

Diskrete Systeme

Automaten und Zustands-Übergänge

Trennung von Steuerung und Arbeitsebene

Signalebene \Leftrightarrow Energieebene

Modellierung mit Petri-Netzen

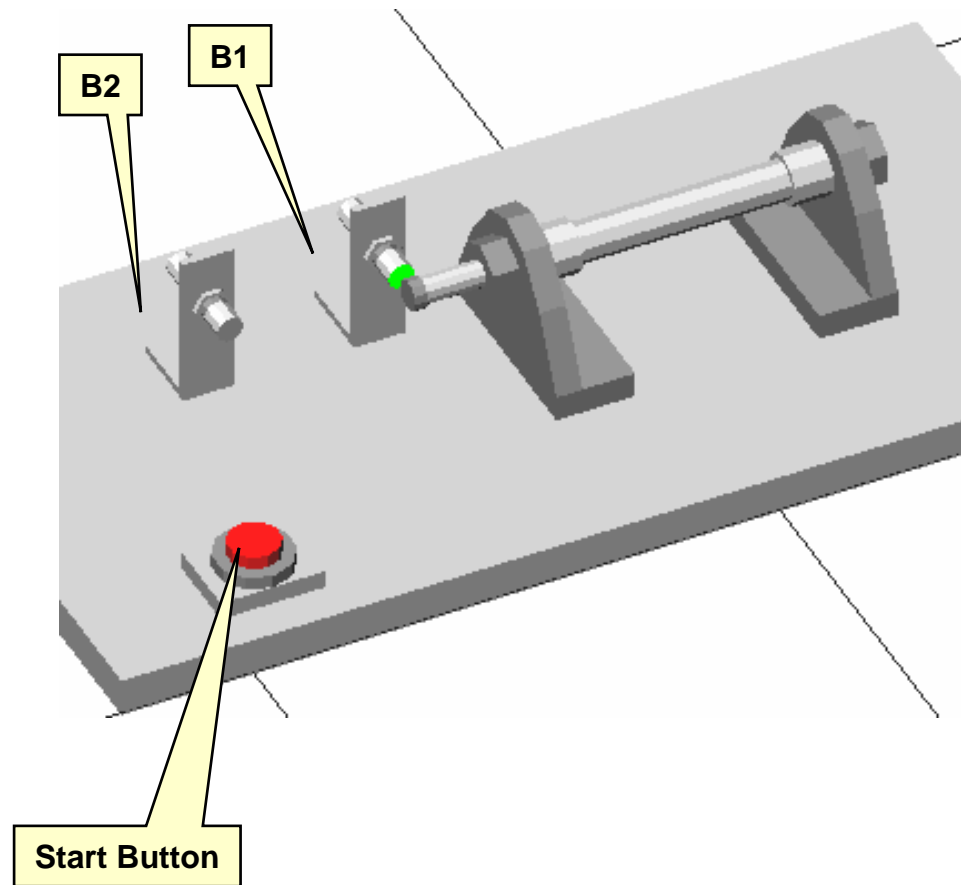
Beispiele

- Elektro-Pneumatik
- Modulares Produktionssystem (MPS)
- Servomotoren (und ihr Doppelcharakter)

Steuerung – Prozess - Umgebung

Steuerung \Leftrightarrow Wirksystem \Leftrightarrow Arbeitsprozess \Leftrightarrow Umgebung

Zylinder-Prozess-Modell



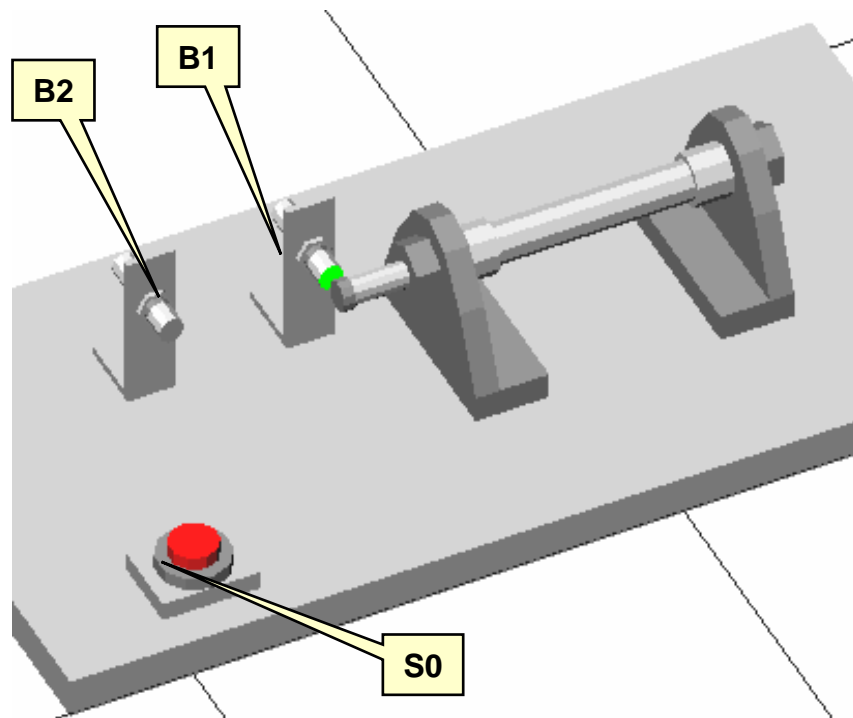
Function

Two proximity switches B1 (retracted) and B2 (extended) signal the positions of the cylinder.

Process sequence

When the Start button is pressed the cylinder moves from one end position to the other. The cylinder must only travel once each time the button is pressed. In order to trigger a second motion of the cylinder, the button must be released and pressed again.

Sensoren und Aktoren



Signal Behavior

Process input		Description
Sensor 0	S1	Start button
Sensor 1	B1	Cylinder retracted
Sensor 2	B2	Cylinder extended

Process output		Description
Actuator 0	Y1	Cylinder 1.0 extended

*Initial position (inactive)
The cylinder is retracted*

3/2-way valve with pushbutton, normally closed - Microsoft Internet Explorer

Datei Bearbeiten Ansicht Favoriten Extras ?

Zurück

Suchen

Favoriten

Medien

Wechseln zu

Links

Adresse <http://lab.artec.uni-bremen.de/help/compThreeTwoWayValveWithPushbuttonNormallyClosed.html>

lab@future

deriveSERVER

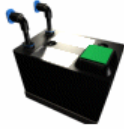
Mixed Reality Web Service

Druckknopf

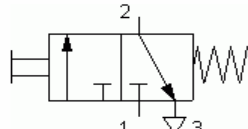
3/2-way valve with pushbutton, normally closed

Pressing the pushbutton operates the valve. The flow passes freely from 1 to 2. Releasing the pushbutton allows the valve to return to its starting position through the use of a return spring. Connection 1 is shut.

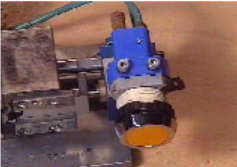
Pictures and Movies



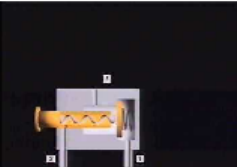
3D picture



Symbol



Working principle movie



Example movie

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Fertig

Internet

Experiment contact persons -- Experiment description

Connected to real hardware students can freely explore the system while sending air through the Internet

Fertig, es sind Fehler auf der Seite aufgetreten.

Internet

Start

ModellingSequen...

T-Online StartCe...

Virtual Construct...

Cortona Console

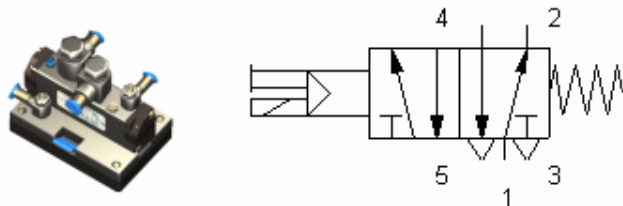
3/2-way valve...

13:22

5/2-way valve, pneumatically operated

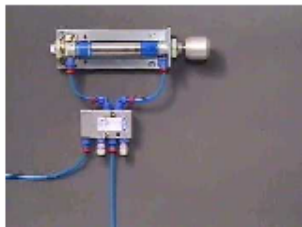
The pneumatic valve is controlled by applying a pilot pressure at connection 14. The flow passes freely from 1 to 4. By stopping the signal the valve is set back to its starting position through the use of a return spring. The flow passes freely from 1 to 2.

