Third School Year

HYDRAULIC AND PNEUMATIC MECHANISMS

They use ***fluid*** for the transfer of energy between a generator and a motor:
- hydraulic mechanisms – the working ***fluid*** is hydraulic oil
- pneumatic mechanisms – the working ***fluid*** is air

Classifications

1) hydrostatic
2) pneumostatic

} they mostly use ***compressed*** energy for transfer

3) hydrodynamic
4) pneumodynamic

} they mostly use ***kinetic*** energy for transfer

The use of hydraulic mechanisms

– hydraulic ***presses***, hydraulic ***jacks***, hydraulic ***machine sets***.

The use of pneumatic mechanisms

– pneumatic ***mine supports***, pneumatic ***jacks***, ***spot welder drives***.

Simple hydrostatic mechanisms

– their function is based on the knowledge of the uniform ***expansion*** of pressure in all directions in liquids *(Pascal´s Law)*:

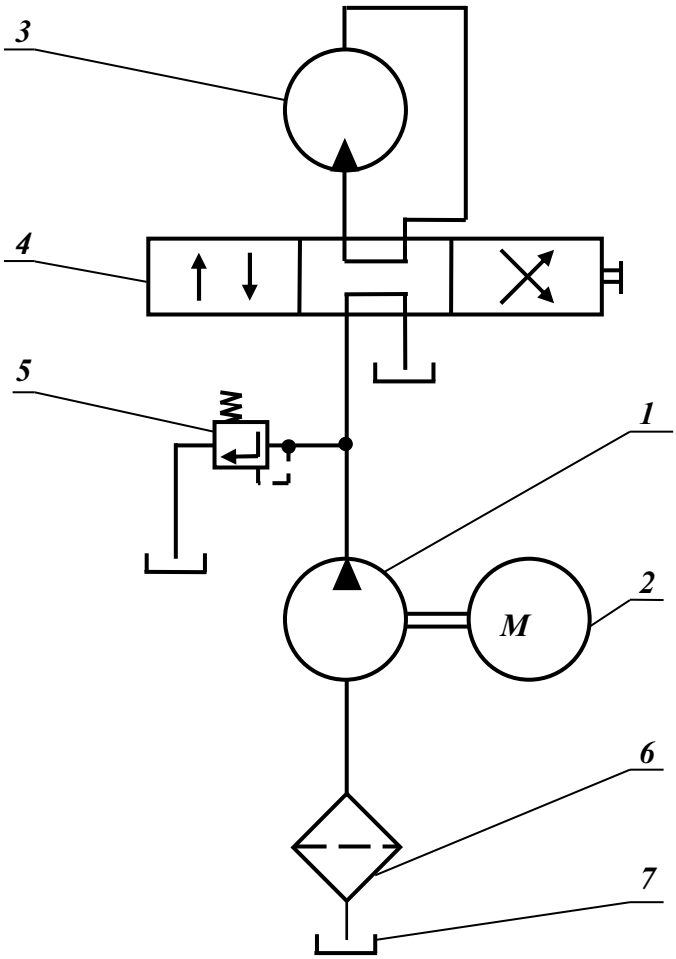
$$p = \frac{F}{S}$$

p – pressure [Pa] *Pa* – unit symbol
pascal– unit name

F – force [N] *N* – unit symbol
newton – unit name

S – surface area [m^2] m^2 – unit symbol
m^2 – variable dimension

Functional diagram of a hydrostatic mechanism



1– hydrogenerator
2 – electric motor
3 – rotational hydromotor
4 – distributor
5 – pressure ***valve***
6 – purifier (filter)
7 – tank

Hydrogenerator transfers the mechanical energy of the electric motor to pressure energy using liquids.
Hydromotor - it changes it back to mechanical energy.
Pressure ***valve*** - it limits the maximal pressure in the ***circuit***.
Distributor enables a change in the movement of the hydromotor.

Hydrogenerators – ***geared***, ***spiral***, ***lamellar***, ***piston***.
Hydromotors – straight, rotational.
Control elements 1) for controlling pressure (safety ***valves***),
2) for controlling flow (***throttle valves***),
3) for making flow and ***fluid*** distribution barriers (***distributors***).
Auxiliary *equipment* – tanks for liquid, ***purifiers*** (filters).

Pramen: Rudolf Kříž: Stavba a provoz strojů

VOCABULARY

auxiliary	pomocný
circuit	obvod
compressed	tlakový
distributor	rozvaděč
expansion	šíření
fluid	tekutina
geared	zubový
jack	zvedák
kinetic	pohybový
lamellar	lamelový
machine set	agregát
mine support	důlní podpěra
piston	pístový, píst
press	lis
purifier	čistič
spiral	šroubový
spot	bod, tečka
throttle	škrtící
valve	ventil
welder drive	svařovací pohon

COMPREHENSION QUESTIONS

1. Where do we use hydraulic mechanisms?
2. Where do we use pneumatic mechanisms?
3. How does a distributor work?

EXERCISES

1. Letter tiles - Unscramble the tiles to reveal a message. Then translate in Czech.

QUI	ERG	TO	E M	RGY	LI	SSU	TH
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CAL	IC	TRA	OR	ERS	CTR	ING	F T
MOT	DS .	HE	HYD	ECH	PRE	ENE	US
Y O	OR						

2. Translate the words into English:

1 ventil
2 tekutina
3 píst
4 elektromotor
5 řízení
6 nádrž
7 rovnoměrný
8 převádět
9 škrtící
10 umožnit

EXERCISES – key for teachers only

1. Solution:
Hydrogenerator transfers the mechanical energy of the electric motor to pressure energy using liquids.

2.

1 ventil - valve
2 tekutina - fluid
3 píst - piston
4 electromotor – electric motor
5 řízení - controlling
6 nádrž - tank
7 rovnoměrný - uniform
8 převádět - transfer
9 škrtící - throttle
10 umožnit - enable