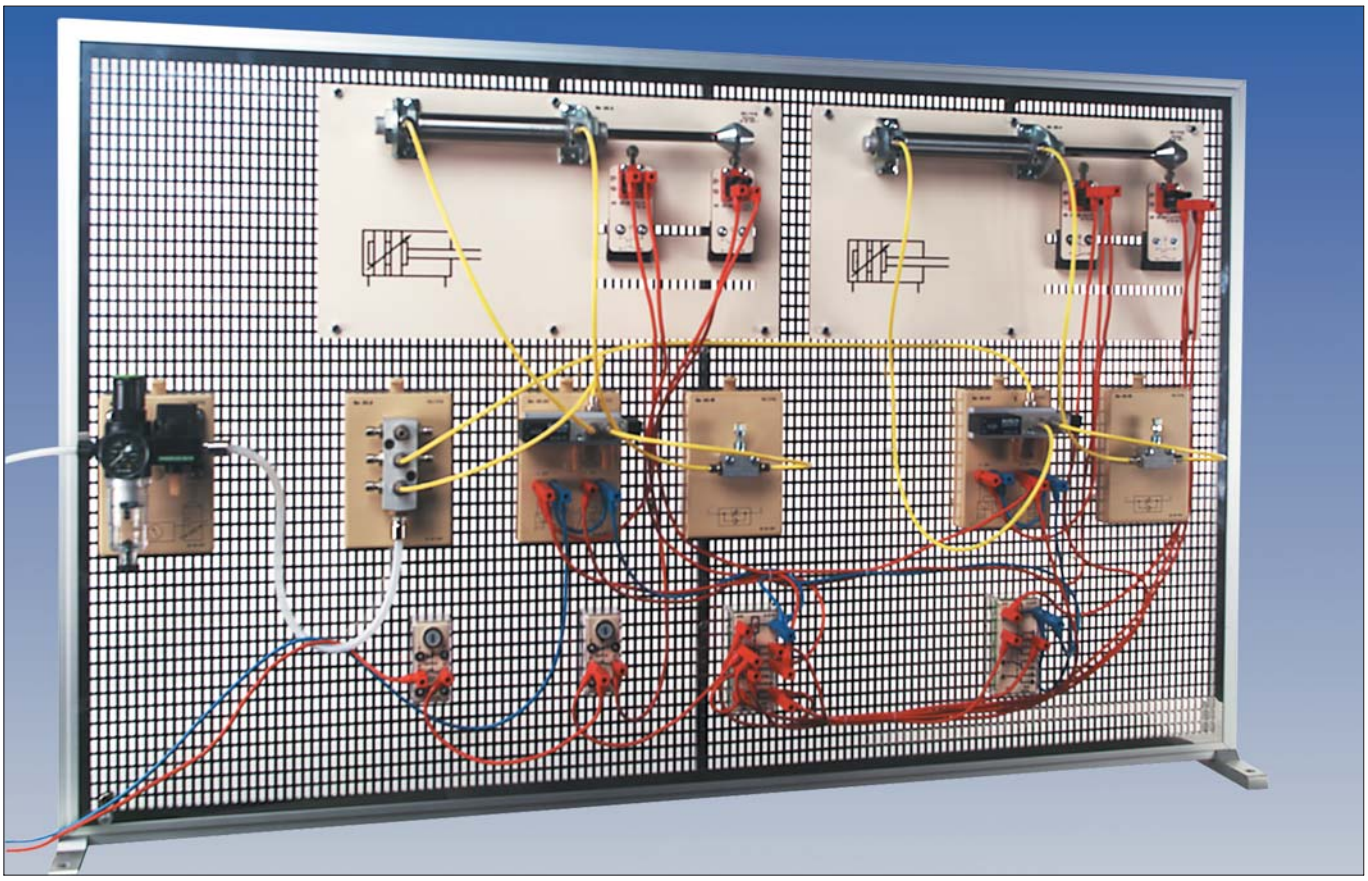
T-junction **26 30 002**
(5 pieces per equipment)
for PU hose Ø 4/2 mm.
Dimensions in mm: 30 x 22 x 9 (W x H x D)
Mass: 0.02 kg

PU hose, Ø 4/2 mm

PU hose **26 30 005**
Ø 4/2 mm, 25 m long.
Dimensions in mm: 4 x 4 x 25000 (W x H x D)
Mass: 0.27 kg

Pressure indicator, optical **26 30 025**
(5 pieces per equipment)
with quick-release coupling.
Dimensions in mm: 12 x 12 x 50 (L x W x H)
Mass: 0.03 kg

Supplementary Equipment "Electropneumatics" U 30.30 02 30 030



The basic equipment components for pneumatics are required for the exercises carried out with the additional equipment for electropneumatics.

The main subject matters of the experiments conducted with this equipment include:

- Basic knowledge on current circuits and Ohm's law
- Structure and operating principle of control systems with relays
- Operating principle and use of electromagnetically-operated directional valves
- Realisation of logic functions (AND, OR) with electropneumatic circuits
- Automatic control systems with limit switches and contact-free sensors
- Structure and operating principle of electropneumatic sequence control systems
- Structure and operating principle of time and pressure-operated electropneumatic control systems
- Structure and operating principle of electropneumatic control systems with boundary conditions (e.g. single scan, continuous scan, emergency stop)

Pushbutton switch
BS 30.50

3/2-way valve
BS 30.51

5/2-way valve
BS 30.52

The supplementary equipment consists of:

Pushbutton switch BS 30.50 22 30 050 1

Variable switching pressure of 0.5 ... 8 bar, 1 changeover contact.

Contact rating:	2 A DC max.
Dimensions in mm:	100 x 150 x 70 (W x H x D)
Mass:	0.32 kg

3/2-way valve, magnetically operated BS 30.51 22 30 051

with spring return mechanism, locked when at "off" position (changeover valve).

Dimensions in mm:	100 x 150 x 100 (W x H x D)
Mass:	0.20 kg

5/2-way valve, magnetically operated BS 30.52 22 30 052

(3 pieces per equipment)

with spring return mechanism (changeover valve).

Dimensions in mm:	120 x 150 x 100 (W x H x D)
Mass:	0.29 kg

5/2-way valve
BS 30.53

Relay
4 change-over contacts

Relay
on-delay

Relay
off-delay

Socket E10

Filament lamp
E10

Latching
pushbutton

Pushbutton

Electrically-operated
sensor-switch

Limit switch
30.55

5/2-way valve, magnetically operated BS 30.53 22 30 053
(3 pieces per equipment)
Magnetically operated on both sides (changeover valve).
Dimensions in mm: 120 x 150 x 120 (W x H x D)
Mass: 0.37 kg

Relay 12 ... 24 V, 4 change-over contacts, SB plug-in element 20 49 418
(6 pieces per equipment)
Dimensions in mm: 49 x 41 x 99 (W x H x D)
Mass: 0.07 kg

Relay 12 ... 24 V, SB plug-in element 20 13 030 2
Relay, on-delay, 0.2 ... 20 s,
1 make contact / 1 break contact.
Dimensions in mm: 40 x 50 x 77 (W x H x D)
Mass: 0.04 kg

Relay 12 ... 24 V, SB plug-in element 20 13 040 2
Relay, off-delay, 0.2 ... 20 s,
1 make contact / 1 break contact.
Dimensions in mm: 40 x 50 x 77 (W x H x D)
Mass: 0.04 kg

Socket E10, SB plug-in element 20 49 010
Dimensions in mm: 18 x 40 x 40 (W x H x D)
Mass: 0.01 kg

Filament lamp E10, 24 V, 80 mA, 1.9 W 59 50 240
Dimensions in mm: 10 x 10 x 25 (W x H x D)
Mass: 0.01 kg

Latching pushbutton, SB plug-in element 20 49 124
(2 pieces per equipment)
Latching pushbutton, illuminated.
Dimensions in mm: 40 x 75 x 50 (W x H x D)
Mass: 0.03 kg

Pushbutton, SB plug-in element 20 49 122
(3 pieces per equipment)
Pushbutton, illuminated.
Dimensions in mm: 40 x 75 x 50 (W x H x D)
Mass: 0.03 kg

Electrically-operated sensor-switch 26 30 030
(6 pieces per equipment)
with LED, for cylinders of 25 mm diam.
Dimensions in mm: 100 x 100 x 40 (W x H x D)
Mass: 0.07 kg

Limit switch 30.55 22 30 055 1
1 make contact / 1 break contact.
Dimensions in mm: 45 x 100 x 70 (W x H x D)
Mass: 0.15 kg

Storage box with guide grooves 21 00 171 01
to store large plug-in elements for basic grids or any other parts in cabinets or suspended cabinets; stacking. Colour: light grey.
Dimensions in mm: 287 x 90 x 445 (W x H x D)
Mass: 1.00 kg

Optional Accessories

The optional accessories enables one to do more advanced exercises, thus meeting specific customer requirements, particularly in the field of further education. If further components are required, please do not hesitate to ask us.

Pressure supply unit with oiler
BS 30.1

3/2-way valve
BS 30.8

5/2-way valve
BS 30.14

Shuttle valve
BS 30.18

Mixed pressure valve
BS 30.19

Amplifier
BS 30.22

Reflex nozzle
BS 30.23

Pressure supply unit
BS 30.24

3/2-way valve
BS 30.30

Pressure supply unit with oiler BS 30.1 **22 30 001 a**
Service unit with oiler consisting of a filter pressure control valve (membrane pressure regulator) with manometer and a knob-operated 3/2-way shut-off valve. The filter cartridge can be exchanged. The adjuster of the pressure regulator can be turned and locked. The knob of the shut-off valve can be turned by 90° (open – shut).

