Ingenieurbüro de Vries

Hybrid Education Industry 4.0

Hydraulic-, Pneumatic-, Electro,- PLC - Combination bench

All in One

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Steuer-Nr.: 69/145/11351
USt-Id.Nr.: DE152360647

Overview to the four area´s

(Detailed information on the next pages)

In industry, employees are increasingly gaining a holistic knowledge of different plant areas.

This has led us to also have a holistic training system in the

Offer automation technology:

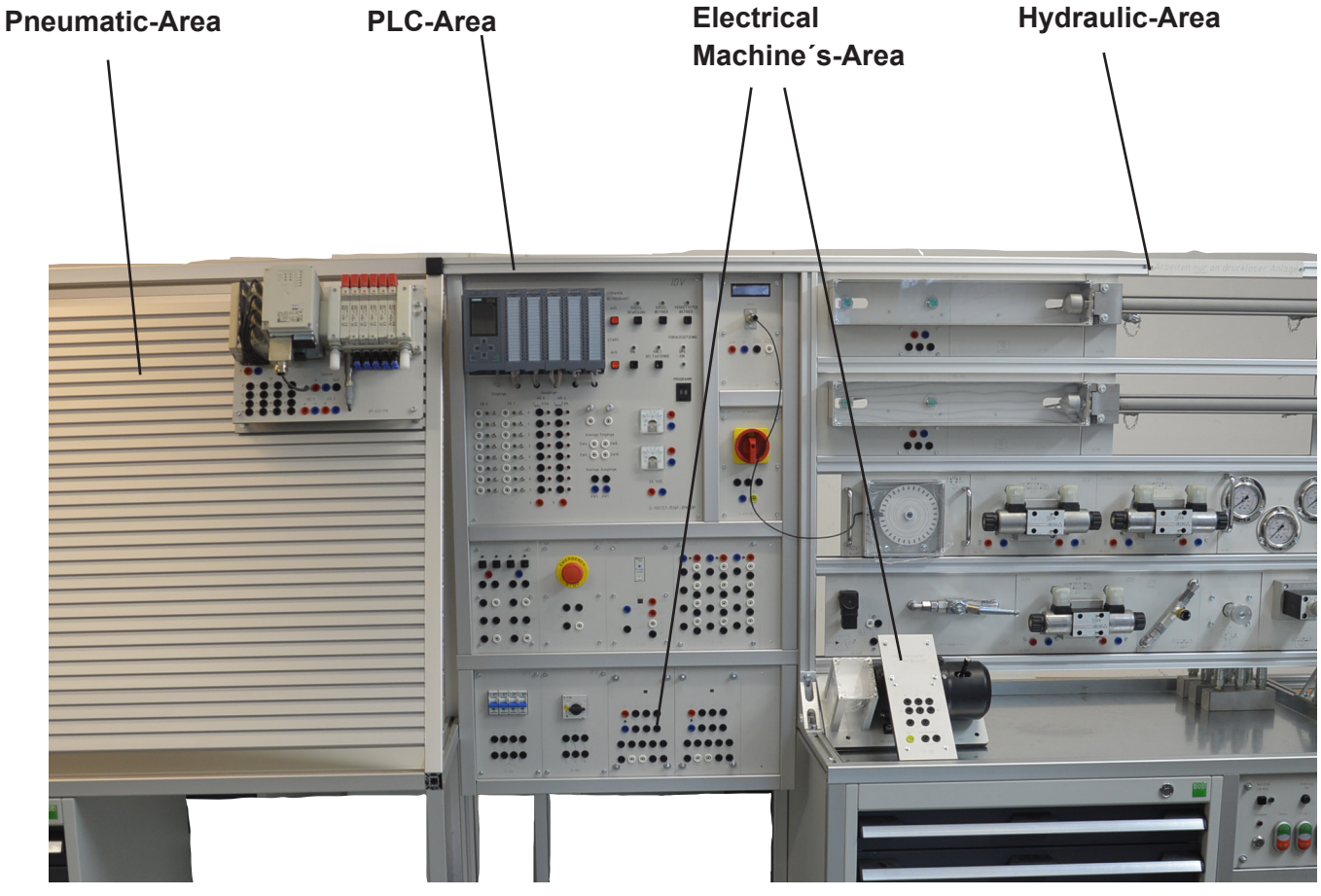
It consists of the following four (4) area´s:

1. Pneumatics, Electropneumatics, Sensors in Pneumatics

2. Hydraulics, Electrohydraulics, Proportional Hydraulics

3. PLC technology

4. Electrical machines (motor controls



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Overview of the electrical rail

Operating mode selection:
- single movement
- Single operation
- Chained operation
- Stop at the end of the cycle

BCD selection:
For calling up various programs together with Pneumatics and Hydraulics (11 programs included)

24 VDC supply, Rotation and Q display and switching input for unpressurized circulation

PLC of your choice, here an S7-1512-C (standard)
With operating modes, digital and analogous technology

Main switch for 400 V.

