

# HYDRAULICS & PNEUMATICS

**AMTEC TECHNIQUIP**  
Engineering The Future



Suppliers Of Educational Engineering  
Equipment & Accessories





Amtec Techniquip applies 30 years of knowledge & experience in the design, manufacture and import of educational engineering equipment, accessories, instrumentation and consumables.

During this time, we have been a market leader in innovation, bringing many new concepts and products to the educational industry while expanding our comprehensive range of quality teaching equipment to a level unsurpassed by any other company in the industry.

This includes unique new methods of introducing and educating the learners in all facets of modern engineering. Our products are visual and demonstrational to best teach and explain concepts from basic engineering, all the way up to research and thesis levels in the most advanced forms of engineering.

## Amtec Techniquip's commitment to the end user...

AMTEC offers a personal approach to each and every end user as we are always available to meet and discuss any requirements face-to-face basis to provide a tailor-made solution.

AMTEC have a large footprint throughout Southern Africa and regularly visit the countries and provinces we service while also keeping our customers up-to-date with any new products and innovations we bring to the market.

AMTEC supplies expert training on all our products. Our team of experts offer training at the end user or alternately at our head office in Jhb. All our products are supplied with their relevant manuals, course materials and exercise guides.

AMTEC offers unmatched after-sales service and customer support. All our equipment is supplied complete with ICT (Installation, Commissioning & Training). Our sales and support teams are at the end user's disposal should any assistance be needed during the life of a product.

AMTEC offers an extended Service and Maintenance plan to make sure that your equipment and apparatus are maintained to ensure a long lifespan with little or no downtime.

AMTEC makes use of only quality components to ensure reliability and longevity of all our manufactured equipment. This provides the end user with peace of mind and a product that will stand the test of time in an educational environment.

AMTEC has the manufacturing capability to R+D and manufacture "one-off" designs and customise any equipment within our range to meet the end users requirements. We have many accessories, add-ons and tooling that can work in conjunction with our equipment and trainers.

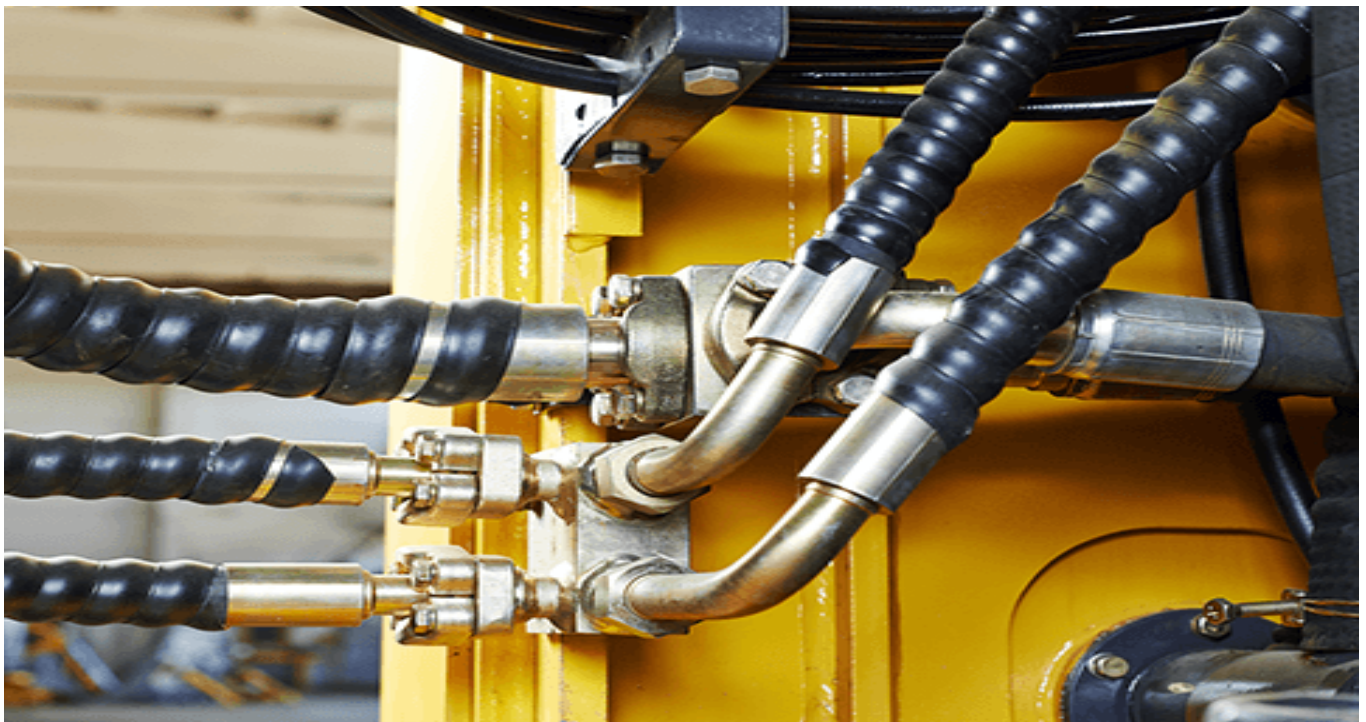
AMTEC offers a 24-month factory warranty on all our products supported by the backing of our local & international suppliers.



Index	Page 1
Hydraulic Training Solutions	Page 2
Transparent Hydraulic sets	Page 9
Hydraulic Trade Test Sets	Page 18
Pneumatic Training Solutions	Page 32
Pneumatic Trade Test Sets OFT	Page 37
Simulation Software	Page 55
AMTEC Workshop equipment	Page 59
AMTEC Tools and Consumables	Page 60
DVD list	Page 61



## AMTEC HYDRAULIC TRAINERS AND EQUIPMENT





## **Hydraulic Training Solutions**

Hydraulic systems are all around us on a daily basis. They're used in vehicles, construction equipment, buildings, and manufacturing facilities. Hydraulics are one of the most efficient ways to create movement when heavy loads are involved or a repetitive motion is needed.

Hydraulic systems in their simplest form are simply a system that uses pressurized fluid to accomplish a task. Simple hydraulic systems have been used even in ancient times but were limited to open systems using gravity to create pressure. Hydraulic systems were revolutionized by the introduction of the pump with which high pressures could be created quickly and easily. The first pump powered hydraulic systems revolutionized how hydraulics were used and used water as the working fluid. Systems like this ranged from small systems to operate a single component to systems spanning an entire city as part of a public utility to operate machinery in multiple factories.

### **Amtec Solutions**

Amtec Techniquip Pty Ltd has partnered with reputable manufacturers of Hydraulic and Pneumatic Training systems for education.

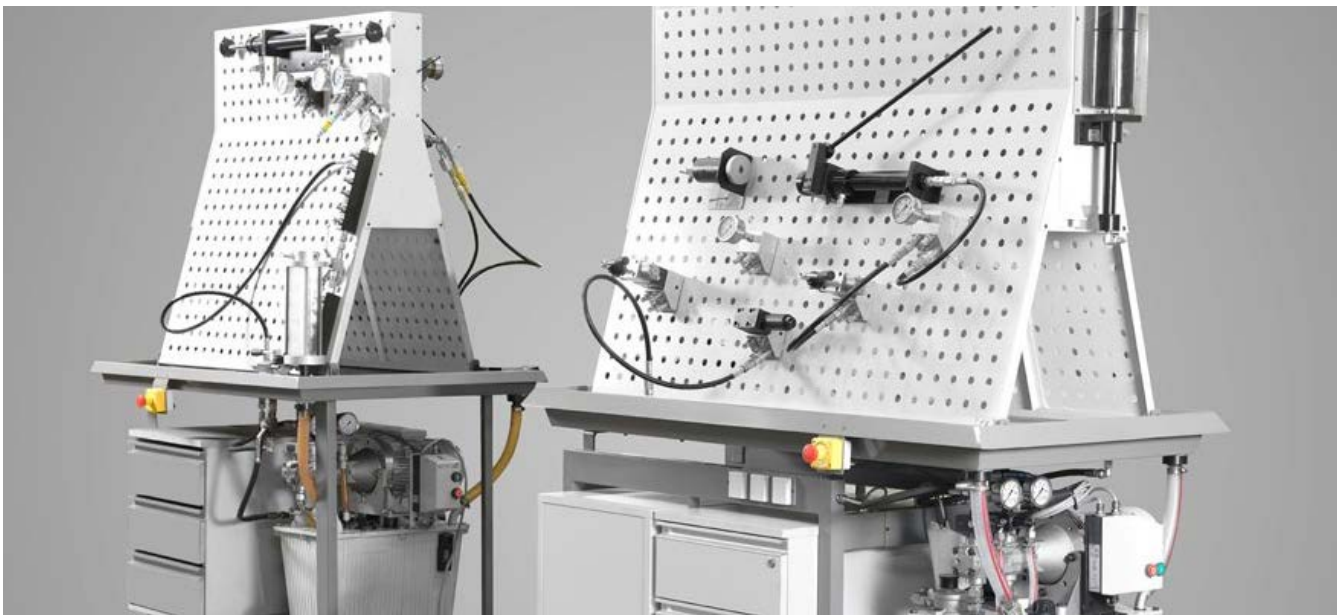
Sourced globally we have selected manufacturers that align with our values to ensure we are able to supply quality, long lasting equipment designed to offer the learner a quality product with repeatable results.

We have managed to create tailored components set feature in the catalogue as follows:

- **Basic Hydraulics Components Set**
- **Skill Development Component Set (South African Curriculum)**
- **Trade Test Component Set (South African Curriculum)**
- **Level I Component Set**
- **Level II Component Set**
- **Electro Hydraulics Level I**
- **Electro Hydraulics Level II**

***Please feel free to contact us for a tailored solution that will meet your requirements.***

## Hydraulic Training Solutions



*Hydraulic systems are all around us on a daily basis. They're used in vehicles, construction equipment, buildings, and manufacturing facilities. Hydraulics are one of the most efficient ways to create movement when heavy loads are involved or a repetitive motion is needed.*

*Hydraulic systems in their simplest form are simply a system that uses pressurized fluid to accomplish a task. Simple hydraulic systems have been used even in ancient times but were limited to open systems using gravity to create pressure. Hydraulic systems were revolutionized by the introduction of the pump with which high pressures could be created quickly and easily. The first pump powered hydraulic systems revolutionized how hydraulics were used and used water as the working fluid. Systems like this ranged from small systems to operate a single component to systems spanning an entire city as part of a public utility to operate machinery in multiple factories*



## Amtec's Solutions for Hydraulics'

*Amtec Techniquip Pty Ltd has partnered with reputable manufacturers of equipment to fulfil the requirement to proficiently train learners on Hydraulics & Pneumatics to allow them to enter industry competently prepared and ready for the workplace.*

*We have tailored solutions to meet the requirements of both the South African and international market in terms of both budget and curriculum requirements.*

*Both Workstations and Component sets we have available are as follows and feature in more detail in this brochure*

### *Hydraulic Workstations:*

- *Single Sided Hydraulic Workstation – Self Contained includes Hydraulic Power Pack*
- *Double Sided Hydraulic Workstation – Self Contained includes Hydraulic Power Pack*
- *Frame Sets c/w Drip Tray – Hydraulic Power Pack Available separately*

### *Hydraulic Component Sets:*

- *Transparent Hydraulic Component Sets / Mini Fluids*
- *Basic Hydraulics Component Sets – Introductory Hydraulics Course*
- *Skill Development Component Set (Tailored for the South African Market)*
- *Trade Test Component Set (Tailored for the South African Market)*



## HYDRAULIC WORKSTATIONS:



### *HLA70-1 – Single Sided Hydraulic Workstation*

### *HLA70-2 – Double Sided Hydraulic Workstation*

#### **Features:**

- Single (HLA70-1) or Double (HLA70-2) Working Post
- Metal Structure with Powder Coated Finish
- Working Surface for Component mounting 950 x 1050mm c/w matric system for component mounting – NO TOOLS REQUIRED TO MOUNT COMPONENTS
- Lockable Castor Wheels
- Drawer Set to house Components
- Hydraulic Power Pack included
- 1x Pressure & 2x Return Ports for both Single & Double Sided working Posts
- Paper Clip Board
- Emergency Stop Buttons
- Metal Tray with Grid Plate to collect any leaks that may occur – oil is returned to the reservoir
- Dimensions – 1176 x 860 x 1948mm (h)



### Tabletop Reclining Training Panel (Small)



Designed with a budget in mind, the small Table Top Frame set allows the end user to mount the frame to an existing workbench / Table in the laboratory / workshop.

#### *Features:*

- Table Top Reclining Panel – Free Standing (Can be mounted and fixed to existing Tables in the laboratory / workshop)
- Applicable to Mini Fluid / Transparent Component Sets
- Working Surface Dimensions - 800 x 600mm (h)
- Powder Coated Finish
- Hydraulic Power Pack Available Separately.

