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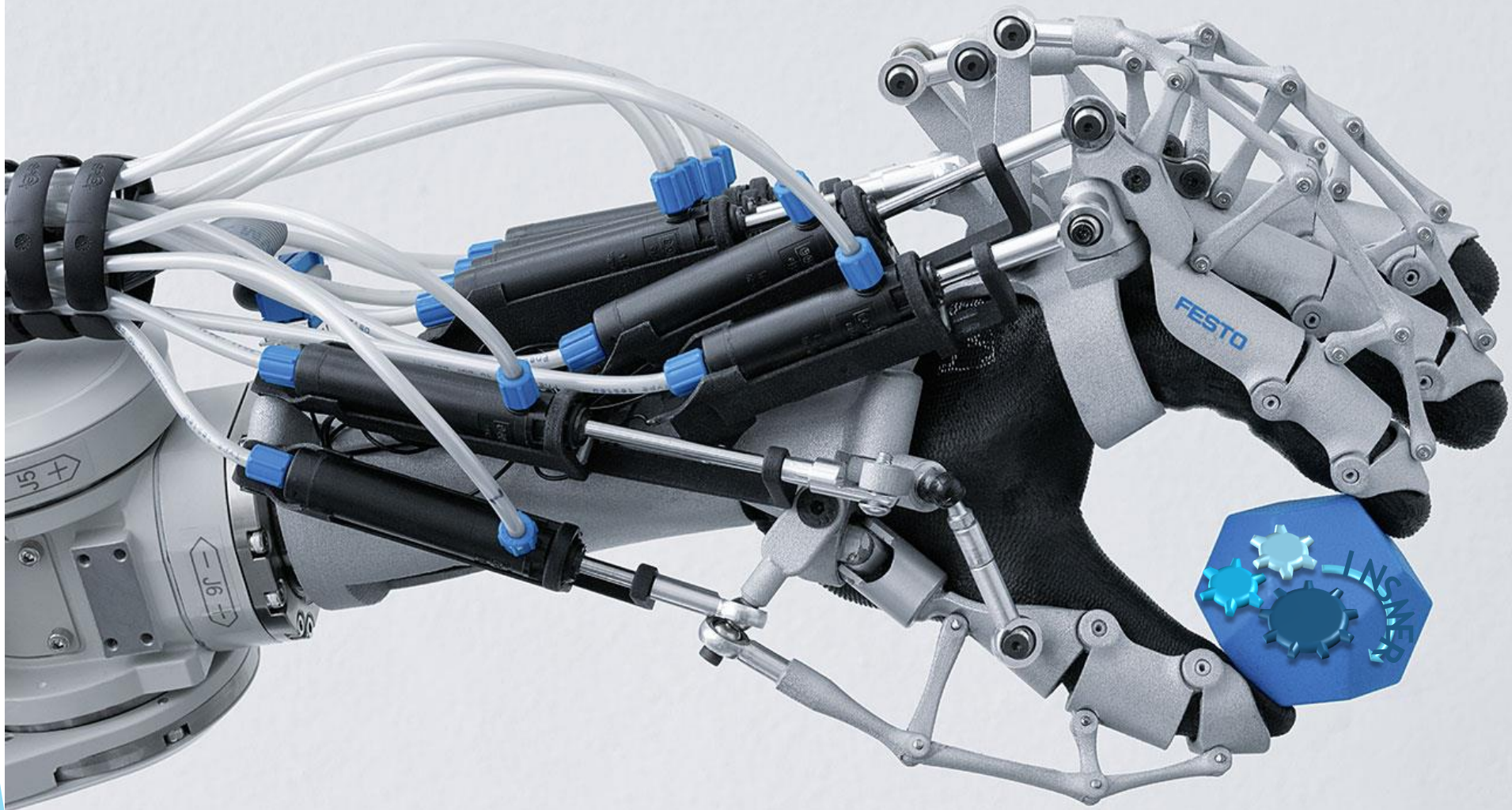
Project number : 2016-1-EE01-KA202-017321



INSMER

INtegrated **SM**art **E**ducation in **R**obotics

Rīga, 10.05.2019. Viktors Gutakovskis, RTK.



Pneimatika un pneimatiskās sistēmas

Periods	6.11.-30.11.2018.
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Pasniedzēji: Mihails Stepanovs, Anda Kazuša.

Mērķa grupa: 4. Kursa grupa «Mehatronika» (MH-4)

- ▶ Rīga, 10.05.2019. Viktors Gutakovskis, RTK.

Pneumatika un pneimatiskās sistēmas

Mērķis:

Sniegt pārskatu par pneimatisko elementu darba principiem un sistēmu struktūru, kas izmantota mūsdienu automatizācijas ražošanas procesā līdz ar Industry 4.0. ieviešanu.

- ▶ Sniegt izpratni par pneimatisko komponentu darbību un savstarpējo mijiedarbību, pamatprincipiem un palielināt teorētiskas zināšanas izpildīt uzdevumus veidojot vairāku variantu pneimatiskās shēmas.
- ▶ Koledžas studenti saņemuši jaunu praktisko darba pieredzi un zināšanas, strādājot ar funkcionējošo konveijera un sadales stacijas mēroga modeli (MTS, FESTO Distribution station didaktiskā iekārta);
- ▶ Šis papildu modulis palielinās zināšanas mehatroniskas specialitātē praktiski un strādājot ar nepieciešamo programmatūru (FluidSim, Mechatronics Assistant).

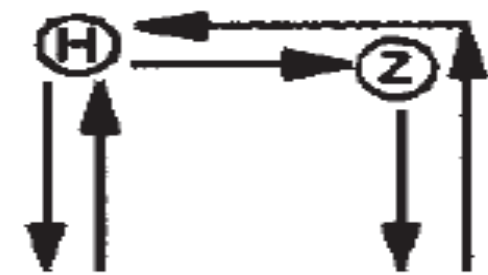
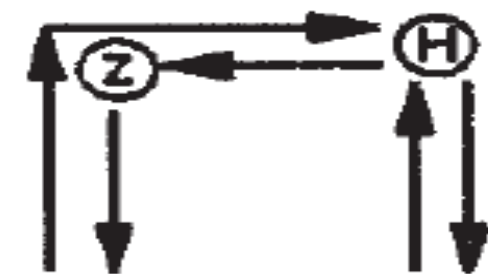
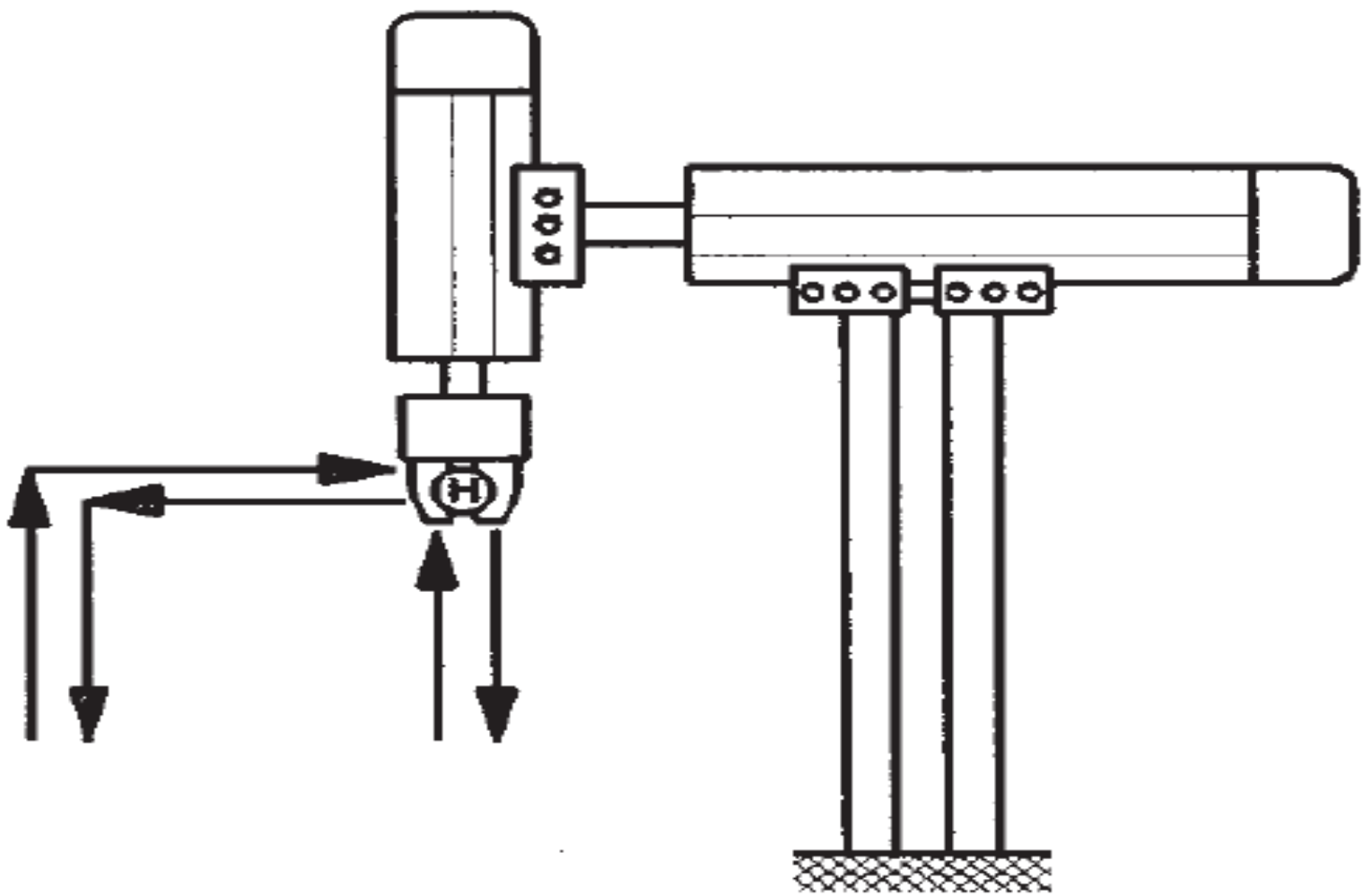
- ▶ Rīga, 10.05.2019. Viktors Gutakovskis, RTK.