All three phases on Safety sockets + N and PE

Push button plate, EMERGENCY STOP, Time relay, relay card (3-fold)

Dimensions:
600 x 200 x 980 mm
(L X D X H)

Breakers,

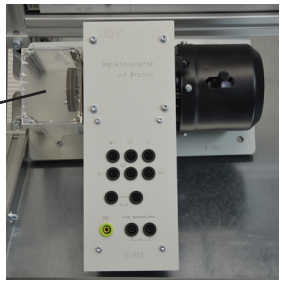
Motor protection switch

Contactors for motor control

To control Electric motors

Electric motor: induction engine

Other motors of your choice



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Pneumatic - Bench

Circuit diagram holder, one for the hydraulic and one for the pneumatic side

Aluminum profile plate, 1240 mm wide and 800 mm high to accommodate the pneumatic components.

On the right the E-frame of the Hydraulic bench are coupled to the Pneumatic bench

Drawer cabinet with 5 drawers (2 for pneumatics, 2 for E-pneumatics, 1 for small for material. Load capacity up to 75 kg per drawer. Color: slate gray (RAL 7015) Other colors available!

4 castors, 2 with brakes

Dimensions: 1300 x 750 x 1800 mm (L X D X H)

Both stands can be connected to one unit !!

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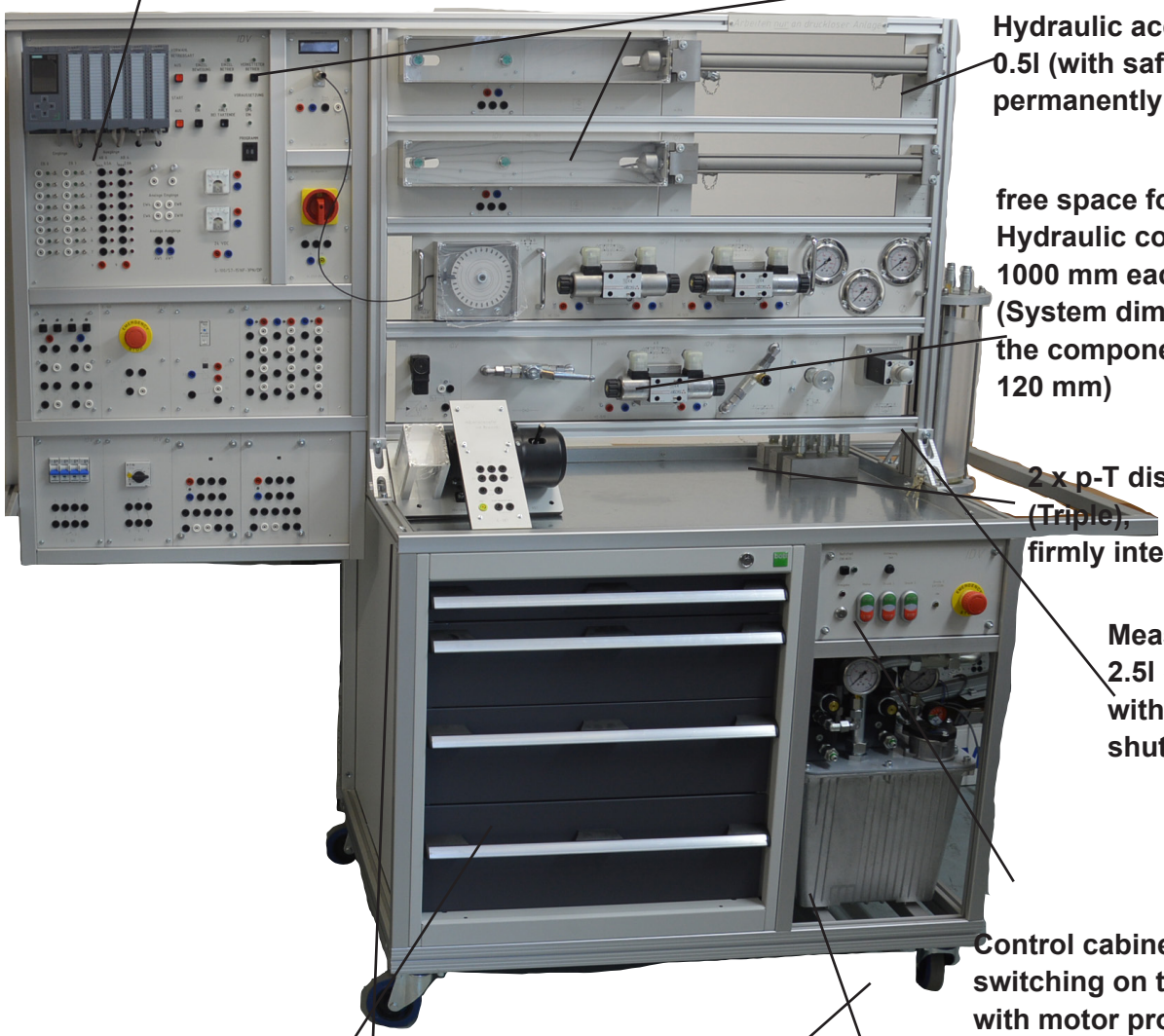
**E-frame with space for all offered e-components including PLC.
The pneumatic bench can be coupled on the left**

