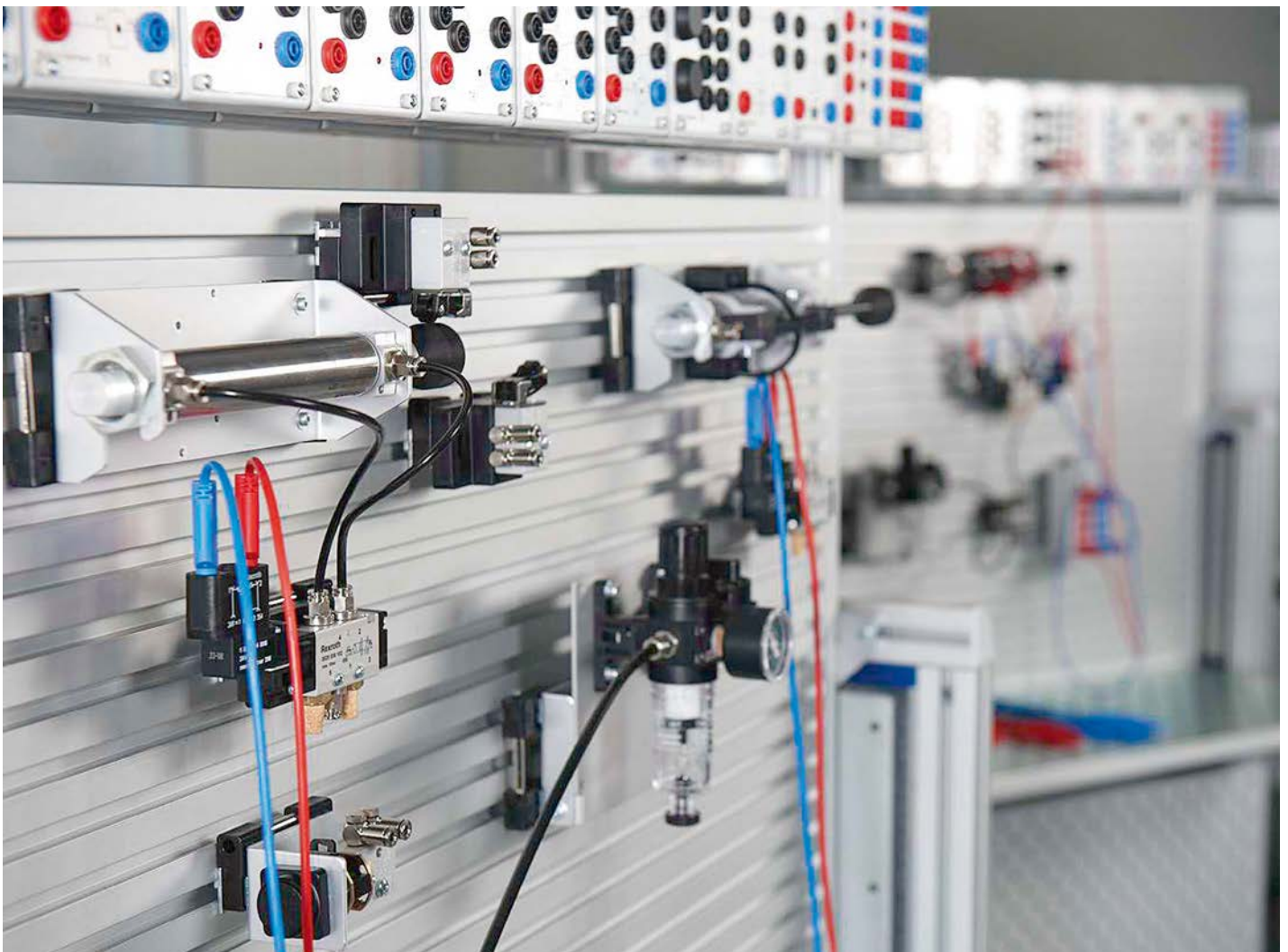


Training systems pneumatics

R999000218 /11.2017



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Drive & Control Academy

Knowledge – the decisive competitive advantage

www.boschrexroth.com/academy



As a leading specialist in drive and control engineering worldwide, Bosch Rexroth has a unique level of technological expertise. At the Drive & Control Academy, we pass on our expertise and support tailored training, development and qualification of technical specialists.

Knowledge is everything

The specialist knowledge and expertise of employees provides a crucial advantage for their company in a competitive global market. Under the tutelage of the Drive & Control Academy, Rexroth offers trainees an extensive portfolio of educational products in the field of drive and control technologies, which is solidly rooted in industrial practice.

The Drive & Control Academy sets the standard for training, especially when it comes to setting up effective learning systems for customers and employees, as well as education and training institutions to support the acquisition of integrated expertise.

Everything we offer is based on the following principles:

- ▶ State-of-the-art, practice-oriented equipment
- ▶ Training tailored to specific target groups
- ▶ Modern training methods

Training systems

For further information please visit:
www.boschrexroth.de/trainingsystems



A training system consists of the workstation, the components contained in the device sets and the project manuals. The training systems provide both novices and advanced trainees with practical knowledge in the fields of hydraulics, pneumatics, electrical drive and control engineering, mechatronics and automation. They include industrial series-produced components and have internationally standardized programming languages and open interfaces.

Media

For further information please visit:
www.boschrexroth.de/trainingmedia



The software-based teaching and learning media from Rexroth are characterized by a high practical relevance and are tailored to the training courses and training systems. They include e-learning modules, technology and applications trainers, animations of components and systems, and simulation-based learning units. Additionally, they include dictionaries, reference books, manuals for trainers and trainees and various tools.

Training

For further information please visit:
www.boschrexroth.com/training



New training courses and continuous development of training methods ensure that the knowledge that is transferred is the current state of the art. The methodological repertoire includes classroom training, e-learning, practical training and blended learning, which combines the advantages of face-to-face instruction with e-learning. The principle of proximity to customers is the focus of our training systems.



Terminology

Term	Explanation
Device sets	A device set is an assembly of components used to carry out practical exercises.
Study topics	For a single study topic, it is possible to use more than one device set with the corresponding project manual. You can find the study topics in this catalog: Basics of pneumatics, electro-pneumatics and control engineering.
Workstations	Workstations are used for receiving components from the device sets to carry out practical exercises according to the project manuals.
Training systems	A training system combines workstations, device sets and project manuals.
Spare parts	Spare parts are parts that are installed on components or workstations.
Accessories	Accessories are complementary products that can be used optionally.
BIBB	German Federal Institute for Vocational Training (Bundesinstitut für Berufsbildung)

Components, accessories and spare parts	
Order examples	
Workstations	
Study topics	
Drive & Control Academy	

Training Systems for Pneumatics

The technical know-how of Rexroth combined with solution expertise in the field of industrial applications flow seamlessly into the modular training systems – this ensures that they fully meet the qualification levels required in industry.

Rexroth training systems

The technical know-how combined with solution expertise in the field of industrial applications flow seamlessly into Rexroth's modular training systems. Consisting of hardware, exercises and project manuals, they impart practice-oriented knowledge.

They are precisely tailored to the qualification levels of industry and educational institutions.

Unique learning with standard components

The training systems allow practical exercises on current standard components from the industrial sector, including the use of standardized programming languages and open interfaces. Just like those used in professional practice.

Pneumatics training systems

To impart know-how in the field of pneumatics during training and further education, Rexroth offers different workstations with the patented "snap-in" holding device, as well as a variety of study topics.

- ▶ WS200: Mobile work station, can be used on both sides, work area approx. 650x700 mm
- ▶ DS3: Mobile workstation, can be used on both sides, work area 1130x700 mm, additional storage area for components
- ▶ EcoDesk: component carrier that can be used on any table with two workstations, work area 1130 x 700 mm

WS200

The WS200 is a low-cost introduction to the world of Rexroth workstations. The workstation is designed to fit through standard doors, but is large and stable enough for mounting all required components securely.

The WS200 is a mobile workstation that can be used on both sides and therefore has space for 1-2 users per side.

DS3

The DS3 is a mobile workstation that has two independent workstations for 2-3 users on each side.

The DS3 has a storage option underneath the actual workstation for components that are not required.

The DS3 can be equipped with an integrated power supply unit and a mounting for electrical assemblies.

EcoDesk

The EcoDesk has two workstations and requires a table as an installation surface. The mounting surface can be increased with the mounting for electrical assemblies.

Study topics

The study topics start with manually or pneumatically operated valves, followed by electrically operated valves and the use of a PLC in a control loop.



Drive & Control Academy



Study topics



Workstations

Practical exercises with appropriate teachware

The specialist knowledge and expertise of employees provides a crucial advantage for their company in a competitive global market.

With exercises from industrial practice, Rexroth creates the ideal range of study content, which is presented using a variety of different media

- ▶ E-learning
- ▶ Textbooks
- ▶ Trainer's and trainees' manuals
- ▶ Teaching aids

Safety

The pneumatics training systems are designed and built in accordance with the EU safety directives.

It goes without saying that the necessary CE certifications are in place.

Create your own configuration

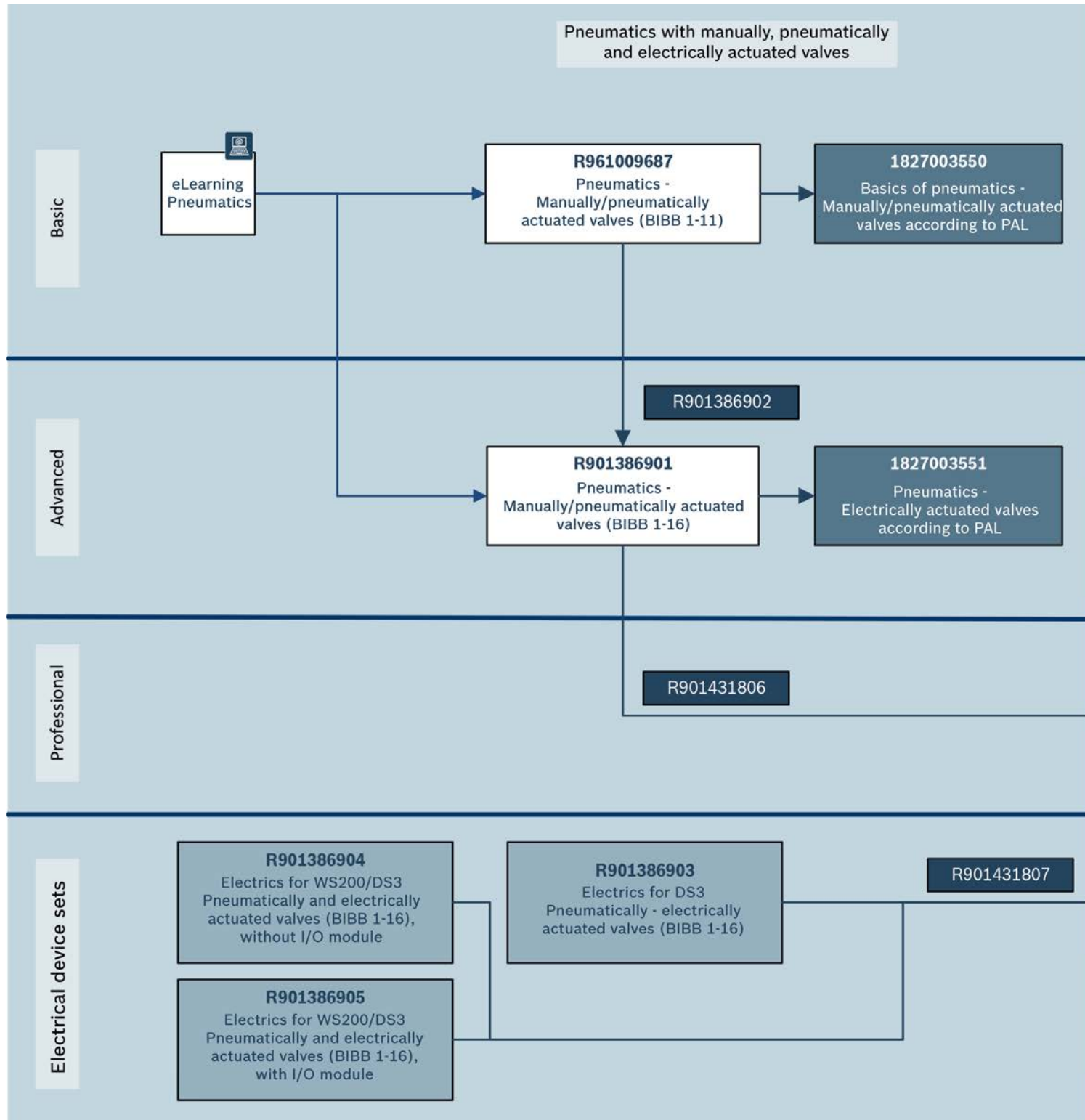
You can adapt your pneumatics training system to your exact requirements. We will happily assist you in compiling your training system.

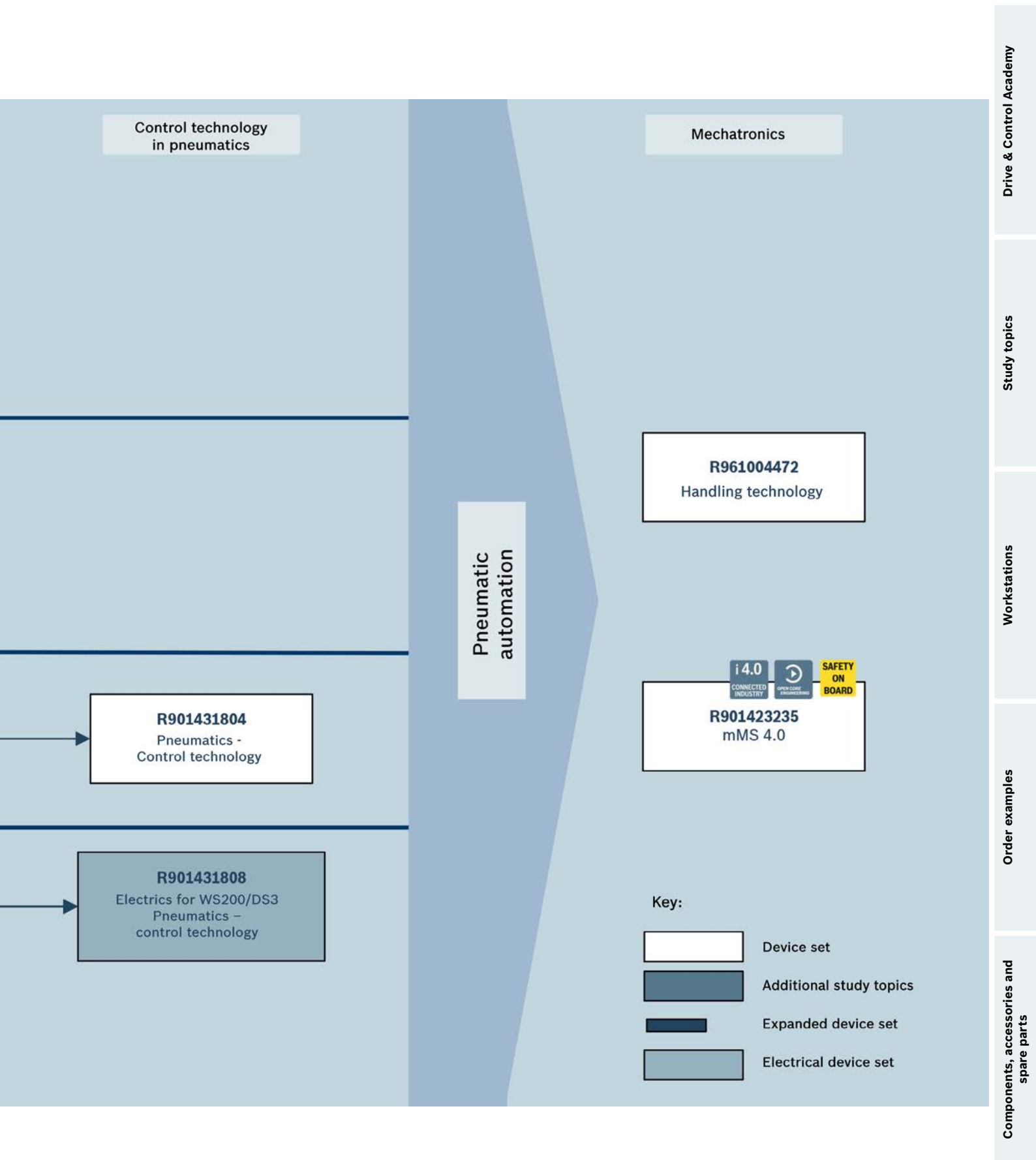
Just get in touch with us!

Order examples

Components, accessories and spare parts

Device sets





Study topics



Contents - Study topics

eLearningeLearning pneumatics – Basic knowledge of pneumatics **16**

**Pneumatics – manually/pneumatically operated valves
(in accordance with BIBB) 17**

**Pneumatics – electrically operated valves
(in accordance with BIBB) 22**

**Pneumatics – manually/pneumatically operated valves
(in accordance with PAL) 34**

**Pneumatics – electrically operated valves
(in accordance with PAL) 37**

Pneumatics – control engineering in pneumatics 41

Pneumatic accessory set 50

eLearning

eLearning pneumatics – Basic knowledge of pneumatics



From the function and properties of select components to the structure of pneumatic diagrams – many basics that pneumatic engineers need to know. This eLearning course is recommended for anybody who plans to attend intermediate training courses. The ePTG eLearning course contents are identical to those of conventional four-day PTG classroom training.

Contents

- ▶ Introduction to pneumatics
- ▶ Basic physical principles of pneumatics
- ▶ Compressed air generation, compressor types, compressed air drying techniques
- ▶ Maintenance units for conditioning and compressed air networks
- ▶ Directional control, flow control, pressure control and shut-off valves
- ▶ Pneumatic drives
- ▶ Graphic symbols, circuit diagrams according to DIN ISO 1219
- ▶ Basics of component design
- ▶ Basic pneumatic circuits

Prerequisites

- ▶ Technical understanding
- ▶ PC with Internet access, Flash Player 10 or higher:
<http://get.adobe.com/flashplayer>
- ▶ E-mail address for personal login

Target group

People interested in pneumatics, personnel involved in planning, operation, maintenance and assembly, design engineers

Learning goals

- ▶ Understanding the basic structure of pneumatic systems
- ▶ Understanding the function and structure of selected pneumatic components
- ▶ Reading and preparing pneumatic diagrams
- ▶ Handling pneumatic systems in planning and day-to-day work

Pneumatics – manually/pneumatically operated valves (in accordance with BIBB)

Manuals “Pneumatics – manual/pneumatic operation (in accordance with BIBB, exercises 1 to 11)”

Material number R901407752

Project exercises in the basic principles of pneumatics in accordance with BiBB

The learning goals are adapted to the topics suggested by the German Federal Institute for Vocational Training (BiBB) and offer a practice-oriented education in the different training levels of pneumatics. Extensive information for trainees and trainers is provided in addition to the collection of exercises. The structure is based on didactic principles and explains the implementation of the individual experiments on a step-by-step basis. The trainee's manual contains check sheets for entering the results obtained. The series of tests is rounded off with comprehension questions.