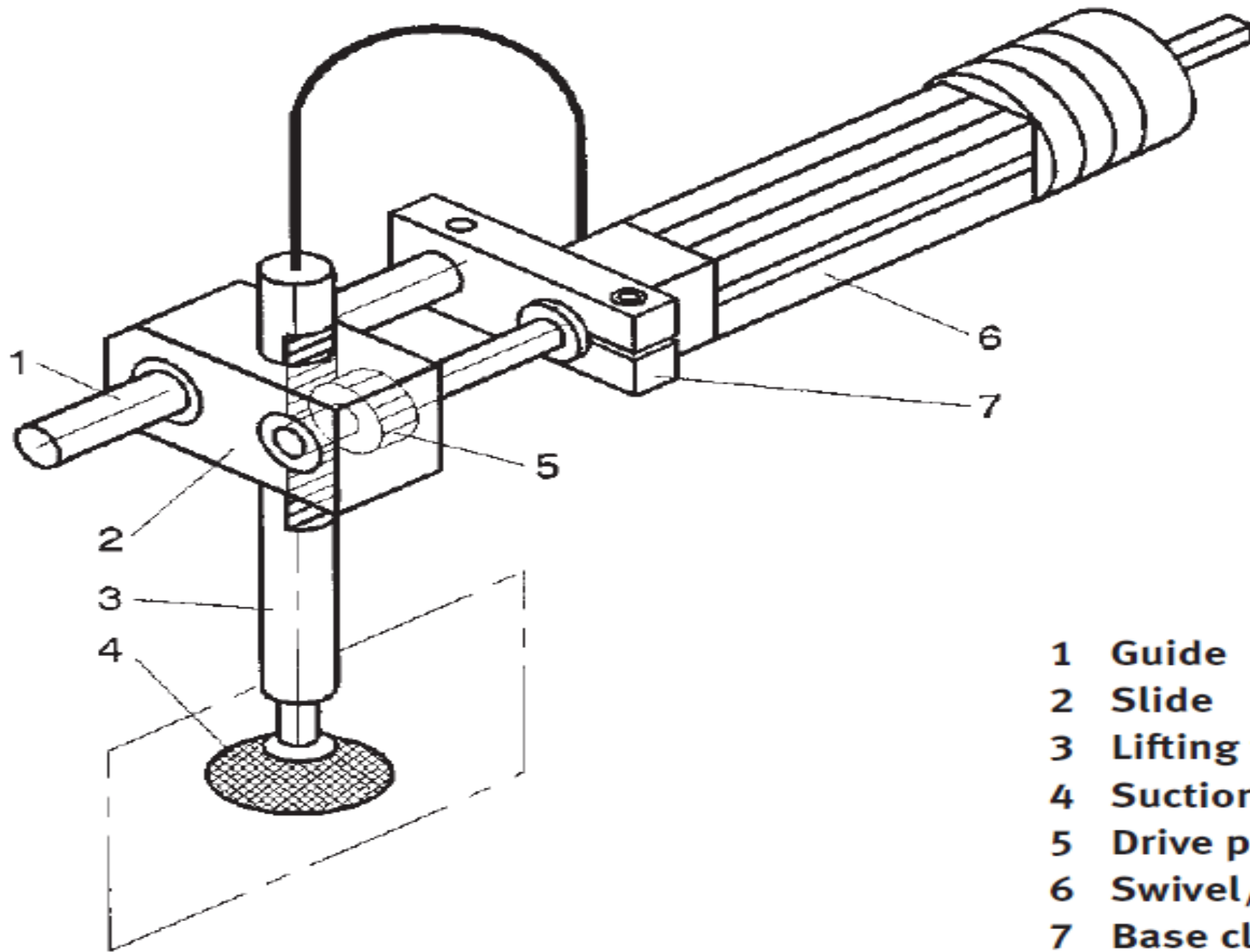
Pneimatika un pneimatiskās sistēmas

Tēmas:

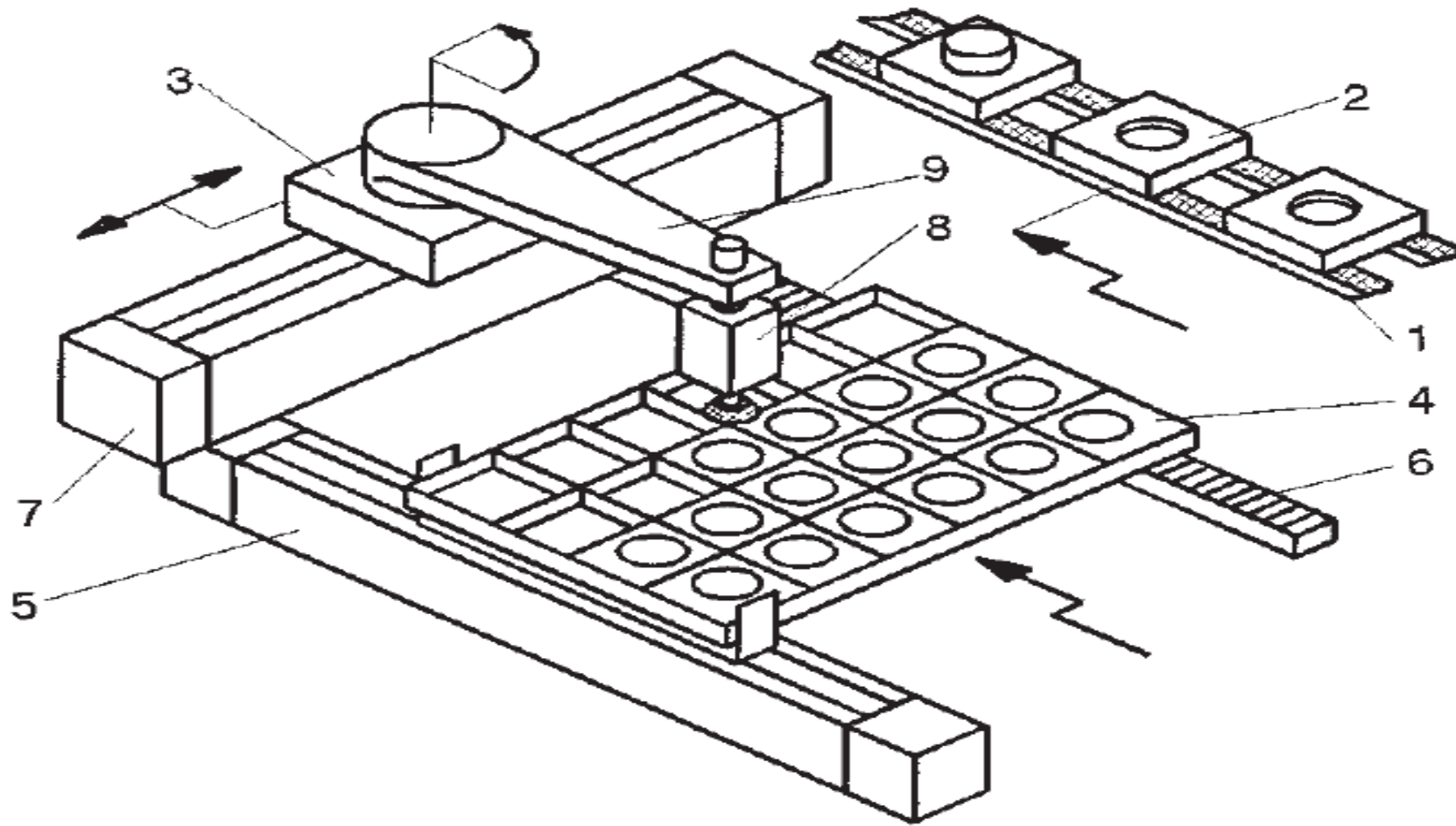
- ▶ Pneimatisko sistēmu raksturojums un pielietojums;
- ▶ Pneimatiskie aktuatori robotikā;
- ▶ Pneimatiskā piedziņa;
- ▶ Rūpniecības robotu kinemātikās struktūra;
- ▶ Objektu satveršanas paņēmieni un satvērēju paveidi;
- ▶ Pneimatiskie vadības elementi robotikā (vārsti);
- ▶ Elektro-pneimatiskās shēmas;
- ▶ Kursa noslēguma apgūšanas pārbaude - praktiskais uzdevums.

- ▶ Rīga, 10.05.2019. Viktors Gutakovskis, RTK.



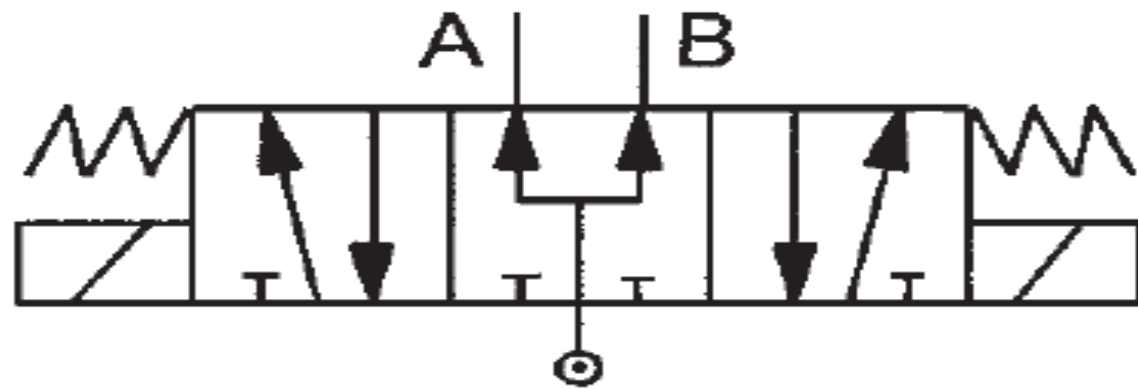


- 1 Guide
- 2 Slide
- 3 Lifting tube with teeth
- 4 Suction cup
- 5 Drive pinion
- 6 Swivel/linear unit
- 7 Base clamping plate



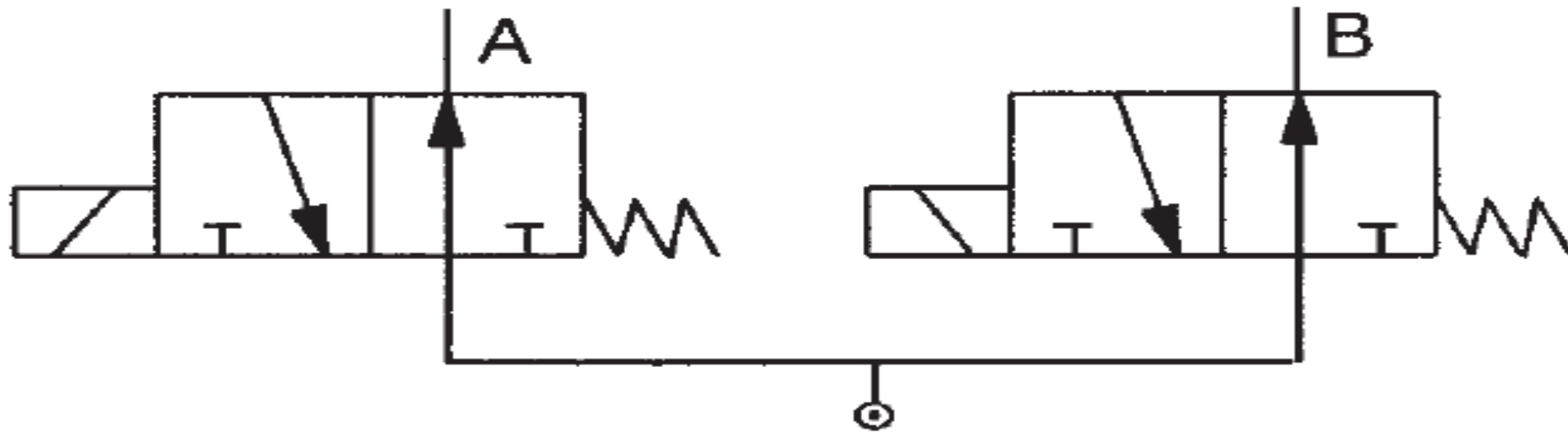
Covering two-dimensional patterns with a pick-and-place device

- 1** Transfer system
- 2** Workpiece carrier
- 3** Rotary unit 90°
- 4** Magazine
- 5** Linear unit with intermediate stops (not visible)
- 6** Roller strip
- 7** Positioning axis
- 8** Lifting suction cup
- 9** Swivel arm

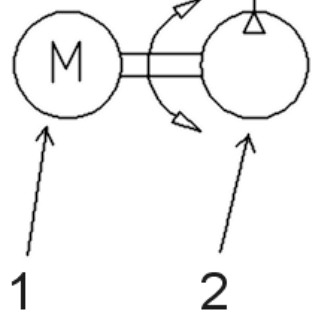


Control of travel from one intermediate stop to another using one 5/3-way valve or two 3/2-way valves