### Tabletop Reclining Training Panel (Large)



Designed with a budget in mind, the small Table Top Frame set allows the end user to mount the frame to an existing workbench / Table in the laboratory / workshop.

#### *Features:*

- Table Top Reclining Panel – Free Standing (Can be mounted and fixed to existing Tables in the laboratory / workshop)
- Applicable to Proportional Hydraulic Component Sets
- Working Surface Dimensions - 950 x 1050mm (h)

## Hydraulic Power Pack – Mini Fluids

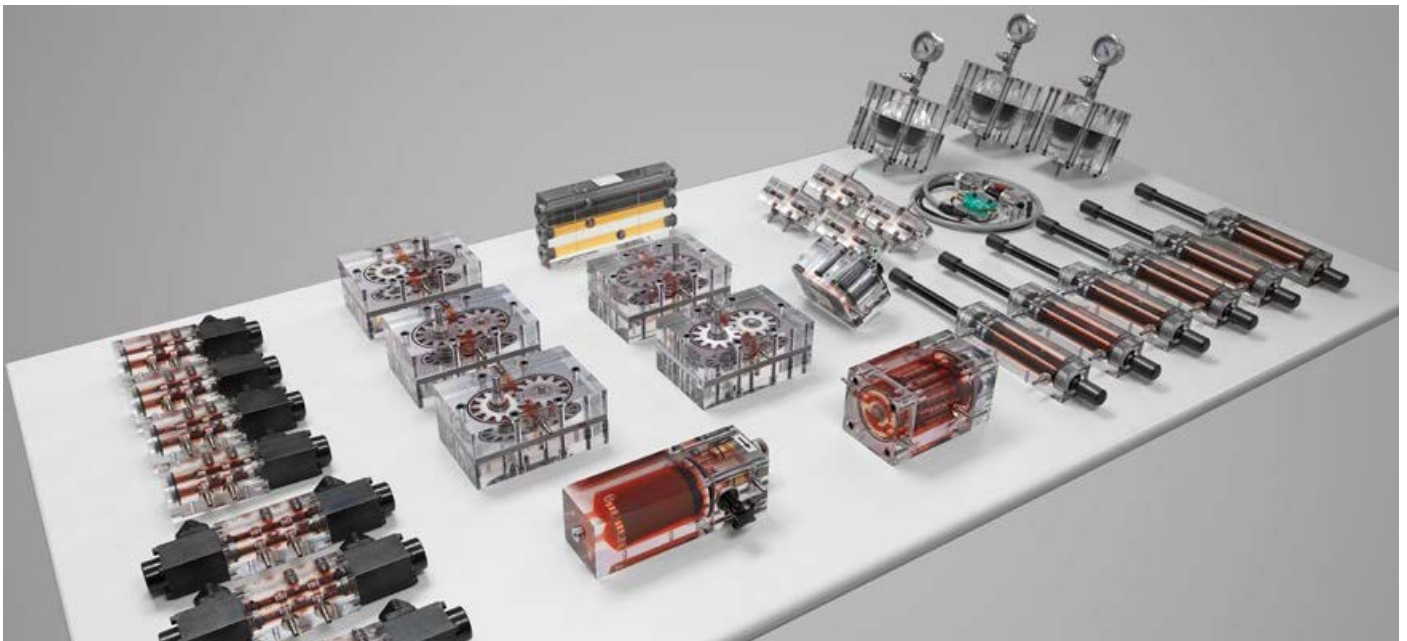


### *Features:*

- Electrically Powered Hydraulic Power Pack / Unit (Single Phase 230Vac / Three Phase 400Vac)
- 6 Litre Tank Capacity
- Super Silent Gear Pump – 0.5l/min
- Pressure Relief Valve –  $P_{max} = 10\text{Bar}$
- Pressure Gauge 0 – 16 Bar
- Stop & Start Button
- Includes Quick Couplings
- Can be supplied with Red Hydraulic Oil when being used in conjunction with transparent component sets to give a more visual demonstration/

## HYDRAULIC COMPONENT SETS

### Mini Fluids / Transparent Hydraulic Components

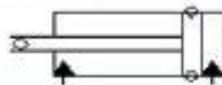


#### *Features:*

- Clear Components to offer a visual approach to allow the learner to understand the internal working of each component
- Can be used in conjunction with a projector as a teaching aid in the classroom
- External Component Body made of Perspex
- Internals are originally industrial components
- Quick Couplings – To eliminate any & all Leaks
- Both Level I & Level II Component sets are supplied complete with a comprehensive User Guide

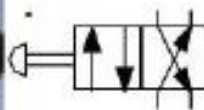
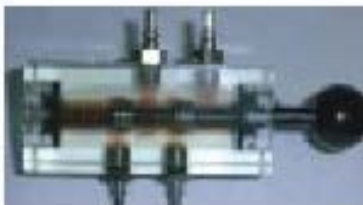
## Mini Fluids / Transparent Hydraulic Components Level I

Set made up of the following components and includes piping to complete the circuits:



**Double effect cylinder**

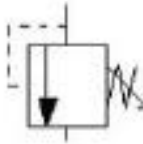
d/e cylinder  $\varnothing 20 \times \varnothing 10 \times 58\text{mm}$



**Manually actuated 4/2 distributor**

Manually actuated, spring return





**Pressure relief valve**  
Ball valve, Direct control



**3 connection divider with pressure gauge**  
0-10 bar pressure gauge  
One female + two male's quick fit  
connectors



**Check valve**  
Seat check valve



**Flow restrictor**  
Needle flow restrictor,  
manual regulation



**6 connection divider**

6 male quick-fit self-sealing  
connectors, size NW4



**Set of hoses**

6 NW4 x 520 mm length  
4 NW4 x 350 mm length  
With quick-fit self-sealing female  
connectors

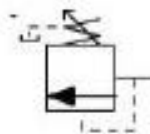


**Oleo-Hydraulics Mini Fluid  
handbook**

Theoretic and practice  
handbook

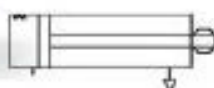
## Mini Fluids / Transparent Components Level II

Set made up of the following components and includes piping to complete the circuits:



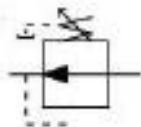
### Pressure relief valve with damping

Spool valve with damping  
3 way valve. Manual regulation

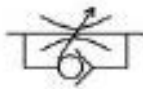


### Single effect cylinder

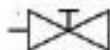
ø20x ø10x40 mm  
Spring return



**Pressure reducing valve**  
3 way pressure reducing  
valve. Direct control  
Manual regulation



**One way flow restrictor**  
Needle valve with by-pass  
check valve

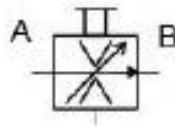


**Shut off valve**  
2/2 valve. Manually  
actuated



**Piloted one way restrictor**  
Hydraulically actuated  
check valve





**Flow control valve with  
pressure compensation**

Hydrostatic valve  
Incorporated. Manual  
regulation



**4 connection divider**

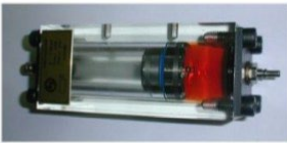
3 male + 1 female quick-fit self-  
sealing connectors, size NW4



**Set of hoses**

5 NW4 x 520 mm length  
With quick-fit self-sealing female  
connectors

## Additional Components - Mini Fluids / Transparent Components



**Piston accumulator**



**Axial piston motor with  
reclined plate**



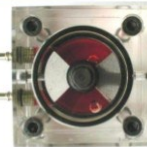
**Bladder accumulator**



**Rack-pinion rotary actuator**



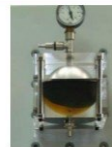
**Double rod cylinder**



**Vane rotary actuator**



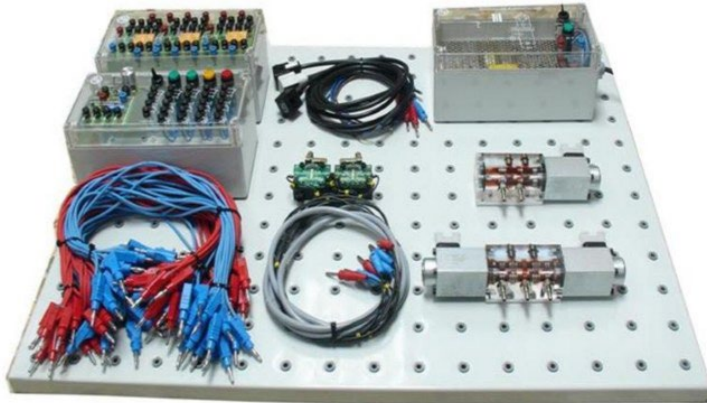
**Double effect cylinder with  
adjustable end stroke  
damping**



**Diaphragm accumulator**

## Electro Hydraulics - Mini Fluids / Transparent Components

Set made up of the following components and includes piping to complete the circuits:



### Set of connection cables

14 blue cables, 50 mm length with  $\phi 4$  mm male connectors  
14 red cables, 50 mm length with  $\phi 4$  mm male connectors  
8 blue cables, 150 mm length with  $\phi 4$  mm male connectors  
8 red cables, 150 mm length with  $\phi 4$  mm male connectors



### Set of 3 connectors for solenoids

2 grey + 1 black  
Including solenoid 2P+G connector, on/off indicator lamp, cable and male  $\phi=4$  mm quick connectors



### Electrical power supply unit

220 VAC/24 VDC, I=5 A  
Over load and short circuit protection  
On/Off switch  
On/Off indication lamp  
Electronically stabilized  
 $\phi=4$  mm quick connectors  
Plastic box with printed transparent cover



### 4/2 solenoid valve

Spring return  
24VDC solenoid 2P+G



### Control unit

4 push buttons, 2 green, 1 red, 1 yellow, with 1 normally open + 1 normally closed contacts each.  
1 switch with 1 normally open + 1 normally closed contacts.  
1 connection / disconnection electronic timer, 0 to 6 seconds regulation.  
4 spark suppressing diodes.  
4 indicator lights, 2 green, 1 red and 1 yellow.  
 $\phi=4$  mm quick connectors.  
Plastic box with printed transparent cover



### 4/3 solenoid valve

4/3 valve, spring centered, A, B, P y T closed in central position. 24 VDC solenoids



### Relay unit

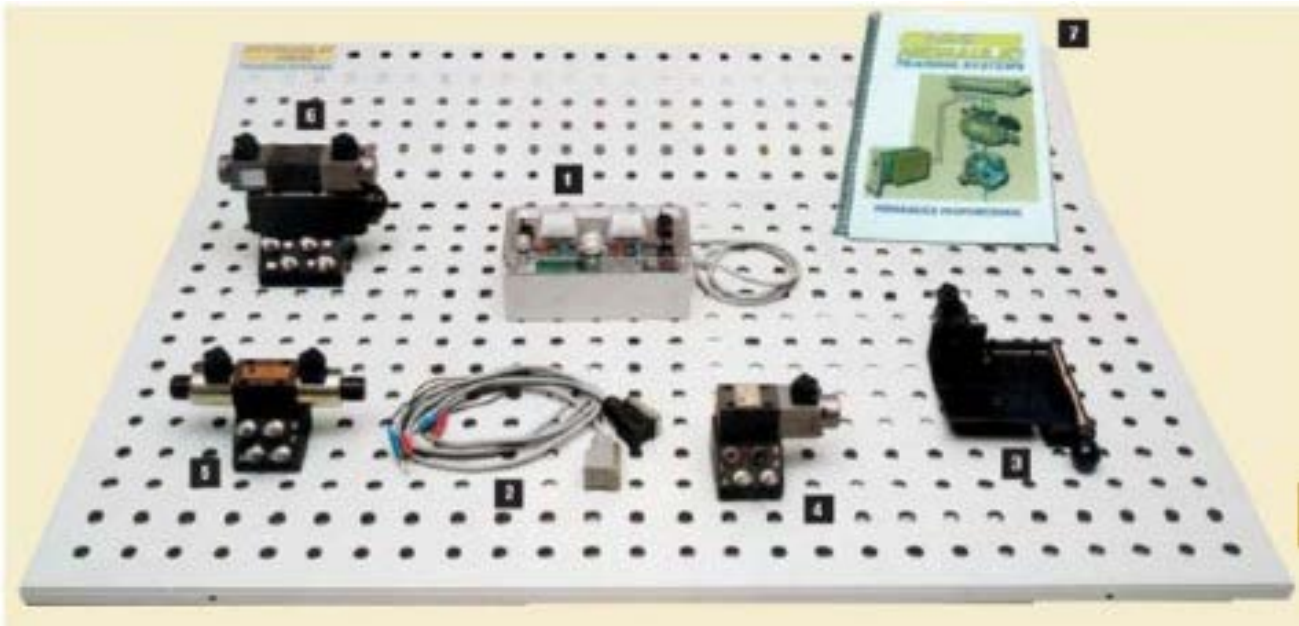
3 relay unit with 4 exchanged (switched) contacts each.  
On/Off light indicator on every relay solenoid  
Spark surprising diode on every solenoid  
6 connection divider for positive voltage  
6 connection divider for negative voltage de  
 $\phi=4$  mm quick connectors  
Plastic box with printed transparent cover