Our range of products includes:

Manuals for trainees and trainers

Device set Pneumatics – manually/pneumatically operated valves (in accordance with BIBB)

Device set Pneumatics - electrically operated valves (in accordance with BIBB)

Project manuals for trainees and trainers

The manuals are adapted to the suggested device sets and offer a practice-oriented education in the different training levels of pneumatics. Extensive information for trainees and trainers is provided in addition to the collection of exercises.

The structure is uniform and explains the implementation of the individual experiments on a step-by-step basis. The series of tests is rounded off with comprehension questions.

Due to Technological developments in pneumatic control engineering, the exercises have been expanded and additional exercises in the Grafset design language for sequence controls were added to the test series.

Exercise topics:

- 01A: Direct control of single action cylinder, extending
- 01B: Direct control of single action cylinder, extending
- 01C: Indirect control of single action cylinder
- 02A: Direct control of double action cylinder
- 02B: Indirect control of double action cylinder
- 03A: Speed regulation of double action cylinder
- 03B: Controlling double action cylinder with impulse valve
- 04A: Travel-dependent control of double actioning cylinder
- 04B: Logical control with twin-pressure valves
- 05: Logical control with shuttle and twin-pressure valves
- 06: Time-dependent control of double action cylinder
- 07: Pressure-dependent control of double action cylinder
- 08: Sequential control with integrated vacuum gripper
- 09: Sequential control of two double action cylinder
- 10: Sequential control with signal overlapping
- 11A: Stop control of double actioning cylinder with locked center position
- 11B: Stop control via pilot controlled non-return valves



18 **Training Systems for Pneumatics** | Study topics
Pneumatics – manually/pneumatically operated valves (in accordance with BIBB)



Item	Components	Mat. no.	Quantity	Image	Page
1	Trainer's manual "Pneumatics – manual/pneumatic operation (in accordance with BIBB, exercises 1 to 11)", DE	R901407752			17
2	Trainer's manual "Pneumatics – manual/pneumatic operation (in accordance with BIBB, exercises 1 to 11)", EN	R901408011			
3	Trainer's manual "Pneumatics – manual/pneumatic operation (in accordance with BIBB, exercises 1 to 11)", ES	R901408012			
4	Trainee's manual "Pneumatics – manual/pneumatic operation (in accordance with BIBB, exercises 1 to 11)", DE	R901407756			
5	Trainee's manual "Pneumatics – manual/pneumatic operation (in accordance with BIBB, exercises 1 to 11)", EN	R901408013			
6	Trainee's manual "Pneumatics – manual/pneumatic operation (in accordance with BIBB, exercises 1 to 11)", ES	R901408014			



Device set for DS3/WS200 “Pneumatics – manually/pneumatically operated valves (BIBB 1-11)”, complete, in L-Boxx










Material number R961009687

The pneumatics device set for BiBB exercises is suitable for implementing the learning goals and study content in technical commercial training and further education. Only industrial components are used, that have been specially prepared for use in the training exercise. The device set is based on the training manual “Pneumatics – manual control (in accordance with BIBB)” that deals with BIBB exercises 1-11. The exercises with the listed components can be performed on both the WS200 and DS3 workstations. The device set is delivered in three stackable plastic cases (L-Boxx).



Item	Components	Mat. no.	Quantity	Image	Page
1	Filter regulator 3/2-way directional control valve 0.5 -10 bar	1827003410	1		105
2	Pneumatic distributor 6 x	1827003411	1		112

Item	Components	Mat. no.	Quantity	Image	Page
3	Single action cylinder, d= 25 mm, H= 50 mm	1827003371	1		84
4	Double action cylinder, d= 25 mm, h= 100 mm	1827003372	2		84
5	Manometer 0-10 bar	1827003406	2		107
6	3/2-way directional control valve M5, push button	1827003392	3		88
7	3/2-way directional control valve G1/8, with push button, open when not operated	R961009683	1		88
8	5/2-way directional control valve G1/8, with spring return, pneumatically operated	R901385290	1		94
9	3/2-way directional control valve M5, sensing roller	1827003399	2		92
10	3/2-way directional control valve G1/8, with spring return	1827003374	1		94
11	5/2-way directional control valve G1/8, pulse, pneumatically operated	R901385291	3		95
12	5/3-way directional control valve G1/8, with locked center position, pneumatically operated	R901385292	1		95
13	3/2-way directional control valve M5, adjustable, 2 to 8 bar	1827003388	1		97

Item	Components	Mat. no.	Quantity	Image	Page
14	2/2-way directional control valve, time-delayed, 2 to 30 s	R961008278	1		97
15	Shuttle valve G1/8, OR	1827003382	1		103
16	Dual pressure valve M5, AND	1827003383	2		103
17	Throttle check valve G1/8	1827003379	2		102
18	Rapid exhaust valve G1/4	1827003381	1		96
19	Load simulator d = 25 mm, h = 100 mm, m = 3.4 kg	R961003214	1		85
20	Proximity switch, pneumatic, with holder	1827003224	2		87
21	Vacuum gripper TS-EBS	R961008951	1		110
22	Non-return valve, pilot-operated	R961008838	2		102

Pneumatics – electrically operated valves (in accordance with BIBB)

Manuals “Pneumatics – electrical operation (in accordance with BIBB, exercises 1 to 16)”

Material number R901407757

Project exercises in electro-pneumatics in accordance with BiBB

The learning goals are adapted to the topics suggested by the German Federal Institute for Vocational Training (BiBB) and offer a practice-oriented education in the different training levels of pneumatics. Due to technological developments in control engineering, the exercises have been expanded and additional electro-pneumatics exercises and exercises in the Grafset design language for sequence controls were added to the test series.

Extensive information for trainees and trainers is provided in addition to the collection of exercises. The structure is based on didactic principles and explains the implementation of the individual experiments on a step-by-step basis.

Project manuals for trainees and trainers

The manuals are adapted to the suggested device sets and offer a practice-oriented education in the different training levels of electro-pneumatics. Selected information for the topic is provided in addition to the collection of exercises.


The structure is uniform and explains the implementation of the individual experiments on a step-by-step basis.

The corresponding trainee's manual contains worksheets for entering the results obtained. The series of tests is rounded off with comprehension questions.

Exercise topics:

- 01 Pilot control with single action cylinder
- 02 Pilot control with double action cylinder
- 03 Hold element control with double action cylinder
- 04 Basic circuit with AND connection
- 05 Basic circuit with OR connection
- 06 Basic circuit with electric lock
- 07 Travel-dependent control with double action cylinder
- 08 Travel-dependent control with two double action cylinder
- 09 Time-dependent control, pick-up delay
- 10 Time-dependent control, dropout delay
- 11 Pressure- and travel-dependent control
- 12 Sequential control with two double action cylinder, intuitive
- 13 Sequential control with two double action cylinder, step sequence
- 14 Sequential control with three double action cylinder, pulse controlled
- 15 Sequential control with three double action cylinder, spring return
- 16 Pilot control with boundary condition








Item	Components	Mat. no.	Quantity	Image	Page
1	Trainer's manual "Pneumatics – electrical operation (in accordance with BIBB, exercises 1 to 16)", DE	R901407757			22
2	Trainer's manual "Pneumatics – electrical operation (in accordance with BIBB, exercises 1 to 16)", EN	R901408015			
3	Trainer's manual "Pneumatics – electrical operation (in accordance with BIBB, exercises 1 to 16)", ES	R901408016			
4	Trainee's manual "Pneumatics – electrical operation (in accordance with BIBB, exercises 1 to 16)", DE	R901407759			
5	Trainee's manual "Pneumatics – electrical operation (in accordance with BIBB, exercises 1 to 16)", EN	R901408018			
6	Trainee's manual "Pneumatics – electrical operation (in accordance with BIBB, exercises 1 to 16)", ES	R901408020			

Expanded device set for DS3/WS200 "Pneumatics – electrically operated valves (BIBB 1-16)", in L-Boxx	
Material number	R901386902

The expanded device set “Pneumatics – electrically operated valves (BIBB 1-16)” is suitable for implementing the learning goals and study content in technical commercial training and further education on the basics of electro-pneumatics in accordance with BiBB based on real industrial products. The device set is based on the exercise manual “Pneumatics – electrical operation (in accordance with BIBB)” that deals with BIBB exercises 1-16. Only the components required in addition to the device set “Pneumatics – manually/pneumatically operated valves” are included. The exercises with the listed components can be performed on both the WS200 and DS3 workstations. All components are delivered in a stackable plastic case (L-Boxx).





Item	Components	Mat. no.	Quantity	Image	Page
1	Double action cylinder, d = 25 mm, h = 100 mm	1827003372	1		84
2	Throttle check valve G1/8	1827003379	1		102

Item	Components	Mat. no.	Quantity	Image	Page
3	3/2-way directional control valve, electrically operated, M5, with spring return	1827003412	1		98
4	5/2-way directional control valve, electrically operated, G1/8, with spring return	R901385293	3		98
5	5/2-way directional control valve, electrically operated, G1/8, pulse	R901385294	3		99

Device set for DS3/WS200 “Pneumatics – electrically operated valves (BIBB 1-16)”, complete, in L-Boxx	
Material number	R901386901

The device set “Pneumatics – electrically operated valves (BIBB 1-16)” is suitable for implementing the learning goals and study content in technical commercial training and further education on the basics of electro-pneumatics in accordance with BiBB based on real industrial products. The device set is based on the exercise manual “Pneumatics – electrical operation (in accordance with BIBB)” that deals with BIBB exercises 1-16. The exercises with the listed components can be performed on both the WS200 and DS3 workstations. All components are delivered in three stackable plastic cases (L-Boxx).



Item	Components	Mat. no.	Quantity	Image	Page
1	Filter regulator 3/2-way directional control valve 0.5 -10 bar	1827003410	1		105
2	Distributor 6 x	1827003411	1		112



Item	Components	Mat. no.	Quantity	Image	Page
3	Single action cylinder, d= 25 mm, H= 50 mm	1827003371	1		84
4	Double action cylinder, d= 25 mm, h= 100 mm	1827003372	3		84
5	Manometer 0-10 bar	1827003406	2		107
6	Throttle check valve G1/8	1827003379	3		102
7	Non-return valve, pilot-operated	R961008838	2		102
8	3/2-way directional control valve, electrically operated, M5, with spring return	1827003412	1		98
9	5/2-way directional control valve, electrically operated, G1/8, with spring return	R901385293	3		98
10	5/2-way directional control valve, electrically operated, G1/8, pulse	R901385294	3		99











Device set “Electrics for DS3 pneumatics – electrically operated valves (BIBB 1-16)”, in L-Boxx	
Material number	R901386903

This device set combines all necessary electrical components for the BIBB exercises 1-16. The electrical functions switch, push button, relay and display are available in the individual boxes. This device set is required to carry out the exercises from the manual “Pneumatics – electrically operated valves (BIBB 1-16)” on a WS200 workstation.

All components are delivered in three stackable plastic cases (L-Boxx).



Item	Components	Mat. no.	Quantity	Image	Page
1	Relay housing version, 4 changeover contacts	R961009602	6		114
2	Relay housing version, pick-up delay, 1 NO contact, 1 NC contact	R961009603	1		115



Item	Components	Mat. no.	Quantity	Image	Page
3	Relay housing version, dropout delay, 1 NO contact, 1 NC contact	R961009604	1		115
4	Switching element housing version, 1 switch + 2 push buttons, 3 NO contacts, 3 NC contacts	R961009618	2		116
5	Display unit housing version, display 4x optical, 1x acoustic	R961009616	1		116
6	Distributor housing version, 10 x	R961009614	2		116
7	Electric cylinder switch with adapter	1827003437	6		86
8	Electrical position sensor with roller lever	1827003421	1		121
9	Mechanical pressure switch, 1 to 16 bar	1827003428	1		108
10	Sensor, inductive	1827003422	1		122
11	Sensor, capacitive	1827003423	1		122
12	Cable set BIBB electro-pneumatics	1827003436	1		131






Device set “Electrics for WS200 pneumatics – electrically operated valves (BIBB 1-16)”, without I/O module, in L-Boxx	
Material number	R901386904

This device set combines all necessary electrical components for the BIBB exercises 1-16. The electrical functions switch, push button, relay and display are combined in one control panel. This device set is required to carry out the exercises from the exercise manual “Pneumatics – electrically operated valves (BIBB 1-16)” on a WS200 workstation.

All components except for the control panel are delivered in a stackable plastic case (L-Boxx).





Item	Components	Mat. no.	Quantity	Image	Page
1	Control unit housing version BIBB module	R961009678	1		114
2	Electric cylinder switch with adapter	1827003437	6		86



Item	Components	Mat. no.	Quantity	Image	Page
3	Electrical position sensor with roller lever	1827003421	1		121
4	Mechanical pressure switch, 1 to 16 bar	1827003428	1		108
5	Sensor, inductive	1827003422	1		122
6	Sensor, capacitive	1827003423	1		122
7	Cable set BIBB electro-pneumatics	1827003436	1		131

Device set “Electrics for WS200 pneumatics – electrically operated valves (BIBB 1-16)”, with I/O module, in L-Boxx	
Material number	R901386905

This device set combines all necessary electrical components for the BIBB exercises 1-16. The electrical functions switch, push button, relay and display are combined in one control panel. This device set is required to carry out the exercises from the exercise manual “Pneumatics – electrically operated valves (BIBB 1-16)” on a WS200 workstation. In this set, the control panel also contains an I/O module, via which sensors and valves can be connected. A simulation program can be connected with the hardware via a USB interface. All components except for the control panel are delivered in a stackable plastic case (L-Boxx).



Item	Components	Mat. no.	Quantity	Image	Page
1	Control unit housing version - BIBB module + I/O module	R961009675	1		114
2	Electric cylinder switch with adapter	1827003437	6		86




Item	Components	Mat. no.	Quantity	Image	Page
3	Electric limit switch with roller lever	1827003421	1		121
4	Mechanical pressure switch, 1 to 16 bar	1827003428	1		108
5	Sensor, inductive	1827003422	1		122
6	Sensor, capacitive	1827003423	1		122
7	Cable set BIBB electro-pneumatics	1827003436	1		131













Pneumatics – manually/pneumatically operated valves (in accordance with PAL)










Device set for DS3/WS200 “Pneumatics - manually/pneumatically operated valves in accordance with PAL”, complete	
Material number	1827003550

The pneumatics device set for PAL exercises is suitable for implementing the learning goals and study content in technical commercial training and further education on the basics of pneumatics in accordance with PAL based on real industrial products. The device set is not specially tailored for a PAL test, which means that older tests can also be used for preparation.



Item	Components	Mat. no.	Quantity	Image	Page
1	Double action cylinder, d = 25 mm, h = 100 mm	1827003372	2		84
2	3/2-way directional control valve M5, push button	1827003392	2		88
3	3/2-way directional control valve M5, toggle	1827003394	1		89

Item	Components	Mat. no.	Quantity	Image	Page
4	3/2-way directional control valve M5, sensing roller	1827003399	3		92
5	3/2-way directional control valve G1/8, sensing roller	1827003400	1		92
6	3/2-way directional control valve M5, idle return roller	1827003401	1		92
7	5/2-way directional control valve G1/8, with spring return, pneumatically operated	R901385290	1		94
8	5/2-way directional control valve G1/8, pulse, pneumatically operated	R901385291	2		95
9	Throttle check valve G1/8	1827003379	3		102
10	Rapid exhaust valve G1/8	1827003098	1		96
11	Shuttle valve G1/8, OR	1827003382	2		103
12	Dual pressure valve M5, AND	1827003383	1		103
13	2/2-way directional control valve, time-delayed, 2 to 30 s	R961008278	1		97
14	Proximity switch, pneumatic, with holder	1827003224	2		87
15	Pneumatic distributor, 6x with 3/2-way directional control valve, PAL	1827003577	1		112

Item	Components	Mat. no.	Quantity	Image	Page
16	Cable channel 200 mm	1827003561	1		135
17	Cable channel 300 mm	1827003564	1		135
18	Cable channel 400 mm	1827003566	1		135
19	Cable channel 500 mm	1827003567	1		135
20	Terminal connector, 5 x, with PAL ID plate	1827003553	1		113
21	Plastic tube 4 x 0.75, PU, black, packaging unit: 10 m	R901395757	2		138
22	T plug connector, 4 mm, packaging unit: 10	1823381043	1		
23	Angled plug connector, 4 mm, packaging unit: 10	1823380019	1		
24	Blanking connector, 4 mm, packaging unit: 20	2123204000	1		




Pneumatics – electrically operated valves (in accordance with PAL)













Expanded device set for DS3/WS200 “Pneumatics – electrically operated valves in accordance with PAL”













Material number 1827003551



The expanded device set for PAL exercises is suitable for implementing the learning goals and study content in technical commercial training and further education on electro-pneumatics in accordance with PAL based on real industrial products. The device set is not specially tailored for a PAL test, which means that older tests can also be used for preparation. The device set 1827003550 is required as a basis.



