

INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

Second School Year

NC AND CNC MACHINES 1 Numerically controlled machines

1. **Automation** is putting *numerically* controlled machines into production.

2. **Automation has the following advantages:**

- a quick change of production,
- increased quality of products,
- increased number of products,
- increased production *accuracy*.

3. **Automation has the following disadvantages:**

- the machines are more expensive,
- in needs qualified personnel for programming machines,
- *maintenance* is more complicated,
- operation of machines is more complicated.

4. These machines can be classified as NC machines and CNC machines.

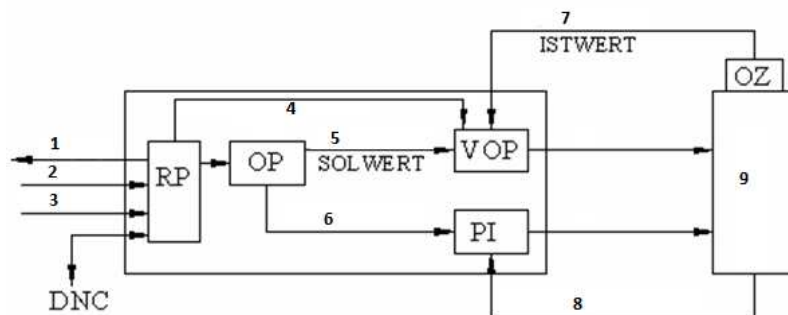
4.1 **Introduction of NC machines = Numerically Controlled Machines:**

- The control of all machine functions is only *carried out* by the control system according to a programme.
- All data is prepared in the form of a series of numbers.

4.2 **Introduction of CNC machines = Computer Numerical Controlled Machines:**

- Unlike *numerically* controlled machines a computer is part of a CNC machine.
- The programme can be written and edited directly in a computer of a machine.

5. **Diagram of a CNC machine**



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5.1 In this diagram you can see:

- | | |
|-----------------------|------------------------------|
| 1...display | 6...logic signal |
| 2...keyboard | 7... feedback |
| 3...information media | 8...discrete feedback |
| 4... tuning | 9...machine |
| 5...digital signal | |

5.2 In this diagram you can identify the following parts:

- OP ... Operation Memory
- VOP ... Evaluating the Shift Circuit
- OZ... Measuring Equipment
- DNC ... Distribution of the NC programme
- RP ... Control Memory
- PI...Programmable Interface

Literature and sources used:

Pavel Hlásek a kol., Strojírenská technologie 3, SNTL

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VOCABULARY

accuracy	přesnost
carry out	provádět, realizovat
feedback	zpětná vazba
introduction	zavedení, zavádění
maintenance	údržba
numerically	číslicově
tool	nástroj
tuning	ladění

COMPREHENSION QUESTIONS

1. What are automation advantages?
2. What are automation disadvantages?
3. What do you know about NC machines?
4. What do you know about CNC machines?

EXERCISES

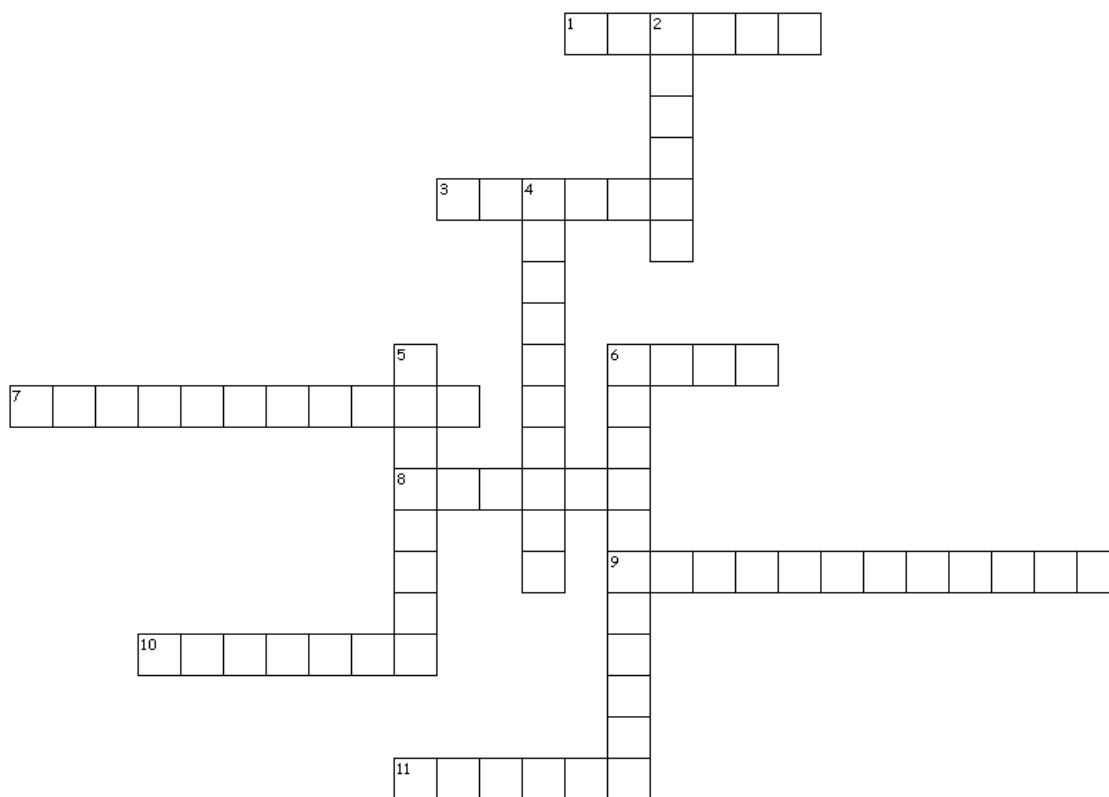
1. Match the words below with words 1-8 to make phrases. Then translate the expressions into Czech:

digital	carry	advantage	according
control	measuring	machine	numerically

- | | | | |
|---|--------------------|-------|-------|
| 1 | tool | _____ | _____ |
| 2 | memory | _____ | _____ |
| 3 | out | _____ | _____ |
| 4 | and disadvantage | _____ | _____ |
| 5 | signal | _____ | _____ |
| 6 | to | _____ | _____ |
| 7 | controlled machine | _____ | _____ |
| 8 | equipment | _____ | _____ |

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2. Complete the crossword:



Across

1. ladění
3. změna
6. potřeba
7. údržba
8. na rozdíl
9. zavedení
10. kvalita
11. paměť

Down

2. číslo
4. automatizace
5. přesnost
6. číslicově

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EXERCISES – KEY FOR TEACHERS

1.

1 tool	<i>machine tool</i>	<i>obráběcí stroj/nástroj</i>
2 memory	<i>control memory</i>	<i>řídící paměť</i>
3 out	<i>carry out</i>	<i>provádět, realizovat</i>
4 and disadvantage	<i>advantage and disadvantage</i>	<i>výhoda a nevýhoda</i>
5 signal	<i>digital signal</i>	<i>číslicový signál</i>
6 to	<i>according to</i>	<i>podle, v závislosti</i>
7 controlled machine	<i>numerically controlled machine</i>	<i>číselně řízený stroj</i>
8 equipment	<i>measuring equipment</i>	<i>odměřovací zařízení</i>

2.

Across

1. tuning
3. change
6. need
7. maintenance
8. unlike
9. introduction
10. quality
11. memory

Down

2. number
4. automation
5. accuracy
6. numerically