**2 cylinders (D = 25mm), each with 3 inductive sensors for position feedback:
Stroke = 400, differential cylinder**

24 VDC supply, Rotation and Q display and switching input for unpressurized circulation



Hydraulic accumulator, 0.5l (with safety block); permanently installed

free space for the Hydraulic components: 1000 mm each (System dimension of the components: 240 or 120 mm)

2 x p-T distributors (Triple), firmly integrated

Measuring glass, 2.5l (in 0.5l steps) with overflow and shut-off valve

Control cabinet for switching on the unit with motor protection and separate pressure activation of both pumps, 4 safety sockets for the phases

**Color: slate gray (RAL 7015)
Other colors too available!**

Oil pan for the component storage

Unit with 30l tank, filter with contamination indicator, 2x prerssure relief valve, permanently set to 60 bar including pressure gauge

4 castor´s, 2 with brakes

Dimensions: 1600 x 750 x 1800 mm (L X D X H)

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Pneumatik-Equipment, or your choice

Pos.	Quant..	Order No.	Description
1	1	LW-007-VW	Laboratory trolley with an inclined (20 °) work surface (ALU grooved board) for mounting pneumatic / electropneumatics Training systems made of aluminum profile, rollable with two brakes, Storage platform, a steel cabinet (650 mm wide) with 5 drawers each (3x125mm, 1x150mm, 1x 50mm), ball bearing (load capacity 100 kg per drawer) with inserts for the components, incl. E-frame on the side for hydraulics for the accommodation of E-components Dimensions: approx.1,300 mm wide, 750 mm deep, 1,800 mm high 1 x pneumatic training board with aluminum frame, 1240 x 800 mm, 25/25 mm grid as angled construction at the front (20 °), straight at the back incl. DIN A4 holder as a circuit diagram holder Pneumatics for 4 places
2	1	P-100 / E	Preparation unit, 0.5 - 10 bar incl. Filter, pressure gauge, water separator, Pressure regulator, manual and electrical (24 VDC) shutdown, connector: AD 6
3	1	P-104	Distribution block, 1 input AD 6 8 self-locking couplings, AD 4
4	2	EP-300	Cylinder, double-acting, D = 32, stroke = 150 mm with adjustable 32-150 end position damping and magnetic pistons, Switch cams for limit switches and sensors
5	1	P-112-32-80	Cylinder, single acting, D = 32, stroke = 80 mm and magnetic pistons, Switch cams for limit switches and sensors
6	1	EP-300-R-10	Part-turn actuator, swivel angle up to 270 °, adjustable with two inductive sensors for position detection
7	3	P-118	Pressure gauge, 0 - 10 bar, can be plugged into the training plate
8	1	P-118 / V	Pressure gauge, -1 - 0 bar, can be plugged into the training plate
9	5	P-123	3/2-way push button valve (NC), direct acting
10	1	P-127	3/2-way push button valve (NO), indirect acting
11	1	P-125	3/2-way selector valve, (dw)
12	6	P-131	3/2-way roller lever valve (NC), (dw)
13	2	P-134	3/2-way rocker arm valve (NC), (dw)
14	3	P-128	3/2-way valve, compressed air actuated (NC) spring-reset
15	3	P-128-NO	3/2-way valve, compressed air operated (N0) spring-reset
16	4	P-143	5/2-way valve, compressed air actuated on both sides
17	1	P-148	5/2-way valve, compressed air operated on one side
18	1	P-151	Time valve, 0.5 to 20 s
19	1	P-168/3	5/3-way valve, compressed air actuated on both sides, vented middle position
20	1	P-157	quick exhaust valve with plug connection and release sleeve
21	5	P-154	One-way flow control valve, adjustable, on plate for aluminum profile
22	2	P-156	Pilot operated check valve with plug connection and release sleeve
23	1	P-136	3/2-way pressure cut-in valve, adjustable
24	1	P-163	Pressure regulating valve, adjustable from 0.5 to 10 bar
25	3	P-161	Two-pressure valve (AND), on plate for aluminum profile
26	3	P-159	Shuttle valve (OR), on plate for aluminum profile
27	1	P-250	Two-hand control block
28	1	EP-405	Suction nozzle, ejector, with ejector pulse, electrical
29	1	P-205	Optical display, operated by compressed air
30	50m	B-1030	Tube 4/2
31	10m	B-1031	Tube 6/4
32	5	678-0200	T-connector 4/2