Item	Components	Mat. no.	Quantity	Image	Page
1	Double action cylinder, d= 25 mm, h= 100 mm	1827003372	2		84
2	Cylinder switch with holder	1827003570	3		87
3	3/2-way directional control valve G1/8, toggle	1827003557	1		91

Item	Components	Mat. no.	Quantity	Image	Page
4	5/2-way directional control valve, electrically operated, G1/8, with spring return, PAL	R901385296	1		100
5	5/2-way directional control valve, electrically operated, G1/8, pulse, PAL	R901385297	1		101
6	Electrical position sensor with roller lever in accordance with PAL	1827003569	1		121
7	Relay with 3 changeover contacts	R961002709	4		124
8	Time relay with pickup or dropout delay	R961002710	2		124
9	Relay socket	R961002699	6		124
10	Strip terminal, 35x	1827003559	1		135
11	Top-hat rail 250 mm	1827003560	1		133
12	Mounting bracket, 4x	1827003558	1		133
13	Electric button 1 open contact/ 1 closed contact	1827001991	2		125
14	Electric switch 1 open contact/ 1 closed contact	1827001992	1		125
15	Indicator light 24V	1827001988	1		125

Item	Components	Mat. no.	Quantity	Image	Page
16	Throttle check valve G1/8	1827003379	2		102
17	Angled plug connector, 4 mm, packaging unit: 10	1823380019	1		
18	T plug connector, 4 mm, packaging unit: 10	1823381043	1		
19	Plastic tube 4 x 0.75, PU, black, packaging unit: 10 m	R901395757	2		138
20	Terminal connector, 5 x	1827003574	4		113
21	Terminal connector, 5 x, with PAL ID plate	1827003553	1		113
22	Electrical cable, blue, 0.75 mm ² , 25 m	1827003031	1		134
23	Wire end ferrule 0.75mm ²	R900016169	100		133
24	Cable fastener L = 130 mm	1821025000	100		144
25	ID plate 15x6	1829929200	100		144
26	Connecting cable, 1500 mm, red and blue	1827003005	1		130
27	Cable channel 200 mm	1827003561	1		135

Item	Components	Mat. no.	Quantity	Image	Page
28	Cable channel 235 mm	1827003562	3		135
29	Cable channel 500 mm	1827003567	1		135

Pneumatics – control engineering in pneumatics

Trainer's manual "Pneumatics - control engineering"

Material number R961004419

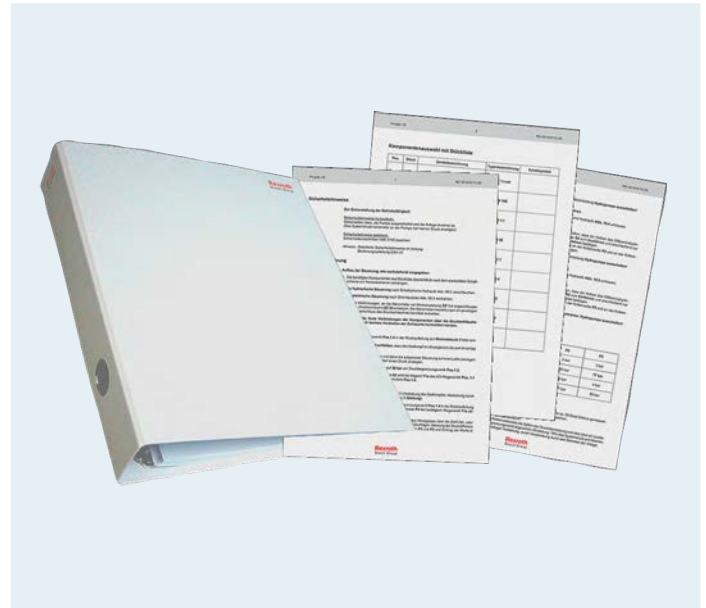
Project exercises in control pneumatics





The project manuals are used as an accompanying book and work-book in the field of pneumatics for explaining pneumatic control and regulation technology. A basic knowledge of pneumatics and electrics, a basic understanding of PLC controls and the procedure for handling programming devices is required.

In all project tasks, core and specialist qualifications are imparted, such as independent planning, implementation and checking of work required for carrying out project assignments.

Exercise topics:

- 01 Constant pressure control
- 02 Force control
- 03 Basics of PID control
- 04 Electropneumatic position control with spring
- 05 Properties of electropneumatic position control with spring










Item	Components	Mat. no.	Quantity	Image	Page
1	Trainer's manual "Pneumatics - control engineering" DE	R961004419			41
2	Trainer's manual "Pneumatics - control engineering" EN	R961004436			
3	Trainer's manual "Pneumatics - control engineering" ES	R961004515			
4	Trainee's manual "Pneumatics - control engineering" DE	R961004420			
5	Trainee's manual "Pneumatics - control engineering" EN	R961004437			
6	Trainee's manual "Pneumatics - control engineering" ES	R961004514			

Device set for DS3/WS200 pneumatics “Pneumatics - control engineering”, complete	
Material number	R901431804

The device set is used to impart practical examples from electropneumatic control and regulation technology based on project work. Only industrial components are used, that have been specially prepared for use in the training exercise. The set is matched to the control engineering exercise manual. The exercises with the listed components and the corresponding electrical device set can be performed at the WS200, WS290 and DS3 workstations.





Item	Components	Mat. no.	Quantity	Image	Page
1	Filter regulator 3/2-way directional control valve 0.5 -10 bar	1827003410	1		105
2	Distributor 6 x	1827003411	1		112









Item	Components	Mat. no.	Quantity	Image	Page
3	Pressure control valve ED02, pneumatically operated	R961003950	1		106
4	Double action cylinder d = 25 mm, h = 100 mm, with distance measuring system SM6	R961006487	1		85
5	Octagon cylinder DWZ, d = 25 mm, h = 100 mm	R961004426	1		84
6	3/2-way directional control valve G1/8, toggle	1827003469	1		90
7	Pressure controller G1/8, 0.5 to 10 bar	1827003386	1		105

Device set for WS200/DS3 electrics “Pneumatics - control engineering”, complete	
Material number	R901431808

The device set includes the necessary electrical components for imparting practical examples from electropneumatic control and regulation technology based on project work. Only industrial components are used, that have been specially prepared for use in the training exercise. The set is matched to the control engineering exercise manual. The exercises with the listed components and the corresponding pneumatics device set can be performed at the WS200, WS290 and DS3 workstations.





Item	Components	Mat. no.	Quantity	Image	Page
1	Pressure switch 0 to 16 bar	R961003948	1		109
2	PLC L20; 12 digital inputs; 12 digital outputs, snap-In	R961004428	1		




Item	Components	Mat. no.	Quantity	Image	Page
3	Control module setpoint specification + adapter in 49TE box	R961007769	1		119
4	Control module setpoint module + switch/push button box in 49TE box	R961007770	1		119
5	Control module with setpoint-actual value display and 2 digital voltmeters in 49 TE box	R961004432	1		118
6	Control pneumatics cable set	R961004433	1		
7	Software IWORKS	R911319774	1		
8	Analog input module, 2 x	R911170784	1		136
9	Analog output module, 2 x	R911170786	1		136
10	Connector for analog modules	R911289332	2		
11	Label field for module	R911289341	2		
12	Distributor housing version, 10 x	R961009614	1		116
13	Screwdriver 0.4x2.5	R900040800	1		

Expanded device set for DS3/WS200 from “Pneumatics – electrically operated valves (BIBB 1-16)” in accordance with “Pneumatics - control engineering”	
Material number	R901431806

The expanded device set is used to impart practical examples from electropneumatic control and regulation technology based on project work. Only industrial components are used, that have been specially prepared for use in the training exercise. The set is matched to the control engineering exercise manual. The exercises with the listed components and the corresponding electrical device set can be performed at the WS200, WS290 and DS3 workstations.



Item	Components	Mat. no.	Quantity	Image	Page
1	Pressure control valve ED02, pneumatically operated	R961003950	1		106
2	Double action cylinder d = 25 mm, h = 100 mm, with distance measuring system SM6	R961006487	1		85

Item	Components	Mat. no.	Quantity	Image	Page
3	Octagon cylinder DWZ, d = 25 mm, h = 100 mm	R961004426	1		84
4	3/2-way directional control valve G1/8, toggle	1827003469	1		90
5	Pressure controller G1/8, 0.5 to 10 bar	1827003386	1		105



Expanded device set for WS200/DS3 electrics from “Pneumatics – electrically operated valves (BIBB 1-16)” in accordance with “Pneumatics - control engineering”








Material number

R901431807

The expanded device set includes the necessary electrical components for imparting practical examples from electropneumatic control and regulation technology based on project work. Only industrial components are used, that have been specially prepared for use in the training exercise. The set is matched to the control engineering exercise manual. The exercises with the listed components and the corresponding pneumatics device set can be performed at the WS200, WS290 and DS3 workstations.



Item	Components	Mat. no.	Quantity	Image	Page
1	Pressure switch 0 to 16 bar	R961003948	1		109
2	PLC L20; 12 digital inputs; 12 digital outputs, snap-In	R961004428	1		





Item	Components	Mat. no.	Quantity	Image	Page
3	Control module setpoint specification + adapter in 49TE box	R961007769	1		119
4	Control module setpoint module + switch/push button box in 49TE box	R961007770	1		119
5	Control module with setpoint-actual value display and 2 digital voltmeters in 49 TE box	R961004432	1		118
6	Control pneumatics cable set	R961004433	1		
7	Software IWORKS	R911319774	1		
8	Analog input module, 2 x	R911170784	1		136
9	Analog output module, 2 x	R911170786	1		136
10	Connector for analog modules	R911289332	2		
11	Label field for module	R911289341	2		
12	Screwdriver 0.4x2.5	R900040800	1		

Pneumatic accessory set

Accessory kit pneumatics, in L-Boxx	
Material number	R901385277
Accessory kit to match the device sets “Pneumatics - manually/pneumatically operated valves” and “Pneumatics - electrically operated valves”. All components are delivered in a stackable plastic case (L-Boxx).	



Item	Components	Mat. no.	Quantity	Image	Page
1	Plastic tube 4 x 0.75, PU, black, packaging unit: 10 m	R901395757	2		138
2	Plastic tube 6.0 x 1.05, PU, packaging unit: 2 m	R961007739	1		138

Item	Components	Mat. no.	Quantity	Image	Page
4	Loosening tool	1823391651	1		143
5	Silencer G1/8, packaging unit: 10	1827000000	1		
6	T plug connector, 4 mm, packaging unit: 10	1823381043	1		
7	Blanking connector, 4 mm, packaging unit: 20	2123204000	1		

Workstations



Contents - Workstations

EcoDesk	56
WS200	57
DS3	59
Accessories	61

EcoDesk

EcoDesk free-standing device carrier		
Material number	R961003826	
A workstation mounted on a table for exercise installations in quick assembly. Components can be moved continuously in horizontal direction and vertically in stages, can be used on both sides, double-sided grooved plate with 25 mm grid width, with 2 fixing brackets, 2 workstations for max. 4 people. Delivered: pre-assembled in assemblies.		
Dimensions	1150x640x730	mm (LxWxH)
Weight	22.5	kg
Work area	1130x700	mm (WxH)



WS200

WS200 pneumatic workstation, double sided for max. 4 trainees - assembled, including packaging

Material number R961008854

This modular preferred type is suitable for carrying out trainings in pneumatics and automation technology.

Pneumatic and automation components can be fixed onto both sides of the grooved plate of the WS200 mobile workstation with the snap-in quick mounting system.

The double-sided WS200 workstation is designed for max. 4 trainees.

The storage shelves of the storage set can be used as a writing surface.

Including:

Base frame

Grooved plate

Storage set

Dimensions	800x806x1772	mm (LxWxH)
Space requirements	3x3	m (LxW)
Number of workstations	max. 4	
Weight	47	kg
Mobile	yes	
Load-bearing capacity	250	kg



WS200 hydraulic workstation, single sided and pneumatics for 1-2 trainees - assembled, including packaging

Material number R961009258

This modular preferred type is suitable for carrying out trainings in the basics of hydraulics (BIBB A-Z3), as well as pneumatics (BiBB 1-16) and automation technology.

Pneumatic and automation components can be fixed onto the grooved plate of the WS200 mobile workstation with the snap-in quick mounting system.

On one side of the WS200 mobile work station there is a grating on which the hydraulic components can be securely mounted. The double-sided WS200 workstation is designed for max. 4 trainees.

The hydraulic unit used consists of an external gear pump and an asynchronous single-phase motor.

The switch box mounted on the WS200 workstation with ON/OFF button and EMERGENCY OFF button supplies the hydraulic unit with power.

The low oil leakage, self-sealing coupling connectors on the P/T distributor enable the workstation to be supplied with hydraulic fluid.

The storage shelves of the storage set can be used as an oil pan or as a writing surface with a simple turning motion.

Including:

Base frame

Grooved plate

Grid

Unit, 230 V/50 Hz with pump, hose set, switch box, and P/T distributor

Storage set

Name	Value	Unit
Dimensions	800x806x1772	mm (LxWxH)
Space requirements	3x3	m (LxW)
Number of workstations	max. 4	
Weight	72	kg
Mobile	yes	
Load-bearing capacity	250	kg
Supply voltage	230	V AC
Nominal flow	16	A
Power frequency	50	Hz
Power	0.55	kW
Operating pressure (hydraulics)	60	bar
Maximum flow	3	l/min



Further accessories and spare parts are available in the hydraulics catalog R999000177

DS3

Mobile workstation DS3, assembled, incl. packaging

Material number 1827003700

Pneumatic and automation components can be fixed onto both sides of the grooved plate of the DS3 mobile workstation with the snap-in quick mounting system.

With storage area for the components not required in the exercise. Mobile frame made from aluminum profiles, 4 lockable rollers, double-sided grooved plate with 25 mm grid width, perforated plate with 50 mm bore grid, storage trays on both sides.

2 workstations for max. 4 people.

Writing surface in the figure is not included in the scope of supply.

Delivered: completely assembled.

Dimensions	1250x790x1610	mm (LxWxH)
Weight	63	kg
Color	blue	RAL 5010
Work area	1130x700	mm (WxH)

Mobile workstation DS3, with mounting for electrical assemblies, with power supply unit and connection cable, assembled, incl. packaging

Material number R901415752

Pneumatic and automation components can be fixed onto both sides of the grooved plate of the DS3 mobile workstation with the snap-in quick mounting system.

With storage area for the components not required in the exercise. Mobile frame made from aluminum profiles, 4 lockable rollers, double-sided grooved plate with 25 mm grid width, perforated plate with 50 mm bore grid, storage trays on both sides, with power supply unit and connection cable, with mounting for electrical assemblies and writing surfaces.

2 workstations for max. 4 people.

Delivered: completely assembled.

Dimensions	1250x790x1610	mm (LxWxH)
Weight	67	kg
Color	blue	RAL 5010
Work area	1130x700	mm (WxH)



Mobile component carrier DS3 ProLine, kit		
Material number	R961005661	
<p>Pneumatic and automation components can be fixed onto both sides of the grooved plate of the DS3 mobile workstation with the snap-in quick mounting system.</p> <p>With storage area for the components not required in the exercise.</p> <p>Mobile frame made from aluminum profiles, 4 lockable rollers, double-sided grooved plate with 25 mm grid width, perforated plate with 50 mm bore grid, storage trays on both sides.</p> <p>2 workstations for max. 4 people.</p> <p>Writing surface in the figure is not included in the scope of supply.</p> <p>Delivered: pre-assembled in assemblies.</p>		
Dimensions	1250x790x1610	mm (LxWxH)
Weight	63	kg
Color	blue	RAL 5010
Work area	1130x700	mm (WxH)



Accessories

Grooved plate 1130 x 700 x 30 mm

Material number R961000168

Mounting surface for quick assembly for exercise installations.
Grooved plate can be used on both sides, for mounting components via clamp connection.

Components can be moved continuously in horizontal direction and vertically in stages, can be used on both sides, double-sided grooved plate with 25 mm grid width.

Dimensions	1130x700x30	mm (LxWxH)
Weight	21	kg
Work area	1130x700	mm (LxW)

Grooved plate 565 x 700 x 30 mm

Material number 1827003299

Mounting surface for quick assembly for exercise installations.
Grooved plate can be used on both sides, for mounting components via clamp connection.

Components can be moved continuously in horizontal direction and vertically in stages, can be used on both sides, double-sided grooved plate with 25 mm grid width.

Dimensions	565x700x30	mm (LxWxH)
Weight	11.5	kg
Work area	565x700	mm (LxW)



Roller container	
Material number	R961000287

Roller container for the device carrier, for holding tools, measuring tools, components and small parts.
It is needed to achieve rapid overall availability of parts at the work-place.

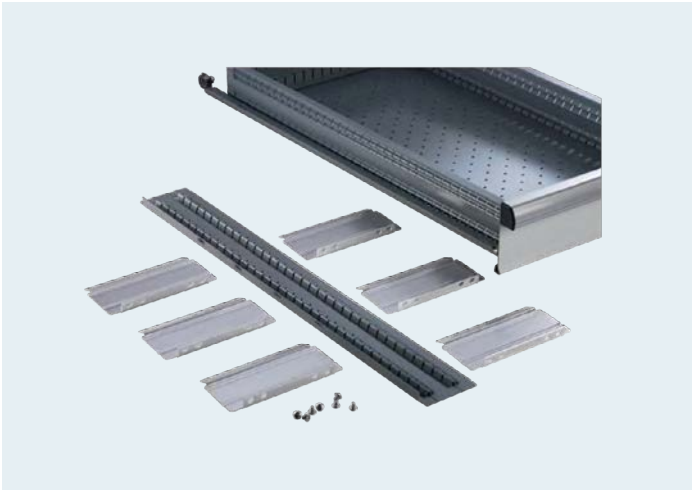
Version details:
central cylinder lock, drawers with easy running tracks, each drawer is locked individually, housing and drawers made from coated sheet steel, 2 lockable castors, 2 fixed castors, top side with frame and rubber top, front side with push bar.

Dimensions	800x425x840	mm (LxWxH)
Weight	75	kg
Color	light gray	RAL 7035

Drawer divider assortment 100 mm	
Material number	R961000563

Division of the area in the drawer of the container, slotted wall is inserted in the center of the drawer, dividing walls can be inserted as required.
Can also be used together with an anti-skid mat.

Weight	900	g
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Drawer divider assortment 150 mm

Material number R961000564

Division of the area in the drawer of the container, slotted wall is inserted in the center of the drawer, dividing walls can be inserted as required.

Can also be used together with an anti-skid mat.

Weight 1.3 kg



Anti-skid mat

Material number R961000568

Stops the parts stored in the container drawer from slipping about, suitable for drawers in the roller container with Mat.

no.: R961000287 and integrated container with mat.

no.: R961000288.

Can also be used with range of 100 mm or 150 mm drawer dividers.

Material: Soft rubber.