A, B Cylinder supply lines

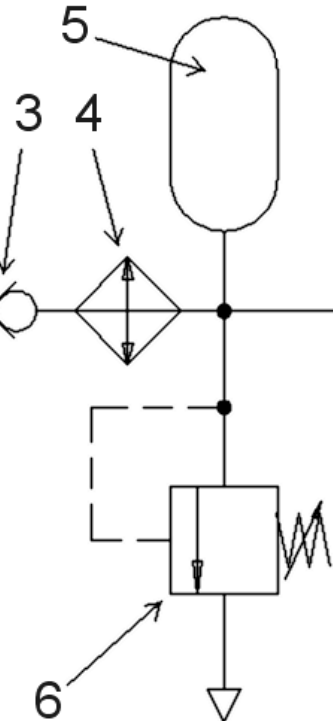


Pneimatiskās enerģijas ģenerators



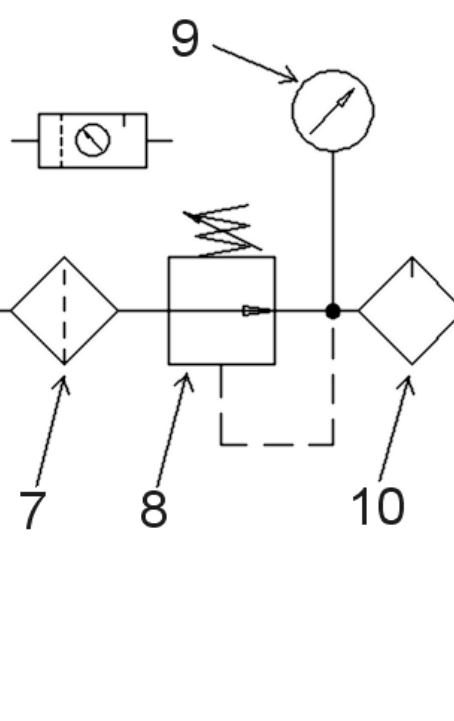
- 1. Elektrodzinējs
- 2. Kompresors

Gaisa primārā sagatavošana



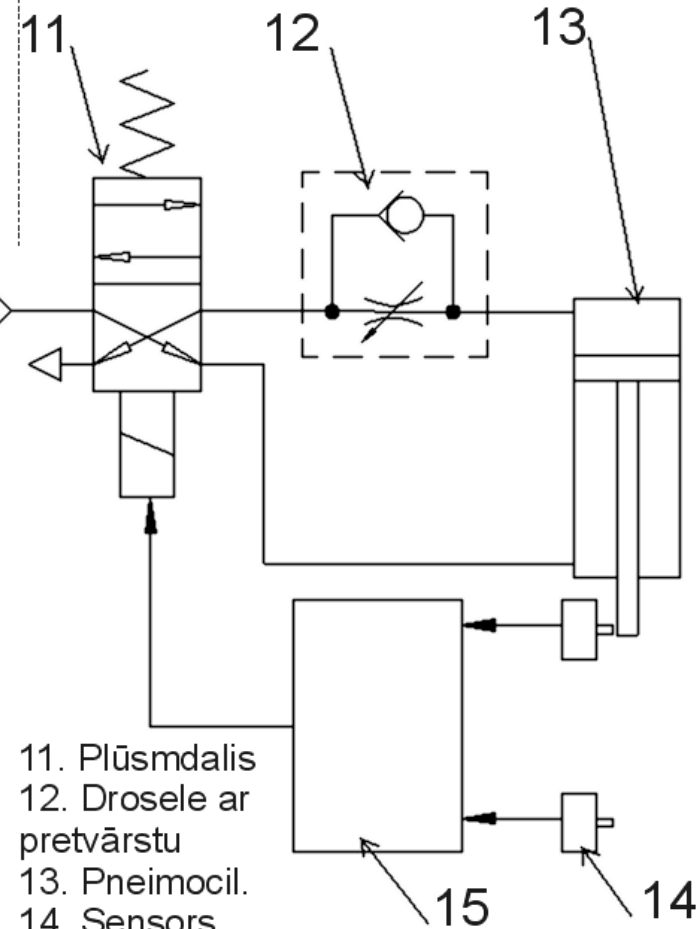
- 3. Pretvārsts
- 4. Dzesētājs
- 5. Ressīvers
- 6. Spiedienu ierobežojošais vārsts

Gaisa servisa modulis

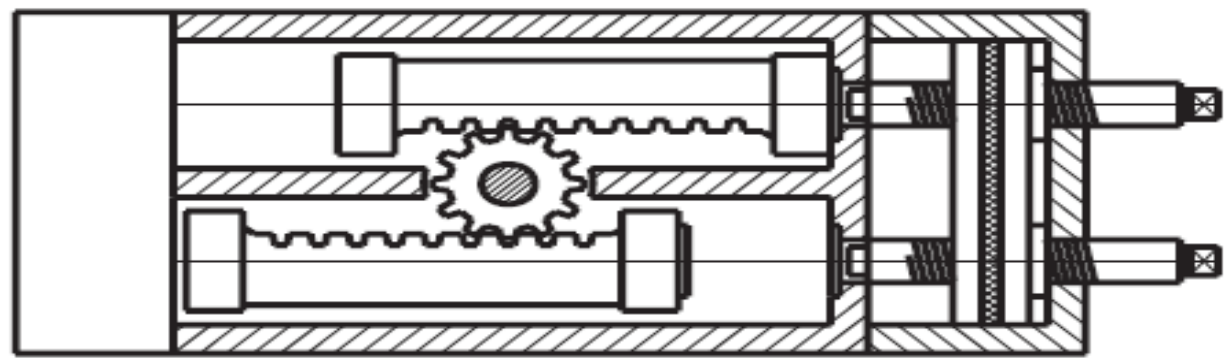
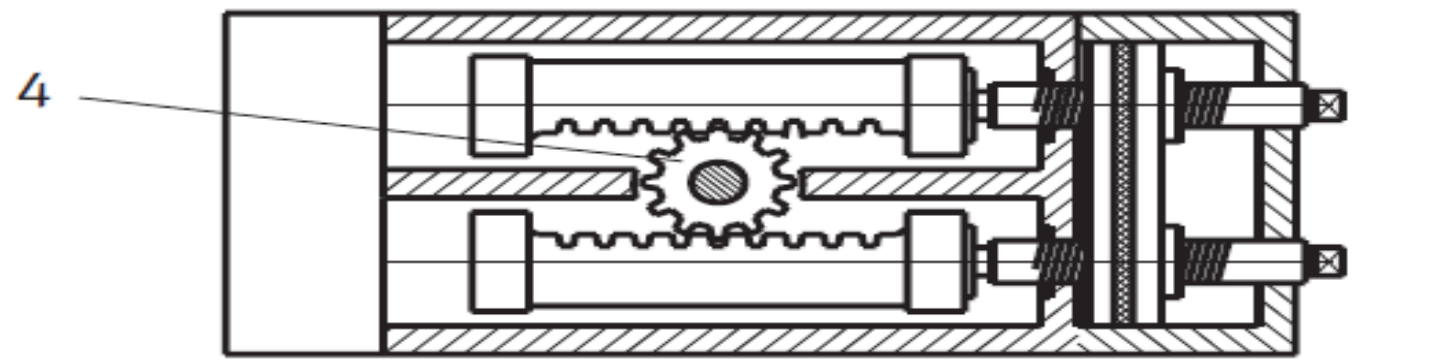
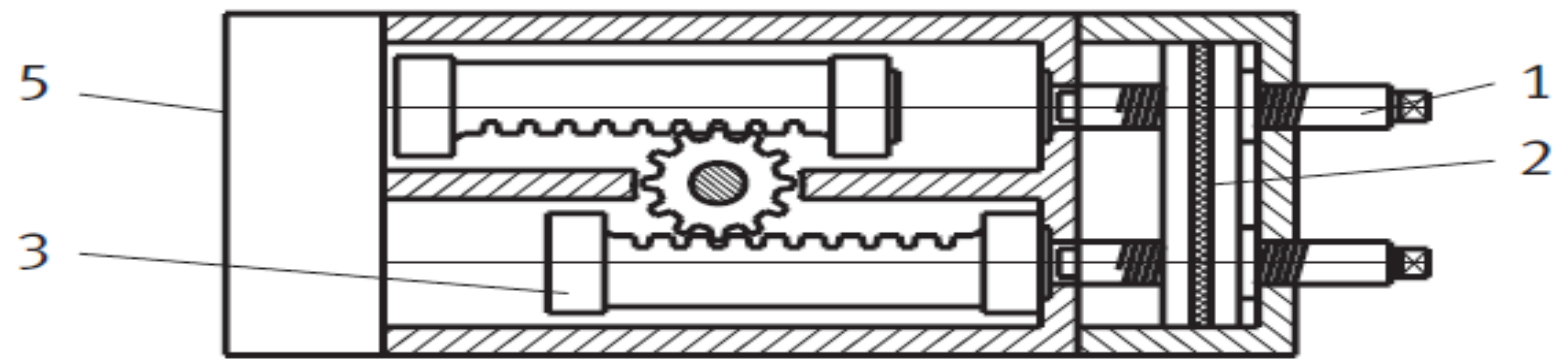