- 2 m hose connection with plug-in nipple NW 7.2
- Inlet pressure $P_{imax.}$ 16 bar
- Pressure regulator 0 ... 10 bar, with manometer
- Filter with water separator
- Condensed water drain, half-automatic
- Outlet with 8-mm quick-release coupling

Dimensions in mm: 220 x 195 x 150 (W x H x D)
Mass: 1.70 kg

3/2-way valve, servo-assisted BS 30.8 **22 30 008**
with pushbutton, locked when at "off" position.
Dimensions in mm: 100 x 150 x 65 (W x H x D)
Mass: 0.13 kg

5/2-way valve, reversing BS 30.14 **22 30 014**
pneumatically operated, with spring return mechanism (reversing valve).
Dimensions in mm: 100 x 150 x 70 (W x H x D)
Mass: 0.20 kg

Shuttle valve, triple BS 30.18 **22 30 018 a**
with OR function, control pressure of 1 bar min.
Dimensions in mm: 100 x 150 x 85 (W x H x D)
Mass: 0.26 kg

Mixed pressure valve, triple BS 30.19 **22 30 019 a**
with AND function, control pressure of 1 bar min.
Dimensions in mm: 100 x 150 x 70 (W x H x D)
Mass: 0.14 kg

Two-stage amplifier BS 30.22 **22 30 022**
Input pressure of 12 ... 500 mbar.
Dimensions in mm: 100 x 150 x 80 (W x H x D)
Mass: 0.40 kg

Reflex nozzle BS 30.23 **22 30 023**
Ø 3 mm.
Dimensions in mm: 100 x 150 x 90 (W x H x D)
Mass: 0.16 kg

Pressure supply unit for low pressure BS 30.24 **22 30 024**
Set pressure of 0.1 ... 3 bar.
Dimensions in mm: 100 x 180 x 150 (W x H x D)
Mass: 0.61 kg

3/2-way valve BS 30.30 **22 30 030**
with lever, latched ON-OFF.
Dimensions in mm: 100 x 150 x 70 (W x H x D)
Mass: 0.18 kg

Limit switch
30.31

5/3-way valve
BS 30.33

Compressed-air
storage BS 30.40

Pressure control valve
BS 30.42

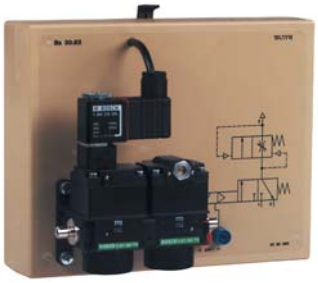
5/3-way valve
BS 30.54

Limit switch
30.55

Sensor, capacitive
30.60

Sensor, induktive
30.61

Sensor, optical
30.62



Filling unit, electrically operated
BS 30.63

Quick stepper
BS 30.90

Sequencer with 4 steps
BS 30.91

Limit switch 30.31 **22 30 031 1**
5/2-way valve with jockey roller.
Dimensions in mm: 90 x 160 x 60 (W x H x D)
Mass: 0.29 kg

5/3-way valve BS 30.33 **22 30 033 1**
lever with latching.
Dimensions in mm: 220 x 180 x 155 (W x H x D)
Mass: 0.81 kg

Compressed-air storage 100 cm^3 BS 30.40 **22 30 040**
Capacity of 100 cm^3, max. pressure of 7 bar.
Dimensions in mm: 100 x 150 x 100 (W x H x D)
Mass: 0.31 kg

Pressure control valve BS 30.42 **22 30 042**
for an optimum pressure adjustment directly where required (energy-saving valve).
Dimensions in mm: 100 x 150 x 145 (W x H x D)
Mass: 0.27 kg

5/3-way valve, magnetically operated BS 30.54 **22 30 054**
Magnetically operated on both sides, locked at center position.
Dimensions in mm: 130 x 150 x 140 (W x H x D)
Mass: 0.82 kg

Limit switch, roller-operated 30.55 **22 30 055 1**
1 make contact, 1 break contact.
Dimensions in mm: 45 x 100 x 70 (W x H x D)
Mass: 0.15 kg

Sensor, capacitive 30.60 **22 30 060**
Dimensions in mm: 120 x 60 x 70 (W x H x D)
Mass: 0.13 kg

Sensor, induktive 30.61 **22 30 061**
Dimensions in mm: 120 x 60 x 70 (W x H x D)
Mass: 0.13 kg

Sensor, optical 30.62 **22 30 062**
Dimensions in mm: 120 x 60 x 70 (W x H x D)
Mass: 0.13 kg

Filling unit, electrically operated BS 30.63 **22 30 063**
to slowly build up pressure in pneumatic systems, i.e. to prevent sudden pressure build-up. When re-starting after power pressure failure or emergency switch off, hazardous sudden cylinder movements do not occur.
Dimensions in mm: 220 x 195 x 135 (W x H x D)
Mass: 1.56 kg

Quick stepper BS 30.90 **22 30 090**
Pneumomechanical stepper to set up a simple sequence control with 12 cycles. Cycles that are not required can be skipped by closing the respective output and check-back connections.
Dimensions in mm: 220 x 195 x 150 (W x H x D)
Mass: 1.28 kg

Sequencer with 4 steps BS 30.91 **22 30 091 a**
Every cycle is assigned to one sequence step component. The individual cycles are interlocked and the states of the individual steps are optically indicated.
Sequence step components: 4 × TAA.
Dimensions in mm: 220 x 195 x 150 (W x H x D)
Mass: 1.46 kg

Counter, electrical
BS 30.92

Presetting counter, pneumatic
BS 30.94

Presetting counter,
electrical BS 30.93

DC-Konstanter

Connection cables

Counter, electrical BS 30.92 **22 30 092**

Display:	LCD 8-digit, digits 7 mm high
Counting method:	adding
Counting range:	0 ... 99 999 999
Input:	5 ... 48 V AC, leading to 4-mm safety sockets
Frequency:	18 Hz max.
Voltage supply:	built-in lithium battery
Dimensions in mm:	100 x 150 x 75 (W x H x D)
Mass:	0.23 kg

Presetting counter, electrical BS 30.93 **22 30 093**

Functions:	adding counter, subtracting counter
Display:	LCD 8-digit, digits 7 mm high
Counting range:	0 ... 999 999
Input:	12 ... 250 V AC, leading to 4-mm safety sockets
Frequency:	25 Hz max.
Reset input:	12 ... 250 V AC, leading to 4-mm safety sockets
Output:	relay contact, programmable as make or break contact, max. switching capacity of 30 V DC, 2 A; 230 V AC, 0.5 A leading to 4-mm safety sockets
Voltage supply:	built-in lithium battery
Dimensions in mm:	100 x 150 x 105 (W x H x D)
Mass:	0.375 kg

Presetting counter, pneumatic BS 30.94 **22 30 094**

Pneumomechanical counter, subtracting.

Display:	5 digits
Counting range:	0 ... 99999
Nominal pressure:	2 ... 8 bar
Frequency:	20 Hz max.
Dimensions in mm:	220 x 195 x 115 (W x H x D)
Mass:	0.77 kg

DC-Konstanter 24 V; 6.5 A **22 12 000**

Stabilised voltage supply unit with little residual ripple; input voltage range of 220 … 240 V AC.

Output voltage:	24 V DC, stabilised (SELV, safety extra-low voltage), resistant to continuous short-circuit and idle run
Residual ripple:	< 150 mV_{PP}
Output current:	6.5 A max.
Voltage supply:	220 ... 240 V AC, 50/60 Hz
Dimensions in mm:	220 x 195 x 95 (W x H x D)
Mass:	1.39 kg

DC stabiliser 24 V; 6.5 A **22 12 000 1**

Data as with 22 12 000, but for 110 … 220 V AC.

Mobile cable holder (see page 14) **70 00 215 01**

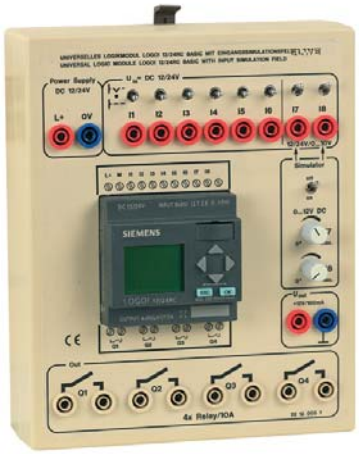
Recommended connection cables with 4-mm plugs:

(The delivery does not include the mobile cable holder)

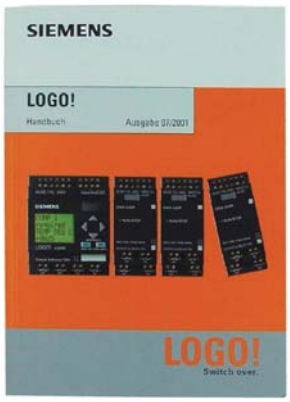
10 Connection cable, red, 2.5 mm^2, 10 cm	56 00 510
32 Connection cable, red, 2.5 mm^2, 35 cm	56 00 535
9 Connection cable, red, 2.5 mm^2, 45 cm	56 00 545
3 Connection cable, red, 2.5 mm^2, 100 cm	56 00 600
1 Connection cable, red, 2.5 mm^2, 150 cm	56 00 601
10 Connection cable, blau, 2.5 mm^2, 10 cm	56 00 410
15 Connection cable, blue, 2.5 mm^2, 35 cm	56 00 435
4 Connection cable, blue, 2.5 mm^2, 45 cm	56 00 445
3 Connection cable, blue, 2.5 mm^2, 100 cm	56 00 500
1 Connection cable, blue, 2.5 mm^2, 150 cm	56 00 501

Universal Logic Module LOGO! 24RC

With the universal logic module it is possible to conduct all exercises on electropneumatics as a programmable control instead of the wired-program design. This is done cost-effectively and quickly using examples.