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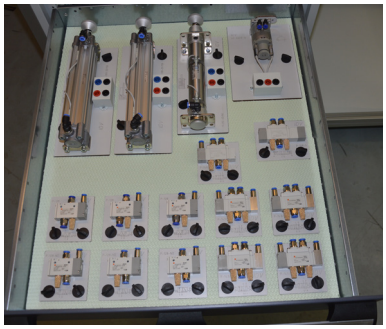
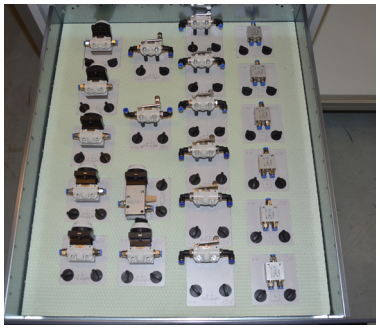
Drawer partition

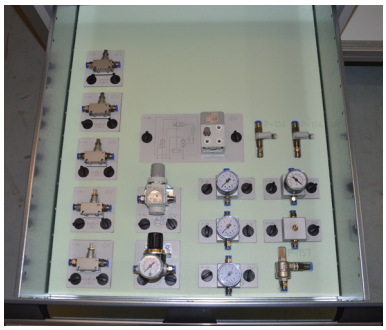
Pneumatic 1



Pneumatic 2



Pneumatic 3



The first drawer is intended for small parts and hoses

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Electro-Pneumatic ,
or your choice

Pos.	Quant..	Order No.	Description
1	1	E-260	Signal input panel, 1 control switch, 3 push button switches, 1 changeover contact each
2	1	E-160	EMERGENCY STOP switch, 1 NC contact / 1 NO contact
3	2	E-140	Relay boards, 3 relays with 4 changeover contacts each
4	1	E-155	Time relay board, optionally delayed pick-up and drop-out), 1 changeover, 4 additional functions
5	3	EP-600	5/2-way solenoid valve, bistable, manual override, LED
6	2	EP-650	5/2-way solenoid valve, unistable, manual override, LED
7	4	EP-402	Sensor, magnetic for CP cylinder, 3-wire
8	2	EP-402 / R	Sensor, magnetic for round cylinders, 3-wire
9	3	EP-400C-3	Coupling set for two magnetic sensors (EP-402) for mounting on the cylinder (EP-300)
10	1	EP-625-PN	valve block with Profinet controller and the following equipment: 1 x start valve 1 x electronic pressure sensor 3 x 5/2-way solenoid valve, bistable, manual override, LED 1 x 5/2-way solenoid valve, unistable, manual override, LED 1 x 5/3-way solenoid valve, vented middle position, manual override, LED 16 bit input feedback for sensors and switches with M12 connector and Safety connector on the other side for direct connection and 24 VDC supply cable with central compressed air connection and joint ventilation with silencer
11	1	EP-850	Pressure switch / p-E converter, pressure adjustable from 0.5 to 10 bar
12	1	EP-860	Electronic pressure sensor
13	1	EP-870	Electronic volume flow sensor
14	1	PP-200	Proportional pressure regulator
15	1	E-500.12	Universal cable set for EP-001 with 4 mm safety plug, Red: 10 x 1.5m; 5 x 1m; 25 x 0.5m Blue: 10 x 1.5m; 5 x 1m; 10 x 0.5m; incl. measuring lead holder set Black: 20 x 1m Green / yellow: 2 x 1m