Dimensions 600x300x3 mm (LxWxH)

Weight 115 g



Perforated plates for container

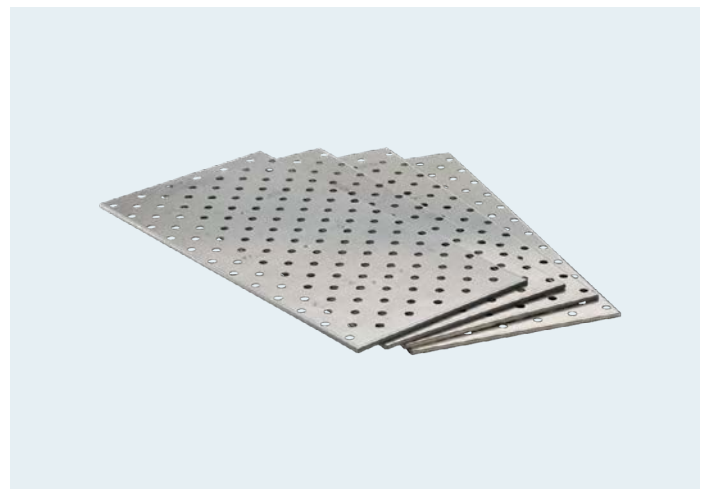
Material number R901430355

4 perforated plates with holes in the grid 50 mm, suitable for the snap-in system, for pneumatics sets, for inserting in the drawers of the container.

Material: Sheet steel, galvanized

Dimensions 600x297x8 mm (LxWxH)

Weight 8 kg

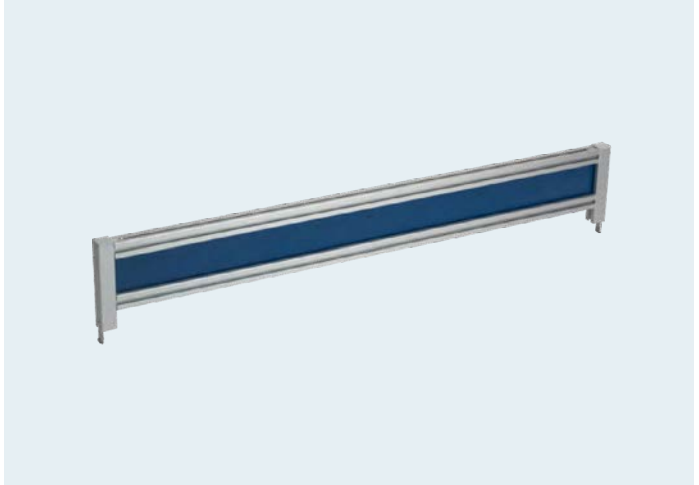


Electrical assembly mounting

Material number 1827003703

Mounting for electrical assemblies, for establishing circuits, can be used on both sides, suitable for the snap-in quick mounting system. For mounting for the DS3 or for the EcoDesk. Profile frame made from aluminum groove profiles with 8 mm groove.

Dimensions	1130x165x30	mm (LxWxH)
Weight	3.7	kg
Color	blue	RAL 5010
Work area	1130x130	mm (LxW)



Info panel

Material number 1827003721

To show information in an ergonomic way that is needed to conduct the training exercise at the workstation. This makes it possible to access this information directly at the workstation.

2 x supple support profile, with mounting set for mounting on the side section of the device carrier or grooved plate, height adjustable, cover with an acrylic protective screen for sheet size DIN A4.

Dimensions	370x280x80	mm (LxWxH)
Weight	3.5	kg
Color	anthracite gray	RAL 7016
Size	DIN A4	



Screen support arm

Material number 1827003725

The support arm with 2 joints and a swiveling mounting plate (415 x 415 mm) supports ergonomic set up of the workstation with a monitor and keyboard.

The support arm is suitable for mounting on the side section of the device carrier.

Support arm made from anodized aluminum profiles with 2 joints, pivoting radius 250 mm each, mounting plate made from sheet steel, pivoting, mounting bracket for keyboard, chrome-plated round steel, with mounting set.

Dimensions	730x420x180	mm (LxWxH)
Weight	8.3	kg
Load-bearing capacity	250	N



Power supply unit 230VAC/24VDC for DS3 and WS290

Material number R961000170

Power supply unit for supplying the control and measurement electronics, for operating the electrical components.

Can be installed in every side section of the device carrier in a space-saving way, can also be retrofitted.

Control area and housing made from coated metal, with mains switch and indicator lamp, short-circuit-proof, 4 connection sockets for DC output, power supply unit in accordance with EN60320-1 / DIN VDE 0625-1, creates safety extra-low voltage.

Connector for the power supply unit in accordance with DIN49441-R2 / CEE7.

Connection cable not included in the scope of supply (s. Accessories).

Dimensions	360x162x47	mm (LxWxH)
Weight	1.9	kg
Color	blue	RAL 5010
Protection class	IP 20	IEC 60529
Supply voltage	230	V AC
Power frequency	47..63	Hz
Output voltage	24	V DC
Current consumption	4.5	A
Short-circuit proof	yes	

Power cable for Germany, 3 m

Material number 1827003724

Connection cable for power supply unit or multiple socket outlet strip, with adapter for USA. Version in accordance with EN60320-1 / DIN VDE 0625-1.

Length	3	m
Weight	380	g
Color	black	
Protection class	IP20	IEC 60529
Supply voltage	230	VAC
Line cross-section	3x1.5	mm ²



Power supply unit 115VAC/24VDC for DS3 and WS290		
Material number	1827003740	
<p>Power supply unit for supplying the control and measurement electronics, for operating the electrical components.</p> <p>Can be installed in every side section of the device carrier in a space-saving way, can also be retrofitted.</p> <p>Control area and housing made from coated metal, with mains switch and indicator lamp, short-circuit-proof, 4 connection sockets for DC output, power supply unit in accordance with EN60320-1 / DIN VDE 0625-1, creates safety extra-low voltage.</p> <p>Connector for the power supply unit in accordance with DIN49441-R2 / CEE7.</p> <p>Connection cable not included in the scope of supply (s. Accessories).</p>		
Dimensions	360x162x47	mm (LxWxH)
Weight	1.9	kg
Color	blue	RAL 5010
Protection class	IP20	IEC 60529
Supply voltage	115	VAC
Power frequency	47 ... 63	Hz
Output voltage	24	VDC
Current consumption	4.5	A
Short-circuit proof	yes	

Power cable for USA, 2 m		
Material number	1827003742	
Connection cable for power supply unit 115V, with connector for USA. Version in accordance with EN60320-1 / DIN VDE 0625-1.		
Length	2	m
Weight	175	g
Color	black	
Protection class	IP 20	IEC 60529
Supply voltage	115	V AC
Line cross-section	3x1.5	mm ²



Multiple socket outlet set, Germany

Material number R961000171

The power connection set consists of:
3 x Schuko multiple socket outlet, power cable (L=3 m) in accordance with EN 60320-1 / DIN VDE 0625-1, connection cable (L=0.5m) to the power supply unit in accordance with DIN49441-R2

Dimensions	267x45x48	mm (LxWxH)
Weight	1	kg
Protection class	IP20	IEC 60529
Operating voltage	230	VAC
Operating current	16	A

Multiple socket outlet set CH

Material number R961000439

The power connection set consists of:
2 x Schuko multiple socket outlet with mains switch, power cable (L=5 m) in accordance with EN 60320-1 / DIN VDE 0625-1, connection cable (L=0.5m) to the power supply unit in accordance with DIN49441-R2 / CEE7 and mounting set.

Dimensions	267x45x48	mm (LxWxH)
Weight	850	g
Protection class	IP20	IEC 60529
Operating voltage	230	VAC
Operating current	10	A



Multiple socket outlet set US		
Material number	R961007862	
The power connection set consists of: 3 x Schuko multiple socket outlet, power cable (L=5 m) in accordance with EN 60320-1 / DIN VDE 0625-1		
Dimensions	267x45x48	mm (LxWxH)
Weight	1.1	kg
Protection class	IP20	IEC 60529
Operating voltage	125	VAC
Operating current	15	A



Writing surface		
Material number	1827003705	
Writing surface for Insertion into the oil pan of the component carrier. For writing notes regarding exercise instructions and procedures. Material: PMMA.		
Dimensions	360x280x20	mm (LxWxH)
Weight	540	g



Cable holder for WS290 for 50 measurement lines		
Material number	R961004144	
Cable holder for holding measuring leads, ergonomic workstation with availability of the required measuring leads for training exercises. The measuring lead is hooked into the cable holder.		
Dimensions	210x63x35	mm (LxWxH)
Weight	140	g



Rag holder

Material number 1827003722

Rag holder for quick access to wipes at the workstation; can also be used to route cables and hoses. Can be easily fixed in the groove profiles of workstations.

Material: Plastic.

Dimensions	60x37x24	mm (LxWxH)
Weight	35	g
Color	black	
Delivery quantity	2	units

Set of rubber feet for grooved plate

Material number R961003221

Rubber buffer as a foot for setting up the device carrier EcoDesk (grooved plate with cross profiles). Balances out unevenness and protects the surface.

Rubber body with vulcanized threaded bolt, with hammer nut for fixing in the groove of the aluminum profile.





Dimensions	15x20	mm (LxØ)
Weight	68	g
Delivery quantity	4	units



Compressor 230 V with accessories	
Material number	1827008426

Compressor for the compressed air supply with manometer, pressure controller, water separator and 2 compressed air connections, low noise level, suitable for operation in the classroom.
Compressor unit for single-phase electrical connection, voltage 230 VAC, frequency 50 Hz, operating pressure 8 bar, air quantity max. 50l/min, noise level max. 40 dB.



Item	Components	Mat. no.	Quantity	Image	Page
1	Compressor 230 V	R900891168	1		
2	Coupling plug with 2/2-way directional control valve	R900891177	1		91
3	T plug connector, 6 mm	2121106000	1		
4	Plastic tube 6.0 x 1.05, PU, black, packaging unit: 8 m	R961007740	1		138

Compressor 110 V with accessories

Material number R961003964

Compressor for the compressed air supply with manometer, pressure controller, water separator and 2 compressed air connections, low noise level, suitable for operation in the classroom.
Compressor unit for single-phase electrical connection, voltage 110 VAC, frequency 60 Hz, operating pressure 8 bar, air quantity max. 50l/min, noise level max. 40 dB.



Item	Components	Mat. no.	Quantity	Image	Page
1	Compressor 110 V	R961003963	1		
2	Coupling plug with 2/2-way directional control valve	R900891177	1		91
3	T plug connector, 6 mm	2121106000	1		
4	Plastic tube 6.0 x 1.05, PU, packaging unit: 8 m	R961007740	1		138

Order examples



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Order example 3 79

Pneumatics – manually/pneumatically operated valves (in accordance with BIBB)

Order example 1

We recommend the equipment below for teaching pneumatics in accordance with the study topic “Pneumatics - manually/pneumatically operated valves (in accordance with BiBB).

Device set suitable for the study topics:

Mat. no.	Designation	Description	Quantity
R961009687	Device set / TS-PS 201-1X-K	Device set for DS3 / WS200 “Pneumatics – manually/pneumatically operated valves (BIBB 1-11)”, complete, in L-Boxx	2

Workstation, suitable for the study topics:

Mat. no.	Designation	Description	Quantity
R961008854	Workstation / TS-WS200-1X/ N1G0A0T1-M1	WS200 pneumatic workstation, double sided for 2 - 4 trainees - assembled, including packaging	1

Project manuals, suitable for the study topics:

Mat. no.	Designation	Description	Quantity
R901407752	Manual / TW-PN-LH-2/X 201DE	Trainer's manual “Pneumatics – manual/pneumatic operation (in accordance with BIBB, exercises 1 to 11)”, DE	1
R901408011	Manual / TW-PN-LH-2/X 201EN	Trainer's manual “Pneumatics – manual/pneumatic operation (in accordance with BIBB, exercises 1 to 11)”, EN	1
R901408012	Manual / TW-PN-LH-2/X 201ES	Trainer's manual “Pneumatics – manual/pneumatic operation (in accordance with BIBB, exercises 1 to 11)”, ES	1
R901407756	Manual / TW-PN-SH-2/X 201DE	Trainee's manual “Pneumatics – manual/pneumatic operation (in accordance with BIBB, exercises 1 to 11)”, DE	2
R901408013	Manual / TW-PN-SH-2/X 201EN	Trainee's manual “Pneumatics – manual/pneumatic operation (in accordance with BIBB, exercises 1 to 11)”, EN	2
R901408014	Manual / TW-PN-SH-2/X 201ES	Trainee's manual “Pneumatics – manual/pneumatic operation (in accordance with BIBB, exercises 1 to 11)”, ES	2

In addition, the following accessories are recommended:

Mat. no.	Designation	Description	Quantity
R901385277	Accessory kit / TS-PC-KLTL-PN-K	Accessory kit pneumatics, in L-Boxx	2

Optional accessories:

Mat. no.	Designation	Description	Quantity
1827008426	Compressor / TS-PC-230 V/50 HZ-8 BAR-WITH-ACCES.	Compressor 230 V with accessories	1

The appropriate books, e-learning media, resources, posters, multimedia and software can be found in our media catalog:

www.boschrexroth.com/en/en/training/medien/media

These resources completely cover the desired study topics for 2 - 4 trainees so that no additional materials are required.

Pneumatics – electrically operated valves (in accordance with BIBB)

Order example 2

We recommend the equipment below for teaching electro pneumatics in accordance with the study topic “Pneumatics - electrically operated valves (in accordance with BiBB)”.

Device set, suitable for the study topics:

Mat. no.	Designation	Description	Quantity
R961009687	Device set / TS-PS 201-1X-K	Device set for DS3/WS200 “Pneumatics – manually/pneumatically operated valves (BIBB 1-11)”, complete, in L-Boxx	2
R901386902	Device set / TS-PS 401-1X-K	Expanded device set for DS3/WS200 “Pneumatics - electrically operated valves (BIBB, 1-16)”, in L-Boxx	2
R901386904	Device set / TS-PS 502-1X-K	Device set “Electrics for WS200 pneumatics – electrically operated valves (BIBB 1-16)”, without I/O module, in L-Boxx	2

Workstation, suitable for the study topics:

Mat. no.	Designation	Description	Quantity
R961008854	Workstation / TS-WS200-1X/ N1G0A0T1-M1	WS200 pneumatic workstation, double sided for 2 - 4 trainees - assembled, including packaging	1

Project manuals, suitable for the study topics:

Mat. no.	Designation	Description	Quantity
R901407757	Manual / TW-PN-LH-2/X 202DE	Trainer's manual “Pneumatics – electrical operation (in accordance with BIBB, exercises 1 to 16)”, DE	1
R901408015	Manual / TW-PN-LH-2/X 202EN	Trainer's manual “Pneumatics – electrical operation (in accordance with BIBB, exercises 1 to 16)”, EN	1
R901408016	Manual / TW-PN-LH-2/X 202ES	Trainer's manual “Pneumatics – electrical operation (in accordance with BIBB, exercises 1 to 16)”, ES	1
R901407759	Manual / TW-PN-SH-2/X 202DE	Trainee's manual “Pneumatics – electrical operation (in accordance with BIBB, exercises 1 to 16)”, DE	2
R901408018	Manual / TW-PN-SH-2/X 202EN	Trainee's manual “Pneumatics – electrical operation (in accordance with BIBB, exercises 1 to 16)”, EN	2
R901408020	Manual / TW-PN-SH-2/X 202ES	Trainee's manual “Pneumatics – electrical operation (in accordance with BIBB, exercises 1 to 16)”, ES	2
R901407752	Manual / TW-PN-LH-2/X 201DE	Trainer's manual “Pneumatics – manual/pneumatic operation (in accordance with BIBB, exercises 1 to 11)”, DE	1
R901407756	Manual / TW-PN-SH-2/X 201DE	Trainee's manual “Pneumatics – manual/pneumatic operation (in accordance with BIBB, exercises 1 to 11)”, DE	2

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Pneumatics – manually/pneumatically operated valves (in accordance with BIBB)

In addition, the following accessories are recommended:

Mat. no.	Designation	Description	Quantity
R901385277	Accessory kit / TS-PC-KLTL-PN-K	Accessory kit pneumatics, in L-Boxx	2

Optional accessories:

Mat. no.	Designation	Description	Quantity
1827008426	Compressor / TS-PC-230V/50HZ-8BAR-WITH-ACCES.	Compressor 230 V with accessories	1
R961008981	Power supply unit / TS-EC-230V/10A	Power supply unit 230V/10A	1

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Pneumatics – control engineering in pneumatics

Order example 3

We recommend the equipment below for teaching control pneumatics in accordance with the study topic “Pneumatics - control engineering”.

Device sets, suitable for the study topics:

Mat. no.	Designation	Description	Quantity
R961009687	Device set / TS-PS 201-1X-K	Device set for DS3/WS200 “Pneumatics – manually/pneumatically operated valves (BIBB 1-11)”, complete, in L-Boxx	2
R901386902	Device set / TS-PS 401-1X-K	Expanded device set for DS3/WS200 “Pneumatics - electrically operated valves (BIBB, 1-16)”, in L-Boxx	2
R901386904	Device set / TS-PS 502-1X-K	Device set “Electrics for WS200 pneumatics – electrically operated valves (BIBB 1-16)”, without I/O module, in L-Boxx	2
R901431806	Device set / TS-PS 402-1X	Expanded device set for WS200/DS3 from “Pneumatics – electrically operated valves (BIBB 1-16)” in accordance with “Pneumatics - control engineering”	2
R901431807	Device set / TS-PS 504-1X	Expanded device set for WS200/DS3 electrics from “Pneumatics – electrically operated valves (BIBB 1-16)” in accordance with “Pneumatics - control engineering”	2

Workstation, suitable for the study topics:

Mat. no.	Designation	Description	Quantity
R961008854	Workstation / TS-WS200-1X/N1G0A0T1-M1	WS200 pneumatic workstation, double sided for 2 - 4 trainees - assembled, including packaging	1

Project manuals, suitable for the study topics:

Mat. no.	Designation	Description	Quantity
R961004419	Manual / PN project Control technology LH DE	Trainer's manual “Pneumatics - control engineering”, DE	1
R961004436	Manual / PN project Control technology LH EN	Trainer's manual “Pneumatics - control engineering”, EN	1
R961004515	Manual / PN project Control technology LH ES	Trainer's manual “Pneumatics - control engineering”, ES	1
R961004420	Manual / PN project Control technology SH DE	Trainee's manual “Pneumatics - control engineering”, DE	2
R961004437	Manual / PN project Control technology SH EN	Trainee's manual “Pneumatics - control engineering”, EN	2
R961004514	Manual / PN project Control technology SH ES	Trainee's manual “Pneumatics - control engineering”, ES	2

In addition, the following accessories are recommended:

Mat. no.	Designation	Description	Quantity
R901385277	Accessory kit / TS-PC-KLTL-PN-K	Accessory kit pneumatics, in L-Boxx	2

Optional accessories:

Mat. no.	Designation	Description	Quantity
1827008426	Compressor / TS-PC-230V/50HZ-8BAR-WITH-ACCES.	Compressor 230 V with accessories	1
R961008981	Power supply unit / TS-EC-230V/10A	Power supply unit 230V/10A	1

The appropriate books, e-learning media, resources, posters, multimedia and software can be found in our media catalog:
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Pneumatics

Cylinders

Single action cylinder, d = 25 mm, h = 50 mm		
Material number	1827003371	
Single action cylinder, Ø 25 mm, stroke 50 mm, corrosion-protected, 1 connection, retracted in pressureless state, damping elastic, with magnetic pistons, suitable for contact-free signaling, with return spring, piston rod with external thread M10x1.25, twistable, with mounted switching cams made from PVC, with plug-in connector Ø 4 mm and mounting system for grooved plate.		
Dimensions	215x70x80	mm (LxWxH)
Weight	540	g
Operating pressure	2 ... 10	(min./max.) bar
Connection thread	G1/8	
Stroke	50	mm



Double action cylinder, d = 25 mm, h = 100 mm		
Material number	1827003372	
Double action cylinder, Ø 25 mm, stroke 100 mm, corrosion-protected, 2 connections, adjustable end position damping, with magnetic pistons, suitable for contact-free signaling, piston rod with external thread M10x1.25, twistable, with mounted switching cams made from PVC, with plug-in connector Ø 4 mm and mounting system for grooved plate.		
Dimensions	270x70x80	mm (LxWxH)
Weight	620	g
Operating pressure	1 ... 10	(min./max.) bar
Connection thread	G1/8	
Stroke	100	mm



Octagon cylinder DWZ, d = 25 mm, h = 100 mm		
Material number	R961004426	
Double action cylinder, Ø 25 mm, stroke 100 mm, corrosion-protected, 2 connections, adjustable end position damping, with magnetic pistons, suitable for contact-free signaling, piston rod with external thread M10x1.25, not twistable, with mounted switching cams made from PVC, with plug-in connector Ø 4 mm and mounting system for grooved plate.		
Dimensions	260x70x80	mm (LxWxH)
Weight	565	g
Operating pressure	1.5.. 10	(min./max.) bar
Connection thread	G1/8	
Stroke	100	mm



Double action cylinder d = 25 mm, h = 100 mm, with distance measuring system SM6

Material number R961006487

Double action cylinder, Ø 25 mm, stroke 100 mm, corrosion-protected, 2 connections, adjustable end position damping, with magnetic pistons, suitable for contact-free signaling, piston rod with external thread M10x1.25, twistable, with mounted spring, protective tube made from PMMA, with plug-in connector Ø 4 mm and mounting system for grooved plate.