### Set of two roller limit switches

1 normally closed + 1 normally opened contacts  
Transparent body  
 $\phi=4$  mm female connectors

## Skill Development Component Set

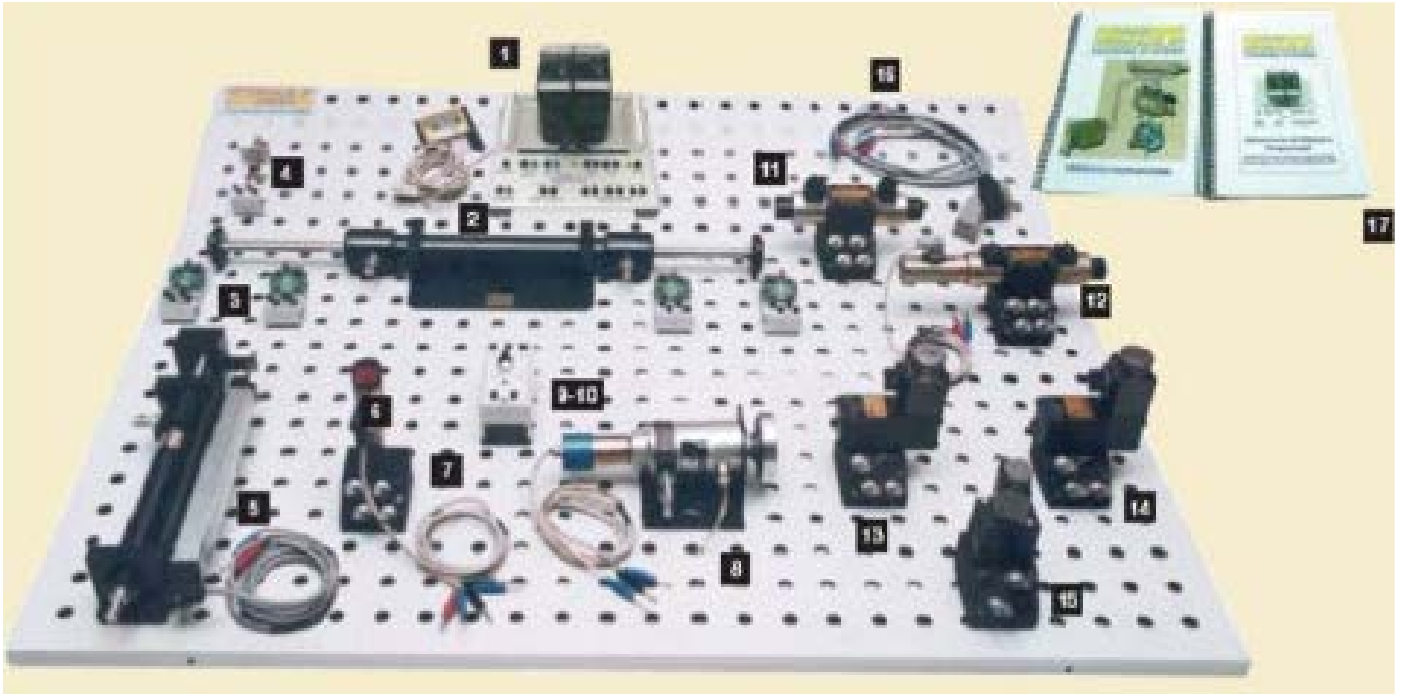


Set made up of the following components and includes piping to complete the circuits:

- 1xx Single Acting Cylinder c/w weight
- 2xx Double Acting Cylinder c/w weight
- 1xx 3/2 Way Hand Lever Type Valve
- 1xx 4/3 Way Hand Lever Type Valve (PABT Blocked)
- 1xx 4/3 Way Hand Lever Type Valve (PT Biased)
- 1xx Directly Operated Pressure Relief Valve
- 1xx Pilot Actuated Pressure Relief Valve
- 2xx Counter Balance Type Valve
- 1xx Check Valve Pilot Type
- 1xx Check Valve 1Bar
- 2xx Check Valve 5Bar
- 1xx Assorted Hose Connection Set
- 1xx Hydraulic Motor
- 1xx Pressure Remover
- 1xx Flow Meter
- 1xx Connector Set



## Trade Test Component Set

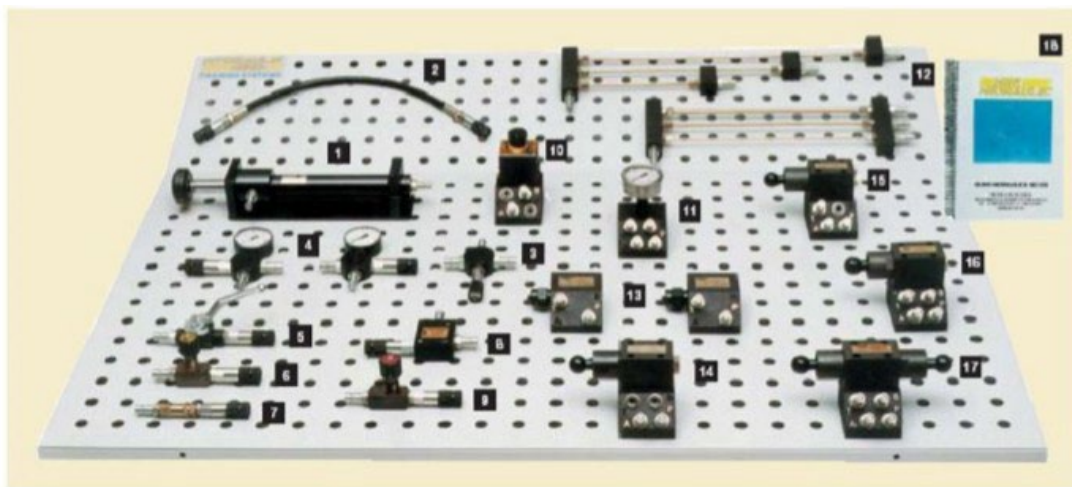


Set made up of the following components and includes piping to complete the circuits:

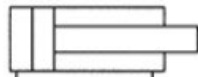
- 1xx Single Acting Cylinder c/w weight
- 2xx Double Acting Cylinder c/w weight
- 1xx 3/2 Way Hand Lever Type Valve
- 1xx 4/2 Way Hand Lever Type Valve
- 1xx 4/3 Way Hand Lever Type Valve (PABT Blocked)
- 1xx 4/3 Way Hand Lever Type Valve (PT Biased)
- 3xx Directly Operated Pressure Relief Valve
- 1xx Pilot Actuated Pressure Relief Valve
- 2xx Counter Balance Type Valve
- 2xx Check Valve Pilot Type
- 2xx Shut OFF Valve
- 1xx Check Valve 1Bar
- 2xx Check Valve 5Bar
- 3xx Pressure Gauge
- 2xx Hoses 1500mm
- 6xx Hoses 1000mm
- 4xx Hoses 600mm
- 1xx Hydraulic Motor
- 1xx Pressure Remover
- 7xx T-Connector
- 1xx Flow Meter
- 1xx Weight 5kg

## Hydraulics Component Set Level I

Set made up of the following components and includes piping to complete the circuits:



1



**Double acting differential cylinder**

Ø32 / Ø22, 200 mm

2



**Set of 12 hoses with quick female connectors**

8 hoses NW6 x 500 mm length

4 hoses NW6 x 1000 mm length

3



**Cross distributor**

4 connections

4



**2 "T" distributor with pressure  
gauge 0...60 bar**  
Glycerin damped

5



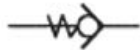
**Shut off ball valve**

6



**Two way flow restrictor**

7



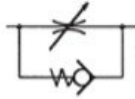
**One way restrictor**  
Non-return valve

8



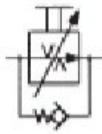
**Piloted one way restrictor**

9



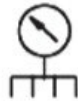
**One way flow restrictor**

10



**Pressure compensated one way flow regulator**  
On base plate

11



**4 connections distributor on manifold with pressure gauge 0...60 bar**  
Glycerin damped

12

**Set of tubes for testing pressure drops**

One item with three different diameters and the same length, another item with three different lengths and the same diameter

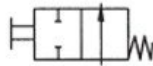
13



**2 pressure relief valve 2...64 bar**  
On base plate



14



**2/2 manual acting valve,  
spring return**  
Onto base plate

15



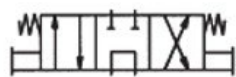
**3/2 manual acting valve,  
spring return**  
Onto base plate

16



**4/2 manual acting valve,  
spring return**  
Onto base plate

17



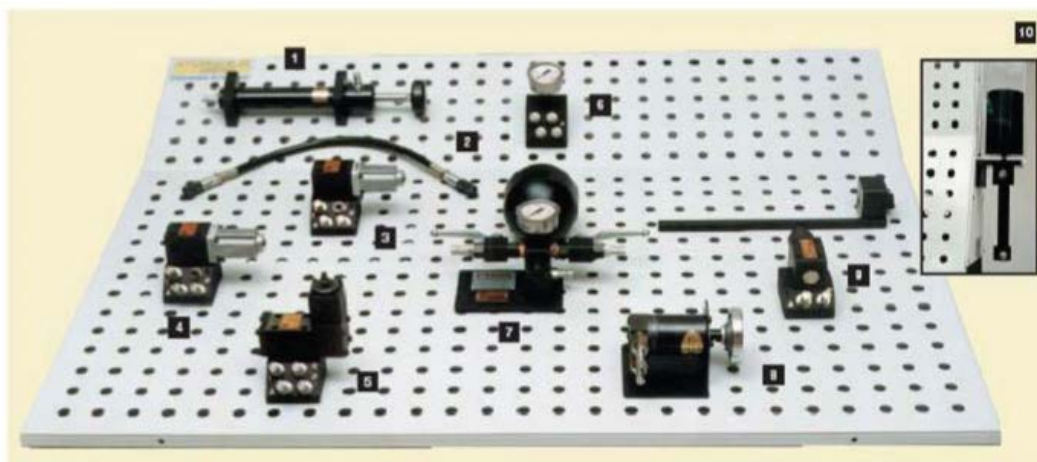
**4/3 manual acting valve,  
spring centered**  
P-T connected at centered  
position, onto base plate

18

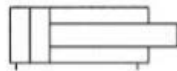
**Workbook with theory and practices**

## Hydraulics Component Set Level II

Set made up of the following components and includes piping to complete the circuits:



1



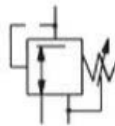
**Double action cylinder**  
Ø32 / Ø16 x 200 mm stroke.