- 7. Filtrs
- 8. Spiediena regulators
- 9. Manometrs
- 10. Elļotājs

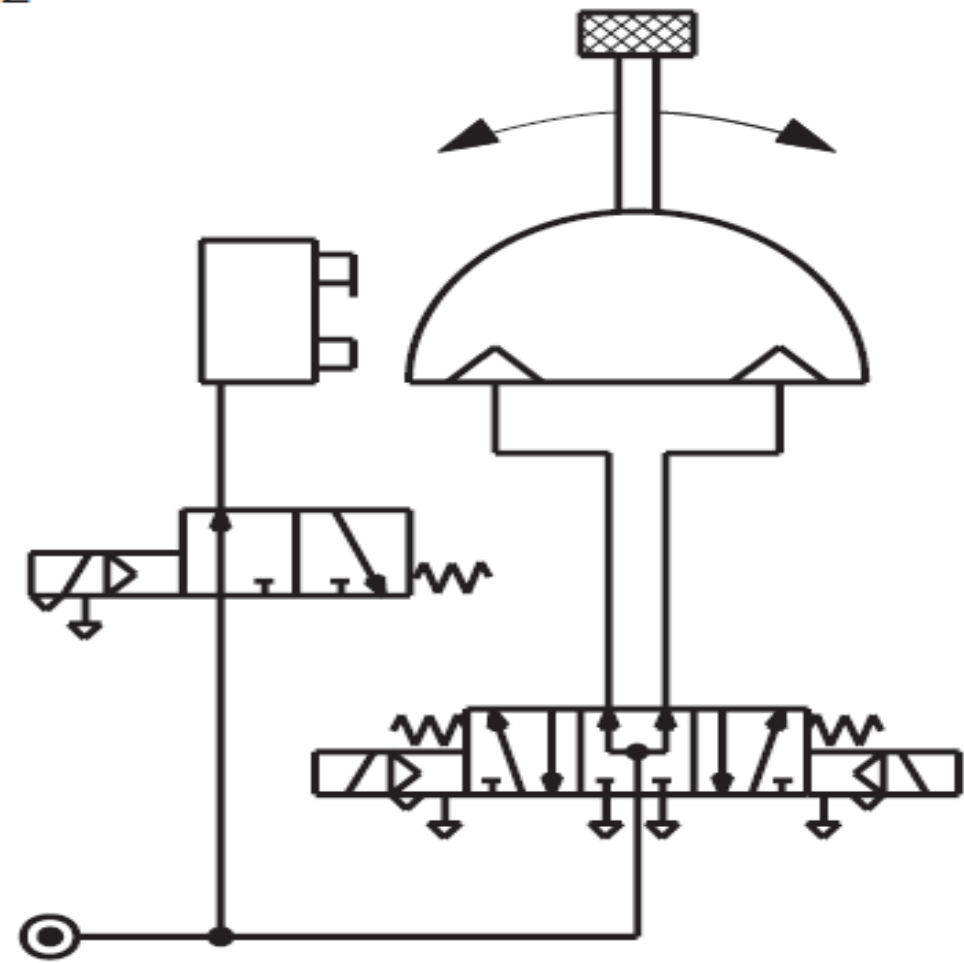
Pneimoautomātikas sistēma



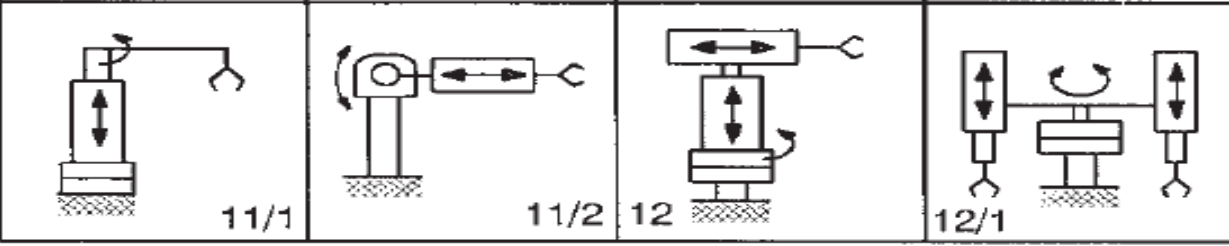
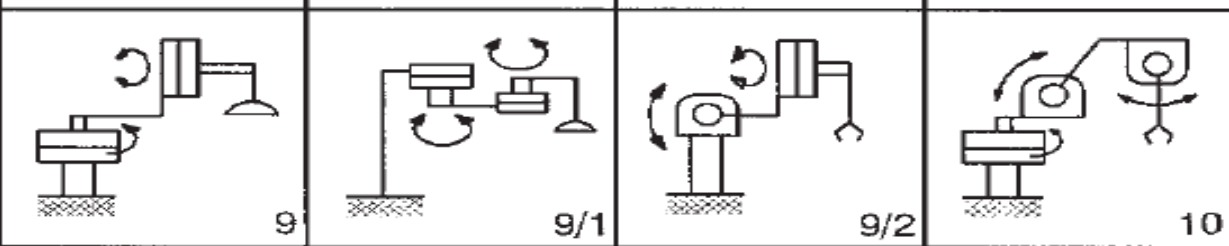
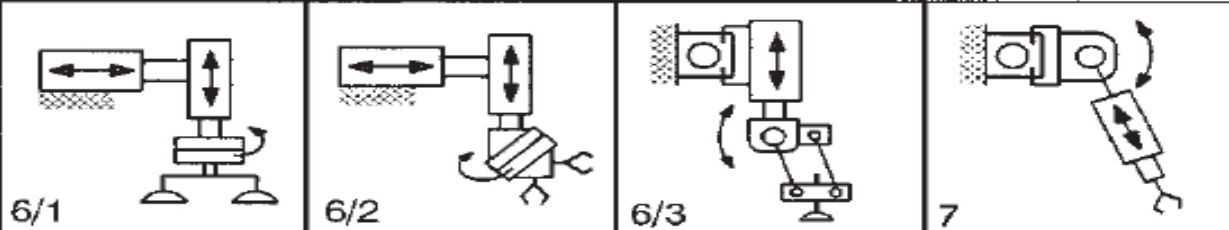
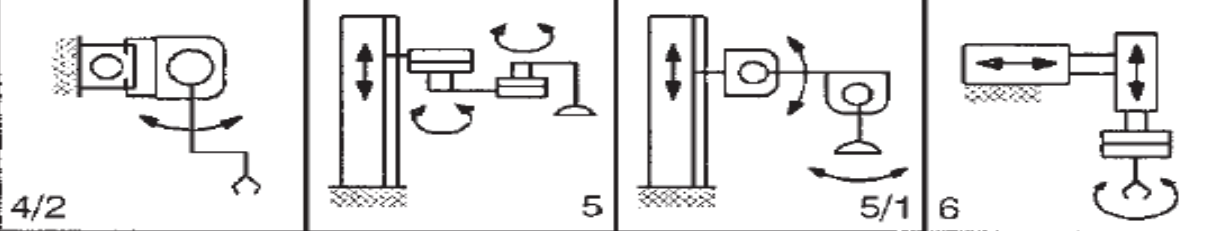
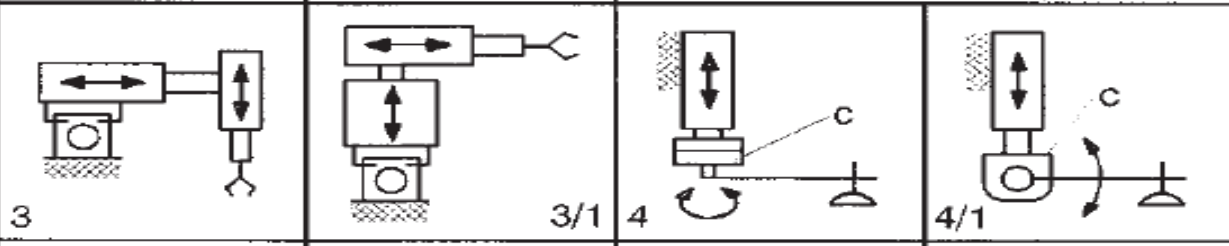
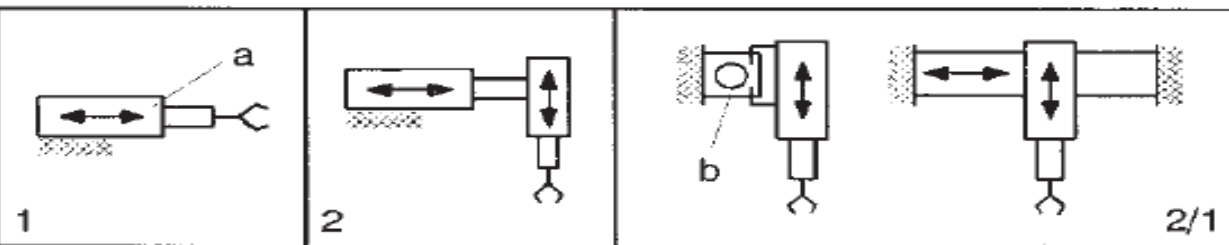
- 11. Plūsmdalis
- 12. Drosele ar pretvārstu
- 13. Pneimocil.
- 14. Sensors
- 15. Vadības sistēma



a)



b)

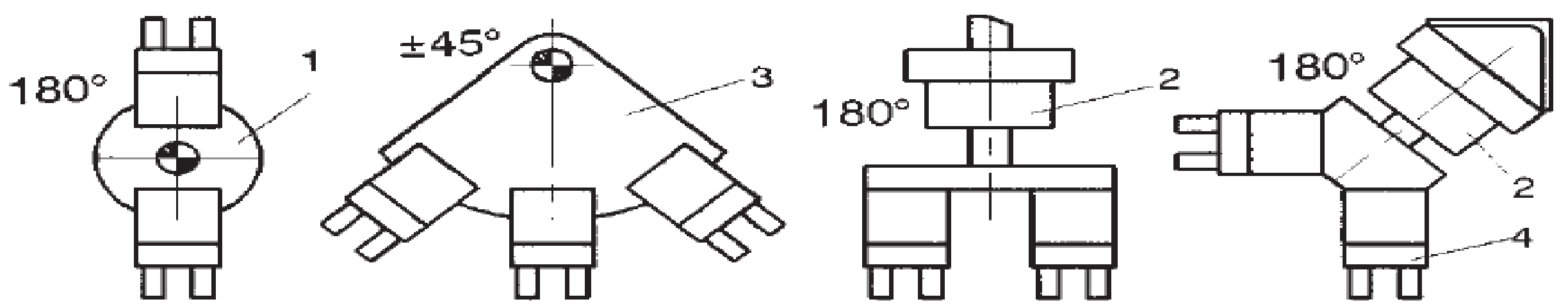


	A1	A2	A3
1	L	—	—
2	L	L	—
3	L	L	L
4	L	D	—
5	L	D	D
6	L	L	D
7	L	D	L
8	D	—	—
9	D	D	—
10	D	D	D
11	D	L	—
12	D	L	L
13	D	D	L
14	D	L	D

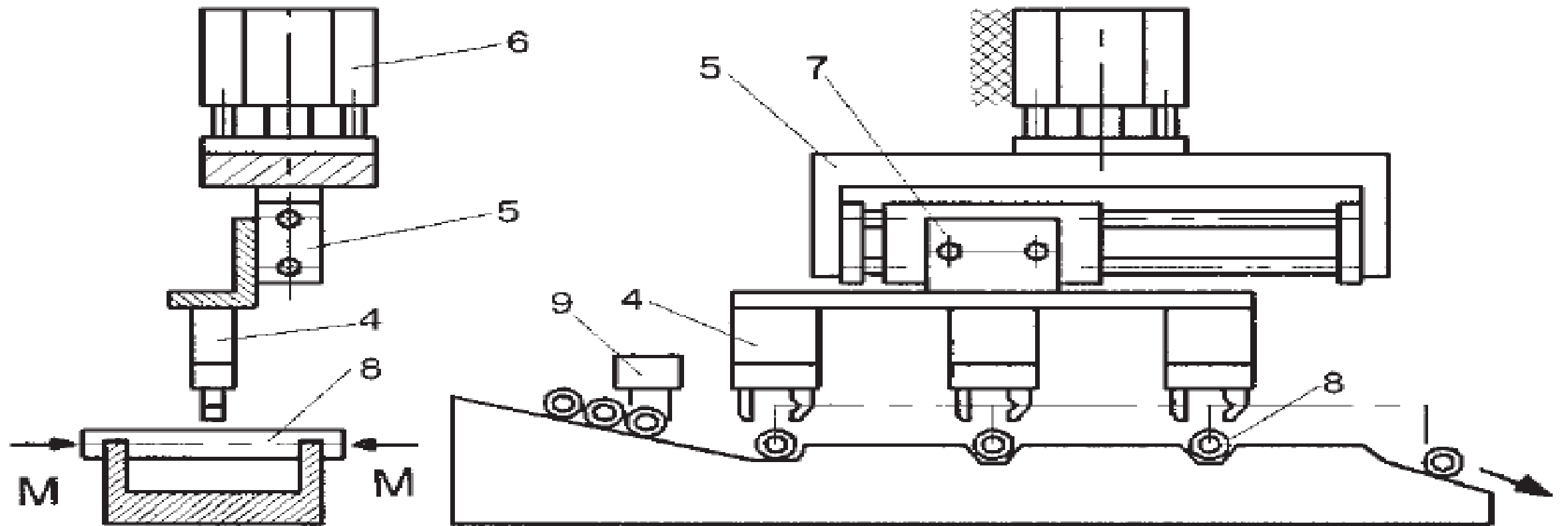
Some combination variants for linear(L) and rotary units (D)