Displacement sensor with cable, connector M8x1, 4-pole, with knurled screw, measuring range 0 ... 96 mm, voltage signal 0 ... 10 V, current signal 4 ... 20 mA, short-circuit-proof, protected against polarity reversal, with overload protection.

Dimensions	357x70x80	mm (LxWxH)
Weight	720	g
Protection class	IP65	IEC 60529
Operating voltage	15 ... 30	(min./max.) VDC
Operating pressure	1 ... 10	(min./max.) bar
Connection thread	G1/8	

Load simulator d = 25 mm, h = 100 mm, m = 3.4 kg

Material number R961003214

Double action cylinder, Ø 25 mm, stroke 100 mm, corrosion-protected, 2 connections, adjustable end position damping, with magnetic pistons, suitable for contact-free signaling, piston rod with external thread M10x1.25, twistable, with mounted load mass made from steel, weight 3.4 kg, with plug-in connector Ø 4 mm and mounting system for profiles with a 10 mm groove.

Dimensions	130x75x450	mm (LxWxH)
Weight	4.5	kg
Operating pressure	1 ... 10	(min./max.) bar
Connection thread	G1/8	
Stroke	100	mm



Cylinder switch

Electric cylinder switch with adapter		
Material number	1827003437	
Cylinder switch with reed contact, 2-conductor, NO contact operated by a magnet in the cylinder piston, switching point can be adjusted depending on the stroke by means of the clamp holder. Switch with plug-in connector M8x1, adapter with socket and contact protection, 4 mm sockets, adjustable clamp holder for round cylinders Ø 25 mm, LED switch indicator.		
Weight	54	g
Protection class	IP67	IEC 60529
Operating voltage	12 ... 36	VDC
Switching frequency	<300	Hz
Switching current	0.3	A max.
Reverse polarity protection	yes	
Short-circuit proof	no	



Adapter for electric cylinder switch		
Material number	1827003221	
Adapter for cylinder switch, with plug-in connector M8x1, short cable and adapter housing with 4 mm measuring sockets.		
Dimensions	39x17x28	mm (LxWxH)
Length (cable)	90	mm
Weight	20	g
Protection class	IP 20	IEC 60529
Operating voltage	24	V DC



Cylinder switch, electronic with 3-pole cable (with short circuit protection)

Material number R961003980

Cylinder switch cube, electronic contact-free PNP, 3-conductor, operated via a magnet in the cylinder piston.
Cylinder switch with connector M8x1 and LED switching display, 3-pole cable, 1.5 m with socket M8x1 and 4 mm connectors.

Length (cable)	1.5	m
Weight	90	g
Protection class	IP67	IEC 60529
Operating voltage	10 ... 30	VDC
Switching frequency	<2 000	Hz
Switching current	0.13	A max.
Reverse polarity protection	yes	
Short-circuit proof	yes	

Cylinder switch with holder, PAL

Material number 1827003570

Cylinder switch with reed contact, 2-conductor, NO contact operated by a magnet in the cylinder piston, switching point can be adjusted depending on the stroke by means of the clamp holder, switch with 2-pole cable and LED switch indicator, end with wire end ferrules, adjustable clamp holder for round cylinders Ø 25 mm.

Length (cable)	3	m
Weight	124	g
Protection class	IP 67	IEC 60529
Operating voltage	12.. 60	V DC
Switching current	0.13	A max.
Reverse polarity protection	yes	
Short-circuit proof	no	

Proximity switch, pneumatic, with holder

Material number 1827003224

Pneumatic proximity switch with 3 connections, 2 switching positions, operation via a permanent magnet in the piston of a cylinder. Switching point can be adjusted depending on the stroke by moving the clamp holder.

Plastic housing, brass quick connectors, optical display of the switching position, ventilation hole, connections with intermediate pipes and straight plug-in connector Ø 4 mm.

Dimensions	120x44x36	mm (LxWxH)
Weight	48	g
Operating pressure	2 ... 6	(min./max.) bar
Nominal flow	40	l/min



Directional control valves manually operated

3/2-way directional control valve M5, push button		
Material number	1827003392	
3/2-way directional control valve, manually operated via push button, with spring return, 2 connections, 1 free hole, 2 switching positions, blocked in idle position. Poppet valve, aluminum housing, with plug-in connector Ø 4 mm and mounting system for grooved plate.		
Dimensions	83x50x69	mm (LxWxH)
Weight	170	g
Operating pressure	0 ... 10	(min./max.) bar
Nominal flow	190	l/min
Connection thread	M5	



3/2-way directional control valve G1/8, push button		
Material number	1827003393	
3/2-way directional control valve, manually operated via push button, with spring return, 3 connections, 2 switching positions, blocked in idle position, with silencer.		
Slide valve, stainless steel housing, with plug-in connector Ø 4 mm and mounting system for grooved plate.		
Dimensions	86x65x69	mm (LxWxH)
Weight	300	g
Operating pressure	-0.95 ... 10	(min./max.) bar
Nominal flow	280	l/min
Connection thread	G1/8	



3/2-way directional control valve G1/8, with push button, open when not operated		
Material number	R961009683	
3/2-way directional control valve, manually operated via push button, with spring return, 3 connections, 2 switching positions, open in idle position, with silencer. Slide valve, stainless steel housing, with plug-in connector Ø 4 mm and mounting system for grooved plate.		
Dimensions	86x65x69	mm (LxWxH)
Weight	300	g
Operating pressure	-0.95 ... 10	(min./max.) bar
Nominal flow	280	l/min
Connection thread	G1/8	



3/2-way directional control valve M5, toggle

Material number 1827003394

3/2-way directional control valve, manually operated via toggle switch, 3 connections, 2 switching positions, blocked in idle position.
Poppet valve, aluminum housing, with plug-in connector Ø 4 mm and mounting system for grooved plate.

Dimensions	95x50x69	mm (LxWxH)
Weight	175	g
Operating pressure	0 ... 10	(min./max.) bar
Nominal flow	190	l/min
Connection thread	M5	

3/2-way directional control valve G1/8, emergency stop

Material number 1827003395

3/2-way directional control valve, manually operated via mushroom push button, with locking and rotary release, 3 connections, 2 switching positions, silencer.
Slide valve, stainless steel housing, with plug-in connector Ø 4 mm and mounting system for grooved plate.

Dimensions	116x64x69	mm (LxWxH)
Weight	320	g
Operating pressure	-0.95 ... 10	(min./max.) bar
Nominal flow	280	l/min
Connection thread	G1/8	

5/2-way directional control valve G1/8, push button

Material number 1827003396

5/2-way directional control valve, manually operated via push button, with spring return, 5 connections, 2 switching positions, with 2 silencers.

Slide valve, stainless steel housing, metal seals, with plug-in connector Ø 4 mm and mounting system for grooved plate.

Dimensions	114x64x69	mm (LxWxH)
Weight	370	g
Operating pressure	-0.95 ... 10	(min./max.) bar
Nominal flow	280	l/min
Connection thread	G1/8	



5/2-way directional control valve G1/8, toggle		
Material number	1827003397	
5/2-way directional control valve, manually operated via toggle switch, with 2 setting positions, 5 connections, 2 switching positions, with 2 silencers. Slide valve, stainless steel housing, metal seals, with plug-in connector Ø 4 mm and mounting system for grooved plate.		
Dimensions	116x65x69	mm (LxWxH)
Weight	380	g
Operating pressure	-0.95 ... 10	(min./max.) bar
Nominal flow	280	l/min
Connection thread	G1/8	



3/2-way directional control valve G1/8, toggle		
Material number	1827003469	
3/2-way directional control valve, manually operated via toggle switch, with 2 setting positions, 3 connections, 2 switching positions, blocked in idle position. Slide valve, stainless steel housing, metal seals, with plug-in connector Ø 4 mm and mounting system for grooved plate.		
Dimensions	99x64x69	mm (LxWxH)
Weight	304	g
Operating pressure	-0.95 ... 10	(min./max.) bar
Nominal flow	280	l/min
Connection thread	G1/8	



3/2-way directional control valve G1/8, toggle, PAL

Material number 1827003557

3/2-way directional control valve, manually operated via toggle switch, with 2 setting positions, 3 connections, 2 switching positions, blocked in idle position.

Slide valve, stainless steel housing, metal seals, with plug-in connector Ø 4 and 6 mm and mounting system for grooved plate.

Dimensions	99x64x69	mm (LxWxH)
Weight	306	g
Operating pressure	-0.95 ... 10	(min./max.) bar
Nominal flow	280	l/min
Connection thread	G1/8	



Coupling plug with 2/2-way directional control valve

Material number R900891177

2/2-way directional control valve with coupling connector, manually operated, 2 connections, 2 switching positions.

Brass housing nickel-plated, with plug-in connector Ø 6 mm.

Dimensions	82x18x30	mm (LxWxH)
Weight	81	g



Directional control valves mechanically operated

3/2-way directional control valve M5, sensing roller		
Material number	1827003399	
3/2-way directional control valve, mechanically operated via roller lever, with spring return, 3 connections, 2 switching positions, blocked in idle position. Poppet valve, aluminum housing, with plug-in connector Ø 4 mm and mounting system for grooved plate.		
Dimensions	70x61x69	mm (LxWxH)
Weight	170	g
Operating pressure	0.. 10	(min./max.) bar
Nominal flow	190	l/min
Connection thread	M5	



3/2-way directional control valve G1/8, sensing roller		
Material number	1827003400	
3/2-way directional control valve, mechanically operated via roller lever, with spring return, 3 connections, 2 switching positions, 1 silencer, blocked in idle position. Slide valve, stainless steel housing, metal seals, with plug-in connector Ø 4 mm and mounting system for grooved plate.		
Dimensions	77x77x65	mm (LxWxH)
Weight	336	g
Operating pressure	-0.95 ... 10	(min./max.) bar
Nominal flow	280	l/min
Connection thread	G1/8	



3/2-way directional control valve M5, idle return roller		
Material number	1827003401	
3/2-way directional control valve, mechanically operated via roller lever, with idle return roller and spring return, 3 connections, 2 switching positions, blocked in idle position. Poppet valve, aluminum housing, elastic seals, with plug-in connector Ø 4 mm and mounting system for grooved plate.		
Dimensions	70x66x68	mm (LxWxH)
Weight	174	g
Operating pressure	0 ... 10	(min./max.) bar
Nominal flow	190	l/min
Connection thread	M5	



3/2-way directional control valve G1/8, idle return roller

Material number 1827003402

3/2-way directional control valve, mechanically operated via roller lever, with idle return roller and spring return, 3 connections, 2 switching positions, 1 silencer, blocked in idle position. Slide valve, stainless steel housing, metal seals, with plug-in connector Ø 4 mm and mounting system for grooved plate.

Dimensions	76x87x62	mm (LxWxH)
Weight	340	g
Operating pressure	-0.95 ... 10	(min./max.) bar
Nominal flow	280	l/min
Connection thread	G1/8	



Directional control valves pneumatically operated

3/2-way directional control valve G1/8, with spring return		
Material number	1827003374	
3/2-way directional control valve, pneumatically operated, with spring return, 3 connections, 2 switching positions, 1 silencer, blocked in idle position, flow-through possible in both directions, suitable for vacuum. Steel slider ground in, stainless steel housing, metal seals, with plug-in connector Ø 4 mm and mounting system for grooved plate.		
Dimensions	80x64x47	mm (LxWxH)
Weight	300	g
Operating pressure	-0.95 ...10	(min./max.) bar
Nominal flow	280	l/min
Connection thread	G1/8	
Control pressure	2 ... 10	(min./max.) bar



3/2-way directional control valve G1/8, pulse		
Material number	1827003375	
3/2-way directional control valve, pneumatically operated on both sides, 3 connections, 2 switching positions, 1 silencer, blocked in idle position, flow-through possible in both directions, suitable for vacuum.		
Steel slider ground in, stainless steel housing, metal seals, with plug-in connector Ø 4 mm and mounting system for grooved plate.		
Dimensions	100x65x47	mm (LxWxH)
Weight	320	g
Operating pressure	0.95 ... 10	(min./max.) bar
Nominal flow	280	l/min
Connection thread	G1/8	
Control pressure	1.8 ... 10	(min./max.) bar



5/2-way directional control valve G1/8, with spring return, pneumatically operated		
Material number	R901385290	
5/2-way directional control valve, pneumatically operated, with spring return, 5 connections, 2 switching positions, 2 silencers. Slide valve, without overlap, soft sealing, polyamide housing, with plug-in connector Ø 4 mm and mounting system for grooved plate.		
Dimensions	86x75x50	mm (LxWxH)
Weight	257	g
Operating pressure	3 ...10	(min./max.) bar
Nominal flow	800	l/min
Connection thread	G1/8	
Control pressure	3 ... 10	(min./max.) bar



5/2-way directional control valve G1/8, pulse, pneumatically operated

Material number R901385291

5/2-way directional control valve, pneumatically operated on both sides, 5 connections, 2 switching positions, 2 silencers. Impulse valve with identical piston surfaces.

Slide valve, without overlap, soft sealing, polyamide housing, with plug-in connector Ø 4 mm and mounting system for grooved plate.

Dimensions	86x75x50	mm (LxWxH)
Weight	261	g
Operating pressure	-0.9 ...10	(min./max.) bar
Nominal flow	800	l/min
Connection thread	G1/8	
Control pressure	2 ... 10	(min./max.) bar



5/3-way directional control valve G1/8, with locked center position, pneumatically operated

Material number R901385292

5/3-way directional control valve, pneumatically operated on both sides, 5 connections, 3 switching positions, 2 silencers, all connections blocked in center position.

Slide valve, without overlap, soft sealing, polyamide housing, with plug-in connector Ø 4 mm and mounting system for grooved plate.

Dimensions	92x75x50	mm (LxWxH)
Weight	268	g
Operating pressure	-0.9 ...10	(min./max.) bar
Nominal flow	700	l/min
Connection thread	G1/8	
Control pressure	3 ... 10	(min./max.) bar



Rapid exhaust valve G1/8

Material number 1827003098

Rapid exhaust valve, pneumatically operated, 2 connections, 1 silencer. Pressure feedback from consumer connection A (2) to connection R (3) with the following effect: with an external pressure build-up on A (2), connection R (3) is released, for installation in the line system close to the consumer, e.g. for venting quick-feed-back cylinders via external force.

Poppet valve, aluminum housing, elastic seal, with plug-in connector Ø 4 mm.

Dimensions	70x48x25	mm (LxWxH)
Weight	98	g
Connection thread	G1/8	
Nominal flow, 1 to 2	420	l/min
Nominal flow, 2 to 3	1 200	l/min



Rapid exhaust valve G1/4

Material number 1827003381

Rapid exhaust valve, pneumatically operated, 2 connections, 1 silencer. Pressure feedback from consumer connection 2 to connection 3 with the following effect: with an external pressure build-up on 2, connection 3 is released, for installation in the line system close to the consumer, e.g. for venting quick-feedback cylinders via external force. Poppet valve, aluminum housing, elastic seal, with plug-in connector Ø 4 mm and mounting system for grooved plate.

Dimensions	108x53x58	mm (LxWxH)
Weight	270	g
Connection thread	G1/4	
Nominal flow, 1 to 2	1 000	l/min
Nominal flow, 2 to 3	2 050	l/min



3/2-way directional control valve M5, adjustable, 2 to 8 bar

Material number 1827003388

3/2-way pressure control valve, adjustable, 3 connections, 1 free hole, 2 switching positions, positive output signal as soon as the input signal reaches a pre-selected switching pressure, hysteresis between switching on and switching off, e.g. as accumulator load-ing valve for pressure switch-on/switch-off.

Poppet valve, with plug-in connector Ø 4 mm and mounting system for grooved plate.

Dimensions	70x105x62	mm (LxWxH)
Weight	230	g
Operating pressure	3 ...10	(min./max.) bar
Nominal flow	170	l/min
Switching pressure	2 ... 8	(min./max.) bar

2/2-way directional control valve, time-delayed, 2 to 30 s

Material number R961008278

2/2-way directional control valve, with spring return, delay time manually adjustable via rotary knob, 2 connections for directional control valve.