2



**Set of 10 hoses with quick female connectors**  
8 hoses NW6 x 500 mm length  
2 hoses NW6 x 1000 mm length

3



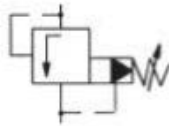
**Pressure reducing valve, 3 ways**  
2...64 bar, onto base plate

4



**Pressure relief valve with  
spool and damping**  
2...64 bar

5



**Pressure relief valve with  
spool, piloted**  
2...64 bar

6



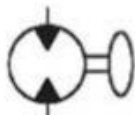
**4 connections distributor on  
manifold with pressure  
gauge 0...60 bar**  
Glycerin damped

7



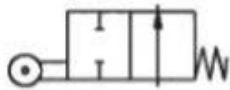
**Hydraulic diaphragm  
accumulator with T.U.V. safety  
certificate**  
2 manual valves and a relief  
security valve.  $V=0,7 \text{ dm}^3$ ,  
Nitrogen pressure 20 bar

8



**Hydraulic motor**  
Gyrator system, with shaft  
wheel.  $12,5 \text{ cm}^3/\text{rev}$

9



**2/2 valve, ball actuated,  
spring return**

With acting cam for Ø32  
cylinder rod

10

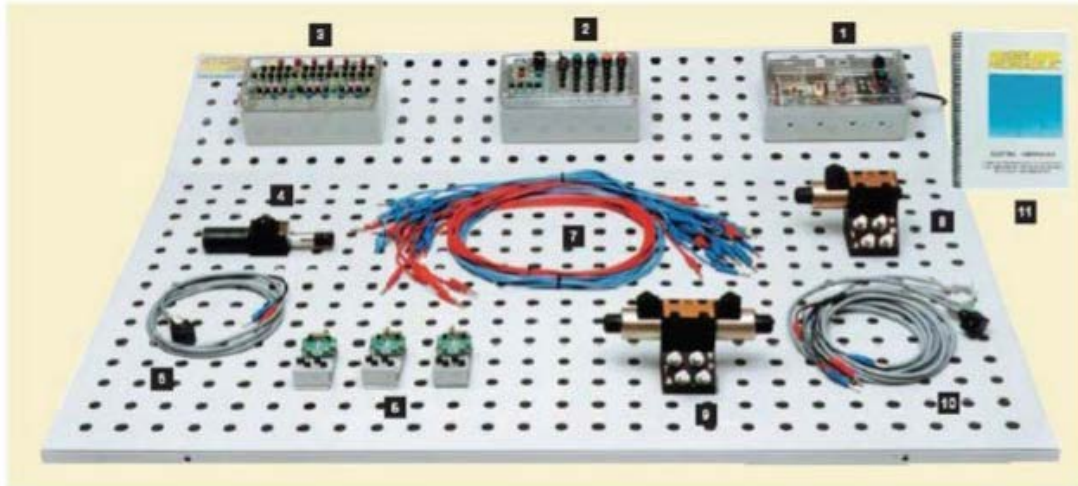
**Counter-weight 30 Kg**

To be fixed on one of the trolley sides. It includes a double effect cylinder Ø20 / Ø12, 150 mm stroke in order to make traction / compression exercises. Transparent protection screen



## Electro Hydraulics Component Set

Set made up of the following components and includes piping to complete the circuits:



1

**Electronic power supply module 220 VAC/24 VDC, I=5 A.  
Over load and short circuit protection**

On/Off switch  
On/Off indication lamp  
Electronically stabilized  
Ø=4 mm electronic quick connectors  
Plastic box with printed transparent cover

2

**Control unit**

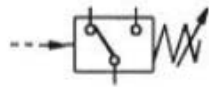
4 push buttons, 2 green, 1 red, 1 yellow, with 1 normally open + 1 normally closed contacts each  
1 switch with 1 normally open + 1 normally closed contacts  
1 connection / disconnection electronic timer, 0 to 6 second regulation  
4 spark suppressing diodes  
4 indicator lights, 2 green, 1 red and 1 yellow  
Ø=4 mm quick connectors  
Plastic box with printed transparent cover

3

#### Relay module

3 relay unit with 4 exchanged (switched) contacts each  
On/Off light indicator on every relay solenoid  
Spark suppressing diode on every solenoid  
6 connection divider for positive voltage  
6 connection divider for negative voltage de  
 $\varnothing=4$  mm quick connectors  
Plastic box printed transparent cover

4



#### Adjustable pressure switch

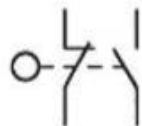
Max. Pressure=40bar  
Output signal by exchanged (switched) contact

5

#### Cable + connector for pressure switch

Male  $\varnothing=4$  mm quick connector  
Cable length = 1,5 m

6



#### Limit switch, with 1 normally closed contact + 1 normally opened contact

Transparent body  
 $\varnothing=4$  mm female connectors

**7**

**Set of connecting cables, formed by:**

14 blue cables, 50 mm length, with  $\varnothing 4$  mm male quick connectors  
14 red cables, 50 mm length, with  $\varnothing 4$  mm male quick connectors  
8 blue cables, 150 mm length, with  $\varnothing 4$  mm male quick connectors  
8 red cables, 150 mm length, with  $\varnothing 4$  mm male quick connectors

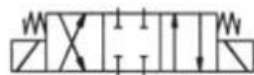
**8**



**4/2 solenoid valve, 24 VDC solenoid and spring return**

NW6 size valve, assembled on base plate with quick fit ecologic connectors

**9**



**4/3 solenoid valve, 24VDC solenoids and spring centered**

A, B, P and T closed in centered position. NW6 size valve assembled on base plate with quick fit ecologic

**10**

**Set of connectors for solenoids. 2 grey + 1 black**

Including solenoid 2P+G connector, on/off indicator lamp, cable and male  $\varnothing=4$  mm quick connector

**11**

**Electro hydraulics workbook with theory and practice**



## Additional Systems / Solutions we offer:



## AUTOMATION

### HYDRAULICS



DL 8110H with DL 8110EH



DL 8110EH

#### THIS TRAINER IS COMPOSED AS FOLLOWS:

- Work bench complete with metal working panel with holes for clamping the hydraulic components without using additional tools, 4 wheels and 3 drawers for storing components.
- Hydraulic power unit assembled onto the metal structure, under the panel; 4.5 liters /min., noise level 60 db - 1 meter, pressure relief valve, oil level viewfinder, air inlet filter, oil return filter, 1 pressure gauge, oil reservoir 30 liters, on-off control box with two push buttons and motor overload protection.
- Pressure relief valves 2 ...125 bar (2 off)
- One way flow restrictor
- Shut off ball valve
- Two way flow restrictor
- "T" distributor with pressure gauge
- Cross distributor, 4 connections
- Pressure compensated one way flow regulator
- Four connections distributor on manifold with pressure gauge 0 .. 100 bar
- One way restrictor (non-return valve)
- Double acting differential cylinder
- Piloted one way restrictor
- 2/2 manual acting valve, spring return
- 3/2 manual acting valve, spring return
- 4/2 manual acting valve, spring return
- 4/3 manual acting valve, spring centred
- Set of tubes for testing pressure drops
- Set of 12 hoses with quick female connectors
- Workbook with theory and practices

#### OPTIONALLY, IT IS POSSIBLE TO ADD THE FOLLOWING SET OF MODULES (DL 8110H-2) FOR ADVANCED HYDRAULICS:

- Four connections distributor on manifold with pressure gauge 0.. 100 bar
- Pressure reducing valve, 3 ways, 2 ...125 bar
- Pressure relief valve with spool and camping, 2...125 bar
- Pressure relief valve with spool, piloted, 2...125bar
- Hydraulic motor, with shaft wheel
- Double acting cylinder, 32, 16 x 200mm stroke
- 2/2 valve, ball actuated, spring return
- Counter-weight 30 Kg.
- Hydraulic diaphragm accumulator, 2 manual valves and a relief security valve
- Set of 10 hoses with quick female connectors

#### A FURTHER OPTION IS GIVEN BY THE ELECTRO-HYDRAULICS SET OF COMPONENTS (DL 8110EH) THAT CAN BE ADDED TO THE ABOVE TO OBTAIN AN ELECTRO-HYDRAULIC TRAINER:

- Electronic power supply module, with over load and short circuit protection
- Control unit, with 4 push buttons, 1 switch, 1 connection / disconnection electronic timer, 4 spark suppressing diodes, 4 indicator lights
- Relay module, with 3 relay units, with 4 exchanged (switched) contacts each, an on-off light indicator on every relay solenoid, spark suppressing diode on every solenoid, 6 connection dividers for positive voltage and 6 for negative voltage
- 4/2 solenoid valve, spring return
- 4/3 solenoid valve, spring centered
- Set of connectors for solenoids
- Limit switch, with 1 normally closed contact + 1 normally open contact (3 off)
- Adjustable pressure switch, max. pressure = 125 bar.
- Cable + connector for pressure switch
- Set of connecting cables
- Electro-hydraulics work-book with theory and practice







## AUTOMATION



### HYDRAULIC BENCH with TRANSPARENT COMPONENTS DL 8110ES

THIS TRAINER IS COMPOSED AS FOLLOWS:



Work Bench



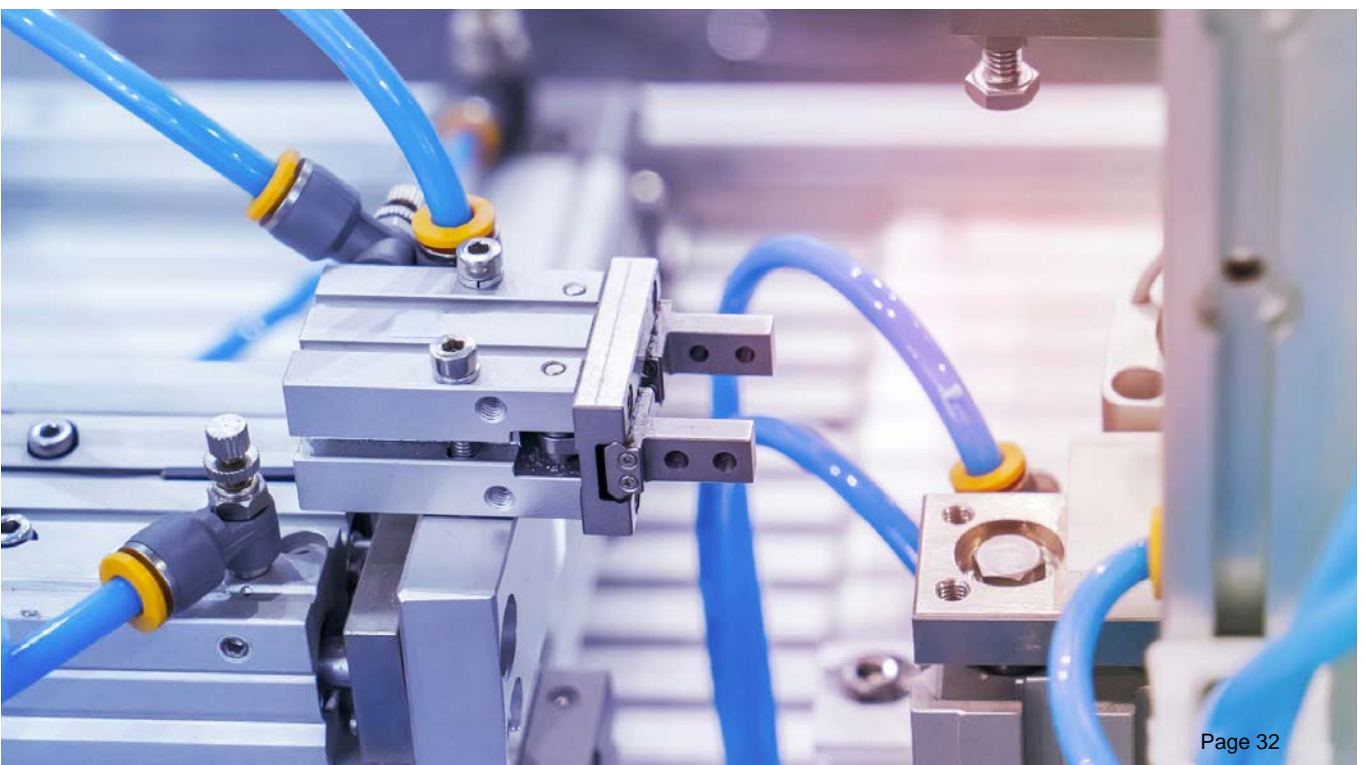
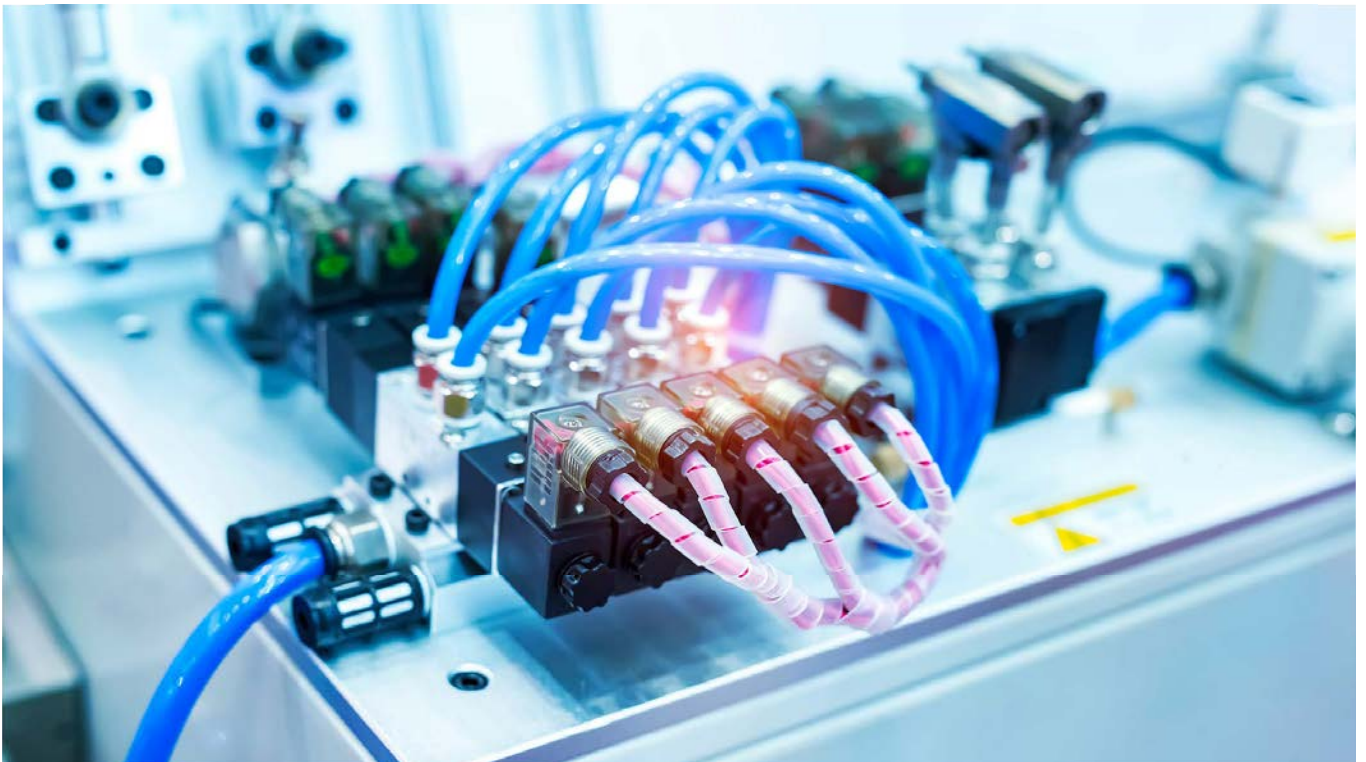
Hydraulic Power Unit