Logic module LOGO!



Manual for logic module

PC connection cable

Software LOGO!Soft Comfort

Program module

Universal Logic Module LOGO! 24RC **22 12 005 1**

with input signal simulation. The Siemens logic module LOGO! is the compact, convenient and cost-effective solution for simple control problems in the field of installation and switching cabinet as well as mechanical engineering.
The module can be easily operated via an integrated keyboard and LCD display panel. The switching programs can also be set up, duplicated, documented and archived with the software LOGO!Soft at the PC.

The logic module LOGO! has the following special features:

- Easy establishment of switching programs by combining basic and special functions
  Basic functions: AND, OR, NOT, NAND, NOR, XOR
  Special functions: ON delay, latching ON delay, OFF delay, current impulse relay, pulse generator, counter (up and down), timer
- Flexibility by recombining the functions
- Failure-safe storage of switching programs and setpoints (e.g. times) through integrated EEPROM
- Convenient saving, duplicating and transport of the switching program via an optional program module.

All inputs and outputs lead to 2 resp. 4-mm safety sockets. One rocker switch per input can be connected via jumper plugs to simulate the input signals.

Inputs:	8
Input voltage:	24 V DC, at signal "0": 5 V max. at signal "1": 15 V min.
Output current:	3 mA at 24 V DC
Outputs:	4 relays, max. 230 V AC
Output current:	10 A max. at resistive load 3 A max. at inductive load
Switching frequency:	2 Hz max. at resistive load 0.5 Hz max. at inductive load
Voltage supply:	24 V DC
Dimensions in mm:	180 x 230 x 100 (W x H x D)
Mass:	1.0 kg

Manual for logic module LOGO! **52 12 122**

Dimensions in mm:	150 x 10 x 210 (W x H x D)
Mass:	0.16 kg

Recommended accessories:

PC connection cable for LOGO! 24RC **24 12 891**

Dimensions in mm:	125 x 35 x 185 (W x H x D)
Mass:	0.11 kg

Software LOGO!Soft - D,GB,F,E,I,NL-Comfort 3.0 **50 12 890 1**

Dimensions in mm:	105 x 10 x 105 (W x H x D)
Mass:	0.05 kg

Software Upgrade LOGO!Soft Comfort 2.0 to 3.0 **50 12 890 2**

Dimensions in mm:	105 x 10 x 105 (W x H x D)
Mass:	0.05 kg

Program module for LOGO! 24RC **24 12 892**

Dimensions in mm:	8 x 14 x 20 (W x H x D)
Mass:	0.01 kg

Electronic control relay "easy"

Electronic control relay

Electronic control relay easy 412-DC-RC **22 12 011**

Apart from contactor, time relay and switching functions, the Moeller control relay easy is also able to perform counting functions and to process analog signals.
The circuit diagram is entered directly using keys. When checking the functions, the active current flow is indicated on the display.
The circuit diagrams can be set up and tested at the PC with the aid of the software "easySoft".
The control relay has 8 digital 24-V inputs, two of which can be used as analog inputs, 4 relay outputs and a real time clock. All inputs and outputs lead to 4-mm safety sockets.
Two voltages variable from 0 … 10 V DC can be connected selectively to the analog inputs. A 12-V-DC voltage is available at sockets to supply voltage to external analog adjusters.
Cards with circuit diagrams can be attached to the front side to make clear the programmed control function.

Voltage supply:	24 V DC
Dimensions in mm:	235 x 180 x 90 (W x H x D)
Mass:	1.06 kg

PC connection cable

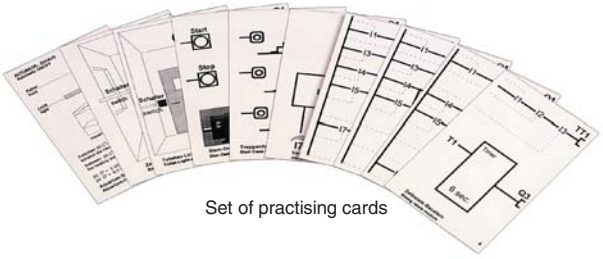
Programming software

PC connection cable for easy **23 12 001**

Dimensions in mm:	95 x 35 x 125 (W x H x D)
Mass:	0.07 kg

Programming software easySoft for easy - D, GB, F, E, I - **50 12 641**

Dimensions in mm:	95 x 13 x 95 (W x H x D)
Mass:	0.03 kg



Set of practising cards

Set of practising cards for easy 412-DC-RC **23 12 002**

Dimensions in mm:	85 x 54 x 4 (W x H x D)
Mass:	0.01 kg

Manual for the control relay

Manual for the control relay easy **52 12 562**

Dimensions in mm:	150 x 6 x 210 (W x H x D)
Mass:	0.13 kg

The Experimental Case Pneumatics

The experimental case Pneumatics is a mobile training unit which allows practical training and further education on the field Pneumatics and Electropneumatics.

The experimental case can be used in any location which means that its application is not dependent on special facilities.

The basic equipment consists of a solid and compact case with removable cover. The case is equipped with a terminal unit for pneumatic devices, a distributor block for pneumatic devices as well as 4 cylinders with locations for limit switches.

Depending on the kind of subject to be dealt with, the insert panels "Pneumatics PT 020", "Pneumatics PT 021", "Electropneumatics PT 030" or "Electropneumatics PT 031" can be inserted selectively.

The insert panel is fixed with 4 screws and can be easily exchanged.

The panels are supplied with air and pressure either by a stationary supply unit or by a small compressor running at a very low noise level which can operate two experimental cases at a time.

Special features of the case and the insert panels include:

- All function groups are clearly arranged in fields.
- All pneumatic and electropneumatic components are quickly connected by means of 4/2-mm hoses and self-locking couplings eliminating any risks.
- All electrical connections run to 2-mm sockets.
- All insert panels are equipped with fault simulators. Faults can thus be chosen and installed autonomously.
- The insert panels contain a compartment with transparent cover to store the 4/2-mm hoses and the electrical 2-mm connection cables.

Experimental Manual "Pneumatics, Electropneumatics" (on CD ROM) 52 30 001 0

Experiments with the Insert Panel "Pneumatics":

- Pulse control
- Memory control unit
- Position control unit
- Protection control unit
- Control circuit with roller valve
- Control unit with pneumatic magnetic sensor
- Control with sequence valve
- Control unit with binary reduction valve
- Control unit with time delay valve
- Control unit with pneumatic counter
- Control unit with vacuum generator
- Sequence control with non overlap signal circuit
- Sequence control with time delay valve
- Sequence control with pneumatic counter
- Sequence control with overlap signal circuit with roller idle return
- Sequence control with overlap signal circuit and cascade control
- Sequence control with shift register (stepper module)
- Sequence control with quickstepper

Experiments with the Insert Panel "Electropneumatics":

- Pulse control
- Memory control unit
- Position control unit
- Protection control unit
- Control circuit with limit switch
- Control circuit with magnetic sensor
- Control circuit with pressure switch
- Control circuit with latching relay
- Control circuit with time relay (on-delay)
- Control circuit with time relay (off-delay)
- Control circuit with electric counter
- Control circuit with vacuum generator and vacuum switch
- Sequence control with non overlap signal circuit and limit switch
- Sequence control with non overlap signal circuit with magnetic sensor
- Sequence control with overlap signal circuit with one short signal time delay
- Sequence control with overlap signal circuit with electric shift register

Basic Equipment "Experimental Case Pneumatics" 24 30 010

The Experimental Case Pneumatics PT 010 is equipped with:

- 1 compressed-air connection NW 7
- 1 pressure regulator, adjustable 0 ... 8 bar
- 1 pressure gauge, 40 mm diam., 0 ... 10 bar
- 1 distributor with 9 self-locking couplings for 4/2-mm hoses, 1 self-locking coupling for 8/6-mm hose and a common shutoff valve with pressure indicator
- 2 double-acting cylinders with adjustable final-position-damping and no-contact signalling, 16 mm diam., 80 mm travel
- 1 double-acting cylinder with adjustable final-position-damping and no-contact signalling as well as two fitted, adjustable non-return throttle valves, 16 mm diam., 80 mm stroke
- 1 single-acting cylinder with no-contact signalling, 16 mm diam., 50 mm stroke
- 2 non-return throttle valves, adjustable
- 6 positions for screw-on limit switches

The insert panels PT 020, PT 021, PT 030 or PT 031 can be inserted selectively.