a Linear unit
 b Cross-travel unit
 c Rotary or swivel unit

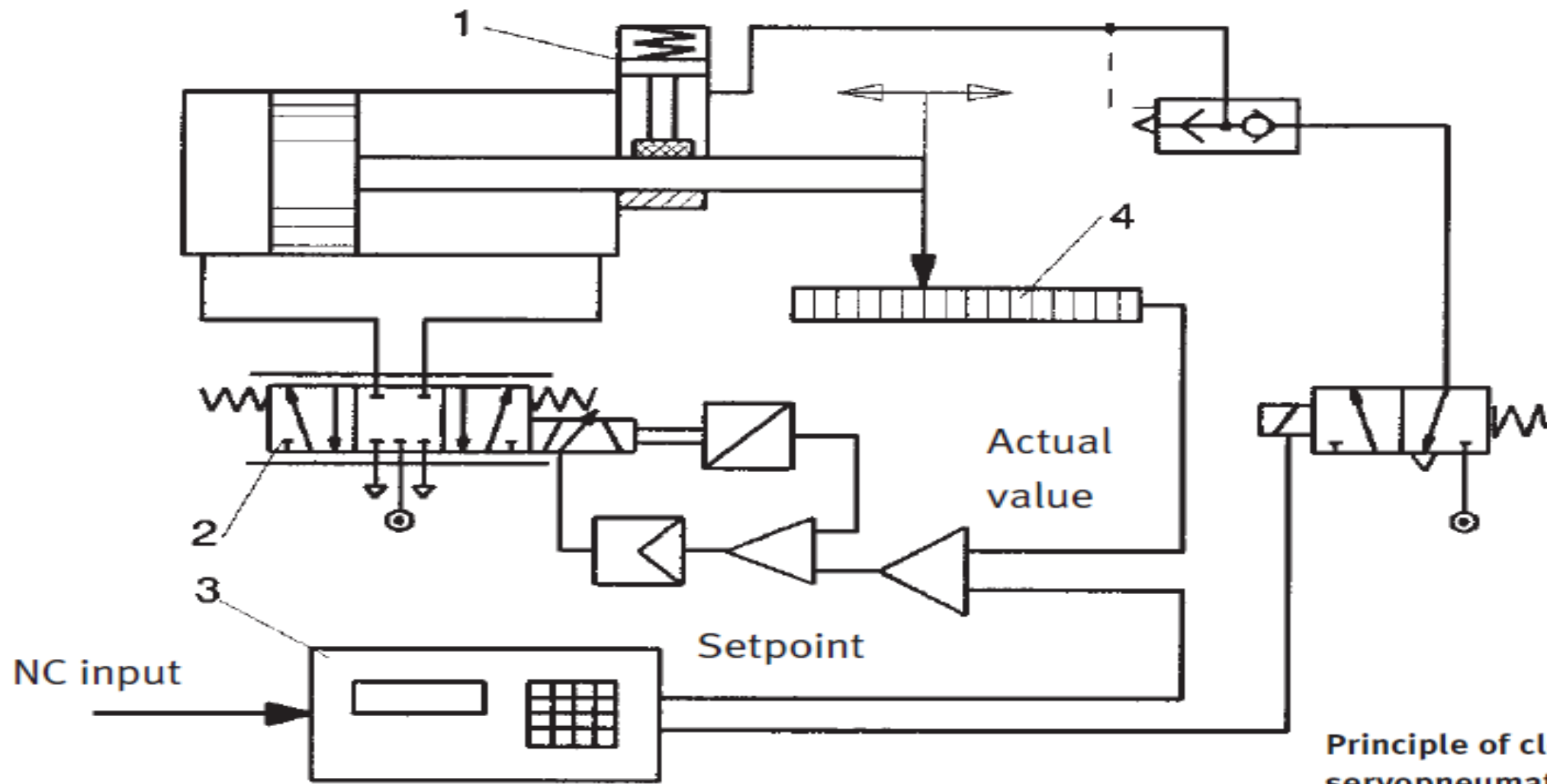
A Axis



a)

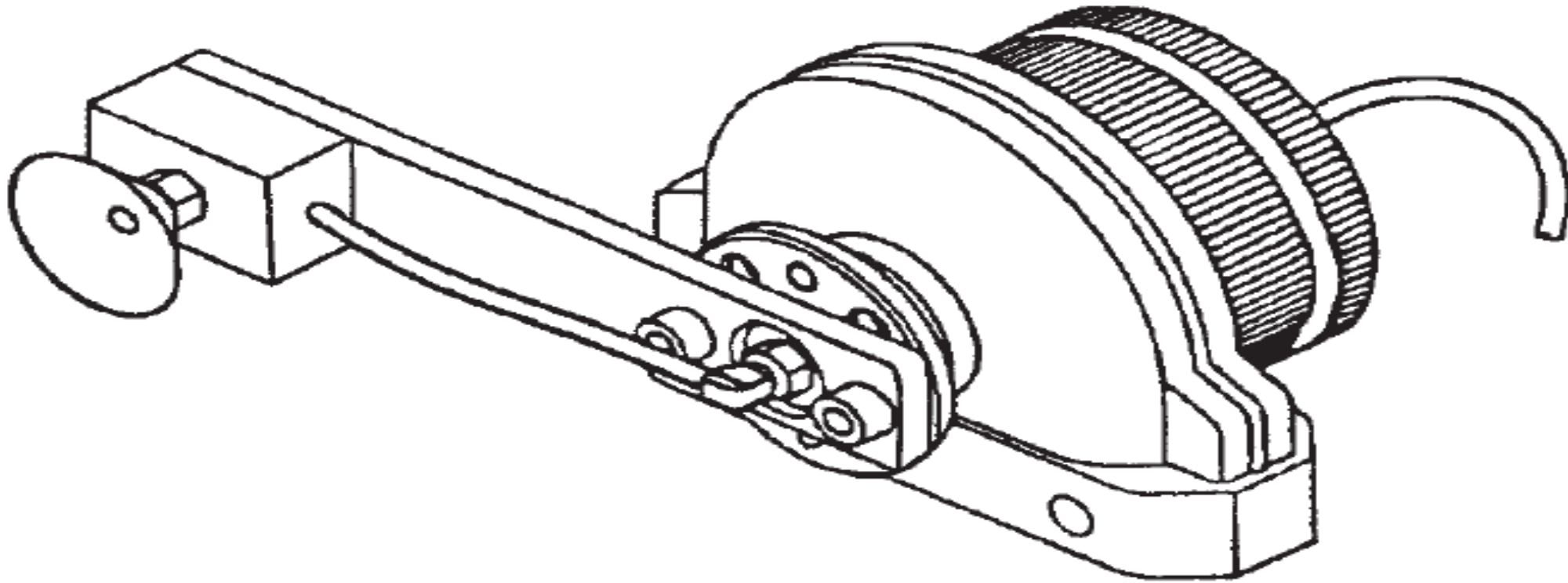


b)

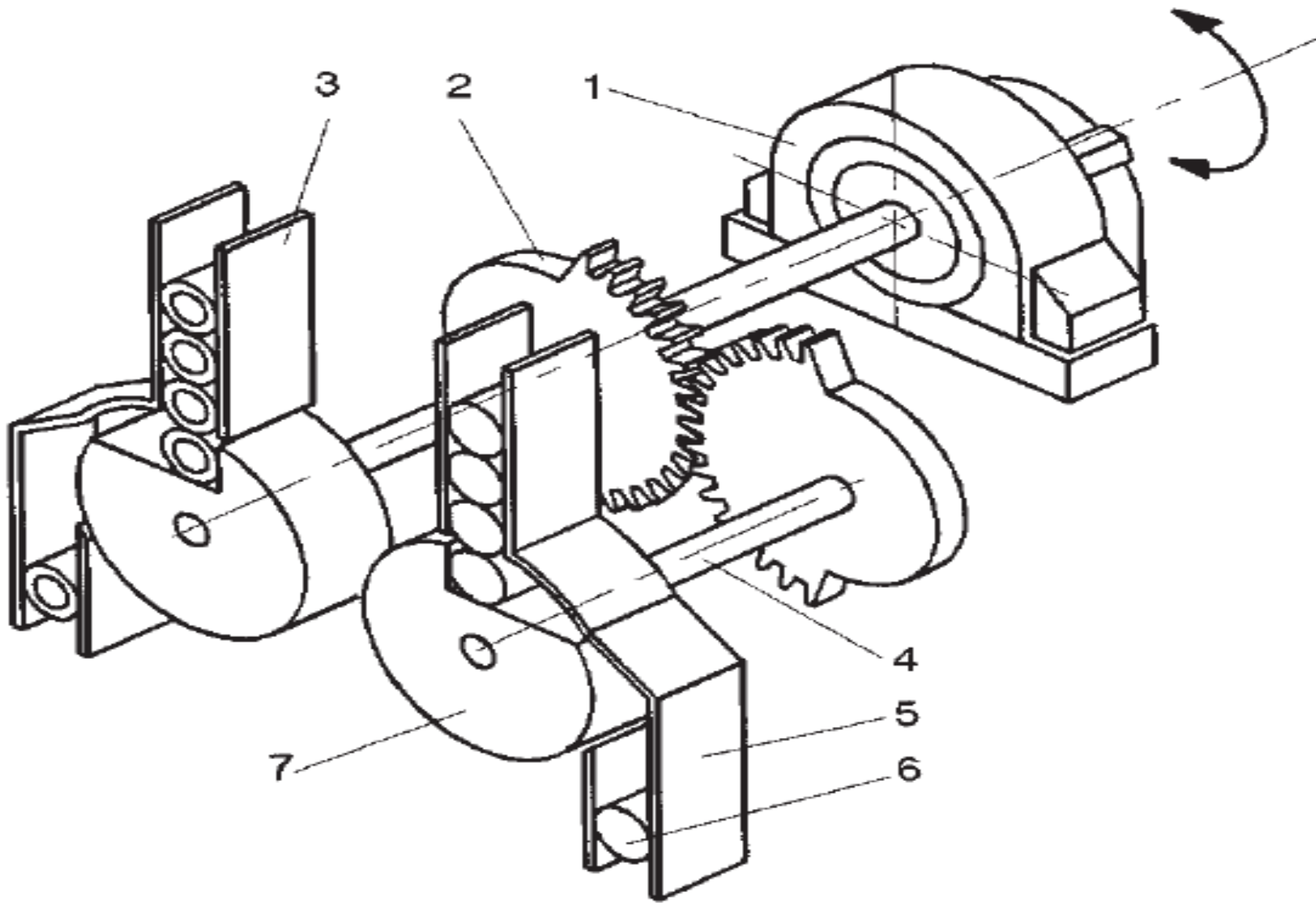


Principle of closed-loop servopneumatic position control

- 1 Brake**
- 2 Proportional valve**
- 3 Controller and programmer**
- 4 Displacement encoder system**