Transparent Components

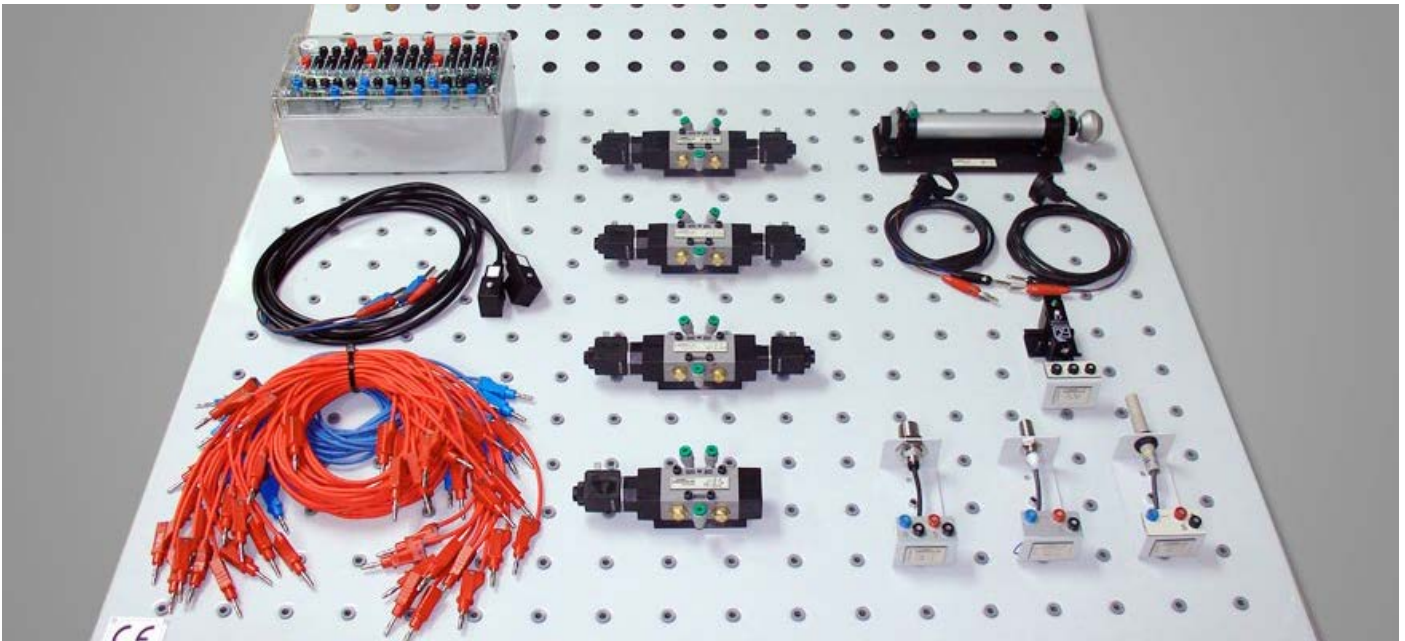
- Work bench complete with:
  - Metal working panel fully plastic coated; panel dimensions: 950 x 1050 mm. With Ø5 mm holes every 50mm (horizontally and vertically) for quick clamping of hydraulic components without using additional tools;
  - 4 wheels (the 2 front wheels are lockable);
  - 3 drawers with locking systems with key for storing components;
  - 1 clipboard located on the side of the work bench.
  
- Movable hydraulic power unit.  
This electrically powered hydraulic unit consists of:
  - 6 litres transparent tank;
  - 0.12Kw single-phase motor;
  - extra-silent gear pump, Q= 0.5 l/min;
  - pressure relief valve, P max: 10 bar;
  - pressure gauge: 0-16 bar Stop-Start switch;
  - quick fit couplings (1P – 2T);
  - 3m power cable with plug;
  - tap for inserting bubbles into circulating oil circuit;
  - oil can (5 litres) with special red colouring.
  
- Transparent components:
  - Double effect cylinder: d/e cylinder Ø20 x Ø10 x 58mm.
  - Manually actuated 4/2 distributor: manually actuated, spring return
  - Pressure relief valve: ball valve. Direct control.
  - 3 connection divider with pressure gauge: 0-10 bar pressure gauge. One female + two male's quick fit connectors.
  - Check valve: seat check valve.
  - Flow restrictor: needle flow restrictor, manual regulation.
  - 6 connection divider: 6 male quick-fit self-sealing connectors, size NW4
  - Set of hoses: 6 NW3 x 520 mm length, 4 NW3 x 350 mm length. With quick-fit self-sealing female connectors.
  - Workbook with theory and practices.

# AMTEC PNEUMATIC TRAINERS AND EQUIPMENT





## Pneumatic Training Solutions



*Hydraulic systems are all around us on a daily basis. They're used in vehicles, construction equipment, buildings, and manufacturing facilities. Hydraulics are one of the most efficient ways to create movement when heavy loads are involved or a repetitive motion is needed.*

*Hydraulic systems in their simplest form are simply a system that uses pressurized fluid to task. Simple hydraulic systems have been used even in ancient times but were limited to open using gravity to create pressure. Hydraulic systems were revolutionized by the introduction of the with which high pressures could be created quickly and easily. The first pump powered systems revolutionized how hydraulics were used and used water as the working fluid. Systems ranged from small systems to operate a single component to systems spanning an entire city as a public utility to operate machinery in multiple factories*



## Amtec's Solutions for Pneumatics

*Amtec Techniquip Pty Ltd has partnered with reputable manufacturers of equipment of equipment to fulfil the requirement to proficiently train learners on Hydraulics & Pneumatics to allow them to enter industry competently prepared and ready for the workplace.*

*We have tailored solutions to meet the requirements of both the South African and international market in terms of both budget and curriculum requirements.*

*Both Workstations and Component sets we have available are as follows and feature in more detail in this brochure*

### *Pneumatic Workstations:*

- *Single Sided Pneumatic Workstation – Self Contained includes Silent Compressor*
- *Double Sided Pneumatic Workstation – Self Contained includes Silent Compressor*
- *Frame Sets – Silent Compressor Available separately*

### *Pneumatic Component Sets:*

- Basic Pneumatic Component Sets – Introductory Hydraulics Course
- Skill Development Component Set (Tailored for the South African Market)
- Trade Test Component Set (Tailored for the South African Market)
- Level I Pneumatic Component Set
- Level II Pneumatic Component Set

### *Electro-Pneumatic Component Sets:*

- Electro-Pneumatics' Component Set Level I
- Electro-Pneumatics' Component Set Level II



## *PNEUMATIC WORKSTATIONS:*



### *PLA70-1 – Single Sided Pneumatic Workstation*

### *PLA70-2 – Double Sided Pneumatic Workstation*

#### *Features:*

- Single (PLA70-1) or Double (PLA70-2) Working Post
- Metal Structure with Powder Coated Finish
- Working Surface for Component mounting 950 x 1050mm c/w matrix system for component mounting – NO TOOLS REQUIRED TO MOUNT COMPONENTS
- Lockable Castor Wheels
- Drawer Set to house Components
- Silent Compressor included
- Paper Clip Board
- Emergency Stop Buttons
- Dimensions – 1100 x 800 x 1960mm (h)

## Tabletop Reclining Training Panel (Small)



Designed with a budget in mind, the small Table Top Frame set allows the end user to mount the frame to an existing workbench / Table in the laboratory / workshop.

### Features:

- Table Top Panel – Free Standing (Can be mounted and fixed to existing Tables in the laboratory / workshop)
- Applicable to Pneumatic Component Sets
- Working Surface Dimensions - 900 x 1050mm (h)
- Powder Coated Finish
- Silent Compressor Available Separately.

## Silent Compressor

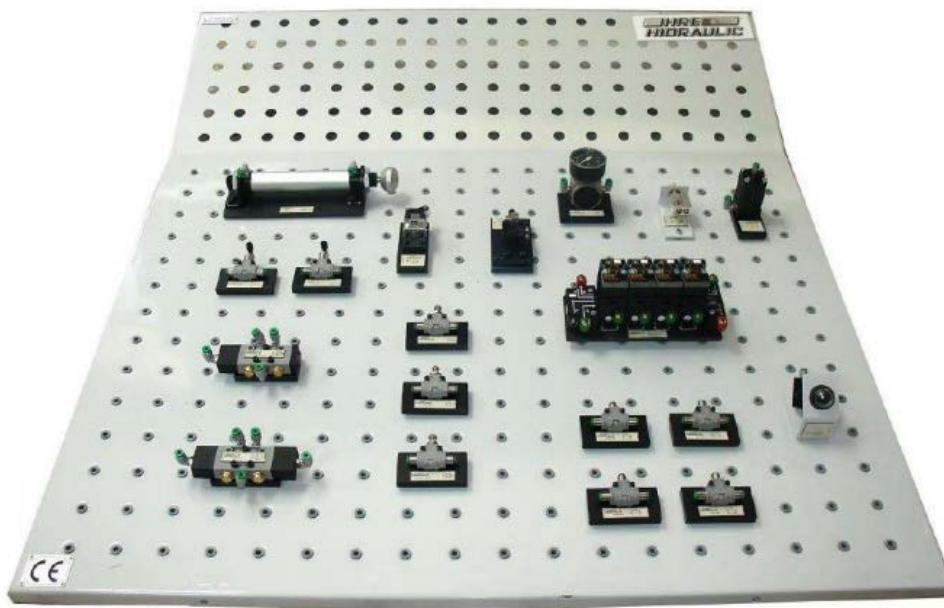


### Features:

- Designed for the classroom environment with low noise levels 45dB @ 1m
- Flow – 50 Litres/ min
- Pmax – 8Bar
- Power – 0,5 HP
- Complete with quick release type pneumatic fittings
- Includes Pressure switch for Auto ON/OFF
- Inlet Air Filter
- Visual Indicator for lubricant Level

## PNEUMATIC COMPONENT SETS

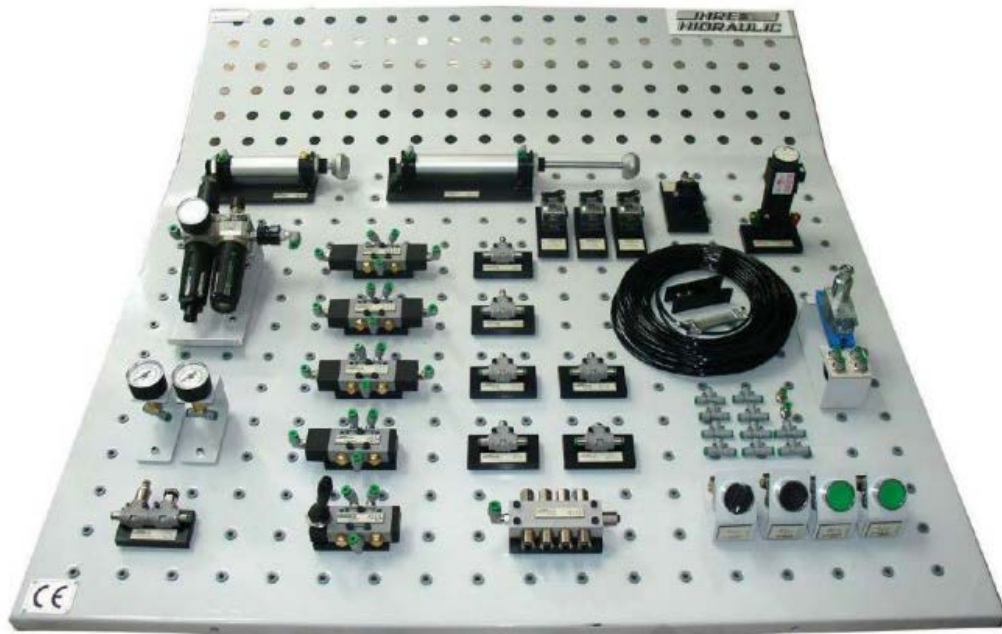
### Skill Development Component Set



Set made up of the following components and includes piping to complete the circuits:

- 2xx Double Acting Cylinder
- 1xx Pressure Sequence Valve
- 1xx Flow Control Valve – One Way
- 1xx Pressure Gauge
- 2xx 3/2 Way Valve - Normally Closed PB Type
- 2xx 3/2 Way Valve – Normally Closed Selector Switch Type
- 1xx 3/2 Way Actuator – Normally Closed Spring Return Type
- 2xx 5/2 Way Actuator - Air Return Type
- 4xx 3/2 Way Limit Switch
- 1xx AND Valve
- 1xx OR Valve
- 1xx Distribution Gauge – Air
- 1xx Hose Cutter
- 1xx Reservoir Tank

## Trade Test Component Set



Set made up of the following components and includes piping to complete the circuits:

- 2xx Double Acting Cylinder
- 1xx Single Acting Cylinder
- 1xx Pressure Sequence Valve
- 1xx Set of Spare Parts
- 10xx T Connector
- 1xx Hose 10m
- 1xx Pressure Sequence Valve
- 1xx Flow Control Valve – One Way
- 1xx Quick Exhaust
- 1xx Pressure Gauge
- 1xx Time Delay Valve NC
- 2xx 3/2 Way Valve - Normally Closed PB Type
- 2xx 3/2 Way Valve – Normally Closed Selector Switch Type
- 1xx 3/2 Way Actuator – Normally Closed Spring Return Type
- 1xx 5/2 Way Air Actuator Spring Return
- 2xx 5/2 Way Actuator - Air Return Type
- 4xx 3/2 Way Limit Switch
- 1xx AND Valve
- 1xx OR Valve
- 1xx Distribution Gauge – Air
- 1xx Hose Cutter
- 1xx Reservoir Tank

## Pneumatic Component Set Level I

Set made up of the following components and includes piping to complete the circuits:



1



**Simple effect cylinder**

Ø25 x 50 mm

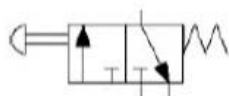
2



**Double effect cylinder**

Ø25 x 100 mm

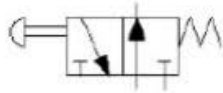
3



**2 3/2 button actuated  
valves, normally closed**  
Spring return

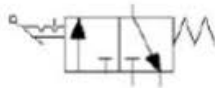


4



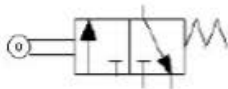
**3/2 button actuated valve,  
normally opened**  
Spring return

5



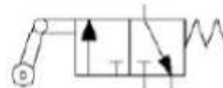
**3/2 valve, actuated by  
manual rotary switch**

6



**3 3/2 pneumatic limit  
switches**

7



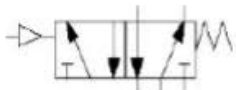
**One way actuated 3/2  
pneumatic limit switch**

8



**5/2 manual valve**  
Spring return

9



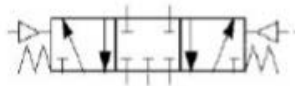
**5/2 valve, pneumatically  
operated**  
Spring return

10



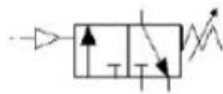
**2 5/2 valves, pneumatically operated on both sides**

11



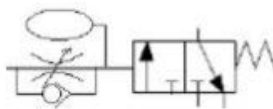
**5/3 valve, pneumatically operated**  
P, A, B, R, S closed at centre position

12



**Sequence valve**

13



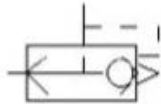
**Pneumatic adjustable timer**  
0-30 sec

14



**One way flow restrictor**

15



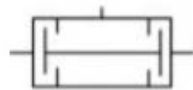
**Quick exhaust valve**

16



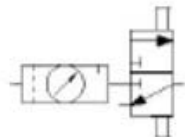
**2 circuit selectors**  
Pneumatic OR logic function

17



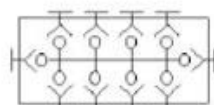
**Pneumatic AND logic function**

18



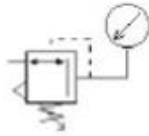
**FRL unit**  
Filter + pressure regulator +  
pressure gauge 0...12 bar +  
lubricator + 3/2 valve

19



**10 connection divider**

**20**



**Pressure regulating valve  
with gauge, 0...10 bar**

**21**



**2 pressure gauges  
0...10 bar, with two  
connections**

**22**



**Flexible black hose  
25 m, Ø4 mm ext**

**23**



**10 "T" fittings**

**23**

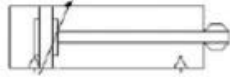
**Workbook with theory and practices**

## Pneumatic Component Set Level II

Set made up of the following components and includes piping to complete the circuits:

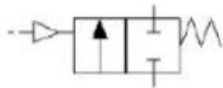


1



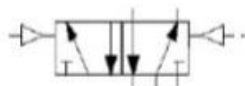
**Double effect cylinder**  
Ø25 x 100 mm with  
adjustable pneumatic  
damping

2



**2 2/2 valves**  
Pilot one way restrictor

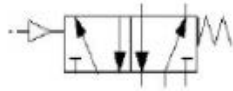
3



**5/2 valve, pneumatically  
operated on both sides**



4



**5/2 valve, pneumatically  
operated**  
Spring return

5



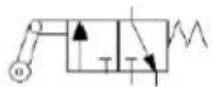
**3 one way flow restrictors**

6



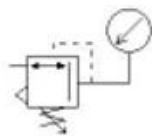
**One way actuated 3/2  
pneumatic limit switch**

7



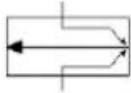
**3/2 pneumatic limit switch**

8



**Low pressure regulator**

9



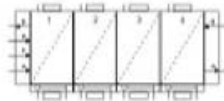
**Pneumatic low pressure detector**

10



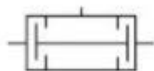
**Amplifier for pneumatic detector**

11



**4 step logic sequencer**

12



**4 pneumatic AND logic functions**

13



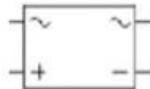
**Pressure indicator**

## Electro - Pneumatic Component Set Level I

Set made up of the following components and includes piping to complete the circuits:



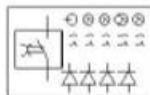
1



### Power supply unit

220 VAC/24 VDC, I= 5A,  
(optionally 110 Vca/24 Vcc)

2



### Control module

4 button switches: 2green, 1 red, 1 yellow, with 2 open contacts + 2 closed contacts each

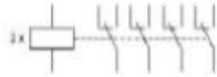
1 switch with 1 open contact + 1 closed contact

1 electronic timer, selectable to connecting / disconnecting function

4 suppressing diodes

4 indicating lamps: 2 green, 1 red, 1 yellow

3



**Relay module**

3 relays with 4 change-over switches each. Powered coil indicating led

4



**3 electric limit switches**

With 1 open contact + 1 closed contact

5



**3/2 solenoid valve**

Spring return, 24 Vcc

6



**2 5/2 solenoid valves**

Spring return, 24 Vcc

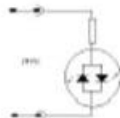
7



**5/2 solenoid valve**

24 Vcc

8



**5 connectors with led and  
cable for solenoids**

9



**Set of cables**

4 red cables, length: 250 mm  
8 red cables, length: 500 mm  
6 red cables, length: 1500 mm  
6 blue cables, length: 500 mm

10

**Workbook with theory and practices**

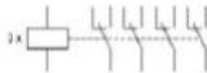


## Electro - Pneumatic Component Set Level II

Set made up of the following components and includes piping to complete the circuits:



1



### Relay module

3 relays with 4 change-over switches each. Powered oil indicating led

2



### Double effect cylinder

Magnetic piston,  $\varnothing 25 \times 100$  mm.  
Pneumatic adjustable damping at both ends

3



2 Magnetic field detectors  
"Reed"

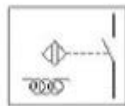
4



**Pressure switch**

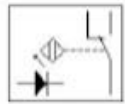
With output by change-over switch

5



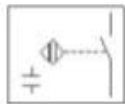
**Inductive detector**

6



**Optic detector**

7



**Capacitive detector**

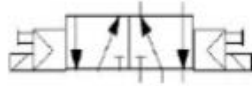
8



**5/2 solenoid valve**

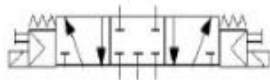
Spring return, 24 Vcc

9



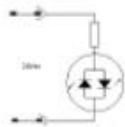
**2 5/2 solenoid valve**  
24 Vcc

10



**5/3 solenoid valve**  
Closed centers, 24 Vcc

11



**2 connectors with led and  
cable for solenoids**

12



**Set of connecting cables**  
6 red cables, 250 mm length  
10 red cables, 500 mm  
length  
8 red cables, 1500 mm  
length

## Additional Systems / Solutions we offer:



## AUTOMATION



### ELECTRO-PNEUMATICS



DL 8115EPB

### SINGLE-PHASE ELECTRO-COMPRESSOR



DL 8110SLZ

With very low noise level for small capacity.  
Tank capacity: 24 litres  
Air intake: 50 litres/min.  
Max. working pressure: 8 bar or 116 PSI  
Motor power: 0.34 kW or 0.45 HP  
Noise level: 40 dB  
Dimensions: 40 x 40 x 60 (h) cm.  
Weight: 25 kg.

This trainer is composed as follows:

#### BASIC MODULES (DL 8115EPB)

- DL 8110P01: Slide valve, filter-regulator with manometer and distributor
- DL 8110P11: Simple effect (SE) magnetic cylinder with retracted piston rod and flow micro-regulator
- DL 8115EP01: 3/2 electro-pneumatic valves, 1 NC (YES) and 1 NO (NOT)
- DL 8115EP02: 5/2 electro-pneumatic valves, bistable (1) and monostable with mechanical spring (1) with filters
- DL 8115EP03: Double effect (DE) magnetic cylinder with flow micro regulators (2), reed sensors (2) and photo-electric sensor
- DL 8115EP04: Double effect (DE) magnetic cylinder with flow micro regulators (2), reed sensors (2), inductive sensor and capacitive sensor
- DL 8115EP05: Stabilized power supply module: 24Vdc, 2A
- DL 8115EP06: Module with 6 push-buttons (with 1 NO contact, 1 NC contact each)
- DL 8115EP07: Module with 3 relays (with 4 NO contacts, 4 NC contacts each)
- DL 8115EP08: Module with 4 lamps, 2 timers (on-delay and off-delay) and two switches, 1 NO contact, 1 NC contact each

#### ADVANCED MODULES (OPTION: DL 8115EPA)

- DL 8110P06: Manometers and two-way flow micro-regulator
- DL 8115EP09: Pressostats, adjustable (1) and pressure controlled (1), 1 NO contact, 1 NC contact each
- DL 8115EP12: Proportional electronic regulator and digital pressostat

**NOTE:** the electro-pneumatic bench DL 8115EP can be connected to a PLC, such as the DL 2110ATN.

**ACCESSORY:** the pneumatic and electro-pneumatic benches need an air compressor such as: 8110SLZ.

#### PLC

With 8 digital inputs, 6 relay outputs, 2 analogue inputs and 2 analogue outputs, panel type. It can be assembled on a De Lorenzo frame. Complete with the programming software.



DL 2110ATN





## AUTOMATION



### PNEUMATIC BOARD



DL 8161

#### Experiments

- Single cylinder circuits with or without speed regulation
- Circuits with logic devices
- Circuits with delay devices
- Single or continuous sequence control of two or more cylinders
- Circuits with emergency control
- Memory circuits

Trainer for demonstrations and experiments in the pneumatic field. The trainer includes a metal frame supporting the following modules:

- A pneumatic board, where all the components are mounted and identified through a clear symbol. They include: 2 double-acting cylinders with 3 return orifice check valves, 4 roller lever and 1 lever 3/2 valves, 2 stable and 2 unstable 5/2 valves, 2 AND, 2 OR and 1 NOT, 1 throttle valve, 1 capacity, 1 fast relief valve and 1 splitter. Supplied with 75 m of  $\varnothing 4$  and 3 m of  $\varnothing 6$  plastic tube, 10 tees and 10 plugs, as well as 1 pipe cutter, service manual and exercise book with experiments.
- An air supply vertical board, providing 1 lever main switch, 1 filter, 2 pressure regulators with 2 pressure gauges, 1 mushroom and 3 digital 3/2 push-buttons, 1 lever 5/2 selector and 1 digital 5/2 push-button.