Pictures and Movies



3D picture

Symbol



Working principle movie



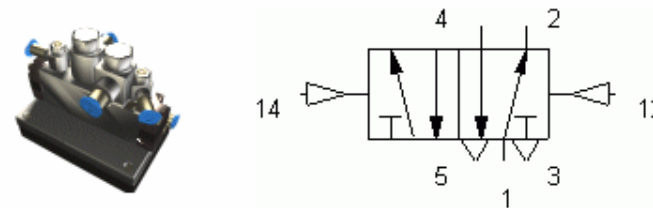
Example movie

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5/2-way impulse valve, pneumatically operated

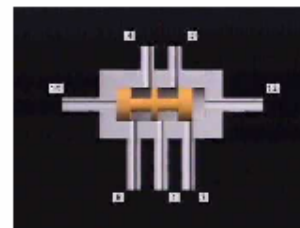
The pneumatic valve is controlled by applying reciprocal pilot pressures at connection 14 (flow passes from 1 to 4) and connection 12 (flow passes from 1 to 2). The valve's operating position remains until an opposite signal is received by the valve.

Pictures and Movies



3D picture

Symbol



Working principle movie



Example movie


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Single acting cylinder - Microsoft Internet Explorer

Datei Bearbeiten Ansicht Favoriten Extras ?

Zurück Suchen Favoriten Medien

Adresse http://lab.artec.uni-bremen.de/help/compSingleActingCylinder.html Wechseln zu Links

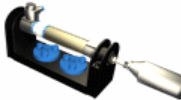


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Mixed Reality Web Service

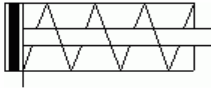
Single acting cylinder

The piston rod of a single acting cylinder is operated by the input of compressed air at the front end position. When the compressed air is shut off, the piston returns to its starting position via a return spring. The piston of the cylinder contains a permanent solenoid which can be used to operate a proximity switch.

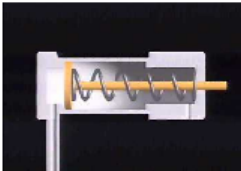
Pictures and Movies




3D picture



Symbol



Working principle movie

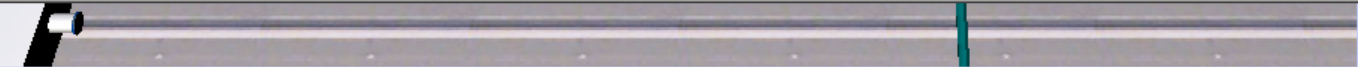


Example movie

Arbeitsprozess, pneumatisch einfach wirkender Zylinder

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Fertig
Internet



Experiment contact persons -- Experiment description

Connected to real hardware students can freely explore the system while sending air through the Internet

Bild http://134.102.68.18:8080/ wird geladen
Internet

Start
ModellingSequen...
T-Online StartCe...
Virtual Construct...
Cortona Console
Single acting c...
Freitag, 23. Januar 2004

Single acting cylinder - Mozilla

File Edit View Go Bookmarks Tools Window Help

Back Forward Reload Stop file:///C:/A Search Print


Home Bookmarks

deriveSERVER
Mixed Reality Web Service for Mechatronics

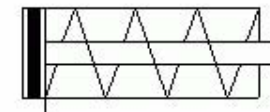
Single acting cylinder

The piston rod of a single acting cylinder is operated by the input of compressed air at the front end position. When the compressed air is shut off, the piston returns to its starting position via a return spring. The piston of the cylinder contains a permanent solenoid which can be used to operate a proximity switch.

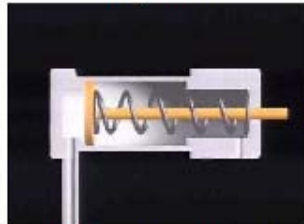
Pictures and Movies




3D picture



Symbol



Working principle movie



Example movie

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Start | deriveSERVER -- test ... | 4 Windows Explorer | Microsoft PowerPoint ... | Double Acting Cylinde... | Single acting cylinder ... | 15:24

Double Acting Cylinder - Mozilla

File Edit View Go Bookmarks Tools Window Help

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Home Bookmarks

Double acting cylinder


The piston rod of a double acting cylinder is operated by the reciprocal input of compressed air at the front and back of the cylinder. The end position damping is adjustable via two regular screws.

The piston of the cylinder contains a permanent solenoid which can be used to operate a proximity switch.

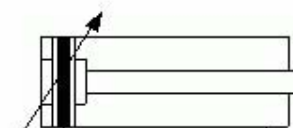
Adjustable parameters

Max. stroke: 10 ... 1000 mm (100 mm)
Piston position: 0 ... max. stroke mm (0 mm)

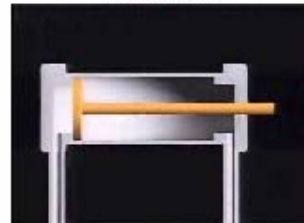
Pictures and Movies




3D picture



Symbol



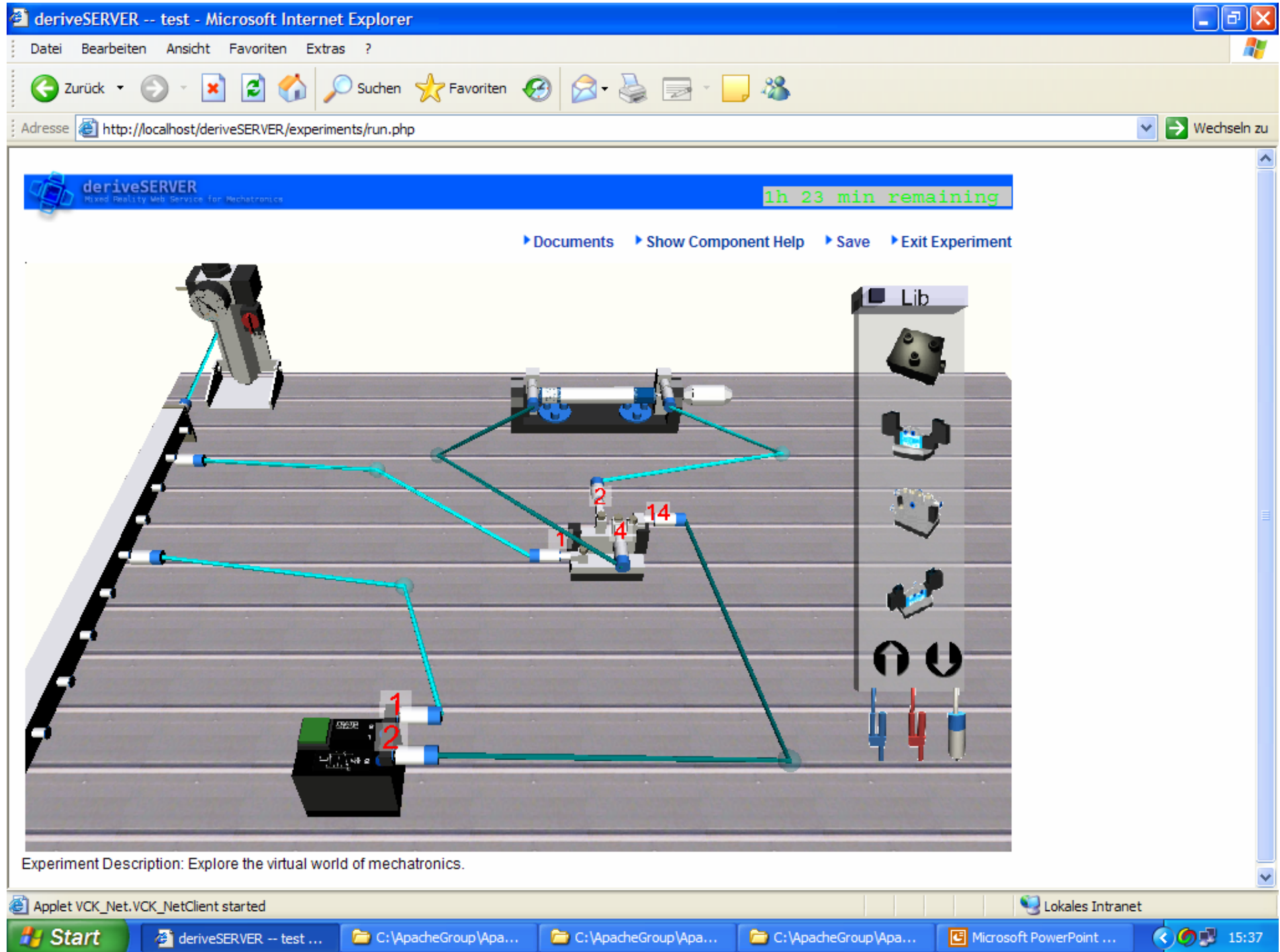
Working principle movie



Example movie

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Start | deriveSERVER -- test ... | 4 Windows Explorer | Microsoft PowerPoint ... | Double Acting Cylinde... | Single acting cylinder ... | 15:24



deriveSERVER -- test - Microsoft Internet Explorer

Datei Bearbeiten Ansicht Favoriten Extras ?