Stainless steel housing, if pressure is applied on the input, the time starts running and, after the time has elapsed, switches to the out-put, with plug-in connector Ø 4 mm, with mounting system for grooved plate.

Dimensions	70x74x125	mm (LxWxH)
Weight	508	g
Operating pressure	2 ... 6	(min./max.) bar
Delay time	2 ... 30	(min./max.) s



Directional control valves electrically operated

3/2-way directional control valve, electrically operated, M5, with spring return

Material number	1827003412	
3/2-way directional control valve, electrically operated with spring return, 3 connections, 2 switching positions, blocked in idle position, with manual override. Poppet valve, separate coil, device connection box form B, elastic seal, with plug-in connector Ø 4 mm and mounting system for grooved plate.		
Dimensions	70x83x70	mm (LxWxH)
Weight	270	g
Operating voltage	24	V DC
Operating current	0.2	A
Operating pressure	2.. 7	(min./max.) bar
Connection thread	M5	
Nominal flow, 1 to 2	40	l/min
Nominal flow, 2 to 3	52	l/min



5/2-way directional control valve, electrically operated, G1/8, with spring return

Material number	R901385293	
5/2-way directional control valve, electrically operated with spring return, 5 connections, 2 switching positions, 2 silencers, with manual override. Slide valve, without overlap, soft sealing, polyamide housing, electrical connection form C in accordance with ISO 15217, with connection box for 4 mm measuring lines, with plug-in connector Ø 4 mm and mounting system for grooved plate.		
Dimensions	139x75x50	mm (LxWxH)
Weight	300	g
Operating pressure	3..10	(min./max.) bar
Nominal flow	800	l/min
Connection thread	G1/8	
Current consumption	84	mA



5/2-way directional control valve, electrically operated, G1/8, pulse

Material number R901385294

5/2-way directional control valve, electrically operated on both sides, 5 connections, 2 switching positions, 2 silencers, with manual override.

Slide valve, without overlap, soft sealing, polyamide housing, electrical connection form C in accordance with ISO 15217, with connection box for 4 mm measuring lines, with plug-in connector Ø 4 mm and mounting system for grooved plate.

Dimensions	192x75x50	mm (LxWxH)
Weight	352	g
Operating voltage	24	V DC
Operating pressure	2.5..10	(min./max.) bar
Nominal flow	800	l/min
Connection thread	G1/8	
Current consumption	84	mA

5/3-way directional control valve, electrically operated, G1/8, with locked center position

Material number R901385295

5/3-way directional control valve, electrically operated on both sides with spring return, 5 connections, 3 switching positions, 2 silencers, all connections blocked in center position, with manual override.

Slide valve, without overlap, soft sealing, polyamide housing, electrical connection form C in accordance with ISO 15217, with connection box for 4 mm measuring lines, with plug-in connector Ø 4 mm and mounting system for grooved plate.

Dimensions	198x75x50	mm (LxWxH)
Weight	358	g
Operating pressure	3..10	(min./max.) bar
Nominal flow	700	l/min
Connection thread	G1/8	
Current consumption	84	mA



2x 3/2-way directional control valve, electrically operated, G1/8		
Material number	R961008378	
2x 3/2-way directional control valve, electrically operated with spring return, 5 connections, 2 switching positions, 2 silencers, with manual override. Slide valve, without overlap, soft sealing, polyamide housing, electrical connection form C in accordance with ISO 15217, with connection box for 4 mm measuring lines, with plug-in connector Ø 4 mm and mounting system for grooved plate.		
Dimensions	205x75x50	mm (LxWxH)
Weight	375	g
Operating voltage	24	V DC
Operating pressure	2.5..10	(min./max.) bar
Nominal flow	600	l/min
Connection thread	G1/8	
Current consumption	84	mA



5/2-way directional control valve, electrically operated, G1/8, with spring return, PAL		
Material number	R901385296	
5/2-way directional control valve, electrically operated with spring return, 5 connections, 2 switching positions, 2 silencers, with manual override. Slide valve, without overlap, soft sealing, polyamide housing, electrical connection form C in accordance with ISO 15217, electrical connection box with molded cable, with plug-in connector Ø 4 mm and mounting system for grooved plate.		
Dimensions	128x75x50	mm (LxWxH)
Weight	464	g
Operating pressure	3..10	(min./max.) bar
Nominal flow	800	l/min
Connection thread	G1/8	
Current consumption	84	mA



5/2-way directional control valve, electrically operated, G1/8, pulse, PAL

Material number R901385297

5/2-way directional control valve, electrically operated on both sides, 5 connections, 2 switching positions, 2 silencers, with manual override.

Slide valve, without overlap, soft sealing, polyamide housing, electrical connection form C in accordance with ISO 15217, electrical connection box with molded cable, with plug-in connector Ø 4 mm and mounting system for grooved plate.

Dimensions	169x77x50	mm (LxWxH)
Weight	682	g
Operating voltage	24	V DC
Operating pressure	2..10	(min./max.) bar
Nominal flow	800	l/min
Connection thread	G1/8	
Current consumption	84	mA



Flow control valves

Throttle check valve G1/8		
Material number	1827003379	
Throttle check valve, manually operated, 2 connections, flow restricted in one direction (from 1 to 2) - free flow in the opposite direction, manual throttle setting via lockable knurled screw. Cone-type throttle and diaphragm check valve, aluminum housing, elastic seal, with plug-in connector Ø 4 mm, with mounting system for grooved plate.		
Dimensions	70x60x48	mm (LxWxH)
Weight	160	g
Operating pressure	0.5.. 10	(min./max.) bar
Nominal flow	135	l/min
Connection thread	G1/8	
Nominal flow, 1 to 2	32	l/min



Non-return valve, pilot-operated		
Material number	R961008838	
Non-return valve, pneumatically pilot operated, 3 connections, flow from connection 1 to 2. With sufficiently high control pressure on port 12, the non-return valve can be released. Poppet valve, aluminum housing, elastic seal, with plug-in connector Ø 4 mm.		
Dimensions	90x38x18	mm (LxWxH)
Weight	87	g
Operating pressure	0.5.. 10	(min./max.) bar
Connection thread	G1/8	
Nominal flow, 1 to 2	300	l/min



Logic valve

Shuttle valve G1/8, OR

Material number 1827003382

Logic valve 1 x, independently controlled, 3 connections, pressure is applied on consumer connection 2 if supply pressure is applied on one of the two inputs.

Poppet valve, aluminum housing, elastic Perbunan seal, with plug-in connector Ø 4 mm and mounting system for grooved plate.

Dimensions	74x50x48	mm (LxWxH)
Weight	156	g
Operating pressure	1 ... 10	(min./max.) bar
Nominal flow	640	l/min
Connection thread	G1/8	

Dual pressure valve M5, AND

Material number 1827003383

Logic valve 1 x, independently controlled, 3 connections, pressure is applied on consumer connection 2 if the pressure is equal on the two inputs 1.

Poppet valve, plastic housing, NBR seal, with plug-in connector Ø 4 mm and mounting system for grooved plate.

Dimensions	70x60x46	mm (LxWxH)
Weight	130	g
Operating pressure	1 ... 10	(min./max.) bar
Nominal flow	80	l/min
Connection thread	M5	



Valve carrier systems

Valve carrier system, Profibus DP		
Material number	R961003081	
Valve carrier system, with Profibus DP connector, 2 5/2-way directional control valves, monostable, 2 5/2-way directional control valves, operated on both sides, manual override, terminating resistor, Profibus connection cable, voltage supply with contact-protected connection cables, plug-in connector Ø 4 mm and mounting system for grooved plate.		
Dimensions	160x160x92	mm (LxWxH)
Weight	1.22	kg
Protection class	IP 65	IEC 60529
Operating voltage	24	V DC
Operating pressure	3.. 8	(min./max.) bar



Valve carrier system, multipole		
Material number	R961004464	
Valve carrier system, with multipole connector, two 5/2-way directional control valves, monostable, 5/2-way directional control valve, operated on both sides, 5/3-way directional control valve, blocked in center position, manual override, plug-in connector Ø 4 mm and		
Dimensions	160x160x92	mm (LxWxH)
Weight	910	g
Protection class	IP 65	IEC 60529
Operating voltage	24	V DC
Operating pressure	8	(max.) bar



Maintenance units/pressure controller

Maintenance unit with pressure controller, filter and 3/2-way directional control valve, 0.5 to 10 bar

Material number 1827003410

Maintenance unit with pressure controller, filter and 3/2-way directional control valve, 0.5 to 10 bar, manually operated, filter with downstream pressure control valve, with manometer, with shut-off valve, 2 connections, 1 free hole.

Diaphragm pressure controller with secondary ventilation, lockable ball shut-off valve, zinc die casting housing, hand wheel for setting the secondary pressure, vertical installation position, filter insert: Cellpor, replaceable, condensate drain, semi-automatic, depressurized open, with plug-in connector Ø 6 mm and mounting system for grooved plate.

Dimensions	158x161x142	mm (LxWxH)
Weight	955	g
Operating pressure	1.5.. 16	(min./max.) bar
Nominal flow	950	l/min
Connection thread	G1/8	
Control range	0.5.. 10	(min./max.) bar

Pressure controller G1/8, 0.5 to 10 bar

Material number 1827003386

Pressure controller with manometer, 2 connections, 1 free hole, secondary pressure, manually adjustable, supply pressure is adjusted to secondary pressure.

Diaphragm pressure controller with relief opening, zinc housing, hand wheel for setting the secondary pressure, with plug-in connector Ø 4 mm and mounting system for grooved plate.

Dimensions	70x82x100	mm (LxWxH)
Weight	420	g
Operating pressure	0.5 ... 16	(min./max.) bar
Nominal flow	600	l/min
Connection thread	G1/8	
Control range	0.5.. 10	(min./max.) bar



Pressure control valve ED02, pneumatically operated		
Material number	R961003950	
E/P pressure control valve, pressure control range 0-6 bar, setpoint input 0-10 V, actual value output 0-10 V, electr. connection with connector M12x1, 5-pole, with plug-in connector Ø 4 mm and mounting system for grooved plate.		
Dimensions	94x76x76	mm (LxWxH)
Weight	433	g
Protection class	IP 65	IEC 60529
Supply voltage	24	V DC
Operating current	300	mA
Operating pressure	8	(max.) bar
Connection thread	G1/8	
Pressure control range	0.. 6	(min./max.) bar



Manometer

Manometer 0 to 10 bar

Material number 1827003406

Manometer, analog pointer instrument, 2 connections.
Bourdon tube pressure gauge, aluminum connection block, with
plug-in connector Ø 4 mm and mounting system for grooved plate.

Dimensions	70x50x88	mm (LxWxH)
Weight	222	g
Operating pressure	0 ... 10	(min./max.) bar
Connection thread	G1/8	
Usage range	0 ... 8	(min./max.) bar
Display range	0 ... 10	(min./max.) bar
Scale value	0.5	



Manometer 0 to 2.5 bar

Material number 1827003407

Manometer, analog pointer instrument, 2 connections.
Bourdon tube pressure gauge, aluminum connection block, with
plug-in connector Ø 4 mm and mounting system for grooved plate.

Dimensions	70x50x88	mm (LxWxH)
Weight	222	g
Operating pressure	0 ... 2.5	(min./max.) bar
Connection thread	G1/8	
Usage range	0 ... 1.7	(min./max.) bar
Display range	0 ... 2.5	(min./max.) bar
Scale value	0.1	



Manometer -1 to 0 bar

Material number 1827003408

Manometer for vacuum indicator, analog pointer instrument, 2 connections. Bourdon tube pressure gauge, aluminum connection block, with
plug-in connector Ø 4 mm and mounting system for grooved plate.

Dimensions	70x50x88	mm (LxWxH)
Weight	222	g
Operating pressure	-1.. 0	(min./max.) bar
Connection thread	G1/8	
Usage range	-0.8.. 0	(min./max.) bar
Display range	-1.. 0	(min./max.) bar
Scale value	0.1	



Pressure switches

Mechanical pressure switch, 1 to 16 bar		
Material number	1827003428	
Pneumatic / electrical pressure switch, manually adjustable, with spring preload, changeover contact, with contact-protected 4 mm safety sockets. Used for the pressure-dependent generation of an electrical switching signal. Diaphragm with spring preload, with device socket form A, with plug-in connector Ø 4 mm and mounting system for grooved plate.		
Dimensions	101x50x103	mm (LxWxH)
Weight	311	g
Protection class	IP65	IEC 60529
Supply voltage	24	VDC
Operating pressure	0.5 ... 16	(min./max.) bar
Connection thread	G1/4	
Switching current	10	A max.
Switching pressure	0.5 ... 16	(min./max.) bar



Mechanical pressure switch, -1 to 0 bar		
Material number	1827003434	
Pneumatic / electrical pressure switch, manually adjustable, with spring preload, changeover contact, with contact-protected 4 mm safety sockets. Used for the pressure-dependent generation of an electrical switching signal. Diaphragm with spring preload, with device socket form A, with plug-in connector Ø 4 mm and mounting system for grooved plate.		
Dimensions	107x50x103	mm (LxWxH)
Weight	318	g
Protection class	IP65	IEC 60529
Supply voltage	24	VDC
Operating pressure	-0.9 ... 0	(min./max.) bar
Connection thread	G1/4	
Switching current	10	A max.
Switching pressure	-0.9 ... 0	(min./max.) bar



Pressure switch 0 to 16 bar

Material number R961003948

Electronic pressure sensor with sensor element on piezoresistive basis, switching pressure range 0 - 16 bar, output signal 1 x PNP and 1 x analog, electr. connection with connector M12x1, 5-pole, with plug-in connector Ø 4 mm and mounting system for grooved plate. Matching accessories: Connection cable R961008919

Dimensions	113x50x65	mm (LxWxH)
Weight	210	g
Protection class	IP 65	IEC 60529
Supply voltage	15.. 32	V DC
Operating current	<50	mA
Ambient temperature	-10.. 60	(min./max.) °C
Connection thread	G1/4	
Switching current	0.5	A max.
Short-circuit proof	yes	



Vacuum gripper

Vacuum gripper TS-EBS		
Material number	R961008951	
<p>Ejector, 2 connections, vacuum is generated by compressed air flow from 1 through the Venturi nozzle to 2. Vacuum is generated on the smallest nozzle cross-section on connection 2, that leads to the suction cup, for gripping flat material with a smooth surface.</p> <p>Plastic housing made from polyamide, nozzle made from aluminum, flat suction cup, material Perbunan with internal thread, with plug-in connector Ø 4 mm.</p>		
Weight	182	g
Operating pressure	3 ... 6	(min./max.) bar
Air consumption	8	l/min



Counter

Pneumatic preset counter, subtracting

Material number R901414298

Pneumatic preset counter, subtracting, 5-digit, for pneumatic pulses, 4 connections, reset button, preset pushbutton. The integrated 3/2-way impulse valve switches if the counter is in zero position. Reset manually or pneumatically. Stainless steel housing, with 4 plug-in connectors Ø 4 mm and mounting system for grooved plate.

Dimensions	74x140x115	mm (LxWxH)
Weight	745	g
Operating pressure	2 ... 8	(min./max.) bar
Control pressure	2 ... 10	(min./max.) bar
Pulse duration	8	(min.) ms

Pneumatic totalizer, 6-digit

Material number 1827003404

Pneumatic-mechanical totalizer, 2 connections, counter frequency dependent on the pressure and the pipe length, reset manual or pneumatic.

Plastic housing, digits white, 6-digit display, any installation position, with plug-in connector Ø 4 mm and mounting system for grooved plate.

Dimensions	115x70x58	mm (LxWxH)
Weight	225	g
Operating pressure	2 ... 8	(min./max.) bar
Connection thread	M5	
Pulse duration	18	(min.) ms



Distributors

Pneumatic distributor, 6 x		
Material number	1827003411	
Pneumatic distributor 6 x, 6 consumer connections, 1 connection as intake, flow release in running direction after inserting the plastic tube. Housing made from anodized aluminum, connection for intake with plug-in connector Ø 6 mm, connections for every flow with blocking plug-in connector Ø 4 mm in running direction, with mounting system for grooved plate.		
Dimensions	71x75x53	mm (LxWxH)
Weight	224	g
Operating pressure	-0.95 ... 16	(min./max.) bar
Connection thread	M5	



Pneumatic distributor, 6 x with 3/2-way directional control valve, PAL		
Material number	1827003577	
Pneumatic distributor 6 x, 6 connections for flows, 1 connection as intake, 3/2-way manual slide valve with locking and 1 free hole, switching position 1: Intake blocked, switching position 2: Intake open, free hole closed.		
Housing made from anodized aluminum, with plug-in connector Ø 6 mm for intake, with plug-in connector Ø 4 mm for flow, with mounting system for grooved plate.		
Dimensions	157x55x53	mm (LxWxH)
Weight	282	g
Operating pressure	-0.95 ... 16	(min./max.) bar
Connection thread	M5	



Hose holder

Terminal connector, 5 x

Material number 1827003574

5 x terminal connector for mounting plastic hoses.
Plastic terminal connector, with mounting system for grooved plate.

Dimensions	70x50x40	mm (LxWxH)
Weight	98	g



Terminal connector, 5 x, with PAL ID plate

Material number 1827003553

5 x terminal connector for mounting plastic hoses, with ID plate.
Plastic terminal connector, aluminum ID plate, with mounting system for grooved plate.

Dimensions	90x50x40	mm (LxWxH)
Weight	116	g



Electrics

Control modules

Control unit housing version - BIBB module + I/O module		
Material number	R961009675	
Control module 1 switch and 2 buttons with 1 NO and 1 NC contact each, 2 buttons with NO contact, 6 relays, pick-up delay relay, drop-out delay relay, distributor 10 x, 8 sensor connections, 6 valve connections, 8 analog inputs 0-10 V, 4 analog inputs 4-20 mA, power pack 24 V 10 A, power switch, USB port, housing and power cable, contact-protected 4 mm laboratory sockets, 25 pole Sub D plugs for connecting to valve island, mounting system.		
Operating voltage	24	VDC
Supply voltage	230	VAC
Delay time	1 ... 15	s



Control unit housing version BIBB module		
Material number	R961009678	
Control module 1 switch and 2 buttons with 1 NO and 1 NC contact each, 2 buttons with NO contact, 6 relays, pick-up delay relay, drop-out delay relay, distributor 8 x, 2 LED displays, 1 acoustic signal, power pack 24 V 10 A, housing and power cable, contact-protected 4 mm laboratory jacks, mounting system.		
Operating voltage	24	VDC
Supply voltage	230	VAC
Delay time	1 ... 15	s



Relay housing version, 4 changeover contacts		
Material number	R961009602	
Relay with 4 changeover contacts, direct switching, indicator lamp lit when in operation. Plastic housing with aluminum front plate, contact-protected 4 mm measuring sockets, relay and control circuit designed as plug-in unit with circuit board, with mounting system for grooved plate or grooved plate case.		
Dimensions	150x85x71	mm (LxWxH)
Weight	386	g
Protection class	IP 50	IEC 60529
Operating voltage	24	V DC
Current consumption	60	mA
Contact load	4	A



Relay housing version, pick-up delay, 1 NO contact, 1 NC contact

Material number R961009603

Relay with 1 NO and 1 NC contact, pick-up delayed switching, delay time freely-adjustable, indicator lamp lit when in operation. Plastic housing with aluminum front plate, contact-protected 4 mm measuring sockets, relay and control circuit designed as plug-in unit with circuit board and mounting system for grooved plate.