### ELECTRO-PNEUMATIC BOARD



DL 8171

#### Experiments

- Circuits with single and double-acting cylinders
- Circuits with logic controls
- Circuits with relays
- Circuits with timers
- Circuits with multiple cylinder sequences
- Driving of circuits with programmed logic sequence, using an optional PLC

Trainer for demonstrations and experiments in the electro-pneumatic field.

The trainer includes a metal frame supporting the following modules:

- A pneumatic board, where all the components are mounted and identified through a clear symbol. They include: 6 magnetic double-acting cylinders with 12 flow regulators and 12 proximity sensors, 4 stable and 2 unstable 5/2 valves, 10 unstable 2/2 solenoid valves and 1 splitter. Supplied with 50 m of  $\varnothing 4$  and 3 m of  $\varnothing 6$  plastic tube, 1 tee and 5 plugs, as well as 1 pipe cutter, service manual and exercise book with experiments.
- An electro-pneumatic board, that, in addition to providing the terminal board for limit switches and valve solenoids, includes: 1 emergency and 4 control push-buttons, 1-2PDT switch, 1 delayed pickup and 1 delayed drop-out time relay, 5 auxiliary contactors with 6 changeover contacts each and 3 signal lamps.
- An air supply vertical board, providing 1 lever main switch, 1 filter, 2 pressure regulators with 2 pressure gauges, 1 mushroom and 3 digital 3/2 push-buttons, 1 lever 5/2 selector and 1 digital 5/2 push-button.

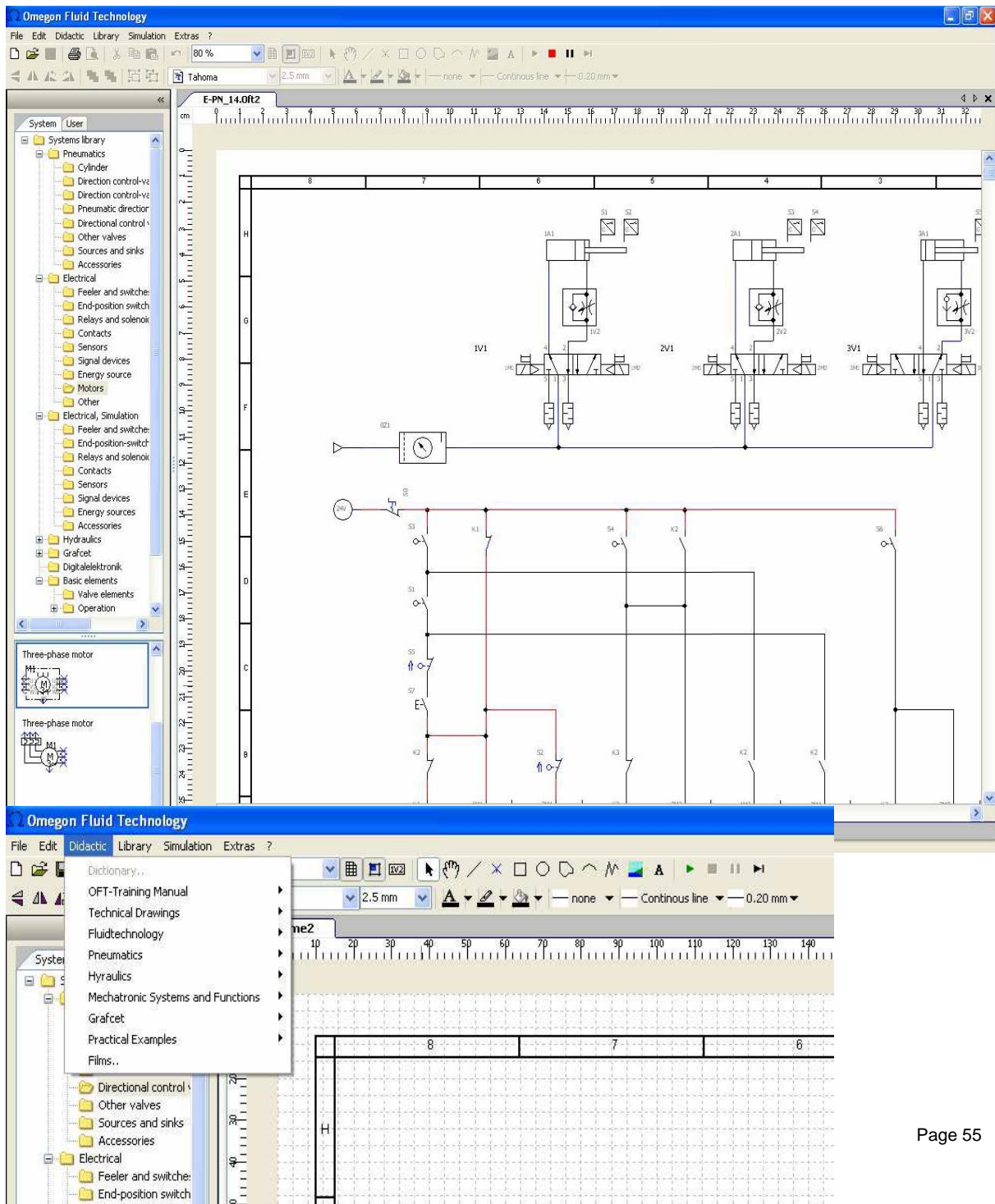
**NOTE:** the electro-pneumatic bench DL 8171 can be connected to a PLC, such as our DL 2210A or DL 2210B.

**ACCESSORY:** both the pneumatic and electro-pneumatic benches need an air compressor such as our DL 8110SLZ.

Software Solutions Available:

# OFT – Simulation Software for Hydraulics, Pneumatics, Electricals and Logic.

The Software package with integrated Teachware for basic and further training.



The software also includes fundamentals of each subject plus exercises and solutions to form an excellent introduction. The test exercises incorporate numerous circuit diagrams. Also included are technical books on the subject. Some of these have already been translated into English (marked blue).

- Technical Drawings - Fundamentals
- Graphic Symbols DIN ISO 1219
- Introduction - Fluid Technology
- Pneumatics. Basics and Application
- Pneumatics - Exercises and Solutions
- Electropneumatics - Exercises and Solutions
- Pneumatic Control - Exercises and Solutions
- Electropneumatic Control - Exercises and Solutions
- Hydraulic Control - Exercises and Solutions
- Mechatronic Systems and Functions
- Introduction - Grafcet - Exercises and Solutions
- Electric Drives
- Fundamentals of Electro-technics
- PLC

- Dictionary – English - German

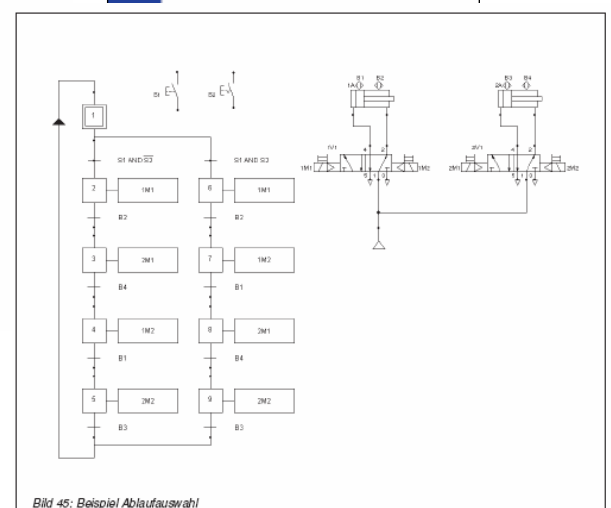
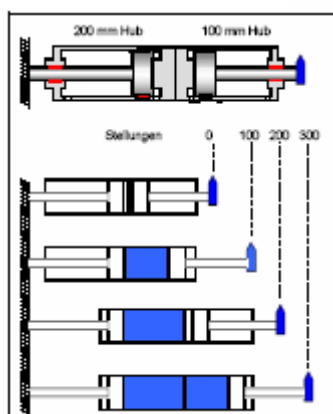
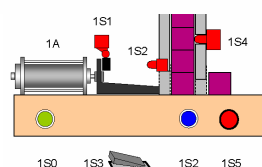
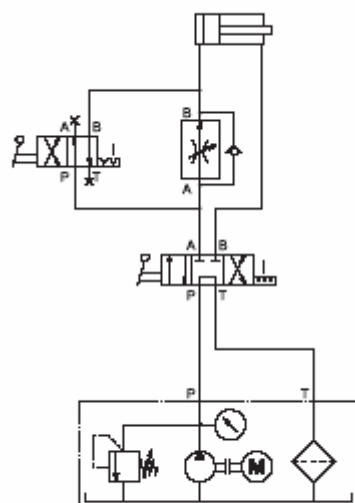
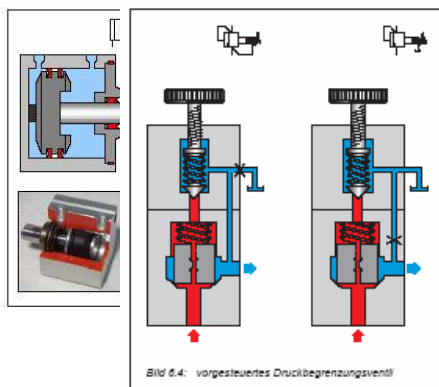
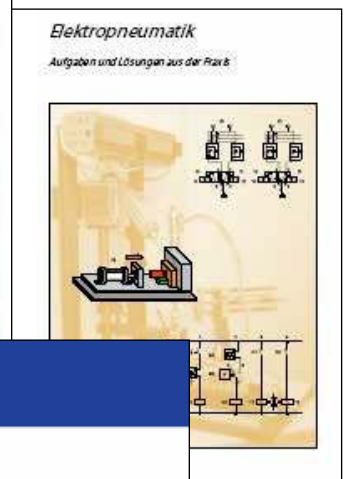
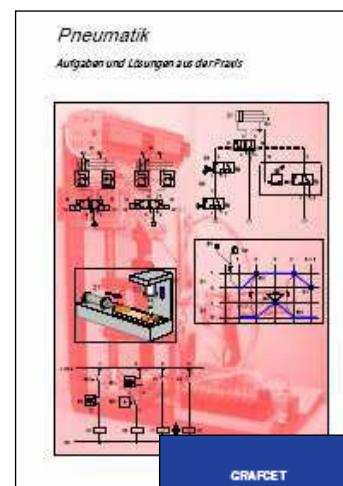
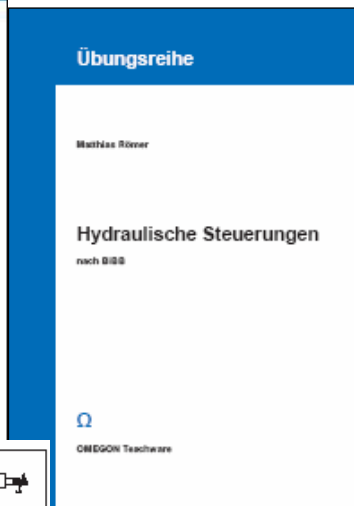
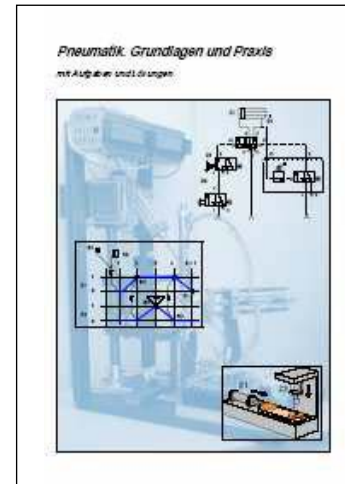
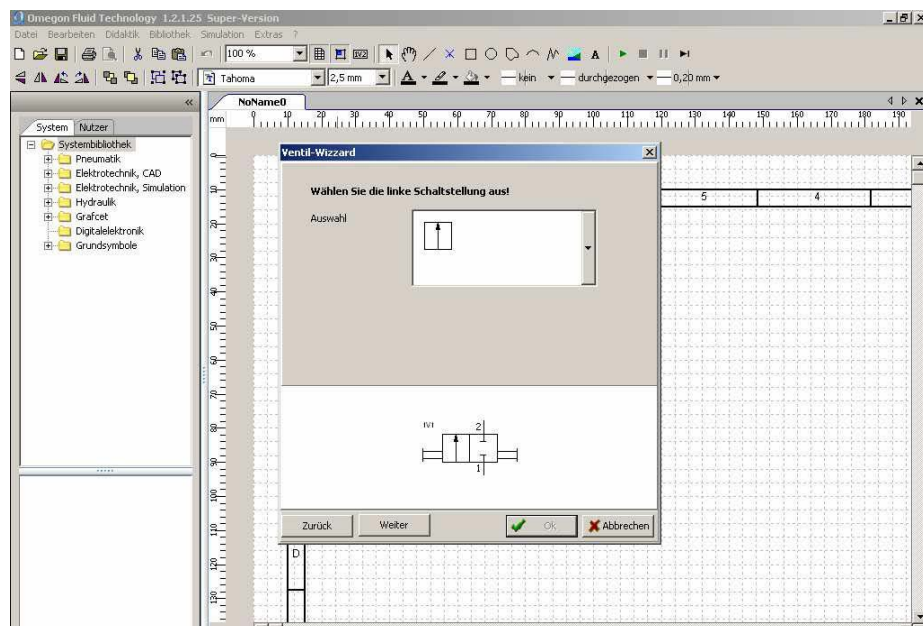
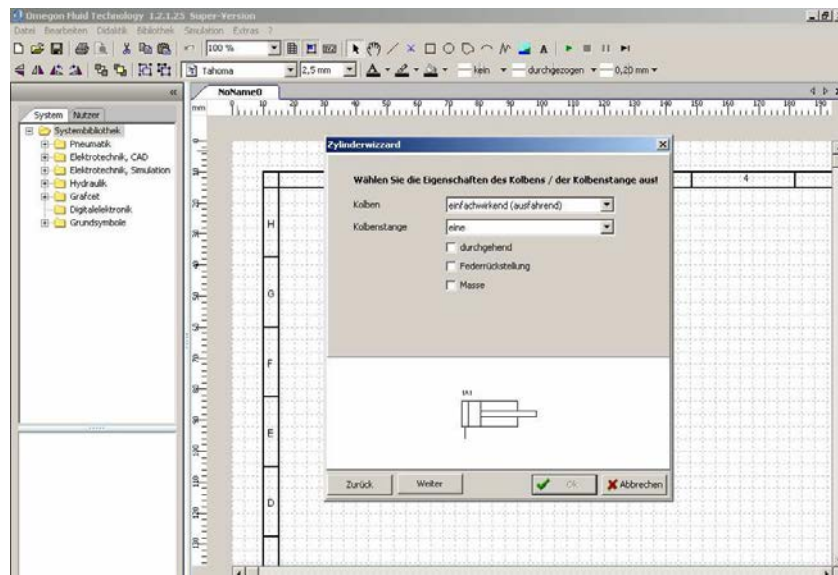