E-Pneumatic

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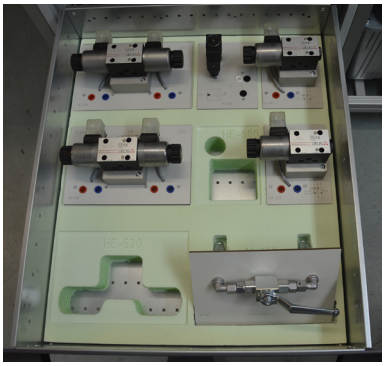
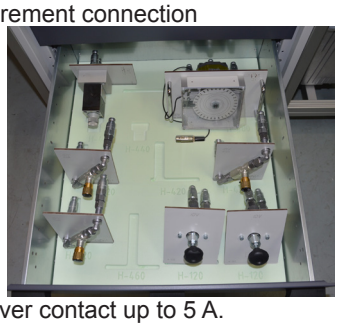
Hydraulic,
or your choice

Pos.	Quant..	Order No.	Description
1	1	H-050-VW	Unit and workplace, 30l tank, P = 1.1 KW, Q = 2 x 3 l / min., p = 60 bar, electric motor: 400 V, 915 rpm., with oil pan for the Component storage, 16 A CEE plug, cable length 5 m with display unit for speed and volume flow (digital and analog) 1 storage cabinet with 4 drawers, ALU mounting system with 4 rows (each row: 1.0 m long), 24 VDC supply ,; 10 A 24 VDC is led through the aluminum profile and thus supplies centrally the hydraulics, pneumatics and the PLC with 2.5 l measuring glass in 0.5 l steps with overflow and shut-off valve incl. 2 x P and 1 x T connections (each 3-fold) complete with control cabinet for motor ON / OFF, pressure ON / OFF, Power supply ON / OFF, key switch including motor protection circuit and EMERGENCY STOP device EMERGENCY STOP switches off three latches (1x electric motor, 2 x pressure) 5 safety sockets for L1 to L3, N and PE go through the profile In the middle of the E-frame Aluminum frame in 30x30, 30x50 and 30x60 profile, rollable Dimensions: 1.6 mx 0.75 m, height approx.1.8 m
2	1	H-040	Equipment trolley with hose holder and holder for additional components (Proportional hydraulics and servohydraulics)
3	1	H-540	Hydraulic accumulator (membrane accumulator, 0.5l) with accumulator safety device
4	1	H-150	pressure gauges, 3 pieces, 3 x 100 bar, class 1.6
5	2	H-390	Hydraulic differential cylinder, 25/18 - 400, including switch cams for sensors with safety cover (plexiglass from above) Oil connection and mini measurement connection on both sides
6	1	H-480	Hydraulic motor (12 qcm / rev) with integrated sensor for speed display
7	2	HE-383	Sensor plate with 3 inductive sensors for the end positions and a middle position
8	4	H-065	Tube with 2 safety couplings, 1/4 ", 800mm
9	8	H-060	Tube with 2 safety couplings, 1/4 ", 1100mm
10	8	H-063	Tube with 2 safety couplings, 1/4 ", 1500mm
11	4	H-080	cross distributor, 3x connection nipple, 1 x mini measurement connection
12	6	H-067	Mini measureing tube
13	1	H-160	Check valve
14	4	H-300	Check valve, opening pressure 0.5 bar
15	2	H-320	check valve, pilot operated
16	2	H-120	pressure relief valve, direct acting
17	4	H-420	One-way flow control valve, adjustable
18	2	H 440	2-way flow control valve, pressure compensated
19	1	H-460	3-way pressure reducing valve
20	1	HE-600	Pressure switch, p-E converter, adjustable, 1 changeover contact up to 5 A.
21	1	HE-620	Electronic pressure switch
22	2	HE-230	4/2-way valve, solenoid operated, crossed and parallel switching position, 24 VDC
23	1	HE-500	4/3-way valve, NC, solenoid operated, 24 VDC
24	1	HE-510	4/3-way valve, circulation, solenoid operated, 24 VDC
25	1	HE-520	4/3-way valve, A, B, T connected in middle position, solenoid operated, 24 VDC