Dimensions	150x85x85	mm (LxWxH)
Weight	362	g
Protection class	IP50	IEC 60529
Operating voltage	24	VDC
Current consumption	80	mA
Contact load	4	A max.
Delay time	0.5 ... 15	s

Relay housing version, dropout delay, 1 NO contact, 1 NC contact

Material number R961009604

Relay with 1 NO and 1 NC contact, dropout delayed switching, delay time freely-adjustable, indicator lamp lit when in operation. Plastic housing with aluminum front plate, contact-protected 4 mm measuring sockets, relay and control circuit designed as plug-in unit with circuit board and mounting system for grooved plate.

Dimensions	150x85x85	mm (LxWxH)
Weight	365	g
Protection class	IP50	IEC 60529
Operating voltage	24	VDC
Current consumption	80	mA
Contact load	4	A max.
Delay time	0.5 ... 15	s



Display unit housing version, display 4x optical, 1x acoustic

Material number R961009616

Optical and audible signal display; optical display 4x red LED, audible signal with buzzer, indicators are activated when voltage is connected to the sockets (+, -).

Plastic housing with aluminum front plate, contact-protected 4 mm measuring sockets, designed as plug-in unit on circuit board, with mounting system for grooved plate.

Dimensions	150x85x71	mm (LxWxH)
Weight	346	g
Protection class	IP50	IEC 60529
Operating voltage	24	VDC
Current consumption	20	mA



Distributor housing version, 10 x

Material number R961009614

Distributor box for 24 V and 0 V, 10 red sockets for 24 V and 10 blue sockets for 0 V.

Plastic housing with aluminum front plate, with 10 red and 10 blue contact-protected 4 mm measuring sockets, designed as plug-in unit on circuit board, with mounting system for grooved plate.

Dimensions	150x85x71	mm (LxWxH)
Weight	369	g
Protection class	IP50	IEC 60529
Operating voltage	24	VDC



Switching element housing version, 1 switch + 2 push buttons, 3 NO contacts, 3 NC contacts

Material number R961009618

Switch and button box, 1 switch with 2 lockings, 1 NC, 1 NO contact, operation by means of turning the knob switch; 2 push buttons with spring return, 1 NC and 1 NO contact each, operation by pressing the button.

Plastic housing with aluminum front plate, contact-protected 4 mm measuring sockets, designed as plug-in unit with circuit board, with mounting system for grooved plate.

Dimensions	150x85x85	mm (LxWxH)
Weight	376	g
Protection class	IP50	IEC 60529
Operating voltage	24	VDC
Contact load	4	A



Switching element housing version, emergency stop, 1 switch, 1 NO contact, 1 NC contact

Material number R961009620

Switch for emergency stop, mechanical locking in switched position, unlocking mechanically by turning the switch knob, 1 NO contact, 1 NC contact.

Plastic housing with aluminum front plate, contact-protected 4 mm measuring sockets, designed as plug-in unit, with mounting system for grooved plate.

Dimensions	150x85x97	mm (LxWxH)
Weight	324	g
Protection class	IP 50	IEC 60529
Operating voltage	24	V DC
Contact load	4	A

Preset counter TS-PC 601

Material number R961008790

Preset counter box with potential-free changeover contact, the contact switches when the preset value is reached, the counter is reset by the reset pulse or manually with a push button, the preset value is set with the 6-digit thumbwheel switch.

Plastic housing with aluminum front plate, manual reset button, contact-protected 4 mm measuring sockets, designed as plug-in unit on circuit board, with mounting system for grooved plate.

Dimensions	150x85x71	mm (LxWxH)
Weight	382	g
Protection class	IP50	IEC 60529
Operating voltage	24	VDC
Current consumption	50	mA
Contact load	3	A



Input/output unit housing version, adapter for 16 signals, with laboratory jacks and 26-pole D connector, 24 V DC, 4 A

Material number	R961009622	
Adapter for 16 signals from D-SUB connector to measuring sockets, 2 measuring sockets for supply voltage 24 V and 0 V connected with D-SUB connector, assignment of the connector pins to measuring sockets according to a plan. Plastic housing with aluminum front plate, with contact-protected 4 mm measuring sockets, 16 x for signals black, 1 x for 24 V red, 1 x for 0 V blue, D-SUB connector 26-pole, designed as plug-in unit on circuit board, with mounting system for grooved plate.		
Dimensions	150x85x72	mm (LxWxH)
Weight	386	g
Protection class	IP50	IEC 60529
Operating voltage	24	VDC
Contact load	2	A



Control module with setpoint-actual value display and 2 digital voltmeters in 49 TE box

Material number	R961004432	
Control module with setpoint-actual value display, 2 digital voltmeters, display 3 ½ digits, digit height 13 mm, measuring range +/- 20 V DC. Control module adapter for pressure control valve ED02 with 7-pole connector to laboratory jacks, contact-protected 4 mm laboratory jacks for setpoint and voltage supply, 2 mm laboratory jacks for actual values. Aluminum front plates with scratch-proof inscription, with mounting system for grooved plate.		
Dimensions	280x150x160	mm (LxWxH)
Weight	1.4	kg
Operating voltage	24	VDC



Control module setpoint specification + adapter in 49TE box

Material number R961007769

Adapter for 16 signals from D-SUB connector to measuring sockets, 2 measuring sockets for supply voltage 24 V and 0 V connected with D-SUB connector, assignment of the connector pins to measuring sockets according to a plan.

16 x for signals black, 1 x for 24 V red, 1 x for 0 V blue, D-SUB connector 26-pole.

Control module with 10-stage potentiometer and scale for manual setpoint specification, ± 10 Volt output, 1 rotary switch with 3 positions, optical display for selected polarity, contact-protected 4 mm laboratory jacks for the voltage supply, 2 mm laboratory jacks for the setpoints.

Plastic housing, aluminum front plate with scratch-proof inscription, with mounting system for grooved plate.

Dimensions	280x160x150	mm (LxWxH)
Weight	1.33	kg
Protection class	IP50	IEC 60529
Operating voltage	24	VDC

Control module setpoint module + switch/push button box in 49TE box

Material number R961007770

Switch and button box, 1 switch with 2 lockings, 1 NC, 1 NO contact, operation by means of turning the knob switch; 2 push buttons with spring return, 1 NC and 1 NO contact each, operation by pressing the button.

Setpoint module for 4 retrievable setpoints and 5 ramps per setpoint; contact-protected 4 mm laboratory sockets; setpoint connections with 2 mm laboratory jacks.

Plastic housing, aluminum front plate with scratch-proof inscription, with mounting system for grooved plate.

Dimensions	280x150x150	mm (LxWxH)
Weight	1.45	kg
Protection class	IP50	IEC 60529
Operating voltage	24	VDC



Power supply units

Table power pack 230VAC/0-30VDC		
Material number	R901229673	
Power supply unit with controllable output 0-30 V DC, 3 A and output 3-6 V DC, 2 A, with contact-protected 4 mm safety sockets, table device with fold-out feet, with power cable.		
Dimensions	255x245x110	mm (LxWxH)
Weight	5.3	kg
Protection class	IP20	IEC 60529
Operating voltage	230	VAC
Power frequency	50	Hz
Output voltage	0.. 30	V DC
Short-circuit proof	yes	



Power supply unit 230V/10A		
Material number	R961008981	
Power supply unit with power switch, operating light and power cable, contact-protected 4 mm measuring sockets, 1 red for DC 24 V, 1 blue for 0 Volt. Plastic housing, aluminum front plate with scratch-proof inscription, with mounting system for grooved plate.		
Dimensions	280x150x140	mm (LxWxH)
Weight	2.13	kg
Protection class	IP20	IEC 60529
Operating voltage	230	VAC
Power frequency	50	Hz
Output voltage	24	VDC
Output current	10	A



Operating module, power supply unit, 230V/5A, 42TE		
Material number	R900703147	
Power supply unit for mounting in 19" frame; short-circuit-proof; stabilized; illuminated mains switch; with power cable; 4 safety sockets for 24V DC output voltage		
Dimensions	214x128	mm (WxH)
Length, power cable	2	m
Weight	1.88	kg
Protection class	IP50	
Operating voltage	24	VDC
Output current	5	A
Power frequency	50	Hz
Input voltage	230	VAC
Installation type	screw-fastened	



Limit switch

Electrical position sensor with roller lever

Material number 1827003421

Electric limit switch with roller lever, operation via switch cam.
1 changeover contact, 3 contact-protected 4 mm measuring sockets,
center contact (1, red), NC contact (2, blue), NO contact (4, black),
with mounting system for grooved plate.

Dimensions	70x72x85	mm (LxWxH)
Weight	165	g
Protection class	IP00	IEC 60529
Operating voltage	24	V DC
Switching current	2	A

Electrical position sensor with roller lever in accordance with PAL

Material number 1827003569

Electrical position sensor with roller lever in accordance with
PAL, operation via switch cam.
1 changeover contact, 3 screw terminals, center contact, NC con-
tact, NO contact, with mounting system for grooved plate.

Dimensions	70x59x57	mm (LxWxH)
Weight	120	g
Protection class	IP00	IEC 60529
Operating voltage	24	V DC
Switching current	2	A



Sensors

Sensor, inductive		
Material number	1827003422	
Inductive proximity switch NJ2-12GM40-E2 with PNP NO function, switching distance 2 mm, measuring distance mechanically adjustable. Installation flush, voltage supply 10 ... 60 V (DC), switching status display LED yellow, holder for sensor made from anodized aluminum plate, contact-protected 4 mm safety sockets, with mounting system for grooved plate. Incl. steel cams 1823219007.		
Dimensions	70x92x84	mm (LxWxH)
Weight	318	g
Protection class	IP20	IEC 60529
Supply voltage	24	VDC
Operating current	0 ... 200	mA
Switching frequency	0 ... 300	Hz
Switching distance	2	mm
Installation type	flush	
Switching current	2	A



Sensor, capacitive		
Material number	1827003423	
Capacitive proximity switch CBB4-12GH70-E2, with PNP NO function, switching status display LED yellow, switching distance 4 mm, adjustable via potentiometer. Installation flush, operating voltage 10 ... 36 V (DC), holder for sensor made from anodized aluminum plate, contact-protected 4 mm safety sockets, with mounting system for grooved plate.		
Dimensions	70x95x84	mm (LxWxH)
Weight	185	g
Protection class	IP20	IEC 60529
Supply voltage	24	V DC
Operating current	0 ... 100	mA
Switching frequency	0 ... 50	Hz
Switching distance	4	mm
Installation type	flush	



Sensor, optical

Material number 1827003424

Optical sensor, reflection light sensor OF5010, operating display LED green, function display LED yellow, current carrying capacity 200 mA, switching frequency 400 Hz.
Switching element function PNP NO contact, light /dark switching, electronically switchable.
Holder anodized aluminum plate, 3 contact-protected 4 mm safety sockets for voltage supply 10 ... 36 V (DC) and switching signal, with mounting system for grooved plate.

Dimensions	70x98x84	mm (LxWxH)
Weight	184	g
Protection class	IP20	IEC 60529
Supply voltage	24	VDC
Switching frequency	400	Hz
Scanning range	200	mm



Relay

Relay with 3 changeover contacts		
Material number	R961002709	
Relay with 3 changeover contacts. Transparent plastic housing, can be connected to 11-pole socket with Mat. no. R961002699.		
Dimensions	66x33x66	mm (LxWxH)
Weight	82	g
Protection class	IP40	IEC 60529
Operating voltage	24	VDC
Switching current	10	A max.



Time relay with pickup or dropout delay		
Material number	R961002710	
Multifunctional time relay, operating mode pick-up delayed or drop-out delayed can be selected, 2 changeover contacts, 6 function types and 4 time ranges can be set manually, optical display of the set time value. Plastic housing, can be connected to 11-pole socket with Mat. no. R961002699.		
Dimensions	48x49x93	mm (LxWxH)
Weight	91	g
Protection class	IP40	IEC 60529
Operating voltage	24	VDC
Switching current	8	A max.



Relay socket		
Material number	R961002699	
Socket for relay installation on mounting rail (top-hat rail), for holding an 11-pole plug-in relay, blue plastic housing, with screw terminals.		
Dimensions	71x38x26	mm (LxWxH)
Weight	50	g
Protection class	IP20	IEC 60529
Operating voltage	24	VDC
Contact load	10	A
Connection cross-section	0.5.. 2.5	mm ²



Operating and display elements

Indicator light 24 V

Material number 1827001988

Indicator light for displaying electrical signals.
Display matt white, electrical connection via plug-in terminal,
mounting in the mounting bracket Mat. no. 1827003558, display
unit can be separated from the contact unit.

Dimensions	71x44x30	mm (LxWxH)
Weight	34	g
Protection class	IP20	IEC 60529
Operating voltage	24	VDC
Operating current	50	mA



Electrical button, 1 NC contact, 1 NO contact

Material number 1827001991

Button with 1 NC contact and 1 NO contact.
Pressing the actuating element opens a contact, the other is closed.
When the actuating element is released, the switching contacts are
returned to the idle position by the return springs.
Actuating element black, electrical connection via screw terminal,
mounting in the mounting bracket Mat. no.: 1827003558, actuating
element can be separated from the contact unit.

Dimensions	52x41x30	mm (LxWxH)
Weight	36	g
Protection class	IP 20	IEC 60529
Operating voltage	24	V DC
Contact load	10	A max.



Electrical toggle switch, 1 NC contact, 1 NO contact

Material number 1827001992

Toggle switch with setting position, 1 NC contact and 1 NO contact.
Turning the actuating element opens a contact, the other is closed.
Actuating element black, electrical connection via screw terminal,
mounting in the mounting bracket Mat. no.: 1827003558, actuating
element can be separated from the contact unit.

Dimensions	70x41x30	mm (LxWxH)
Weight	42	g
Protection class	IP20	IEC 60529
Operating voltage	24	VDC
Contact load	10	A max.



Device socket with LED, form A		
Material number	1827003352	
Adapter with 2 connections for laboratory plugs, signal exchange with rectification, thereby providing reverse polarity protection, optical display, can be used for valves. Plastic housing with contact-protected 4 mm measuring sockets, contact with the valve coil via coupling socket in accordance with DIN 43650, form A.		
Dimensions	50x35x28	mm (LxWxH)
Weight	35	g
Protection class	IP20	IEC 60529
Operating voltage	22 ... 26	VDC



Device socket with LED, form B		
Material number	1827003353	
Adapter with 2 connections for laboratory plugs, signal exchange with rectification, thereby providing reverse polarity protection, optical display, can be used for valves. Plastic housing with contact-protected 4 mm measuring sockets, contact with the valve coil via coupling socket in accordance with DIN 43650, form B.		
Dimensions	50x35x28	mm (LxWxH)
Weight	35	g
Protection class	IP20	IEC 60529
Operating voltage	22 ... 26	VDC



Device socket with LED, form C		
Material number	1827003354	
Device socket with 2 connections for laboratory plugs, forwarding of the signals to the valve coil, rectification of the signals, thereby providing reverse polarity protection, optical display. Plastic housing with contact-protected 4 mm measuring sockets, contact with the valve coil via coupling socket in accordance with DIN 43650, form C.		
Dimensions	39x17x28	mm (LxWxH)
Weight	18	g
Protection class	IP20	IEC 60529
Operating voltage	24	VDC



Device socket P/E, form A

Material number 1827003355

Device socket with 3 connections for laboratory plug, suitable for pressure switch with Mat. no. 1827003428 and 1827003434.
Plastic housing with contact-protected 4 mm measuring sockets, contact via coupling socket in accordance with DIN 43650, form A.

Dimensions 50x35x28 mm (LxWxH)

Weight 39 g

Protection class IP20 IEC 60529



Measuring lines/cables

Measuring line 250 mm, red		
Material number	1827003212	
Flexible laboratory cable with 4 mm laboratory plug, socket and pin section with contact protection, stackable, for establishing secure electrical connections for exercise installations.		
Length	250	mm
Weight	22	g
Color	red	
Protection class	IP20	IEC 60529
Line cross-section	1	mm ²
Measuring line 250 mm, blue		
Material number	1827003213	
Color	blue	
Measuring line 250 mm, black		
Material number	1827003214	
Color	black	
Measuring line 500 mm, red		
Material number	1827003215	
Flexible laboratory cable with 4 mm laboratory plug, socket and pin section with contact protection, stackable, for establishing secure electrical connections for exercise installations.		
Length	500	mm
Weight	28	g
Color	red	
Protection class	IP20	IEC 60529
Line cross-section	1	mm ²
Measuring line 500 mm, blue		
Material number	1827003216	
Color	blue	
Measuring line 500 mm, black		
Material number	1827003217	
Color	black	



Measuring line 1000 mm, red

Material number 1827003218

Flexible laboratory cable with 4 mm laboratory plug, socket and pin section with contact protection, stackable, for establishing secure electrical connections for exercise installations.

Length	1000	mm
Weight	40	g
Color	red	
Protection class	IP20	IEC 60529
Line cross-section	1	mm ²

Measuring line 1000 mm, blue

Material number 1827003219

Color blue

Measuring line 1000 mm, black

Material number 1827003220

Color black

Measuring line 1500 mm, red

Material number 1827003464

Flexible laboratory cable with 4 mm laboratory plug, socket and pin section with contact protection, stackable, for establishing secure electrical connections for exercise installations.