Zurück Suchen Favoriten

Adresse <http://localhost/deriveSERVER/experiments/run.php> Wechseln zu

deriveSERVER
Mixed Reality Web Service for Mechatronics

1h 19 min remaining

Documents Show Component Help Save Exit Experiment

Pneumatischer Steuerungs- und Arbeitsprozess,



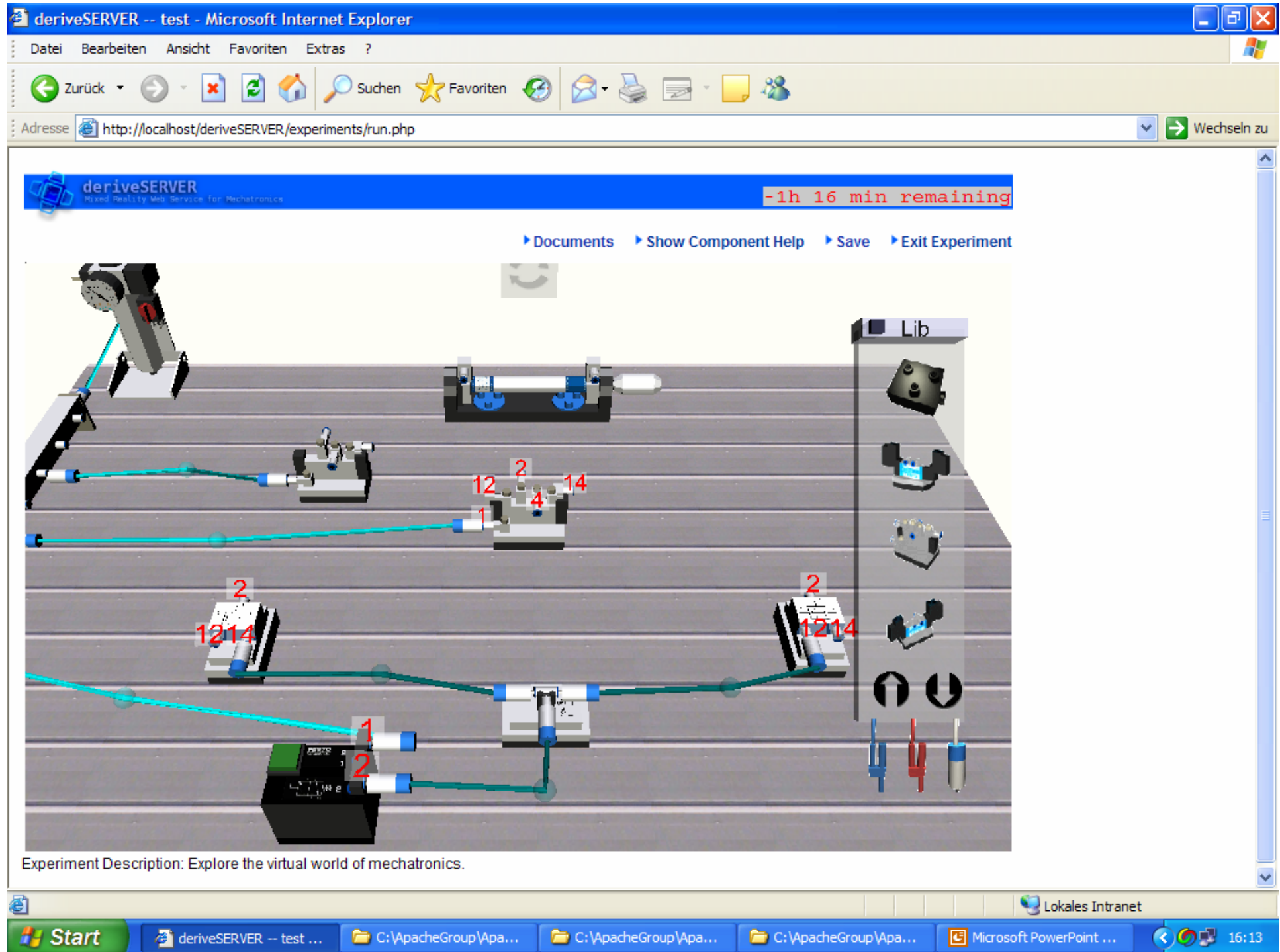
Experiment Description: Explore the virtual world of mechatronics.

Applet VCK_Net.VCK_NetClient started

Lokales Intranet

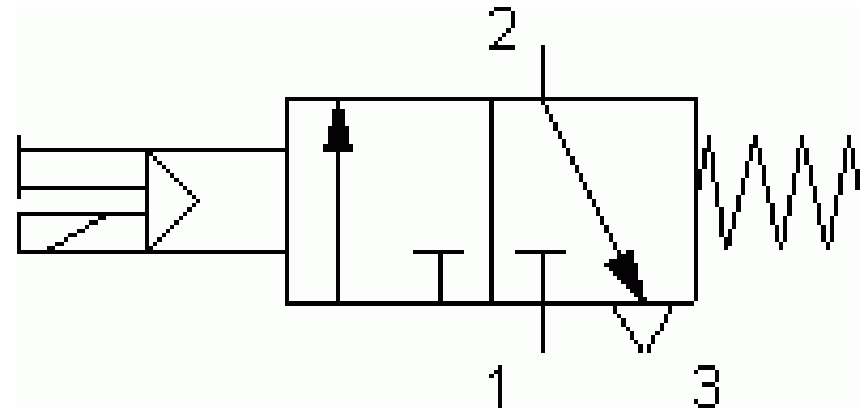
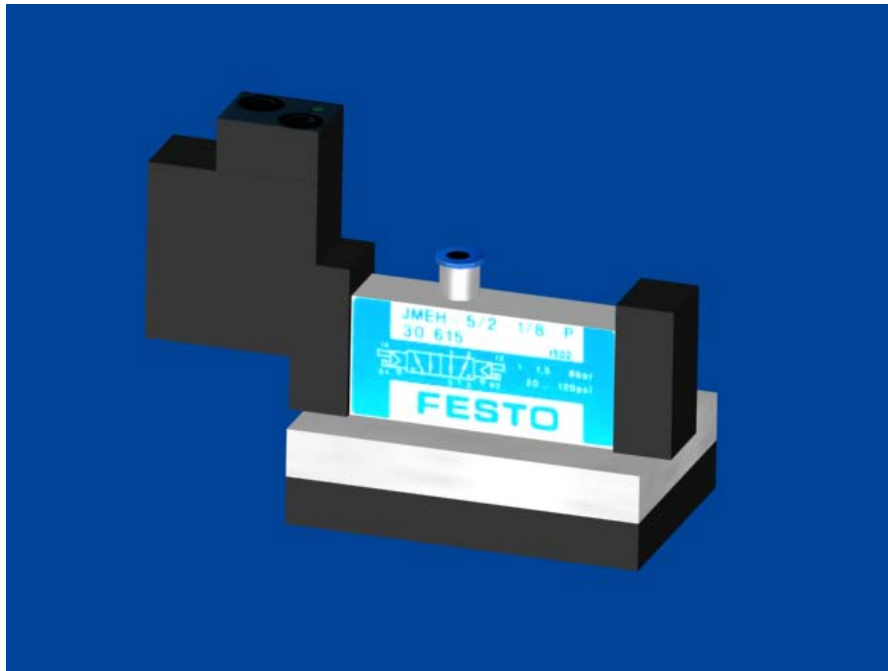
Start

deriveSERVER -- test ... C:\ApacheGroup\Apa... C:\ApacheGroup\Apa... C:\ApacheGroup\Apa... Microsoft PowerPoint ... 15:39



Steuerungskomponenten, elektro-pneumatisch

3/2-Wege-Magnetventil mit LED, normal geschlossen



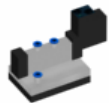


5/2-way solenoid valve

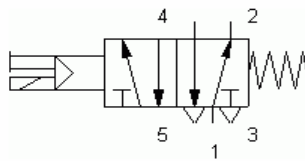
Steuerung elektropneumatisch

The solenoid valve is controlled by applying a voltage signal at the solenoid coil. The flow passes freely from 1 to 4. By stopping the signal the valve is set back to its starting position through the use of a return spring. The flow passes freely from 1 to 2. If no signal is applied to the valve, it can be manually operated.

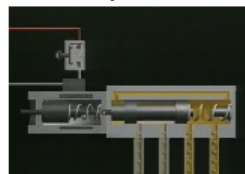
Pictures and Movies



3D picture



Symbol



Example movie

Working principle movie

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5/2-Wege-Magnetventil

deriveSERVER -- demo - Microsoft Internet Explorer

Datei Bearbeiten Ansicht Favoriten Extras ?