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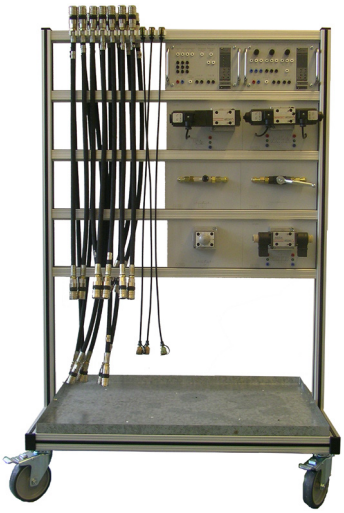
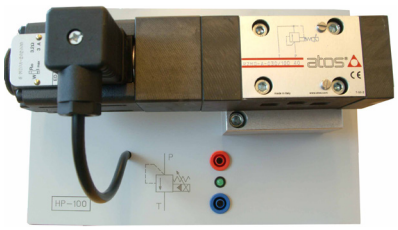
Additional components

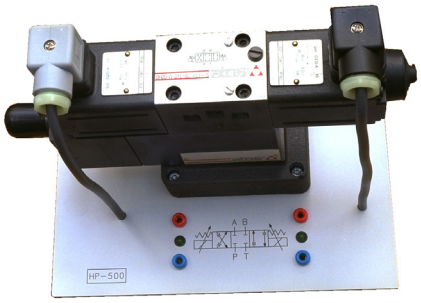
These components must then be placed in the equipment trolley (H-040).

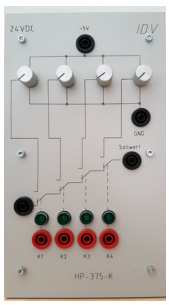


Proportional-Hydraulic (H-005)

Pos.	Quant.	Order No.	Description
1	1	HP-100	Pressure relief valve, proportional
2	1	HP-150-AR	Amplifier, 1-channel, for HP-100
3	1	HP-500	4/3-way valve, proportional
4	1	HP-580-AR	Amplifier, 2-channel, for HP-500
5	1	HP-375-K	Setpoint card with 4 potentiometers and associated 4 call-off rel
6	1	H-040	Equipment tray







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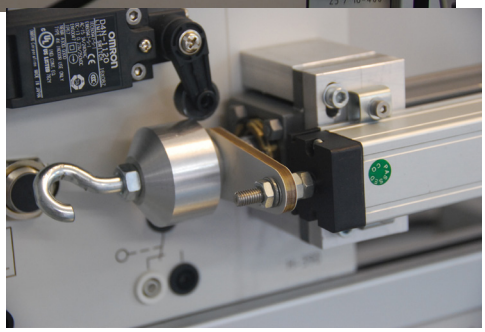
Servo-Hydraulik (H-006)

Pos.	Quant.	Order.-No.	Description
1	1	HS-390	Way measureing system for Hydraulic cylinder H-390, 400 mm stroke When using the cylinder, the plexiglass cover must be removed!
2	1	HS-600-AR	PID controller for controlling the position of the cylinder



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PLC

Order No.	Description
Hybrid-SPS S7-1512C-PN	PLC - SIEMENS S7-1500 (CPU 1512C-PN) with 32 digital inputs, 32 digital outputs, 4 analog inputs, 2 analog outputs, 24 VDC supply, on a didactic carrier plate incl. 24 MB memory card With 4 mm safety sockets are: 16 DI with toggle switch (momentary / latching) and LED (green) (bytes 0 - 1) the other 16 DI´s are wired to a 2-digit BCD selection (byte 2) and the operating modes on IB3 with 7 buttons and 7 red LEDs 16 DQ with LED (red), the other 8 DQ are intended for the operating modes (byte 3) 2 AI are wired as voltage inputs on sockets (0-10 V) 2 AQ are wired as voltage outputs on sockets (0 - 10 V) 2 potentiometers (incl. 10 V supply) are wired to 2 sockets and can so easy to connect to a respective analog input 2 voltage indicators (0-10V) are placed on sockets for visualization an analog output signal incl. Ethernet connection cable including TIA Portal (SIMATIC STEP 7, Professional) software for training incl. 14 exercises can be call with the BCD-Pre selector

or:

Hybrid-SPS S7-1215C-PN	PLC - SIEMENS S7-1200 (CPU 1215C-PN) with 38 digital inputs, 26 digital outputs, 2 analog inputs, 2 analog outputs 24 VDC supply, on a didactic carrier plate With 4 mm safety sockets are: 22 DI with toggle switch (momentary / latching) and LED (green) (bytes 0,1,8) the other 16 DI´s are wired to a 2-digit BCD selection (byte 12) and the operating modes on IB13 with 7 buttons and 7 red LEDs 19 DQ with LED (red), Byte 0, 12, 13 the other 7 DQ are intended for the operating modes (byte 0) 2 AI are wired as voltage inputs on sockets (0-10 V) 2 AQ are wired as voltage outputs on sockets (0 - 10 V) 2 potentiometers (incl. 10 V supply) are wired to 2 sockets and can so easy to connect to a respective analog input 2 voltage indicators (0-10V) are placed on sockets for visualization an analogue output signal incl. Ethernet connection cable including TIA Portal (SIMATIC STEP 7, Basic) software for training incl. 14 exercises can be call with the BCD-Pre selector

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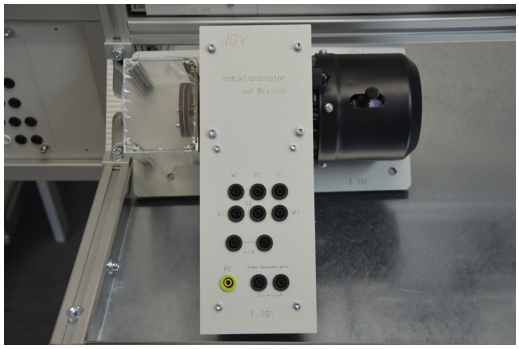
Electrical devices for controlling an electric motor

Pos.	Quant.	Order No.	Description
1	1	E-102	Motor protection switch with thermal and magnetic tripping Rated current: 0.16 to 0.25 A in the housing for mounting in the hydraulic frame all connections placed on safety sockets Circuit engraved on the plate
2	1	E-104	Miniature circuit breakers, consisting of four overload releases, triggers individually, 3 x 2 A, 1 x 6 A per phase in the housing for mounting in the hydraulic frame all connections placed on safety sockets Circuit engraved on the plate Switches and anchors are operated from the outside
3	1	E-106	RCD, 16A; 10 mA tripping; 2 pole in the housing for mounting in the hydraulic frame all connections placed on safety sockets
4	2	E-108	Motor contactor Switching voltage: 24 VDC 3 main contacts, contact load: 230V / 5A; 400V / 2A 4 auxiliary contacts (2 NC contacts, 2 NO contacts) in the housing for mounting in the hydraulic frame all connections placed on safety sockets Circuit engraved on the plate
5	1	E-901	Asynchronous motor, 400, 690 V; 0.06 KW; 1,300 rpm. on carrier plate with protective cover with brake



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Here are some arguments for the **IDV** system compared to the competition (Bosch Rexroth, Festo)

A. Pneumatics:

1. The offered pneumatic laboratory trolley has been developed directly for your requirements. With the competitors you will probably have to fall back on their catalog standard laboratory trolley.

2. The aluminum grid system is with us in the 25mm grid, with the competitor Festo in the 50mm grid. This means that you can make the circuits more compact in our system

3. The drawers have a load capacity of 75 kg per drawer, and only 20 kg for the competitors. Their stability and lifespan are correspondingly low.

4. In all drawers there is a sorting system for everyone specially developed for your requirements Components. So you can see at a glance whether it is complete again. Bosch Rexroth does not have such a sorting system, Festo only has so-called Systainers for its standard tool sets. It is very questionable whether the competition can offer you such a sorting system specifically for your component list.

5. All pneumatic and electropneumatic components have built industrial valves and are with one Metal screw connection provided. In this way you can e.g. easily change the function of a valve, e.g. from NC to NO. This is only partially solved by the competition, and if so, with plastic fittings. in the Festo systems are e.g. the manually operated valves completely integrated in a plastic housing, especially for Training produced very cheaply. In addition, if such a valve should ever be defective, you must completely replace it replace, since even the screw connections are not screw connections, but directly into the plastic housing are pressed. In the IDV system, only industrial components are screwed onto the didactic plate, high recognition value for practice.