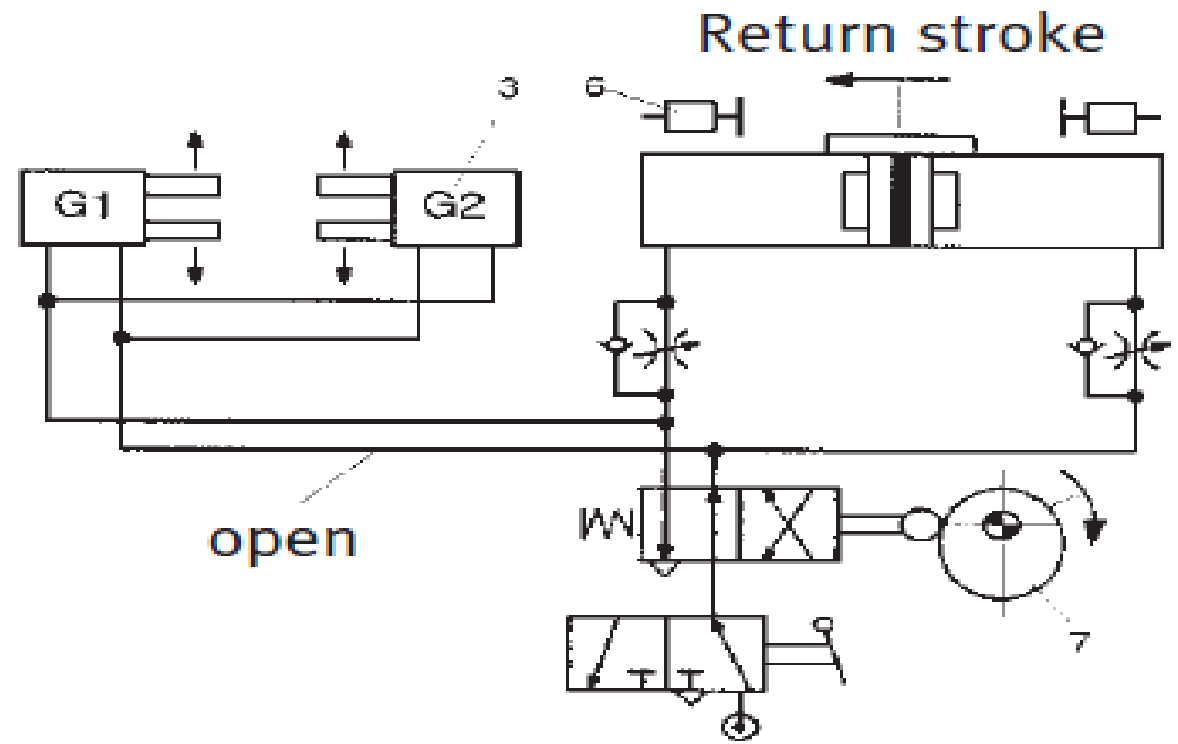
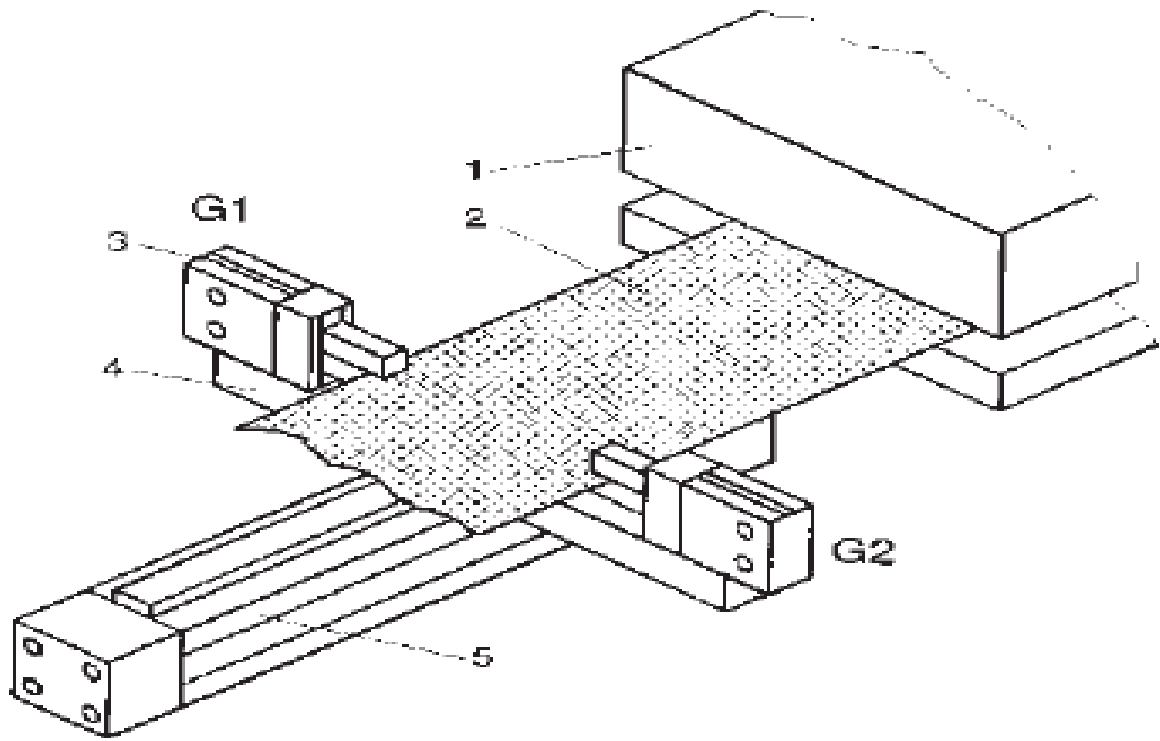


Rotary arm unit – a Festo classic



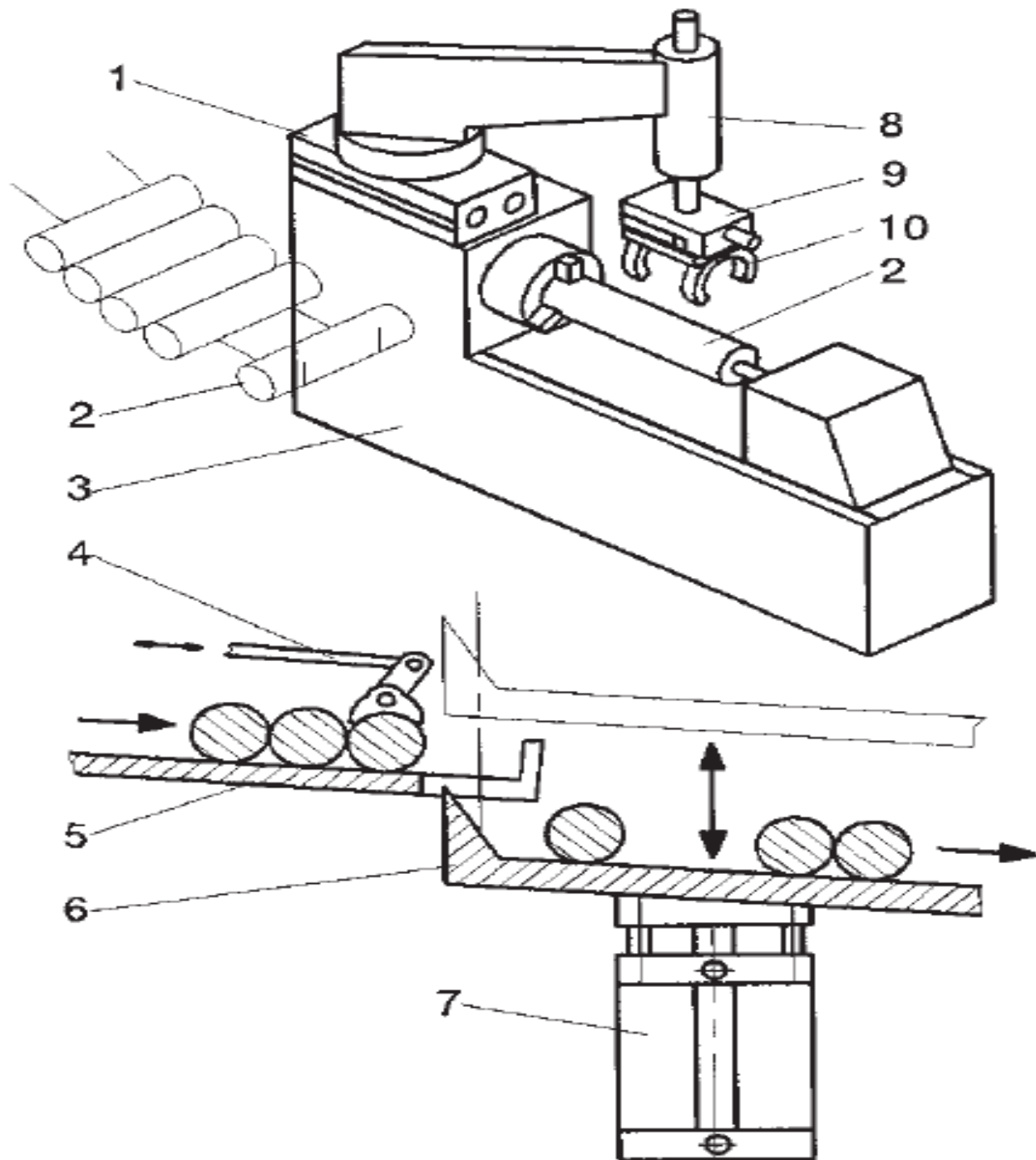
Double distributor for the marshalling of assembly components

- 1 Rotary-vane unit
- 2 Toothed segment
- 3 Feed magazine
- 4 Axis
- 5 Channel to assembly machine
- 6 Workpiece
- 7 Rotary slide



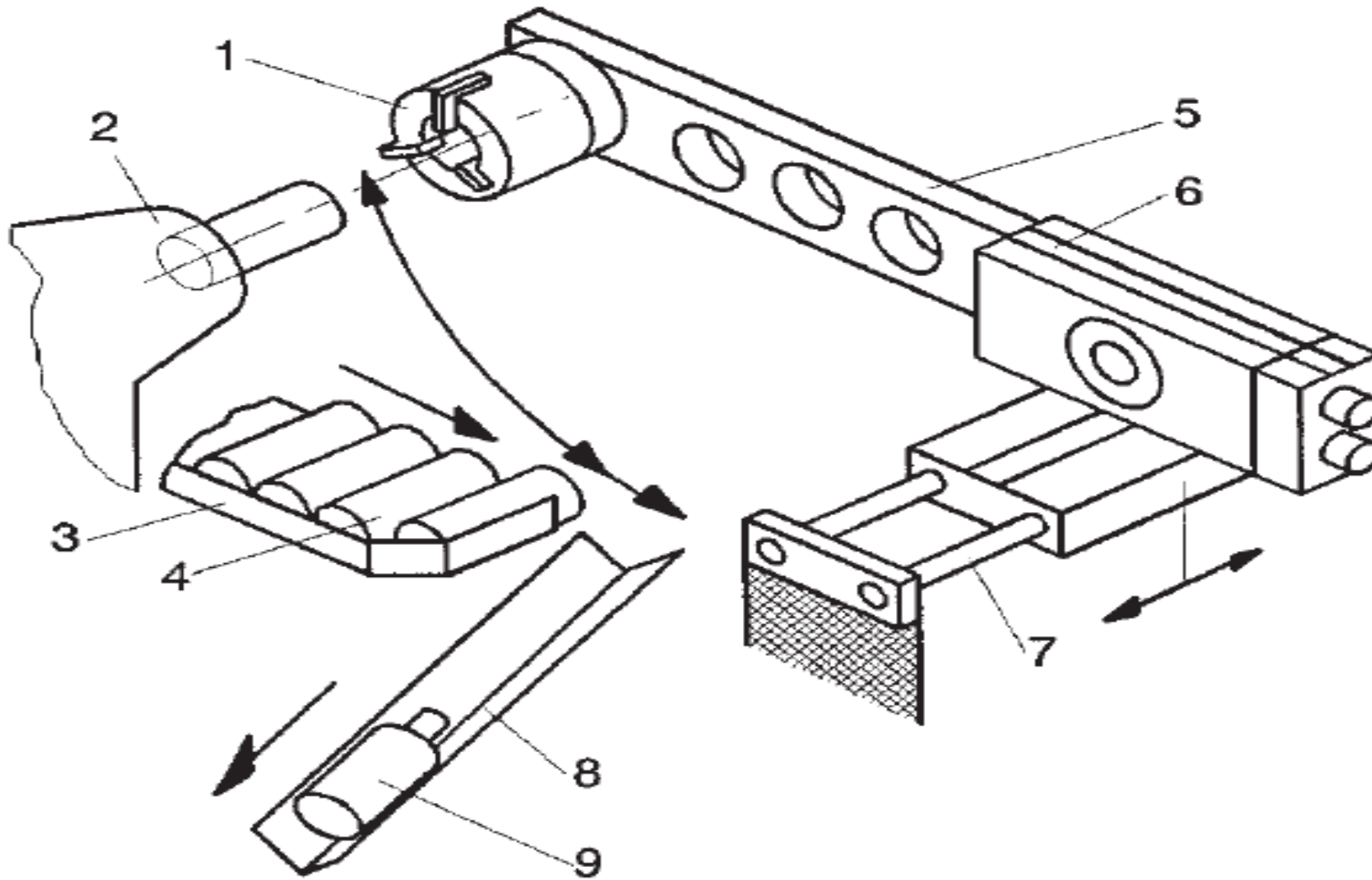
Strip material feed using parallel-jaw grippers

- 1 Tool, press
- 2 Strip material
- 3 Parallel-jaw gripper
- 4 Upper plate
- 5 Pneumatic linear unit
- 6 External stop
- 7 Control cam in press drive