Zurück

Suchen

Favoriten

Adresse <http://localhost/deriveSERVER/experiments/run.php>

Wechseln zu

deriveSERVER

Mixed Reality Web Service for Mechatronics

Experiment Description: Explore the virtual world of mechatronics.

http://127.0.0.1 - 5/2-way solenoid impulse valve - Microsoft Internet Explorer

The solenoid valve is controlled by applying a voltage signal at the solenoid coil (flow passes from 1 to 4) and remains in this operating position even when the signal is cut off. Only by applying an opposite signal will the valve return to its starting position (flow passes freely from 1 to 2). If no signal is applied to the valve, it can be manually operated.

Pictures and Movies

3D picture

Symbol

Example movie

Working principle movie

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Lokales Intranet

Start

deriveSERVER --...

http://127.0.0.1...

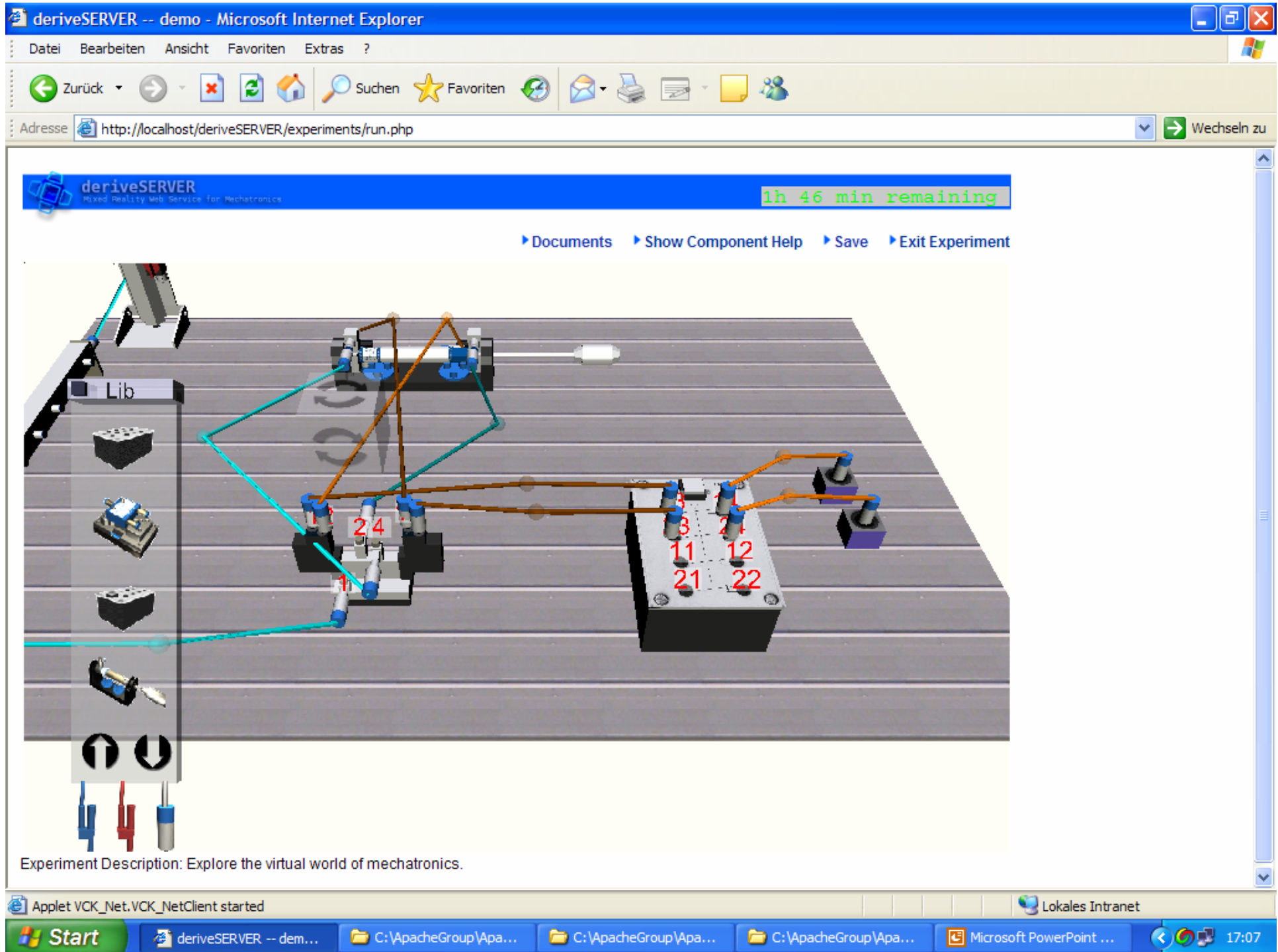
C:\ApacheGrou...

C:\ApacheGrou...

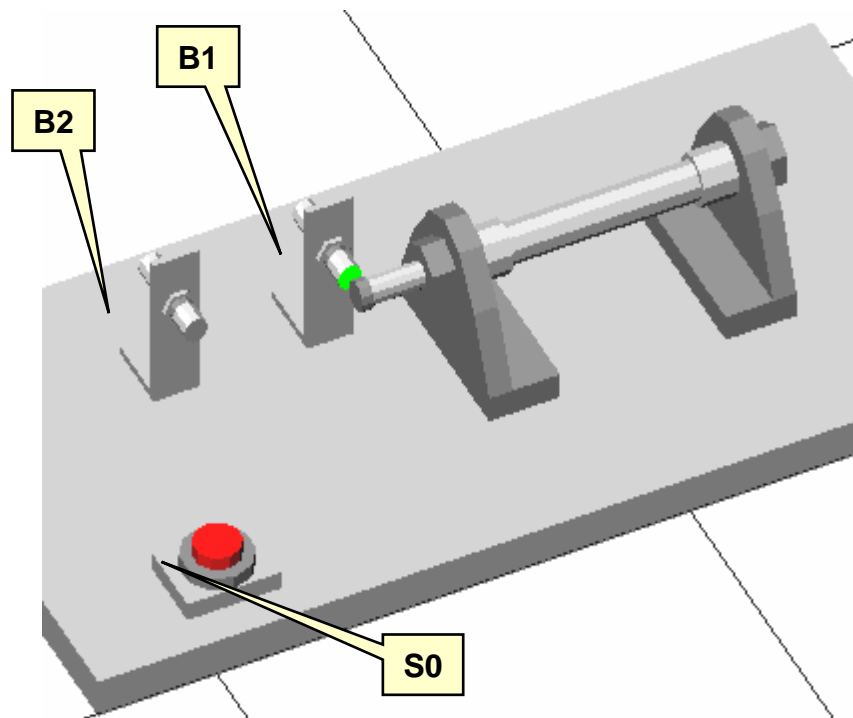
C:\ApacheGrou...

Microsoft Power...