Length	1500	mm
Weight	50	g
Color	red	
Protection class	IP20	IEC 60529
Line cross-section	1	mm ²

Measuring line 1500 mm, blue

Material number 1827003465

Color blue

Measuring line 1500 mm, black

Material number 1827003466

Color black



Connecting cable, 1500 mm, red and blue		
Material number	1827003005	
Flexible laboratory cable with 4 mm laboratory plug and wire end ferrule, socket and pin section with contact protection, stackable, for establishing secure electrical connections for exercise installations.		
Length	1500	mm
Weight	83	g
Color	red, blue	
Protection class	IP20	IEC 60529
Line cross-section	1	mm ²

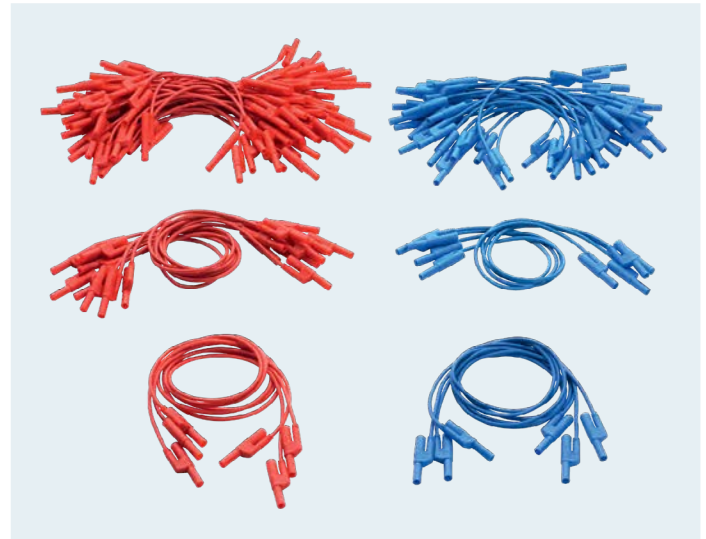





Cable set BIBB electro-pneumatics

Material number 1827003436

Cable set for electro-pneumatics, for setting up the BiBB exercises for electro-pneumatics.

Flexible laboratory cable with 4 mm laboratory plug, socket and pin section with contact protection, stackable. For establishing secure electrical connections for exercise installations.



Item	Components	Mat. no.	Quantity	Image	Page
1	Measuring line red, 250 mm	1827003212	42		128
2	Measuring line blue, 250 mm	1827003213	25		128
3	Measuring line red, 500 mm	1827003215	9		128
4	Measuring line blue, 500 mm	1827003216	4		128
5	Measuring line red, 1000 mm	1827003218	3		129
6	Measuring line blue, 1000 mm	1827003219	3		129

Cable set 3-pole, 4 mm, L = 1.5 m		
Material number	R961008919	
Connection cable 3-pole for P/E transformer with M12x1 socket, contact-protected 4mm connector, red 24 V, blue 0 V, black signal.		
Length	1.5	m
Weight	120	g
Protection class	IP 20	IEC 60529



Connection cable 26-pole, 1:1		
Material number	R901198698	
Connection cable 26-pole, 1:1, with SUB-D socket and connector, length = 1.5 m. plastic housing, color gray.		
Length	1.5	m
Weight	200	g
Protection class	IP20	IEC 60529



General accessories

Mounting bracket, 4x

Material number 1827003558

Mounting bracket for holding 4 operating elements securely (e.g. switch, push button, indicator light).
Anodized aluminum plate, with mounting system for grooved plate.

Dimensions	260x70x69	mm (LxWxH)
Weight	262	g



Top-hat rail 250 mm

Material number 1827003560

Mounting rail for holding elements for the electrical installation, e.g. for max. 6 relay sockets or max. 35 strip terminals.
Sheet steel, with slotted holes, mounting with screw and hammer nut in 8 mm groove.

Dimensions	250x35x7	mm (LxWxH)
Weight	91	g



Wire end ferrule 0.75; L2= 7.9mm; flange size - packaging unit: 100

Material number R900016169

Wire end ferrule with gray flange, as strip protection for flexible wires.

Weight	11	g
Delivery quantity	100	units
Line cross-section	0.75	mm ²



Electrical cable, blue 0.75 mm², 25 m		
Material number	1827003031	
Flexible electrical cable, 1-pole.		
Length	25	m
Weight	300	g
Color	blue	
Line cross-section	0.75	mm²



Bridge for strip terminal		
Material number	1827003037	
The bridge establishes a secure electrical connection between neighboring strip terminals via a screw connection. A maximum of 10 strip terminals can be connected.		
Dimensions	50x20x5	mm (LxWxH)
Weight	15	g



Terminal designation 01-40		
Material number	1827003142	
Pluggable terminal designations with the numbers 1 to 40, suitable for strip terminals Mat. no. 1827003559.		
Weight	2	g



Strip terminal, 35x

Material number 1827003559

Strip terminal 35 x, for wiring with single conductors.
Mounted on a mounting rail with end brackets and end plate, terminals made from nickel-plated brass with clamping ring, plastic body, mounting with a screw and hammer nut in 8 mm groove.

Dimensions	250x56x55	mm (LxWxH)
Weight	356	g
Line cross-section	2.5	mm ²



Cable channel 200 mm

Material number 1827003561

Cable channel slotted at the side, with lockable and movable cover, mounting with hammer nut in 8 mm groove or with self-adhesive strips on a smooth surface, for holding cables and plastic tubes, improves clarity during installation.
Gray PVC.plastic

Dimensions	200x23x23	mm (LxWxH)
Weight	40	g



Cable channel 235 mm

Material number 1827003562

Dimensions	235x23x23	mm (LxWxH)
Weight	45	g

Cable channel 300 mm

Material number 1827003564

Dimensions	300x23x23	mm (LxWxH)
Weight	52	g

Cable channel 400 mm

Material number 1827003566

Dimensions	400x23x23	mm (LxWxH)
Weight	72	g

Cable channel 500 mm

Material number 1827003567

Dimensions	500x23x23	mm (LxWxH)
Weight	83	g

Analog input module, 2 x		
Material number	R911170784	
PLC module with 2 analog inputs, for mounting on the L20, 4-20 mA, 0-10 V.		
Weight	70	g
Input voltage	0 ... 10	V



Analog output module, 2 x		
Material number	R911170786	
PLC module with 2 analog outputs, for mounting on the L20, output voltage 0-10 V.		
Weight	71	g
Output voltage	0 ... 10	V



Interface module Profibus FLSPBM12DIO8/8M12		
Material number	R961004467	
Profibus module with 8 digital inputs and outputs, M12x1 plug-in connector, short-circuit and overload protection of the outputs and sensor supply, max. output current per channel 500 mA, 2 connections for BUS IN and BUS OUT, 4 connections for voltage supply load and logic, 16 LEDs for status I/O, 4 LEDs for status voltage supply load and logic, 3 LEDs for diagnosis, 2 rotary selector switches for station address, with mounting system for grooved plate.		
Dimensions	178x70x80	mm (LxWxH)
Weight	600	g
Protection class	IP 67	IEC 60529
Supply voltage	24	VDC
Ambient temperature	-25 ... 60	(min./max.) °C
Digital I/O	8	



VC175 digital multimeter

Material number R913038027

VC175 digital multimeter Robust beginners' device with automatic measuring range selection incl. measuring leads.

Equipment:

- Standard measuring ranges V/DC, V/AC, A/DC, A/AC
- Diode test
- Acoust. continuity tester
- Contactless AC voltage tester
- Hold function
- Low-batt indicator
- Auto power off
- Robust housing with soft rubber protection.

Dimensions	137x72x40	mm (LxWxH)
Weight	200	g
Current	10	A
Measurement category	CAT III 250 V	
Display	4000	Counts

Grid for WS200

Material number R961009533

The grid for the WS200 workstation is used for the connection of the components of the hydraulic equipment sets.
Hydraulic components from the device sets can be mounted safely on the grid.

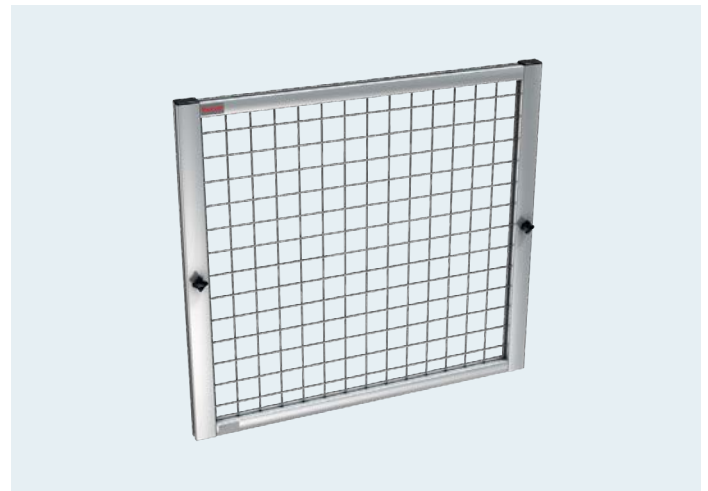
The grid can be mounted on the base frame of the WS200 workstation. The grid mounting set is attached to provide vertical protection.

Including:

Grid

Grid mounting set

Dimensions	800x733x30	mm (LxWxH)
Weight	6.15	kg



Spare parts pneumatics

Plastic tube 4 x 0.75, PU, black, packaging unit: 10 m

Material number R901395757

Plastic tube for installing pneumatic circuits.

Tube made from polyester polyurethane 4x0.75 mm, outside calibrated, for compressed air in accordance with ISO 8573-1:2001, ambient temperature: -30 °C to +80 °C.

Length	10	m
Weight	90	g
Ambient temperature	-30 ... 80	°C
Operating pressure	10	bar
Outside diameter	4	mm
Inside diameter	2.5	mm
Bending radius	12	mm



Plastic tube 6.0 x 1.05, PU, black, packaging unit: 2 m

Material number R961007739

Plastic tube for installing pneumatic circuits.

Tube made from polyester polyurethane 6x1.05 mm, length = 2 m, outside calibrated, for compressed air in accordance with ISO 8573-1:2001, ambient temperature: -30 °C to +80 °C.

Length	2	m
Weight	40	g
Ambient temperature	-30.. 80	°C
Operating pressure	10	bar
Outside diameter	6	mm
Inside diameter	3.9	mm
Bending radius	18	mm



Plastic tube 6.0 x 1.05, PU, black, packaging unit: 8 m

Material number R961007740

Plastic tube for installing pneumatic circuits.

Tube made from polyester polyurethane 6x1.05 mm, length = 8 m, outside calibrated, for compressed air in accordance with ISO 8573-1:2001, ambient temperature: -30 °C to +80 °C.

Length	8	m
Weight	160	g
Ambient temperature	-30.. 80	°C
Operating pressure	10	bar
Outside diameter	6	mm
Inside diameter	3.9	mm
Bending radius	18	mm



Straight screw fitting M5, with non-return valve, 4 mm

Material number 1827003124

Straight screw connection for establishing a flow connection from the internal thread to the plug-in connector for the plastic tube, the installed non-return valve blocks the flow in the running direction, the release takes place by inserting the plastic tube in the plug-in connector, the intake direction is always free.

Nickel-plated brass, poppet valve, the sealing of the screw connection to the connection face and the sealing of the plastic tube to the housing takes place via O-rings. The plastic tube is held by a sharp edge of the spring sleeve and secured against being pulled out.

Dimensions	32x9	mm (LxØ)
Weight	10	g
Operating pressure	10	bar
Connection thread	M5	
Plug-in connector	4	mm (Ø)
Packaging unit	1	

Steel cam M10 x 1.25

Material number 1823219007

For generating a mechanical stroke-dependent signal via the cam, can be installed on the piston rod, actuates the sensing roller or inductive proximity switch.

Tapered slope on both sides for actuating a sensing roller, which, in turn, drives valves or switches.

Dimensions	42x30	mm (LxØ)
Weight	134	g
Connection thread	M10x1.25	



Carrier plate, snap-in, LO

Material number 1827003455

Carrier plate with snap-in, with asymmetric bore pattern and 24 holes, for mounting components with self-cutting screws, clamping with spring preload on clamping piece in 8 mm groove, loosening using pressure against loosening slide, can be mounted turned in steps of 90 degrees.

Plastic carrier plate, aluminum baseplate, with mounting system for grooved plate, carrier plate mounted on baseplate in position "hole top".

Dimensions	70x50x30	mm (LxWxH)
Weight	94	g
Load-bearing capacity	50	N
Mounting surface	70x40	mm (LxW)



Carrier plate, snap-in, with slotted holes, LU

Material number R961002281

Carrier plate with snap-in, with asymmetric bore pattern and 24 holes, for mounting components with self-cutting screws, clamping with spring preload on clamping piece in 8 mm groove, loosening using pressure against loosening slide, can be mounted turned in steps of 90 degrees.

Plastic carrier plate, aluminum baseplate, with mounting system for grooved plate, carrier plate mounted on baseplate in position "hole bottom".

Dimensions	70x50x30	mm (LxWxH)
Weight	94	g
Load-bearing capacity	50	N
Mounting surface	70x40	mm (LxW)



Carrier plate, snap-in, with slotted holes, LU

Material number R961002283

Carrier plate with snap-in, with asymmetric bore pattern and 10 holes, for mounting components with self-cutting screws, installation position adjustable, clamping with spring preload on clamping piece in 8 mm groove, loosening using pressure against loosening slide, can be mounted turned in steps of 90 degrees.

Plastic carrier plate, aluminum baseplate, with mounting system for grooved plate, carrier plate mounted on baseplate in position "holes bottom".

Dimensions	70x50x42	mm (LxWxH)
Weight	96	g
Load-bearing capacity	50	N
Mounting surface	40x32	mm (LxW)



Carrier plate, snap-in, with slotted holes, LO

Material number 1827003456

Carrier plate with snap-in, with asymmetric bore pattern and 10 holes, for mounting components with self-cutting screws, installation position adjustable, clamping with spring preload on clamping piece in 8 mm groove, loosening using pressure against loosening slide, can be mounted turned in steps of 90 degrees.

Plastic carrier plate, aluminum baseplate, with mounting system for grooved plate, carrier plate mounted on baseplate in position "holes top".

Dimensions	70x50x42	mm (LxWxH)
Weight	96	g
Load-bearing capacity	50	N
Mounting surface	40x32	mm (LxW)

Carrier plate, snap-in

Material number 1827003457

Carrier plate with snap-in, with asymmetric bore pattern and 10 holes, for mounting components with self-cutting screws, clamping with spring preload on clamping piece in 8 mm groove, loosening using pressure against loosening slide, can be mounted turned in steps of 90 degrees.

Plastic carrier plate, aluminum baseplate, with mounting system for grooved plate, carrier plate mounted on baseplate.

Dimensions	110x69x30	mm (LxWxH)
Weight	138	g
Load-bearing capacity	50	N
Mounting surface	110x55	mm (LxW)

Loosening slide extension

Material number 1827003349

Extension of the release mechanism, carrier plates with an installation width of over 50 mm require the extension of the loosening slide for releasing.

Plastic body, black, with 2 holes for 2 extension measurements, for installation on a connecting pole.

Dimensions	45x29x13	mm (LxWxH)
Weight	14	g



Snap-in, right format, with screw		
Material number	R961004089	
Snap-in clamping element, “right” version: the movable clamping piece is mounted opposite the loosening slide, with self-cutting screw M3x8 and cup spring for fixing. Plastic loosening slide, snap-in mechanism made from die-cast aluminum.		
Dimensions	40x21x21	mm (LxWxH)
Weight	22	g



Snap-in, left format, with screw		
Material number	R961004090	
Snap-in clamping element,“left” version: the movable clamping piece is mounted on the same side as the loosening slide, with self-cutting screw M3x8 and cup spring for fixing. Plastic loosening slide, snap-in mechanism made from die-cast aluminum.		
Dimensions	40x21x21	mm (LxWxH)
Weight	22	g



Connecting pole for snap-in		
Material number	1827003351	
Connecting pole for snap-in, for synchronous operation of two loosening slides mounted next to each other in 50 mm grid width. Nickel-plated brass, diameter 6 mm.		
Dimensions	46x6	mm (LxØ)
Weight	11	g



Pipe cutter

Material number 1823391390

Pipe cutter, manual operation, the blade cuts into the guided pipe free from burrs.

Body made from gray plastic (polyamide), blade made from stainless steel.

Replacement blade, material number: 1823391389

Dimensions 80x25x30 mm (LxWxH)

Weight 30 g



Loosening tool

Material number 1823391651

Fork lever as release aid for plug connectors, for tube diameters 4, 5, 6, 8, 10, 12, 14 mm. Sheet steel, galvanized

Dimensions 98x25x4 mm (LxWxH)

Weight 22 g



Tool bag for pneumatics

Material number 1827003025

The range consists of:

Open-end wrench 6x7; 8x9; 12x13; 13x14,

slotted screwdriver 3.0x80; 5.5x100,

Allen wrench 2.5,

Phillips screwdriver size 1,

roll-up case made from durable PVC.

Dimensions 400x320 mm (LxW)

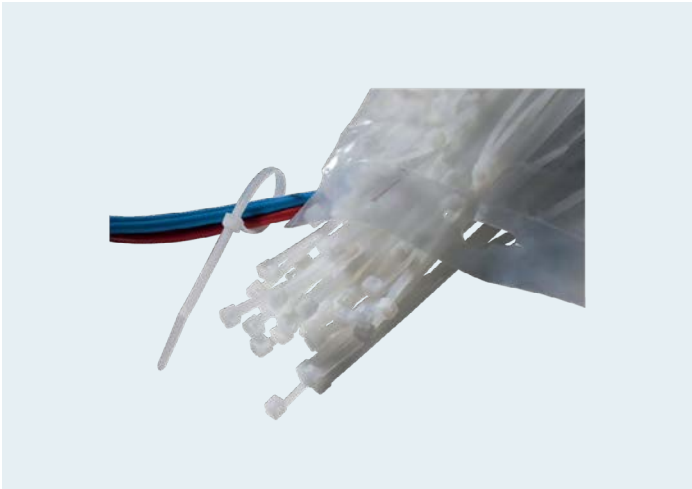
Weight 620 g



Screwdriver TX10		
Material number	R900043942	
TORX screwdriver, size T10, plastic handle.		
Length	200	mm
Weight	30	g



Cable fastener l = 130 mm, packaging unit: 50		
Material number	1821025000	
Cable fastener for fixing pipes or cables.		
Length	130	mm
Weight	72	g
Delivery quantity	50	units



Sticker label, packaging unit: 100		
Material number	1829929200	
Self-adhesive labels for labeling the components used in the pneumatics system, can be written on with pencil and pen, easily shapeable, adhesive used is water-resistant. 100 adhesive labels on a sheet.		
Dimensions	15x6	mm (LxW)
Weight	6	g
Delivery quantity	100	units



Catalogs

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Components, accessories and spare parts	Order examples	Workstations	Study topics	Drive & Control Academy
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