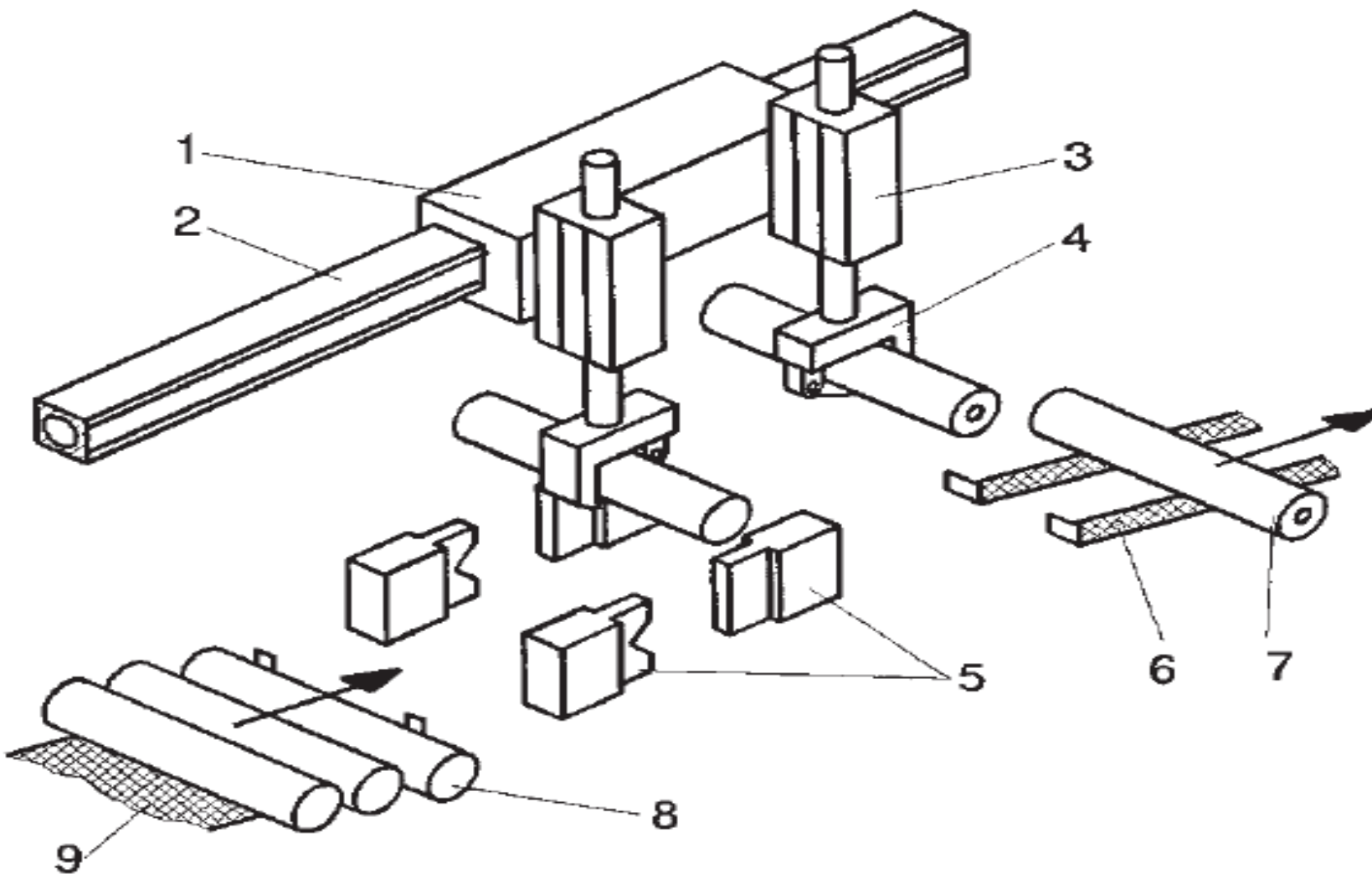
Lathe retrofitted with feed device

- 1 Rotary unit
- 2 Workpiece
- 3 Lathe
- 4 Pick-and-place device drive
- 5 Roller conveyor
- 6 Finished-workpiece magazine
- 7 Lifting cylinder
- 8 Lifting unit
- 9 Short-stroke handling axis
- 10 Gripper



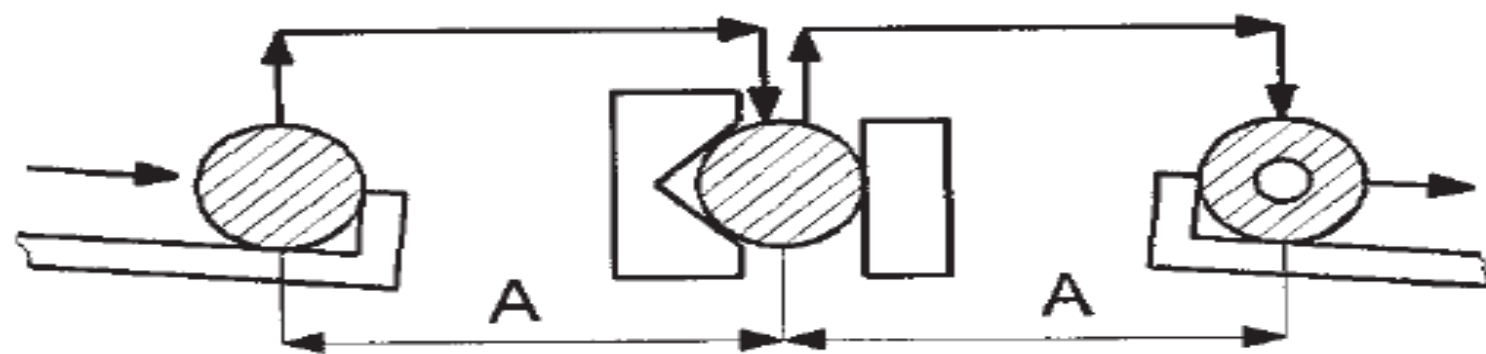
Rotary loader

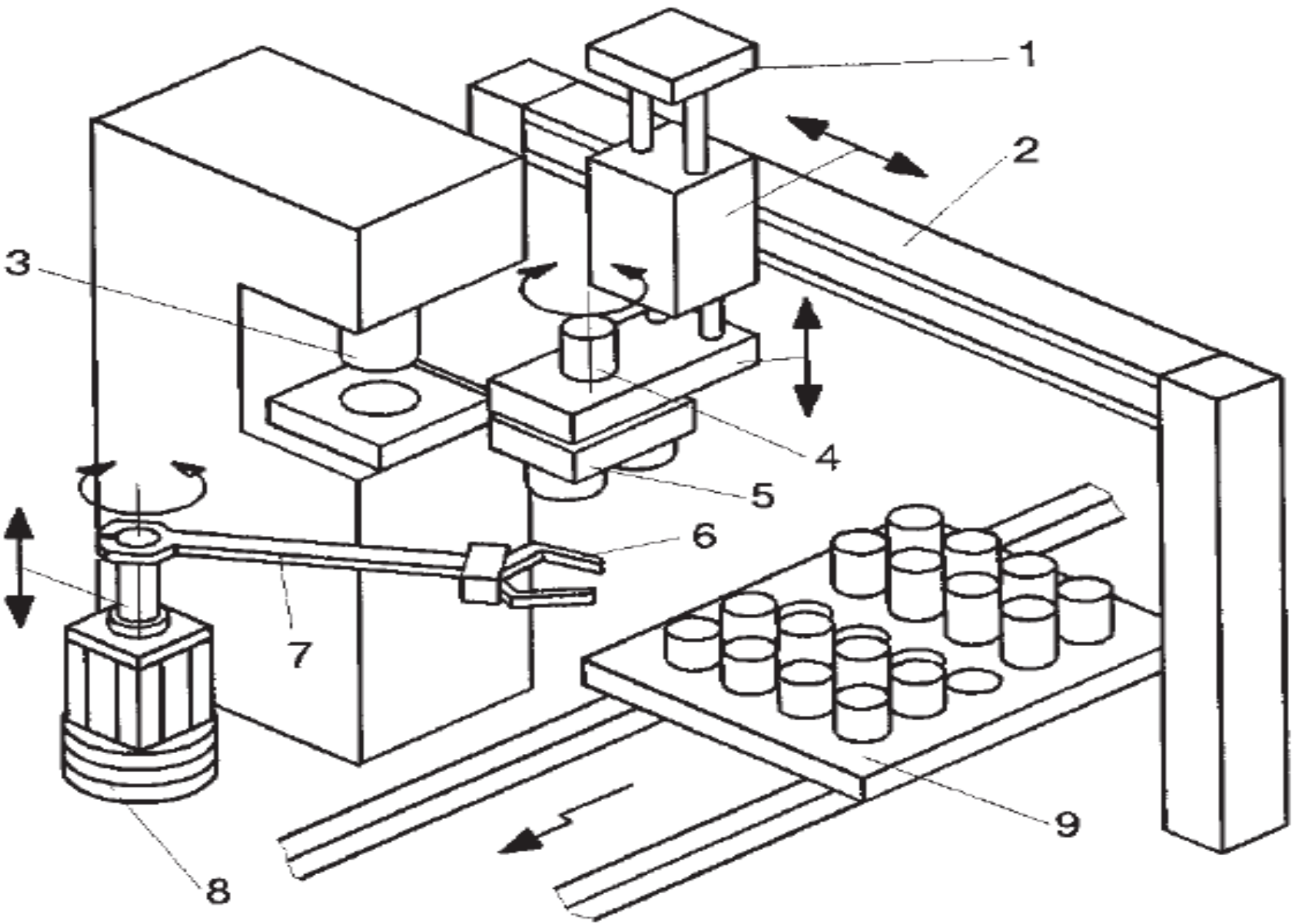
- 1 Centring gripper
- 2 Machine tool
- 3 Feed magazine
- 4 Blank workpiece
- 5 Arm
- 6 Rotary unit
- 7 Lifting unit
- 8 Output chute
- 9 Finished workpiece



Loading device on a counter-sinking and centring machine

- 1 Slide
- 2 Linear unit
- 3 Vertical unit
- 4 Gripper
- 5 Machine tool clamping device
- 6 Roller outfeed conveyor
- 7 Finished workpiece
- 8 Blank workpiece
- 9 Feed zone





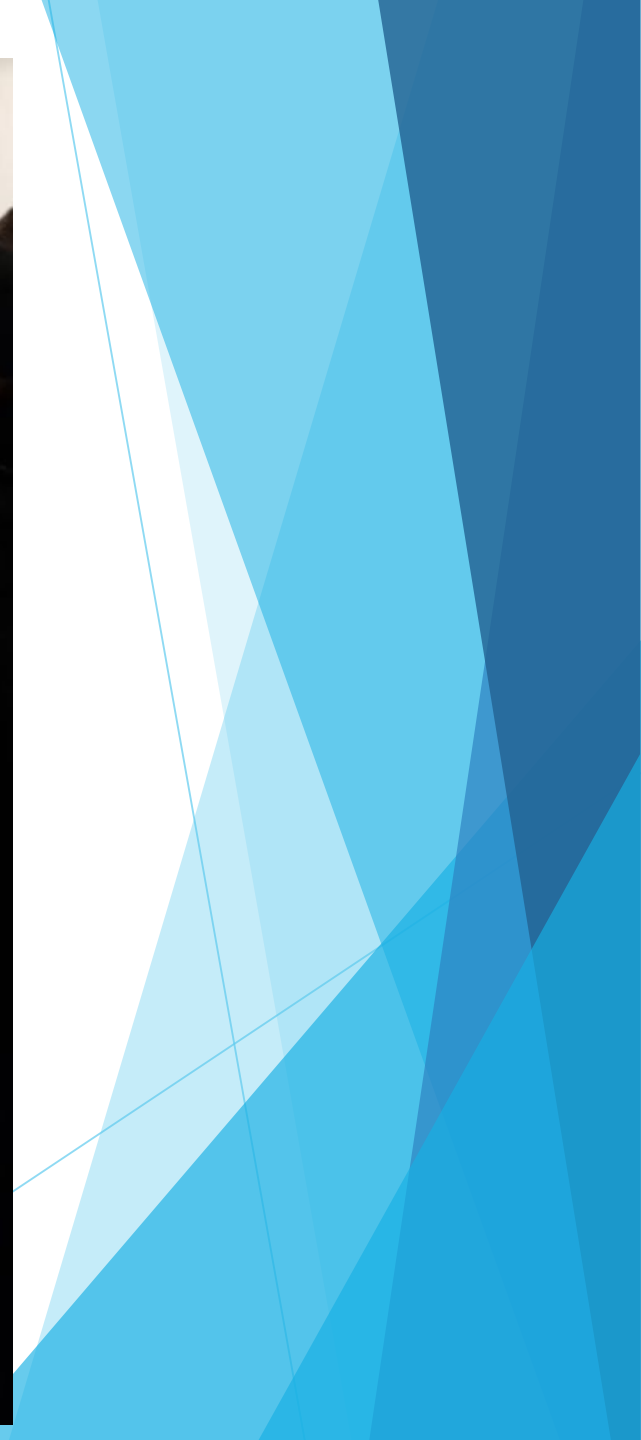
Press feed with distributed handling actions