17:10



Zylinderprozess über SPS gesteuert



Elements used

Cylinder 1.0, single-acting
5/2-way solenoid valve, spring-return
Coil Y1

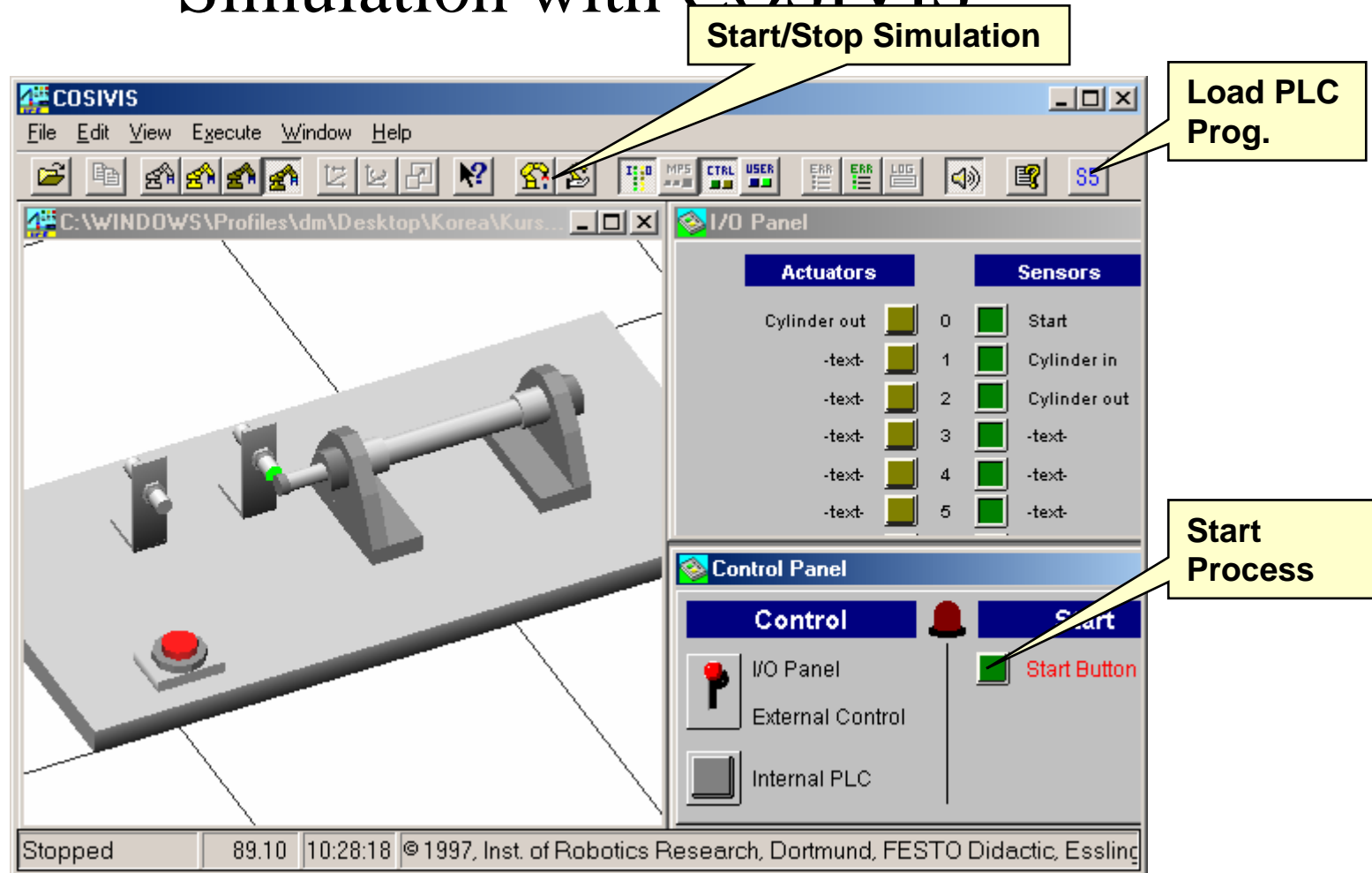
Signal Behavior

Process input		Description
Sensor 0	S1	Start button
Sensor 1	B1	Cylinder retracted
Sensor 2	B2	Cylinder extended

Process output		Description
Actuator 0	Y1	Cylinder 1.0 extended

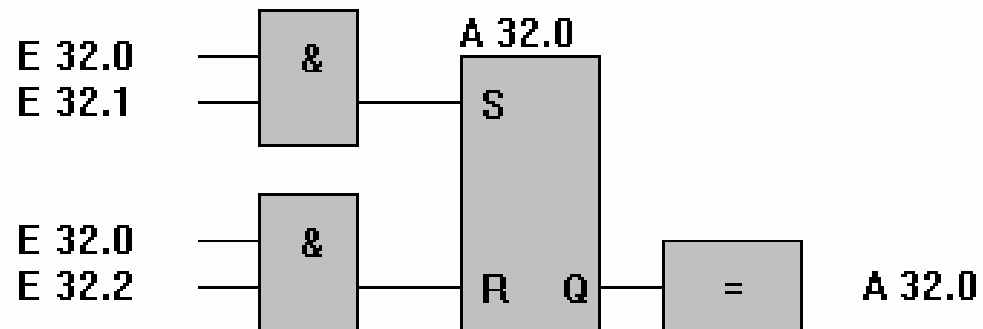
*Initial position (inactive)
The cylinder is retracted*