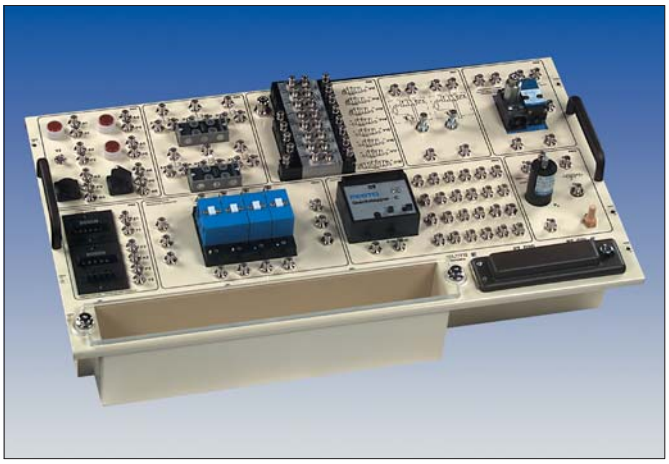
Dimensions in mm (incl. lid): 700 x 550 x 240 (WxDxH)
Mass: 13.2 kg

The basic equipment 24 30 010 consists of:

1	Experimental case pneumatics PT 010	24 30 001
1	Connection hose NW 7, 3 m long	15 30 030
1	PU hose, 4/2 mm diam., 25 m long	26 30 005
1	PU hose, 8/6 mm diam., 400 mm long	26 30 006
1	Hose cutter	15 30 013
10	T-couplings for PU hose 4/2 mm diam.	26 30 002

Equipment "Insert Panel Pneumatics PT 020" 24 30 020

Insert panel PT 020 "Pneumatics" 24 30 002



- **Input field:**
  3 3/2 directional valves with pushbutton
  1 3/2 directional valve with toggle switch
  1 5/2 directional valve with pushbutton
  1 5/2 directional valve with roller

- **AND/OR field:**
  1 triple OR element
  1 triple AND element

- **Valve field:**
  3 5/2 directional valves, pneumatically operated, switch valve with spring-operated air resetting
  4 5/2 directional valves, pneumatically operated, pulse valve
  1 5/3 directional valve, pneumatically operated
  1 main connection with plug-in coupling for 8/6-mm hose

- **Timer field:**
  2 pneumatic time circuits with adjustable time delay 0.15 ... 10 s

- **Pulse divider field:**
  1 pulse divider 2:1, contains a pulse-controlled auxiliary valve and a directly controlled 5/2 directional valve
  1 pressure control valve

- **Meter field:**
  1 summating meter (adding), 6 digits, pneumatic controlled; resetting either mechanically or pneumatically operated
  1 presetting counter (subtracting), 5 digits, pneumatic controlled; mechanical presetting by means of push-button, resetting either mechanically or pneumatically operated

- **Sequencer field:**
  1 sequencer, 4 steps

- **Stepping switch field:**
  1 pneumatic-mechanical small control system with 12 steps and start combinations; step counter 1 to 12 with adding direction; pressure display of active output Pn and check-back signal of the last executed step (INPUT)

- **Vacuum field:**
  1 vacuum suction nozzle to produce a vacuum by using a Venturi tube (ejector method); air consumption 20 l/min at an input pressure of 4 bar; vacuum of 10 % at P(e) = 1 bar up to 80 % at P(e) = 3.5 bar
  1 vacuum control unit with adjustable operating threshold of -0.25 ... -0.6 bar

- **Fault simulator:**
  5 3/2 directional valves with toggle switch behind lockable cover; free hose connections at the back of the valves or the insert panel allow the teacher to install a choice of 5 faults.

Storage compartment with clip-on lid for storing the connection hoses.
Dimensions in mm: 685 x 396 x 126 (W x D x H)
Mass: 14.2 kg

The equipment 24 30 020 consists of:

1	Insert panel pneumatics PT 020	24 30 002
4	Non-contact pneumatic signal transmitters	26 30 021
2	3/2 directional valves with feeler roll, provided with screw-thread	26 30 022
2	3/2 directional valves with feeler roll, idle return, provided with screw-thread	26 30 023
1	Siphon, 30 mm diam.	26 30 024
12	Double connections for PU hose, 4/2 mm diam.	26 30 003
1	Allen key, 3 mm	31 00 905

Equipment "Insert Panel Pneumatics PT 021" 24 30 021

The insert panel "Pneumatics PT 021" is the same as the insert panel "Pneumatics PT 020", only the sequencer and the stepping switch fields are not equipped.

The equipment 24 30 021 consists of:

1	Insert panel pneumatics PT 021	24 30 004
4	Non-contact pneumatic signal transmitters	26 30 021
2	3/2 directional valves with feeler roll, provided with screw-thread	26 30 022
2	3/2 directional valves with feeler roll, idle return, provided with screw-thread	26 30 023
1	Siphon, 30 mm diam.	26 30 024
12	Double connections for PU hose, 4/2 mm diam.	26 30 003
1	Allen key, 3 mm	31 00 905

Equipment "Insert Panel Electropneumatics for 230-V Systems" 24 30 030

Insert panel PT 030 "Electropneumatics" 24 30 003

- **Entry field:**
  1 Female connector of non-heating apparatus
  1 mains switch, illuminated
  1 thermal-magnetic overcurrent protective device 0.4 A
  8 light emitting diodes with compensating resistance for displaying electrical signals
  1 acoustic sensor

- **Input field:**
  1 pushbutton, locking, with signal lamp, 2 make contacts, 2 break contacts
  2 pushbuttons with signal lamp, 2 make contacts, 2 break contacts

- **Timer field:**
  2 ON-delay timers, 0.1 ... 10 s, with LED, 2 make contacts, 2 break contacts
  1 OFF-delay timer, 0.1 ... 10 s, with LED, 2 make contacts, 2 break contacts

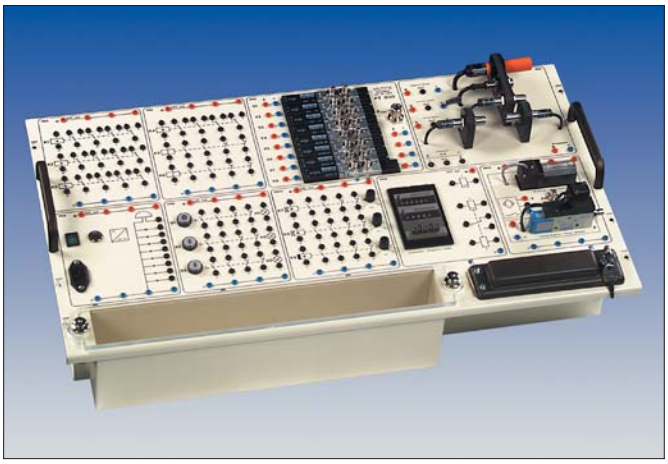
- **Meter field:**
  1 6-digit counter, adding, with mechanical resetting
  1 5-digit presetting counter, subtracting, with mechanical and electrical resetting

- **Relay field 1:**
  3 relays with LED and 4 change-over contacts, 24 V DC, 2 A

- **Relay field 2:**
  1 relay with LED and 4 change-over contacts, 24 V DC, 2 A
  2 pulse relays with 2 make contacts and 2 break contacts

- **Valve field:**
  4 5/2 directional valve, electrically controlled, with spring return, manual operation, LED display of control state
  3 5/2 directional valve, pulse-operated, with manual operation and LED display of control state
  1 5/3 directional valve with blocked center position, with manual operation and LED display of control state

- **Sensor field:**
  1 capacitive sensor, LED display of control state
  1 inductive sensor
  1 optical sensor, reflex-light switch, LED display of control state
  1 optical sensor, one-way light barrier, LED display of control state



- **Vacuum and pressure switch field:**
  1 pneumatic-electronical switch with optical display; switch functions selectable as pressure switch 0.25 ... 8 bar, vacuum switch -0.2 ... -0.8 bar or differential-pressure switch -0.95 ... 8 bar
  1 vacuum suction nozzle, the vacuum is produced by using a venturi tube (ejector method), controlled via solenoid valve, manually operated

- **Fault simulator:**
  The teacher is able to set up to 10 faults by using the ten toggle switches which are located behind a cover with lock. All errors are listed in a table.

Storage compartment with clip-on lid for storing the connection hoses and cables.

Dimensions in mm:	685 x 396 x 126 (W x D x H)
Mass:	13.1 kg

The equipment 24 30 030 consists of:

1	Insert panel electropneumatics PT 030	24 30 003
1	Mains cable 2.5 m	25 00 028
4	Non-contact signalers, electrical	26 30 031
1	Siphon, 30 mm diam.	26 30 024
4	Limit switches with feeler, electrical	26 30 032
1	Allen key, 3 mm	31 00 905
1	Allen key, 4 mm	15 03 372

Connection cables with 2-mm plugs:

5	Connection cables, 30 cm, blue	55 00 430
5	Connection cables, 45 cm, blue	55 00 445
5	Connection cables, 60 cm, blue	55 00 460
5	Connection cables, 30 cm, red	55 00 530
5	Connection cables, 45 cm, red	55 00 545
5	Connection cables, 60 cm, red	55 00 560

Equipment "Insert Panel Electropneumatics for 110-V Systems" 24 30 031

The equipment corresponds to the equipment set 24 30 030 listed above, only the insert panel "Electropneumatics PT<N>030" has been replaced by the insert panel "Electropneumatics PT 031 for 110-V systems" (art. no. 24 30 005). The panel PT 031 has the same extend of components as the panel PT 030.