6. **IDV** offers hose clamps for proper tubing, which can be integrated directly into the aluminum system. The Competitors do not have this in their program

7. Special pressure gauges with different pressure ranges from IDV. The competitors don't have this program.

8. All roller-operated valves have metal rollers, plastic rollers at the competitor !!

9. In the IDV system, the cylinders receive a junction box for the magnetic (REED) sensors. So you can also wire these sensors with the normal laboratory cables.

10. The time relay from IDV has 6 time functions, with the competitors only one time function. The means you have to request several time relays of the different functions for the training. The Competitors only offer the two standard time functions (switch-on delay and switch-off delay) in their program.

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B. Hydraulic:

Here are some arguments for the IDV system compared to the competition (Bosch Rexroth, Festo)

1. The hydraulic laboratory trolley on offer has been developed directly for your requirements. With the competition, you will probably have to fall back on their catalog standard laboratory trolleys.

2. A digital volume flow display and a speed display are integrated in the IDV laboratory stand. The competition does not have this in the program.

3. There is also a 24 VDC shutdown signal input in the IDV laboratory booth. This enables you to circulate the pump via an electrical signal via a button, relay or PLC. This is always implemented as a standard in practice due to the high requirements for energy savings. The competition does not have this in the program.

4. Hydraulic variables such as pressure and volume flow are adapted to your requirements. Questionable with the Competitors.

5. The laboratory stand is designed for maximum safety. In the IDV system, operation and wiring must be carried out from the front, but the hydraulic connections must be made from the rear (Industry 4.0 - requirement). This increases security by 100%. The two competitors don't have this, but everything has to be built from scratch. So if a hose is not installed correctly there, the hose could injure the laboratory technicians.

6. All cylinders you have requested have a stroke of 400 mm. The competitors have in their standard program only 200 mm. The stroke of 200 mm is decidedly too small, especially in connection with the proportional hydraulics.

7. All hydraulic cylinders have an integrated sensor unit for position detection. The competition doesn't have this.

8. All cylinders are protected against contact. A plexiglass pane is integrated from above. So you can Watch the lifting movement very well. This is also not included in the standard program of the competitors.

9. All hydraulic components have self-locking nipples, all hoses have self-locking couplings. All connections are absolutely leak-free. With the Mt applicants, these are low leakage!

10. The drawers have a load capacity of 75 kg per drawer, and only 20 kg for the competitors. Their stability and lifespan are correspondingly low.

11. In all drawers there is a sorting system for everyone specially developed for your requirements Components. So you can see at a glance whether it is complete again. Bosch Rexroth does not have such a sorting system, Festo only has so-called Systainers for its standard tool sets. It is very questionable whether the competition can offer you such a sorting system specifically for your component list.

12. All valves have base plates according to ISO CETOP. This allows you to easily switch the valves to other hydraulic providers. Whether the competition has this is questionable.

13. The time relay from IDV has 6 time functions, with the competitors only one time function. This means that you have to request several time relays of the different functions for the training. The competitors only offer the two standard time functions (switch-on delay and switch-off delay) in their program.

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C. PLC-Rack:

The PLC board is integrated directly between the pneumatic hydraulic level. So you can combine applications with the two areas very well.

All inputs and outputs are led out to safety sockets, a BCD selection (2 digits) for your program selection is also included. 11 programs for pneumatic and hydraulic applications are included.

Analog signals can be displayed with two voltage indicators.

Analog input signals can be simulated very easily with two built-in potentiometers, since 10V are also provided for the potentiometers on board.

D. General:

We, as an engineering office, have set ourselves the goal of optimal training equipment, tailor-made for yours
Develop and produce teaching concepts.

This distinguishes us as the sole provider in this area.

We guarantee you high quality products with a very good price-performance ratio.

I am also available to provide advice and support in all areas. I can guarantee you this, since I have been working in pneumatics, hydraulics and PLC technology since 1986 and have been running my engineering office very successfully since 1991.

With the competition you will probably be looked after by a seller who can help you little in technical questions. As a rule, the competitors have a specialist for each specialist area. For you, this means long distances until your problem is solved.

with best regards

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