Simulation with COSIVIS



PLC - Programm

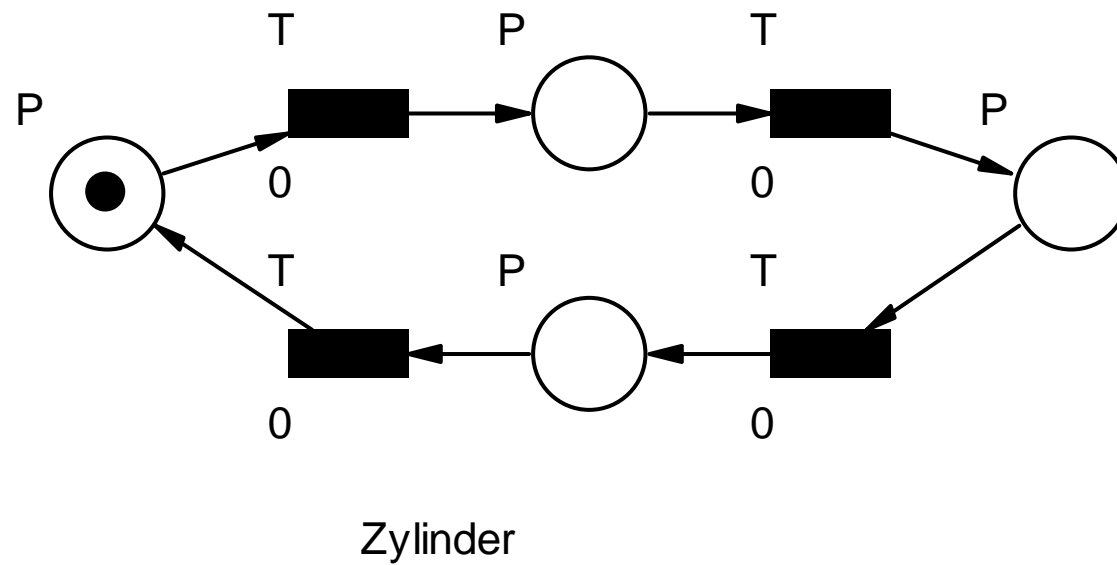
Move Cylinder



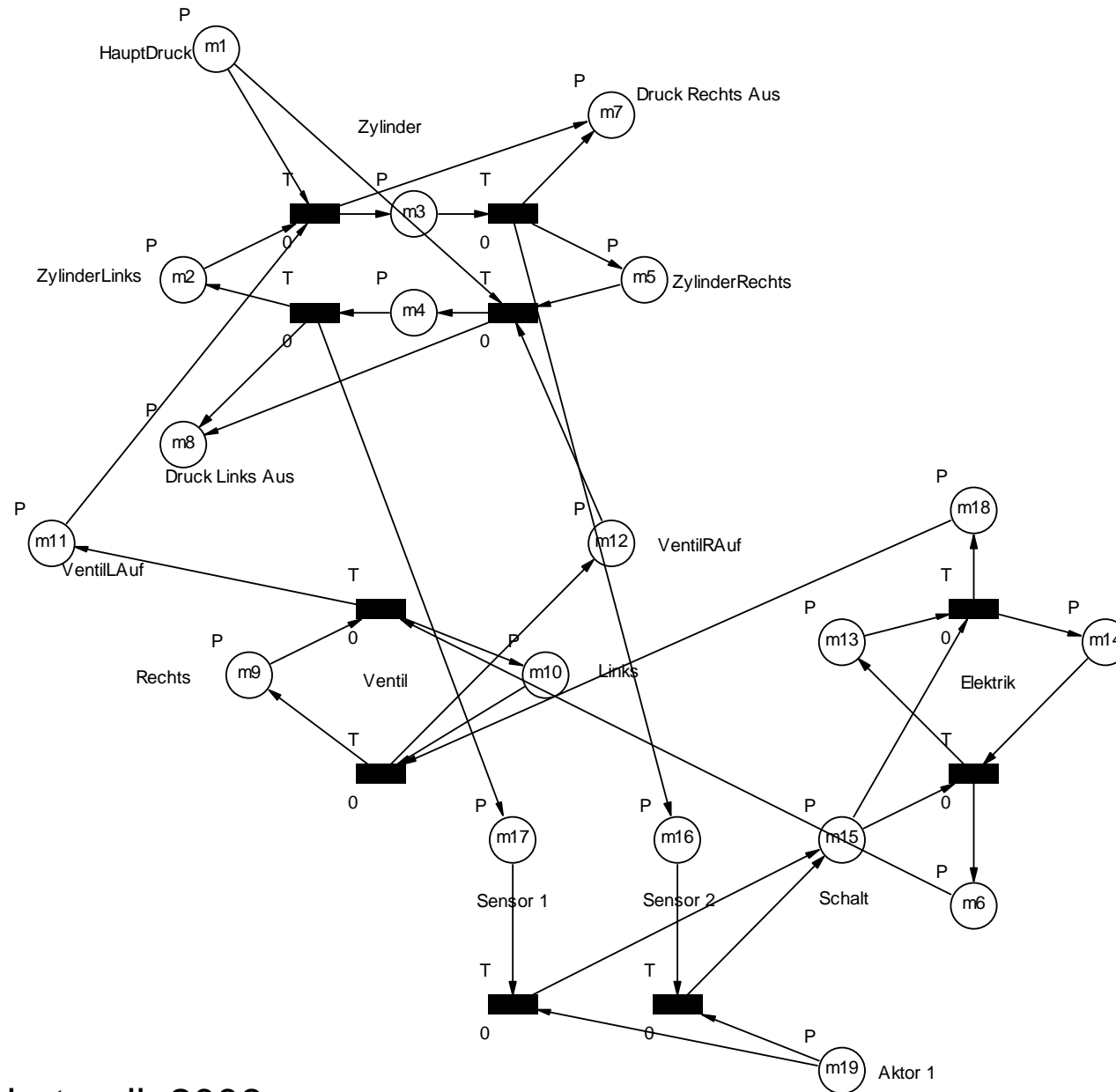
;Move Cylinder

U	E 32.0
U	E 32.1
S	A 32.0
U	E 32.0
U	E 32.2
R	A 32.0
U	A 32.0
=	A 32.0
BE	

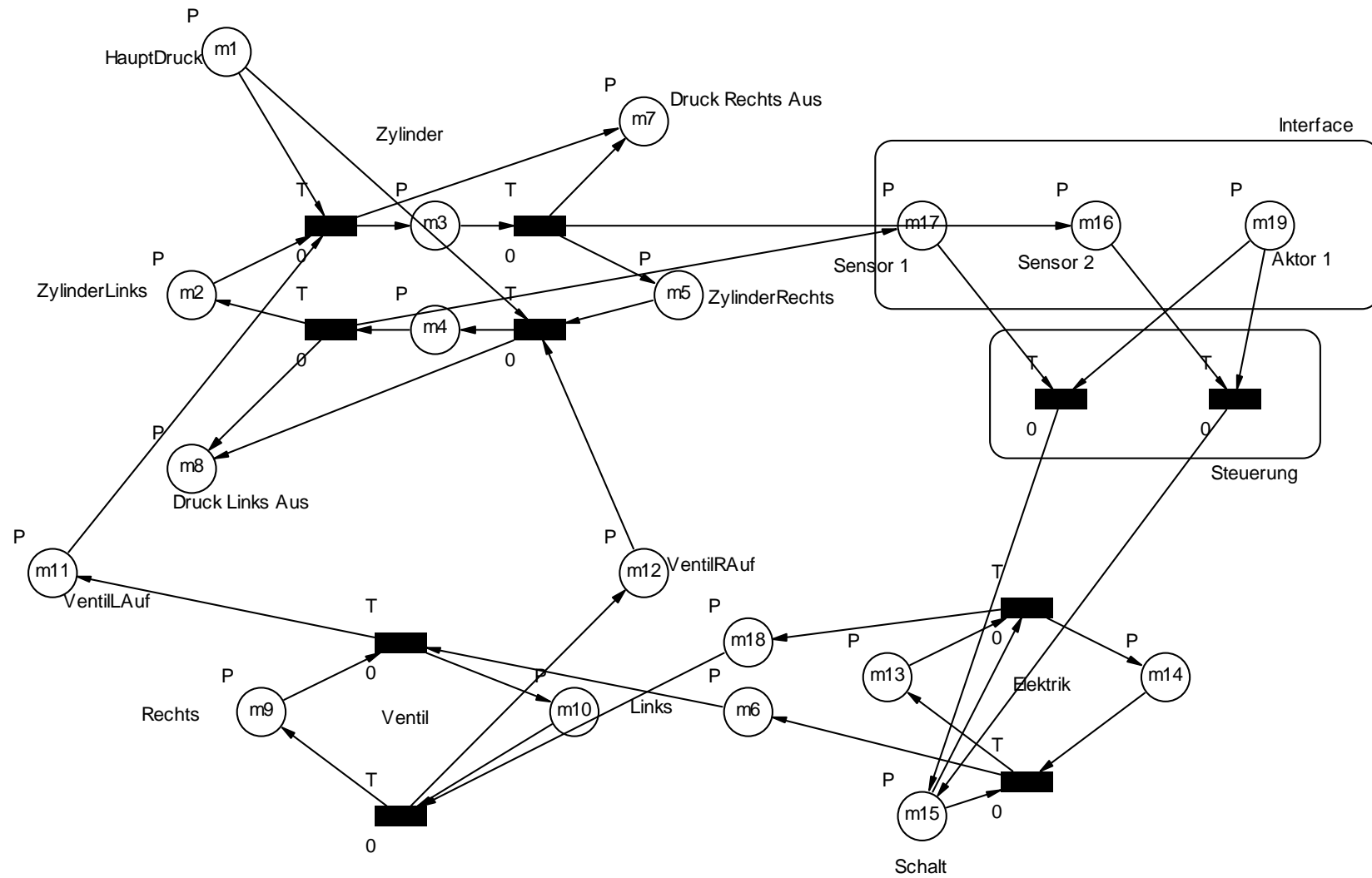
Petri Netz Zylinder 1



Petri Netz Zylinder 7

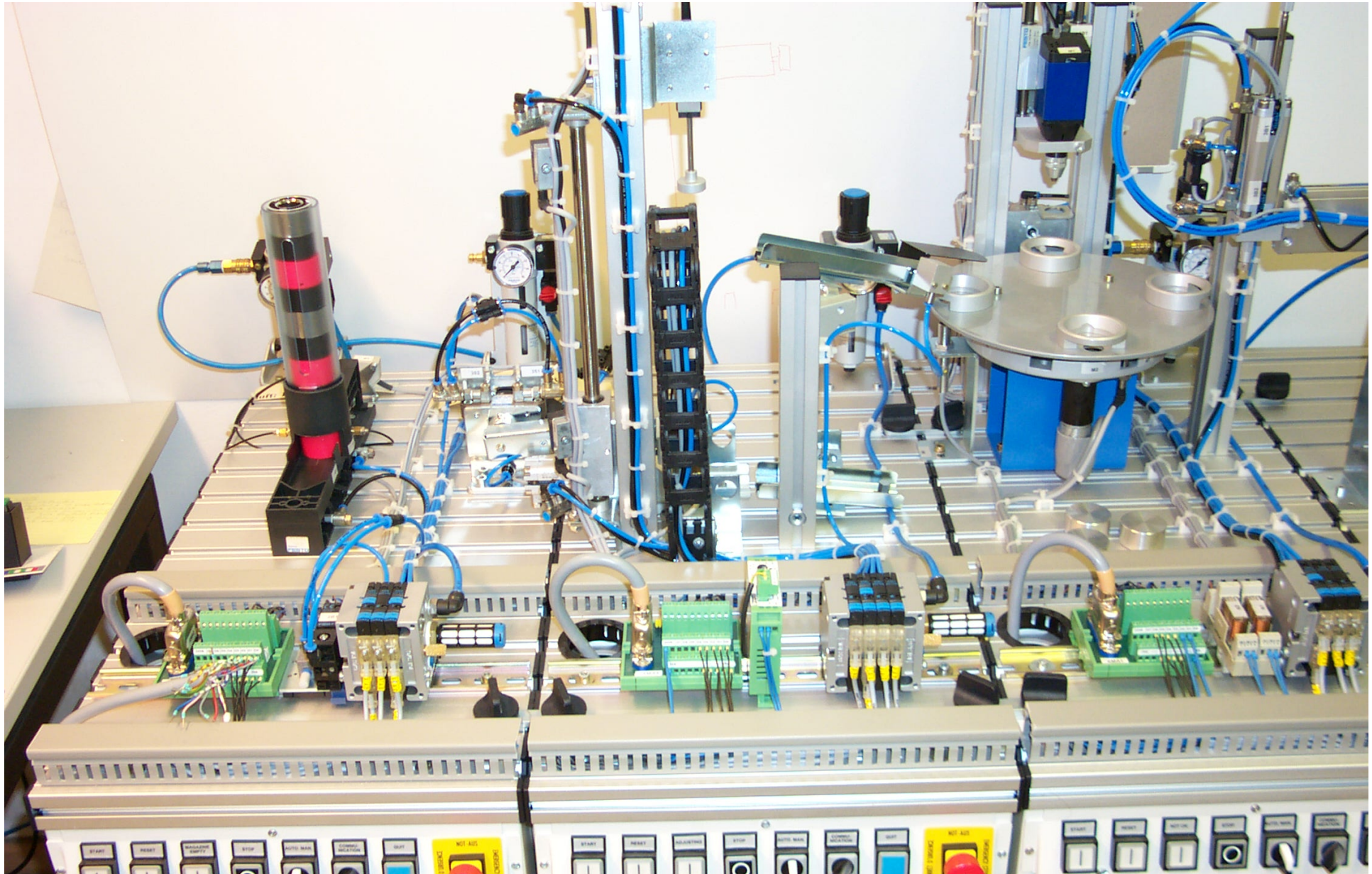