Software Pneumatics / Fluid Technology

Software Automation Studio Pneumatics **50 30 022**
(Parts: Pneumatics, electrical engineering)
single license

Automation Studio is a software package which allows the user to design, simulate and animate control circuits concerning pneumatics. The software is an ideal CAD and simulation tool for pneumatic instruction with the following standard features:

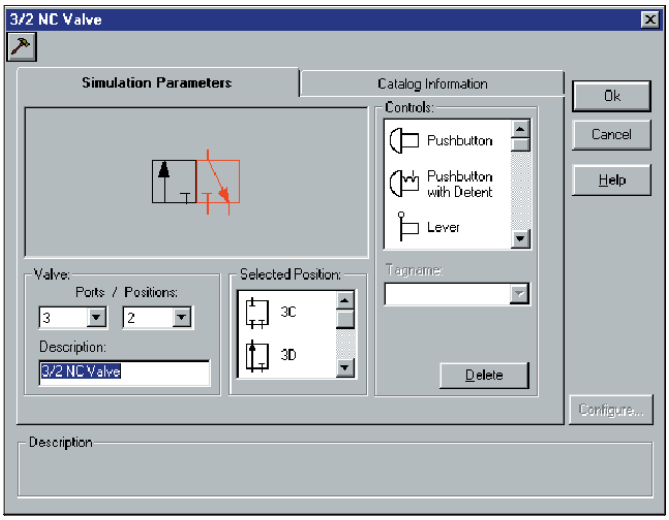
Design and simulation of connections
- Projects with multiple connections
- Simulation process, with different velocities
- Simulation in colour
- User-friendly editor
- Valve editor to change valve symbols
- Comprehensive and modular library

Professional design software
- Simple use for CAD
- Simulation helps with trouble-shooting
- Observance of graphical standards ISO, IEC etc.
- Tracing of changes
- Support with establishing offers
- Printing of drawings

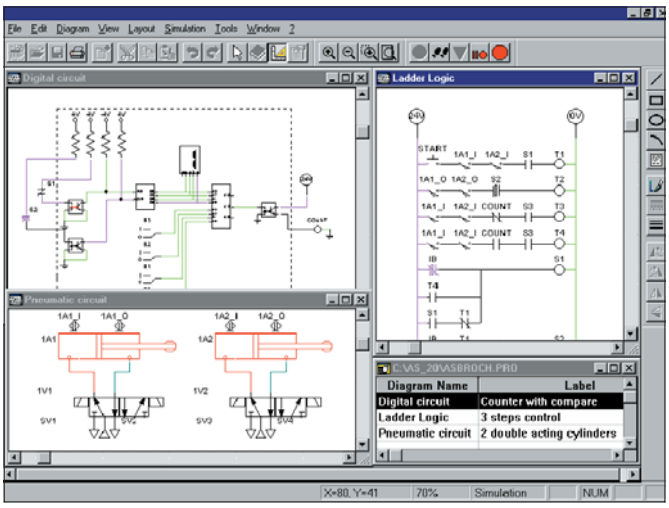
Animation
- Component sections show internal function sequences
- Animation is synchronised with the circuit simulation
- Components from the library are additionally documented with pictures and text on the function and operating method

Contact logic library
- Pushbutton, switch, relay, counter etc.
- European or American graphical standard selectable

System requirements
- Windows 3.1 or higher
- PC with Pentium processor, 16 MB RAM, VGA graphics card



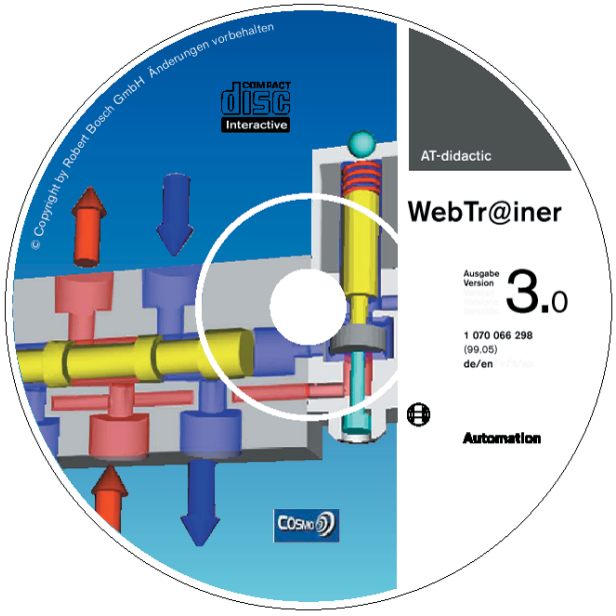
Software Automation Studio Pneumatics
(Parts: Pneumatics, electrical engineering)
license for 6 ... 11 stations, price for each place **50 30 032**
license for 12 ... 19 stations, price for each place **50 30 062**



Software Automation Studio Fluid Technology
(Parts: Pneumatics, hydraulics, electrical engineering)
single license **50 32 042**
Automation Studio is a software package which allows the user to design, simulate and animate control circuits concerning fluid technology. The software is an ideal CAD and simulation tool for instruction on the field of fluid technology. For standard features, please see 50 30 022 above.

Software Automation Studio Fluid Technology
(Parts: Pneumatics, hydraulics, electrical engineering)
license for 6 ... 11 stations, price for each place **50 32 052**
license for 6 ... 11 stations, price for each place **50 32 082**

Software WebTr@iner



Software WebTr@iner

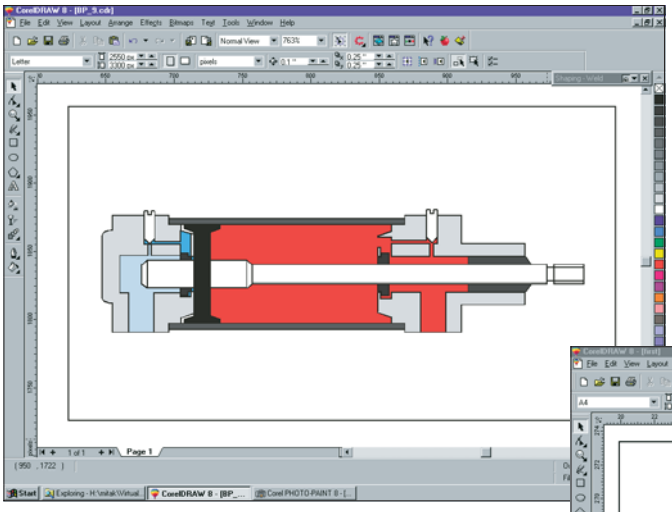
The WBT (**W**eb **B**ased **T**raining) series is Internet compatible. Images, graphics, 3-D simulations and video sequences with sound guarantee an exciting knowledge transfer.

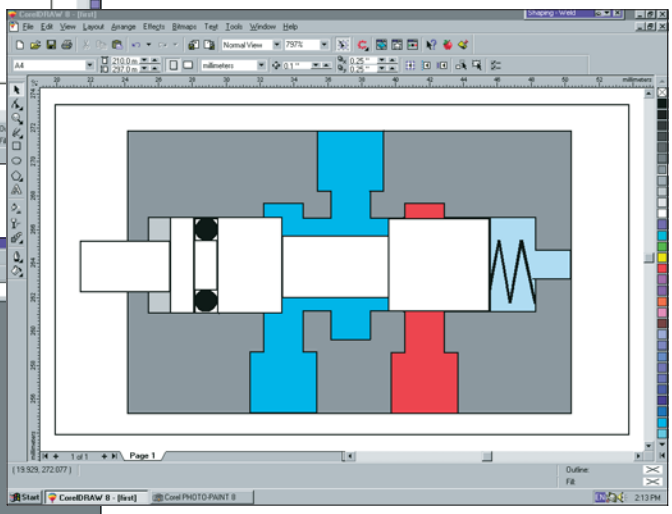
Every Web Tr@iner teaches theoretical and practical skills on ten components or functions in ten lessonss. Virtual reality animation gives a simple insight into the interior of the components and illustrate their operating principles.

Parameters can be changed interactively and the effects can be observed on the monitor.

Finally, the function and use of every component in pneumatically operated systems is illustrated.
Basics on physics and mechanical engineering.

Content:
Each of the 10 lessons includes 2 exercises. In order to increase the learning progress, every exercise can be carried out by following instructions and taking an intermediate test. It guarantees that the goal of an exercise has been understood and that there has been an optimum transfer of knowledge.

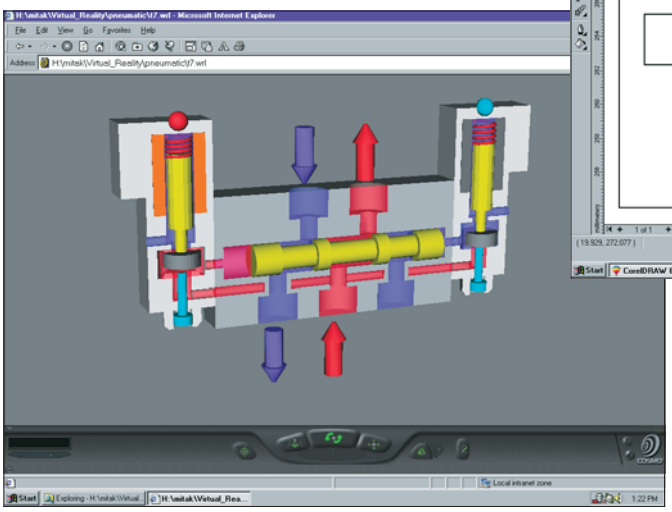




Web Tr@iner Basics of Pneumatics **- D - 50 30 041**
- GB - 50 30 042

single license.

Lessons: Air compression / pressure control valve / service unit / throttle stop valve / 3/2-way valve, mechanical operated / 5/2-way valve, pneumatically operated / 5/2-way valve, electrically operated / cylinder, single-acting / cylinder, double-acting / cylinder, double-acting, limit attenuation / rotary actuator.



Web Tr@iner Pneumatic Systems **- D - 50 30 051**
- GB - 50 30 052

single license.

Lessons: Shuttle valve (OR) / mixed pressure valve (AND) / fast vent valve / system with variable cylinder lift / system with variable feed and cylinder lift / system to control the cylinder force / system to block the cylinder move / system with different movements / systems with distributed peripherals / diagnosis in systems with distributed peripherals.

Compressors

If compressed-air supply is not available, we offer high-quality compressors for different requirements in training and further education.

Compressor 30/D for 230-V systems **15 30 008**
Very quiet, package-type motor-compressor set equipped with an automatic pressure switch, high-quality steel container with pressure-relief and non-return valve, test pressure-gauge and condensate drain.