Bild 45: Beispiel Ablaufauswahl

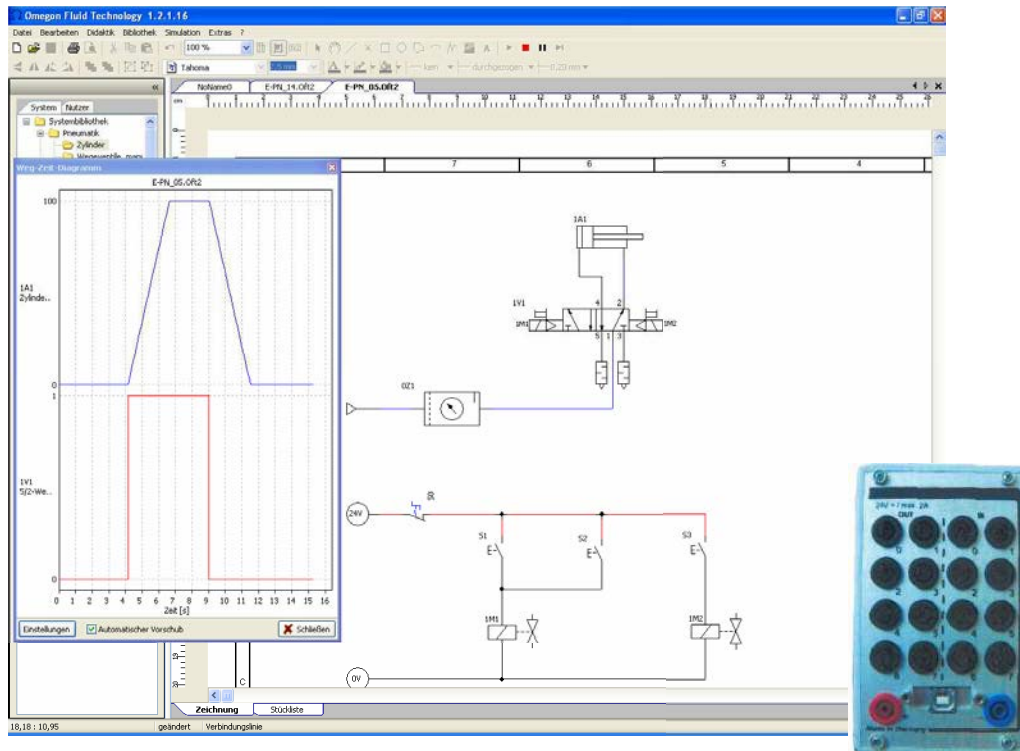


## Cylinder – Valve Wizzard





## - Phase diagrams



USB-IO Box

## Principal features of the Software

- Circuit diagrams using hydraulic, pneumatic, electrical and logic symbols may be created quickly and without problems. They may be printed in different formats and can include extras such as company logos and other required layouts.
- The OFT-Software is easy to use and does not normally require any operator training.
- Symbols are found in the software libraries with the facility that the user may add new symbols. These may be stored in an individual user library.
- An additional library for automotive symbols is also included.
- A parts list of deposited unit symbols is automatically generated.
- A single place student's licence is available with conditions, but would contain all the modules essential to basic training.

## AMTEC WORKSHOP MACHINES AND EQUIPMENT

AMTEC can offer all Workshop equipment and tools required in the Workshops and Training facilities.

We can offer a comprehensive solution to fit-out your entire center.



## AMTEC TOOLS, ACCESSORIES AND CONSUMABLES

**AMTEC supply a wide variety of related tools, accessories and instrumentation**



PVC fittings and conduit



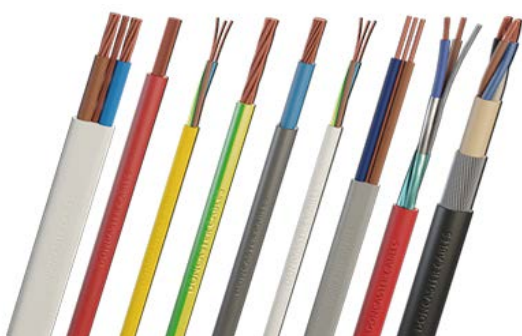
Electrical components



Electronic components



Electrical Consumables



Electrical wires and cables:

- GP wire
- Solid wire
- Armored cable
- Unarmored cable
- Surfix cable
- Cabtyre
- Panel flex
- Bare copper





## AMTEC DVD LIST

**Amtec Techniquip has training DVDs and manuals available for common processes in the various Engineering workshop teaching various principles from safety in the workplace to various machines.**

**We have the following DVD's available for the Engineering Workshop.**

DVD Description	PART NO	COURSE
AC & DC MACHINES DVD + 2 MANUALS	AMTECDVD001	Electrical
AC INDUCTION MOTORS DVD + 2 MANUALS	AMTECDVD002	Electrical
AIR CONDITIONING & REFRIGERATION DVD + 2 MANUALS	AMTECDVD003	AC
ANALOGUE OSCILLOSCOPE DVD + 1 MANUAL	AMTECDVD004	Electronics
AUTO ELECTRICAL TESTING DVD + 1 MANUAL	AMTECDVD005	Auto Electrical
AUTOMATIC PROCESS CONTROL DVD + 2 MANUALS	AMTECDVD006	Instrumentation
AUTOMOTIVE ELECTRICAL MAINTENANCE DVD + 1 MANUAL	AMTECDVD007	Auto Electrical
BASIC BEARING MAINTENANCE DVD + 2 MANUALS	AMTECDVD008	Mechanical
BASIC CENTRIFUGAL PUMPS DVD + 2 MANUALS	AMTECDVD009	Mechanical
BASIC HAND TOOLS DVD + 2 MANUALS	AMTECDVD010	Various
BASIC HYDRAULIC MAINTENANCE DVD + 2 MANUALS	AMTECDVD011	Mechanical
BELT AND CHAIN DRIVES DVD + 1 MANUAL	AMTECDVD012	Mechanical
BRAZING AND BRAZE WELDING DVD + 2 MANUALS	AMTECDVD013	Mechanical
COMPOUND MITRE SAW DVD + 1 MANUAL	AMTECDVD014	Mechanical
COMPRESSED AIR SYSTEMS DVD + 2 MANUALS	AMTECDVD015	Mechanical
CONFINED SPACES DVD + 2 MANUALS	AMTECDVD016	Various
DRILLING TAPPING AND THREADING DVD + 2 MANUALS	AMTECDVD017	Mechanical
ELECTRICAL ANGLE GRINDER DVD + 2 MANUALS	AMTECDVD018	Mechanical
ELECTRICAL CONSTRUCTION OPERATOR DVD + 2 MANUALS	AMTECDVD019	Electrical
ELECTRICAL TEST EQUIPMENT DVD + 2 MANUALS	AMTECDVD020	Electrical
ELECTRICITY IN THE WORKPLACE DVD + 2 MANUALS	AMTECDVD021	Electrical
ESSENTIAL KNOWLEDGE FOR WELDERS DVD + 1 MANUAL	AMTECDVD022	Welding
FIRE SAFETY SERIES DVD + 1 MANUAL	AMTECDVD023	Various
FIRE SAFETY FOR OFFICES DVD - NO MANUALS	AMTECDVD024	Various
FORKLIFT OPERATOR TRAINING 2 DVDs + CD ROM	AMTECDVD025	Fork Lift
GAS HAZARD AWARENESS DVD + 1 MANUAL	AMTECDVD026	Welding
GAS METAL ARC WELDING DVD + 1 MANUAL	AMTECDVD027	Welding
GAS SAFETY - PORTABLE CYLINDER HANDLING DVD + 1 MANUAL	AMTECDVD028	Welding
GEARED REDUCTION UNITS DVD + 1 MANUAL	AMTECDVD029	Mechanical
GENERAL SAFETY IN THE WORKPLACE 2 DVDs + CDROM	AMTECDVD030	Various
GENERAL WELDING SAFETY DVD + 1 MANUAL	AMTECDVD031	Welding
GRINDING MACHINES DVD + 2 MANUALS	AMTECDVD032	Mechanical
LEAD ACID BATTERIES DVD + 2 MANUALS	AMTECDVD033	Electrical
LIGHT DUTY HAND SOLDERING DVD + 1 MANUALS	AMTECDVD034	Electrical
LIGHT VOLTAGE JOINTS DVD + 1 MANUAL & EVJ MANUAL	AMTECDVD035	Electrical
LUBRICATION DVD + 1 MANUAL	AMTECDVD036	Mechanical
MEASURING & MARKING (BASIC ENG SKILLS) DVD + 1 MAN	AMTECDVD037	Mechanical
MECHANICAL COUPLING ALIGNMENT DVD + 2 MANUALS	AMTECDVD038	Mechanical
MECHANICAL THREADED FASTENERS DVD + 1 MANUAL	AMTECDVD039	Mechanical
MEDIUM VOLTAGE JOINTS 2 DVDs - NO MANUALS	AMTECDVD040	Electrical
OXY/ACETYLENE EQUIPMENT DVD + 2 MANUALS	AMTECDVD041	Welding
OXY/ACETYLENE PROCESS DVD + 2 MANUALS	AMTECDVD042	Welding
PRECISION MEASURING INSTRUMENTS DVD + 2 MANUALS	AMTECDVD043	Welding
PRESSURE VESSEL TESTING DVD + 1 MANUAL	AMTECDVD044	Mechanical
PROGRAMMABLE LOGIC CONTROLLERS DVD + 2 MANUALS	AMTECDVD045	Electrical
SAFE LIFTING & MOVING 2 DVDs + CD ROM	AMTECDVD046	Various
SEALS & GASKETS DVD + 2 MANUALS	AMTECDVD047	Various
SHIELDED METAL ARC WELDING DVD + 2 MANUALS	AMTECDVD048	Welding
TUNGSTEN INERT GAS WELDING DVD + 2 MANUALS	AMTECDVD049	Welding
VALVES AND VALVE MAINTENANCE DVD + 2 MANUALS	AMTECDVD050	Mechanical
WORKING WITH PORTABLE LADDERS DVD + 2 MANUALS	AMTECDVD051	Mechanical

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**Street Address:** Unit 20 Hughes Industrial Park  
Cnr. Oscar and Romeo Street  
Hughes, Boksburg  
South Africa  
1460

**Phone:** +27 11 823-2678

**Fax:** +27 11 823-1919

**Email:** sales@amquip.co.za (International/ General Sales)  
marco@amquip.co.za (Sales Manager)  
nick@amquip.co.za (Sales Manager)

**Website:** www.amtectechniquip.co.za

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