- 1** Lifting unit
- 2** Gantry unit with rodless pneumatic cylinder
- 3** Shaping tool
- 4** Rotary unit
- 5** Double gripper
- 6** Gripper
- 7** Swivel arm
- 8** Swivel/lifting unit
- 9** Workpiece carrier magazine for blank and finished workpieces



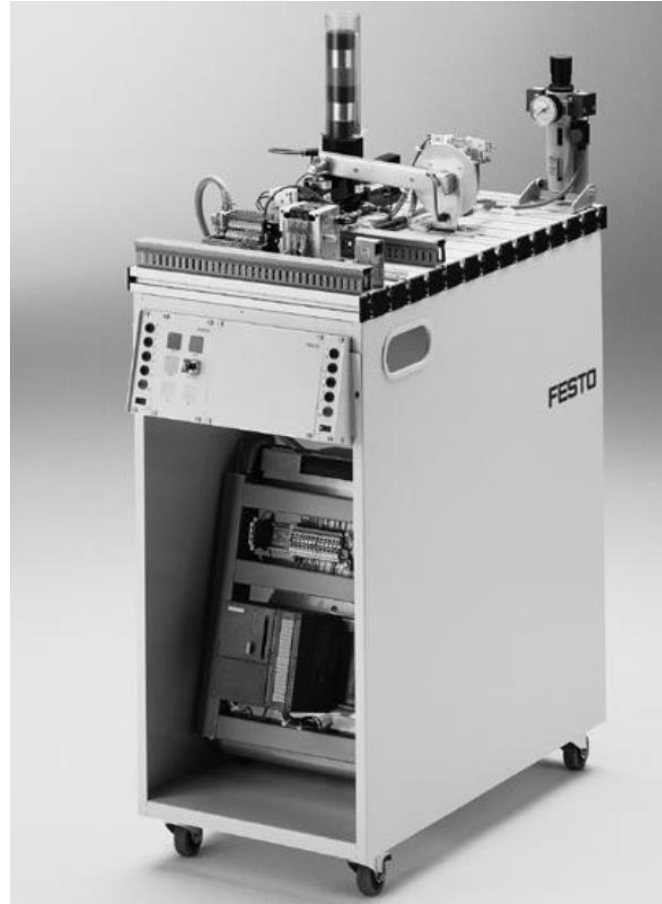






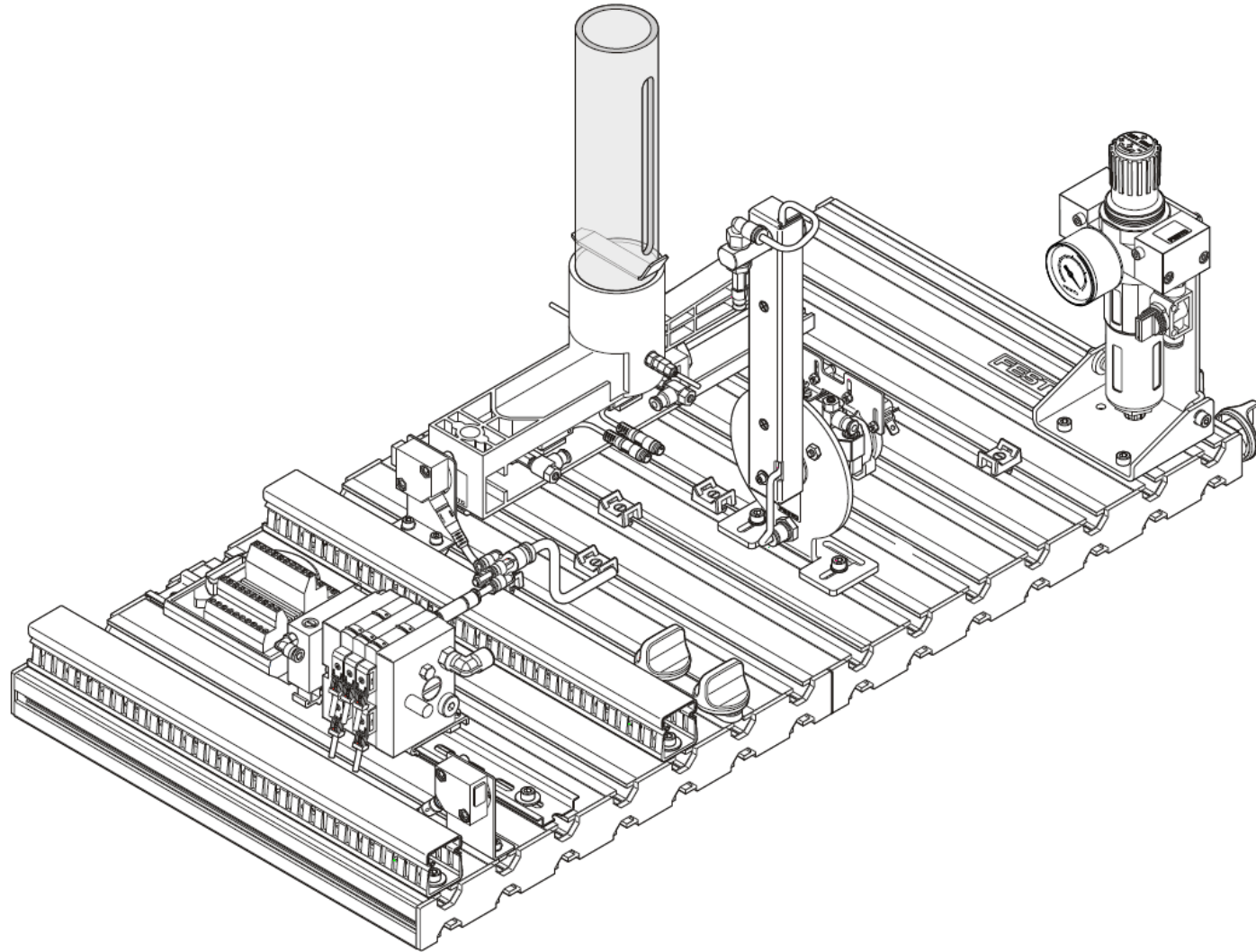
MTS Distribution Station

- ▶ 1. Study work task/
developing the connection
circuit and testing it in
FluidSim
- ▶ 2. Selecting the proper
components / mounting
all the components.
- ▶ 3. Connecting all the
components and analyze
the result

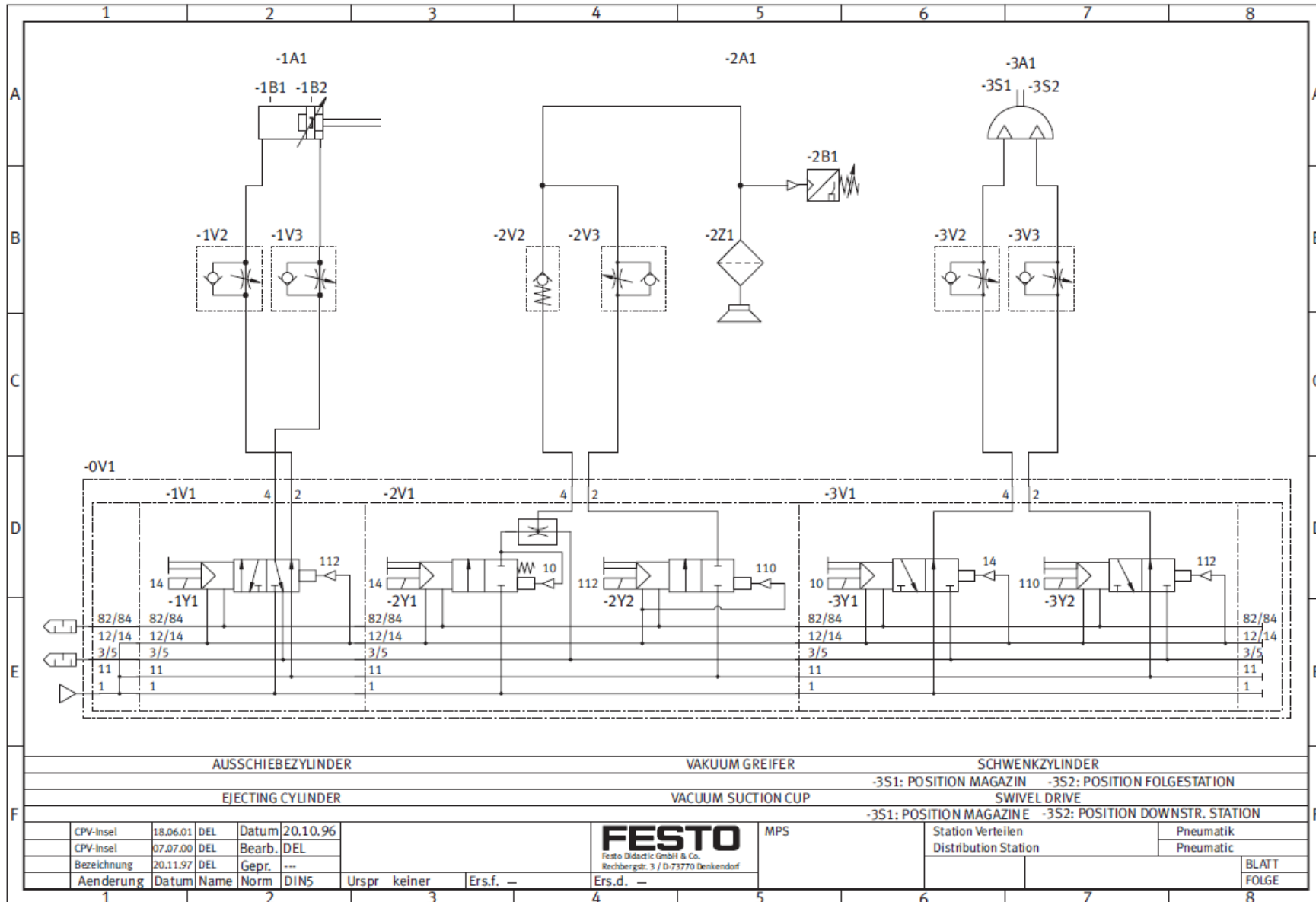


The Distributing station separates workpieces from the Stack magazine module. The magazine barrel of the stack magazine holds up to 8 workpieces. The filling level of the stack magazine is monitored by means of a through-beam sensor. A double acting cylinder pushes out the workpieces individually.

MTS Distribution Station



MTS Distribution Station elektro-pneumatiskā shēma



► Paldies par uzmanību!