Motor:	0.2 kW
Intake power:	30 l/min
Max. pressure:	8 bar
Container capacity:	4 l
Noise level:	40 dB (A)/1 meter
Connection:	NW 7.2
Voltage supply:	230 V AC, 50 Hz
Dimensions in mm:	410 x 180 x 420 (L x W x H)
Mass:	21 kg

Compressor 30/D for 110-V systems **15 30 008 a**
as 15 30 008, but for 110 V, 60 Hz.

Compressor FK 50/15 SL for 230-V systems **15 30 010**
Low-noise pneumatic system, equipped with package-type motor-compressor, thermal switch, automatic pressure switch, high-quality steel container with pressure-relief and non-return valve, test pressure-gauge, condensate drain, stop valve and service unit.

Motor:	0.37 kW
Intake power:	50 l/min
Max. pressure:	8 bar
Container capacity:	15 l
Noise level:	49 dB (A)/1 meter
Connection:	NW 7.2
Voltage supply:	230 V AC, 50 Hz
Dimensions in mm:	355 x 355 x 530 (L x W x H)
Mass:	24 kg

Compressor FK 50/15 SL for 110-V systems **15 30 010 a**
as 15 30 010, but for 110 V, 60 Hz.

Compressor **15 30 006**
Motor compressor for compressed-air supply of up to eight pneumatic work places.

Motor:	1.1 kW
Intake power:	200 l/min
Max. pressure:	8 bar
Container capacity:	24 l
Noise level:	76 dB (A)/1 meter
Connection:	NW 7.2
Voltage supply:	230 V AC, 50 Hz
Dimensions in mm:	600 x 360 x 610 (L x W x H)
Mass:	33 kg

T-distributor NW 7.2 **15 30 001**
1 plug, 2 couplings.

Dimensions in mm:	95 x 30 x 100 (L x W x H)
Mass:	0.29 kg

Set-up Aids for the Experimental Panel System

The set-up aids enable an optimum use of the experimental panel and module system. Please let us know if we can be of assistance to you with furnishing complex laboratories.

Mobile experimental stand FVC **70 00 020 01**
for DIN A4 panel formats.

The mobile experimental stand is used to conduct all demonstrated experiments of the whole professional field of electrical and sheet metal engineering.

Bottom unit:
- Frame made of 40 mm x 40 mm x 2mm steel tube, powder-coated, colour RAL 7035 light grey
- 4 easy-moving castors (2 can be blocked)
- Carcass made of 19-mm thick fine-chip board with plastic coating, colour RAL 7035 light grey
- 2 drawers on roller guides with cylinder lock and handle
- Bottom cabinet with 2 sliding doors and shelf with grooved mats, variable height to hold experimental panels of DIN A4 format or standard ELWE heights; sliding doors with recessed grips and cylinder lock
- Table top made of high-density, multilayer fine-chip board according to DIN 16926 and DIN 68761/E1, 30 mm thick, both sides coated with 0.8 mm thick non-abrasive laminated board; colour RAL 7035 light grey; resistant to diluted acids and diluted alkaline solutions, non-aggressive saline solutions and temperatures up to 180 °C, protective edge made of solid 3 mm thick plastic dyed throughout, colour RAL 7035 light grey

Supply duct:
- mounted to the table top
- duct made of anodised aluminium section, 110 mm x 110 mm
- equipped with: key-operated switch, residual-current-operated circuit-breaker 30 mA, status display, 2 x 3 sockets with earthing-pin, Ceckon socket 16 A, connection cable (3.5 m) with Cekon plug, cable support

Experimental frame:
- side parts made of 40 mm x 25 mm x 2 mm steel tube, colour RAL 5014 pigeon blue
- horizontal slot rails made of anodised special aluminium section to be inserted into the experimental frame
- 3 levels
- two slot rails with separate distribution lines, pick-off at 4-mm safety sockets

Dimensions in mm: 1320 x 1935 x 600 (W x H x D)
Mass: 105 kg

Mobile experimental frame 130M-A4B **70 91 030 01**
to hold experimental panels of DIN A4 height format.

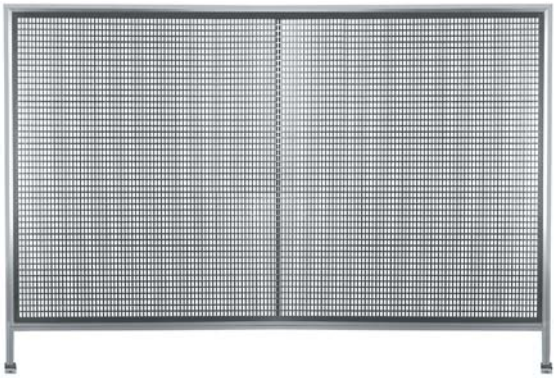
Bottom unit:
- Frame made of 40 mm x 40 mm x 2mm steel tube, powder-coated, colour RAL 5014, pigeon blue
- 4 easy-moving castors (2 can be blocked)
- Table top made of high-density, multilayer fine-chip board according to DIN 16926 and DIN 68761/E1, 30 mm thick, both sides coated with 0.8 mm thick non-abrasive laminated board; colour RAL 7035 light grey; resistant to diluted acids and diluted alkaline solutions, non-aggressive saline solutions and temperatures up to 180 °C, protective edge made of solid 3 mm thick plastic dyed throughout, colour RAL 7035 light grey

Experimental frame:
- side parts made of 40 mm x 25 mm x 2 mm steel tube, colour RAL 5014 pigeon blue
- horizontal slot rails made of anodised special aluminium section to be inserted into the experimental frame
- 3 levels

Dimensions in mm: 1300 x 1920 x 620 (W x H x D)
Mass: 38 kg

Three-phase supply duct (not illustrated) **70 00 008**
in addition to the mobile experimental frame.
Specifications as described in 70 00 020 01.
Dimensions in mm: 1225 x 110 x 110 (W x H x D)
Mass: 5.40 kg

Set-up Aids for the Experimental Module System

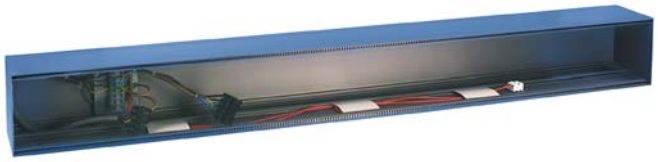


Mounting wall 150K **73 01 215**

Mounting wall to set up experimental modules and modular plug-in elements. The wall is mounted above the basic duct of the modular duct system KKS. Light, solid frame made of anodised special aluminium section, 25 x 25 x 2 mm. The mounting grid is made of stainless steel and supported on expansion joints. It is put into inserts in the table and fastened with knurled screws.

Dimensions in mm: 1490 x 890 x 100 (W x H x D)
Mass: 9.00 kg

Power Supply Duct



Basic duct KKS-1501 **65 11 150 01**

Basic duct with single mounting depth for a table width of 1500 mm of the modular duct system KKS made of 2 mm thick, aluminium section; colour RAL 5014, pigeon blue.

Mounting width: 1351mm (266 PU)
Dimensions in mm: 1355 x 132.5 x 132.5 (W x H x D)
Mass: 4.70 kg

Duct unit for single-phase mains connection with residual-current-operated circuit-breaker **65 10 110 01**

Equipped with:

1 key-operated changeover switch with three positions "low voltage / off / low and extra-low voltage"
1 control lamp, white, for low voltage
1 control lamp, green, for low and extra-low voltage
1 automatic circuit-breaker, 6 A
1 residual-current-operated circuit-breaker, cut-off current 30 mA

Colour: RAL 7035 light grey; Mounting width: 177.5 mm (35 PU)
Dimensions in mm: 177.5 x 128.5 x 115 (W x H x D)
Mass: 1.30 kg

Four sockets with earthing contacts **65 10 204 01**

Equipped with:

4 flush-type sockets with earthing contacts to pick off the mains voltage (230 V AC).

Colour: RAL 7035 light grey; Mounting width: 106.4 mm (21 PU)
Dimensions in mm: 106.4 x 128.5 x 100 (W x H x D)
Mass: 0.50 kg

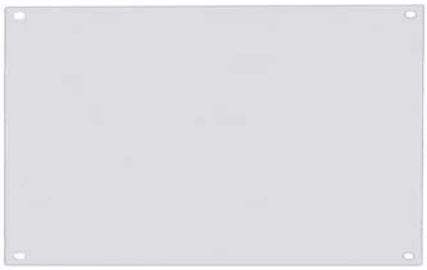
Emergency-off button **65 10 230 01**

This pushbutton is connected to the control circuit of the mains contactor in the laboratory and disconnects the power supply of the whole laboratory in case of emergency. The pushbutton is connected on the customer side.