Petri Netz Zylinder 8

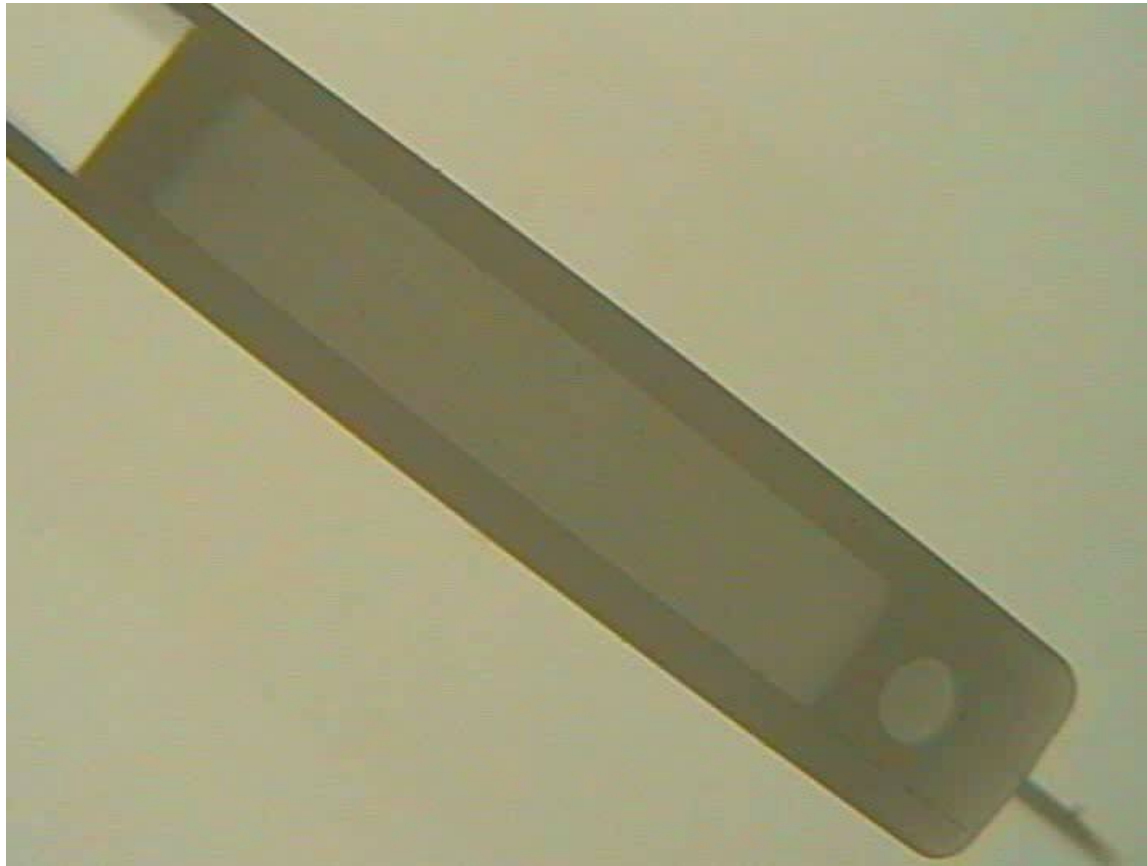


Doppelwirkender Zylinder mit Steuerung

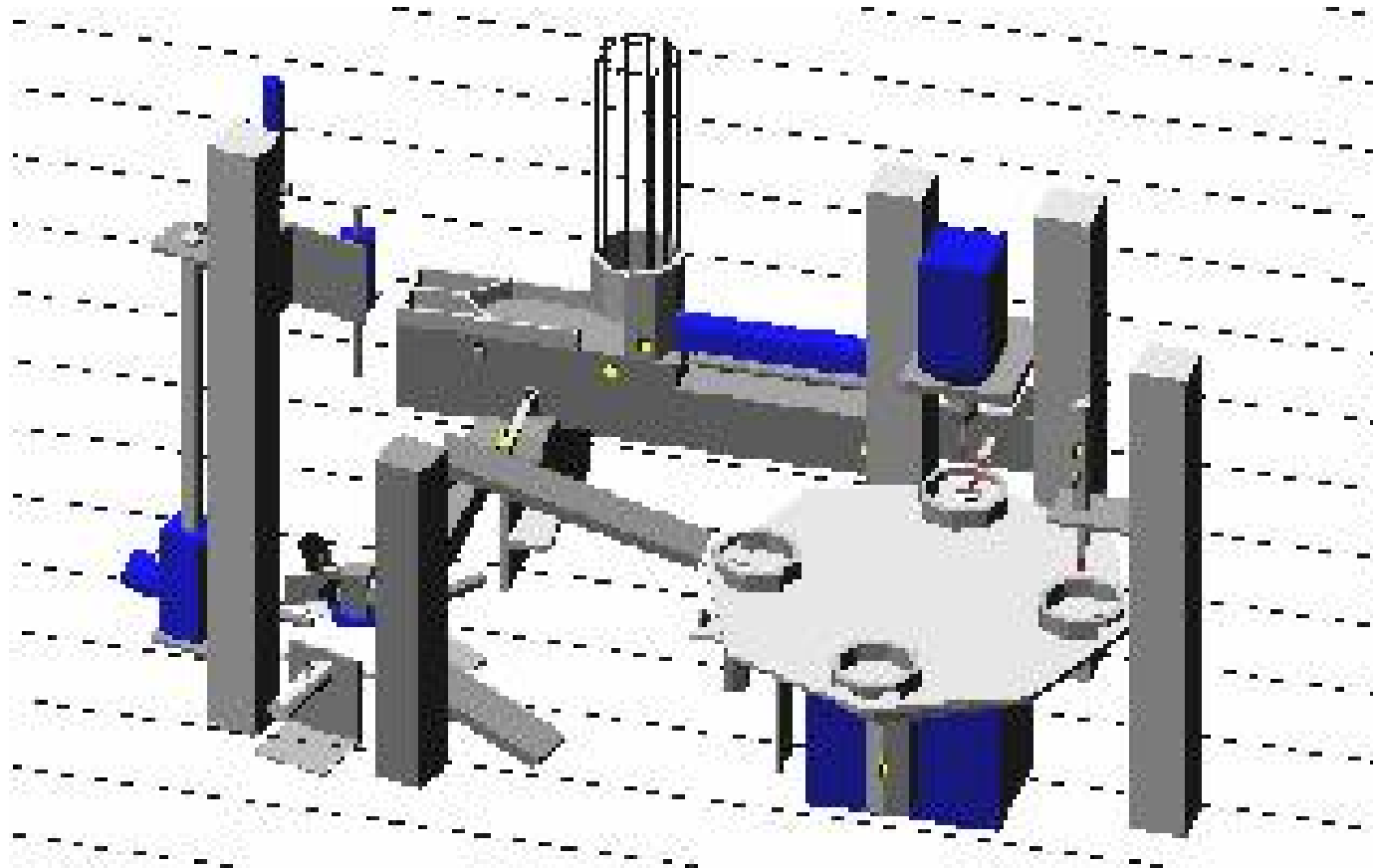
Modulares Produktionssystem



MPS-Film

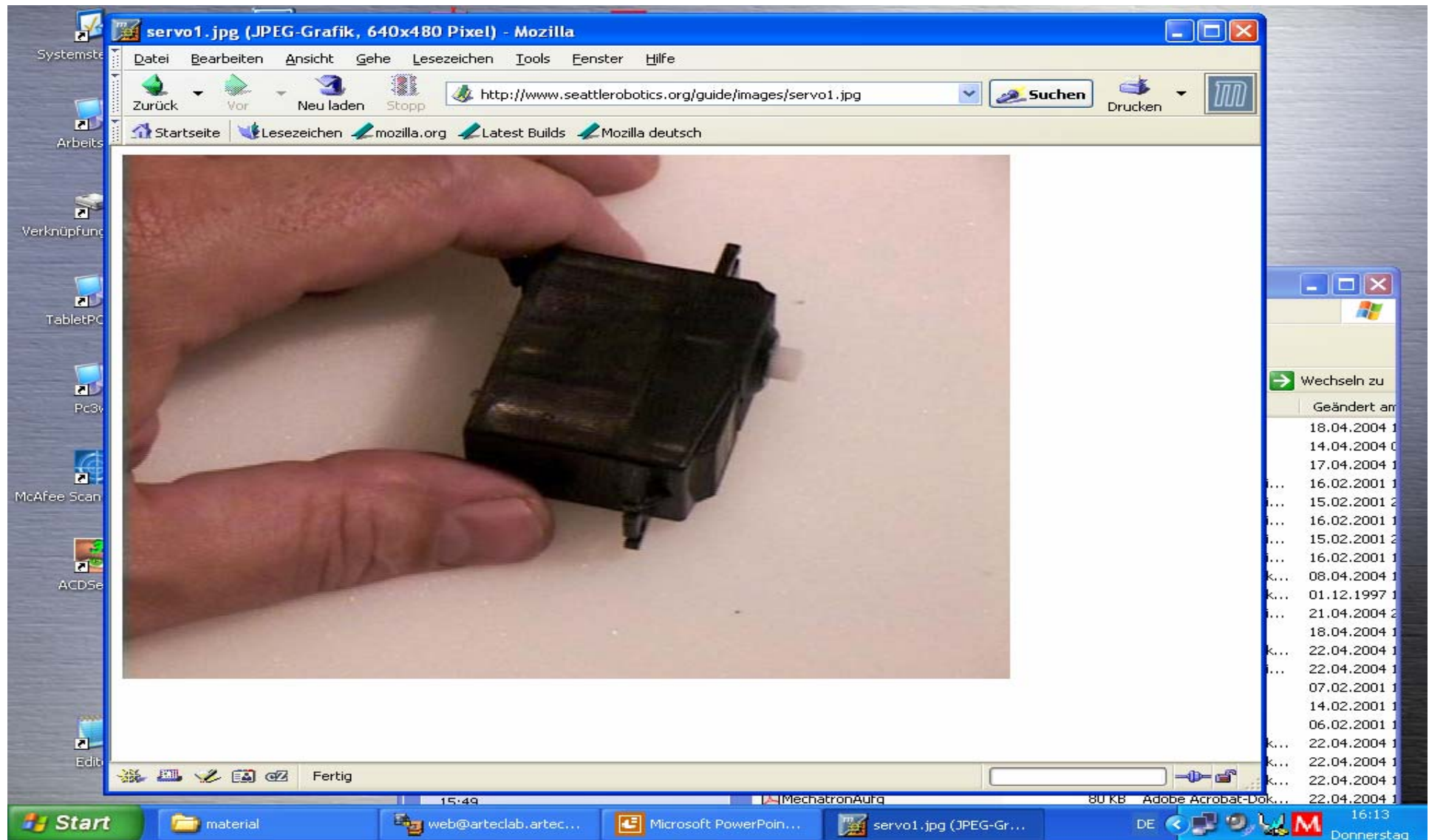


MPS-Simulation

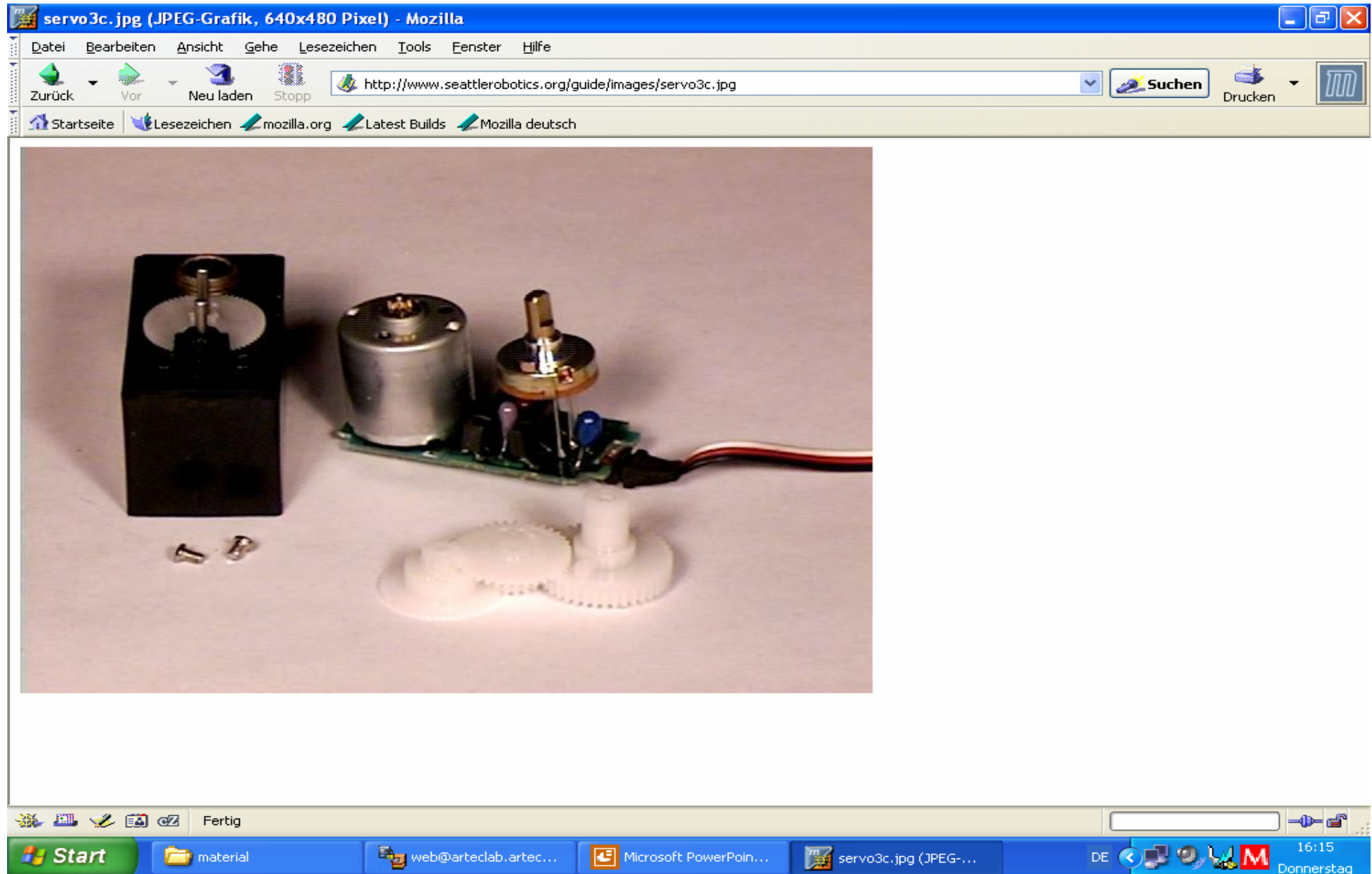


Servomotoren

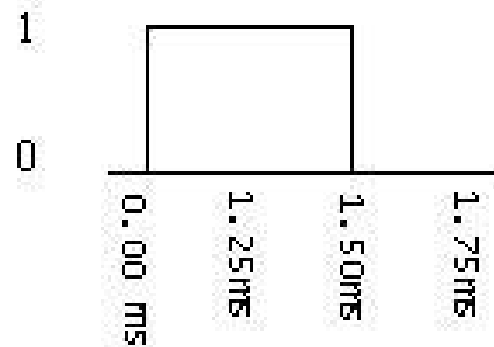