Colour: RAL 7035 light grey; Mounting width: 60.7 mm (12 PU)
Dimensions in mm: 60.7 x 128.5 x 72 (W x H x D)
Mass: 0.30 kg

Pneumatic pick-off sensor NW 7.2 **65 10 800 01**
Colour: RAL 7035 light grey; Mounting width: 81 mm (16 PU)
Dimensions in mm: 81 x 128.5 x 90 (W x H x D)
Mass: 0.35 kg

Duct unit DC stabiliser 24 V; 6.5 A **65 10 400 01**
Stabilised voltage supply with low residual ripple; input range of 110 … 120 V AC or 220 … 240 V AC selectable.
Colour: RAL 7035 light grey.
Output voltage: 24 V DC, stabilised (SELV, safety extra-low voltage), resistant to continuous short circuit or continuous idle run
Residual ripple: < 150 mV_{PP}
Output current: 6.5 A max.
Voltage supply: 110 ... 120, 220 ... 240 V AC, 50/60 Hz
Mounting width: 264.0 mm (52 PU)
Dimensions in mm: 264.0 x 128.5 x 130 (W x H x D)
Mass: 1.46 kg



Blank panel 63 PU (2 required) **65 10 963 01**
Blank panel made of 2 mm thick V2a steel, to close off the unused mounting slots. Colour: RAL 7035 light grey.
Dimensions in mm: 319.7 x 128.5 x 2 (W x H x D)
Mass: 0.64 kg

Blank panel 4 PU **65 10 904 01**
Dimensions in mm: 20 x 128.5 x 2 (W x H x D)
Mass: 0.04 kg

Instruction Material

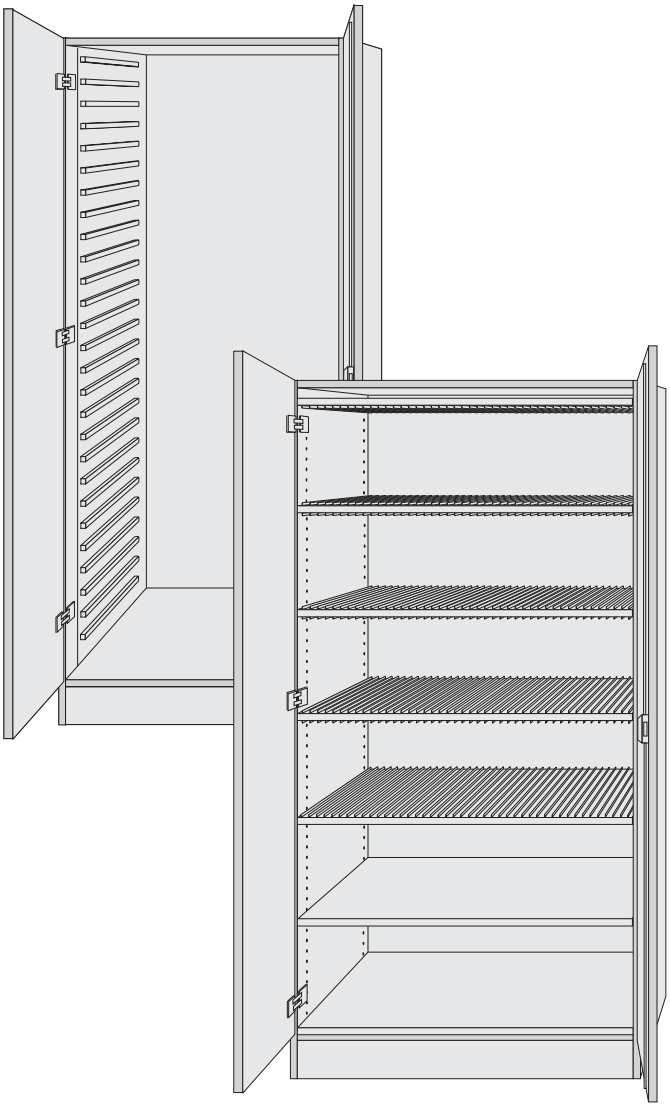
Case with sectioned pneumatic models **15 30 044**
The sectioned models clearly show the structure and function of industrial pneumatic/electropneumatic components.
equipped with:
- Short stroke cylinder
- Cylinder, single-acting 20 x 50
- Cylinder, double-acting 32 x 100
- Cylinder switch with holder
- 3/2 directional control valve, mechanical NG 2.5 (M5)
- 5/2 directional control valve, mechanical NG 4 (G1/8)
- 5/2 directional control valve, pneumatic NG 2.5 (M5)
- 3/2 time delay valve NG 4 (G1/8)
- 5/2 directional valve, pneumatic ISO I
- Throttle check valve NG 4 (G1/8)
- Shuttle valve NG 4 (G1/8)
- Pressure shutoff valve NG 4 (G1/8)
- Fast vent valve NG 6 (G1/4)
- Non return valve NG 4 (G1/8)
- 3/2 directional control valve, electrical NG 2.5 (M5)
- 5/2 directional control valve, electrical NG 4 (G1/8)
- P/E pressure switch
- Filter/pressure regulator unit
- Standard oil fog lubricator
- Automatic condensate drain

Dimensions in mm: 525 x 420 x 120 (W x H x D)
Mass: 6.60 kg

Case containing magnetic labels of pneumatic symbols **15 30 045**
The magnetic graphical symbols cling to a metallic surface which is not part of the equipment set.
Dimensions in mm: 400 x 310 x 100 (W x H x D)
Mass: 4.00 kg

Overhead transparencies "Pneumatics" **15 30 041**
100 transparencies in a folder.

Arrangement Systems



Cabinet assembly AS-AF **75 88 630 01**
Cabinet with 2 doors. The cabinet is equipped with horizontal guide rails inside to hold ELWE storage trays. And shelves. Each guide rail holds two trays that are pushed in one after the other.
Dimensions in mm: 766 x 2000 x 630 (W x H x D)
Mass: 100.00 kg

Cabinet assembly AM **75 88 670 01**
to store ELWE experimental panels and equipment.
Equipped with:
- 2 doors,
- 32-mm European fitting grid,
- 5 shelves, 19 mm, with grooved mats,
- 2 heavy-duty shelves,
- all-metal cup hinges, opening 270°,
- all-metal locking system with turning knob, can be extended to master lock system.

Dimensions in mm: 1020 x 2000 x 560 (W x H x D)
Mass: 137.50 kg

Tray for experimental modules **76 00 020 01**
to store up to 10 small experimental modules or small equipment. Colour: RAL 7035, light grey.
Dimensions in mm: 273 x 33 x 680 (W x H x D)
Mass: 1.65 kg

Tray without partitions **76 00 010 01**
to store large experimental modules, measuring instruments or experimental equipment etc. Colour: RAL 7035, light grey.
Dimensions in mm: 273 x 33 x 680 (W x H x D)
Mass: 1.65 kg

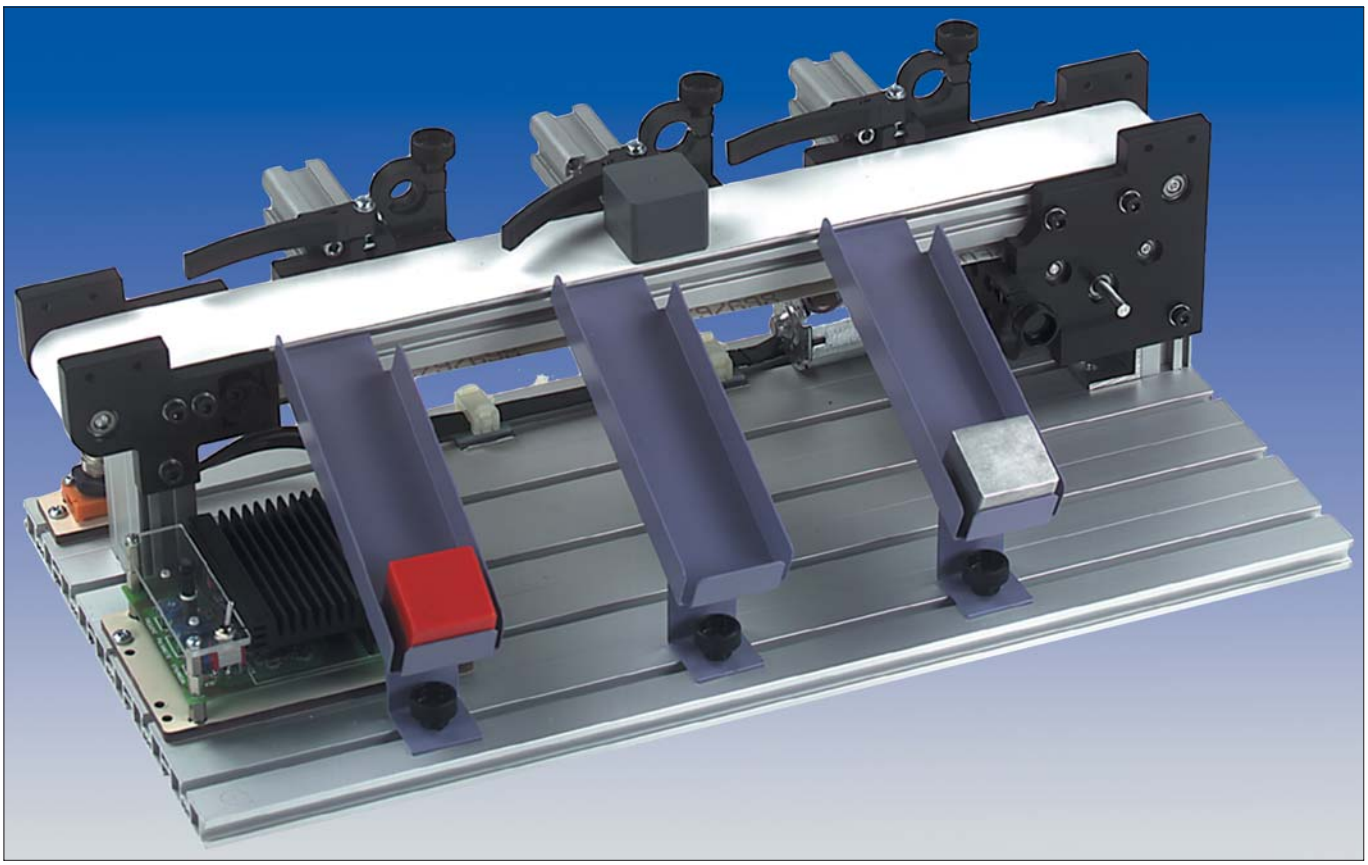
Tray for connection cables **76 00 050 01**
to store sets of connection cables in a concise manner.
Colour: RAL 7035, light grey.
Dimensions in mm: 273 x 33 x 680 (W x H x D)
Mass: 1.65 kg