<http://www.seattlerobotics.org/guide/servos.html>



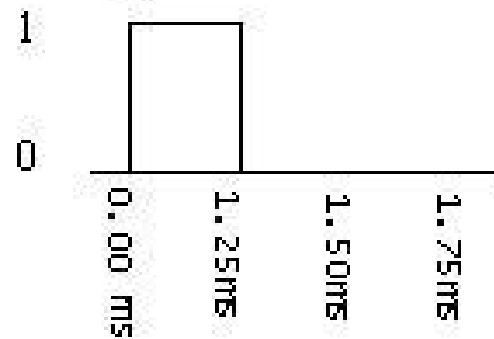
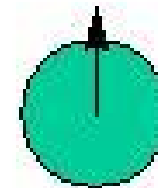
Das Innere



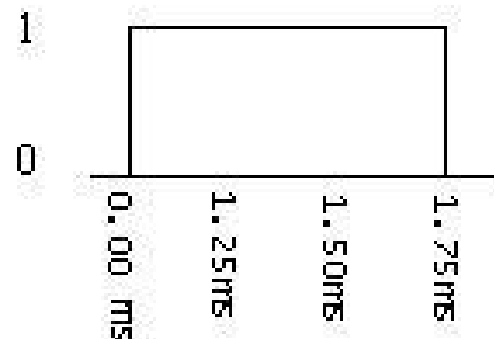
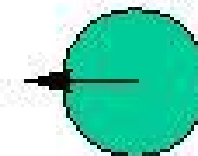
Diskretes Verhalten erwünscht !



1.50 ms: Neutral



1.25 ms: 0 degrees



1.75 ms: 180 degrees



Steuerung SV203