Recommended connection cables with 4-mm plugs:

10 Connection cable, red, 2.5 mm^2, 10 cm	56 00 510
32 Connection cable, red, 2.5 mm^2, 35 cm	56 00 535
9 Connection cable, red, 2.5 mm^2, 45 cm	56 00 545
3 Connection cable, red, 2.5 mm^2, 100 cm	56 00 600
1 Connection cable, red, 2.5 mm^2, 150 cm	56 00 601
10 Connection cable, blue, 2.5 mm^2, 10 cm	56 00 410
15 Connection cable, blue, 2.5 mm^2, 35 cm	56 00 435
4 Connection cable, blue, 2.5 mm^2, 45 cm	56 00 445
3 Connection cable, blue, 2.5 mm^2, 100 cm	56 00 500
1 Connection cable, blue, 2.5 mm^2, 150 cm	56 00 501

Mobile cable holder (ill. see page 14) **70 00 215 01**
(without cables)
178 connection cables with 4-mm plugs (or safety plugs) and 88 19-mm connectors can be clearly arranged and stored on four perforated rails. Support area of 470 mm x 430 mm.
Plastic coated steel tube stand, colour RAL 5014 pigeon grey, with 5 castors, swivelling top with 4 perforated chromate rails.
Dimensions in mm: 470 x 430 x 1125 (L x W x H)
Mass: 6.3 kg

Equipment "Transport and Sorting System" 02 12 050



consisting of:

Transport and Sorting System **23 12 010**

The transport and sorting system sorts machined parts according to material, form, colour or height depending on the sensors used. The system consists of a solid conveyor belt, a 24-V-DC drive with variable speed, 5 sensor holders and 3 double-acting pneumatic cylinders with ejectors. All the parts are mounted to a solid, non-skid and profiled aluminium plate. The sensors can be mounted and adjusted quickly without tools. The pneumatic connection to the actuators is established with plug-in tube connectors. Additional limit switches can be mounted to the cylinders.

Design features:

- Conveyor belt, with fabric back stay and tensioning device
- 3 double-acting pneumatic cylinders with ejectors, non-contact limit switches can be mounted
- 5 sensor holders with 18 mm diam.
- 3 adapters for sensors with 12 mm diam.
- 2 adapters for optical waveguide
- 3 collecting pipes for work pieces
- 24-V DC motor with pulse-width modulation, conveyor belt speed variable with potentiometer.

Necessary voltage supply: 24 V DC, 2 A min., stabilised
Dimensions in mm: 500 x 180 x 255 (L x W x H)
Mass: 6.10 kg

Test objects, aluminium **23 12 070**

(2 pieces per equipment)
Dimensions in mm: 35 x 35 x 30 (L x W x H)
Mass: 0.11 kg

Test objects, plastic, red **23 12 071**

(2 pieces per equipment)
Dimensions in mm: 35 x 35 x 30 (L x W x H)
Mass: 0.06 kg

Test objects, plastic, black **23 12 072**

(2 pieces per equipment)
Dimensions in mm: 35 x 35 x 30 (L x W x H)
Mass: 0.06 kg

Connection cable, black **23 12 073**

Plug M12/M12.
Dimensions in mm: 20 x 20 x 450 (L x W x H)
Mass: 0.07 kg

For further information, available equipment and furnishings as well as available accessories, please see our brochure "Transport and Sorting System".

The Hydraulic Trainer

Hydraulic trainer HY-2K

Transparent devices

For practical training:

the hydraulic trainer
with industrial devices (IS) of the NG 06

When carrying out practical training in specialised fields with the hydraulic trainer, industrial hydraulic components (IS) are used. The electrical and electronic equipment is installed above the experimental panels of the hydraulic trainer to guarantee easy, clear and reliable handling.

All valves are mounted to special blocks with inclined connection plates. Thus, the connection lettering can be read more easily and the plug-in connections can be easily made. Due to the neat hose arrangement, the whole circuit arrangement becomes clearer, too. The components can also be mounted at an angle of 90° 180° or 270° to the perforated plate of the experimental panel. The back of the block is equipped with a lock which is easy to handle. It protects the block from moving even when it is subjected to tensile or compressive stress when the lever is operated or to stress caused by bent hoses.

All hydraulic connections have quick-fit couplings or nipples free from oil leakage and drips.

The manually operated valves are fitted with standard industrial-type levers with a leverage that allows you to operate the valves smoothly either by pushing or pulling.

The engraved connection lettering A, B, P and T on the connection plate is clearly visible.

For theoretical training:

the transparent devices
for the overhead projector

The transparent devices for the overhead projector offer an excellent opportunity to explain the functions of the hydraulic components clearly when teaching theory. The internal structure and the sequence of internal motion and flow are being projected and can be seen on a large surface. Operative transparent devices are available for every essential hydraulic component starting with simple check valves up to complex pilot-operated directional valves.

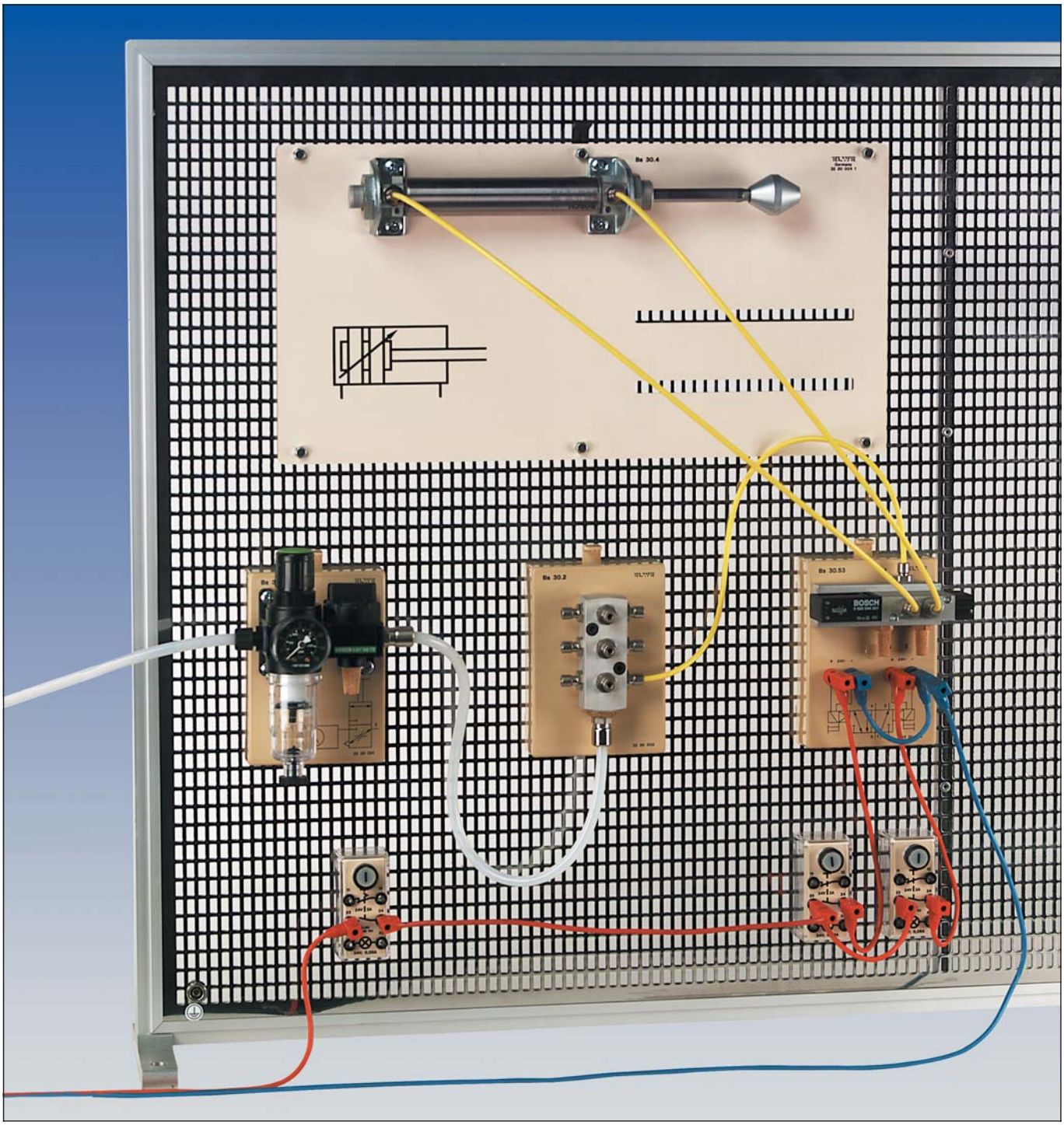
For laboratory exercises:

the experimental case for hydraulics
with plug-in transparent devices

The laboratory exercises enable the student to acquire hands-on knowledge; that is practically and almost independently. The training system – the experimental case for hydraulics with plug-in transparent devices – has a compact design and is distinguished by its simple handling, clearness and the means of configurating the experimental set-up as desired. Low pressures of 10 bars maximum and lowgrade-leakage plug-in connections guarantee a clean and safe operation.

For further information, available equipment and furnishings as well as available accessories, please see our brochure "The Hydraulic Trainer".

Index (art. no. . . . . page)



The illustration shows an experimental set-up with the experimental module system.

For further information and prices please contact:

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D - 38162 Cremlingen / Schandelah • Fax (05306) 930-404 • Internet: http://www.elwe.com