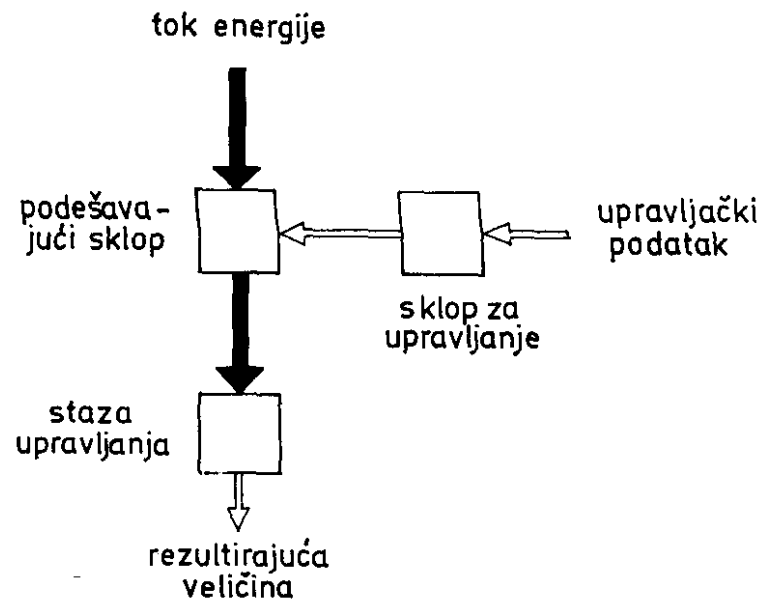


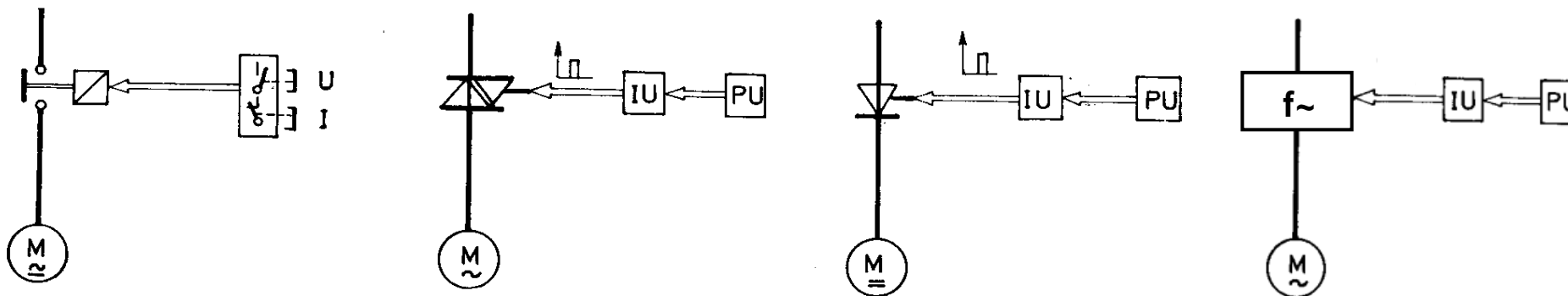
## Regulirani elektromotorni pogoni

tri glavne grupe pogona

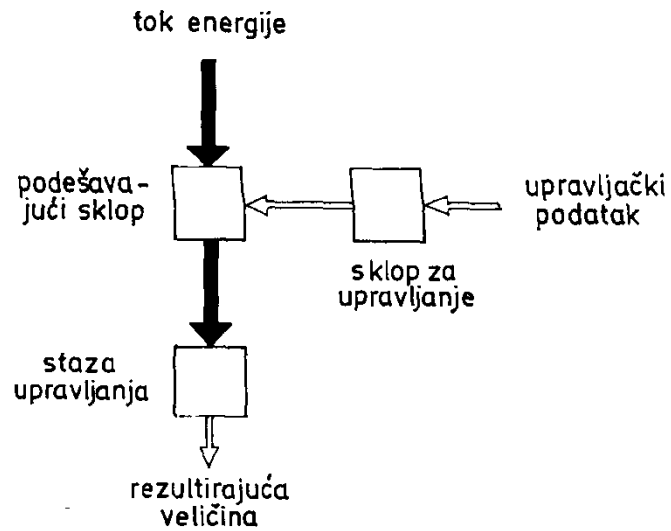
- regulacija standardnih asinhronih (ili sinhronih) motora i to samo dodatnim uređajima
- regulacija pomoću sklopova sastavljenih od više (rotirajućih) jedinica
- regulacija istosmjernih motora s nezavisnom uzбудom



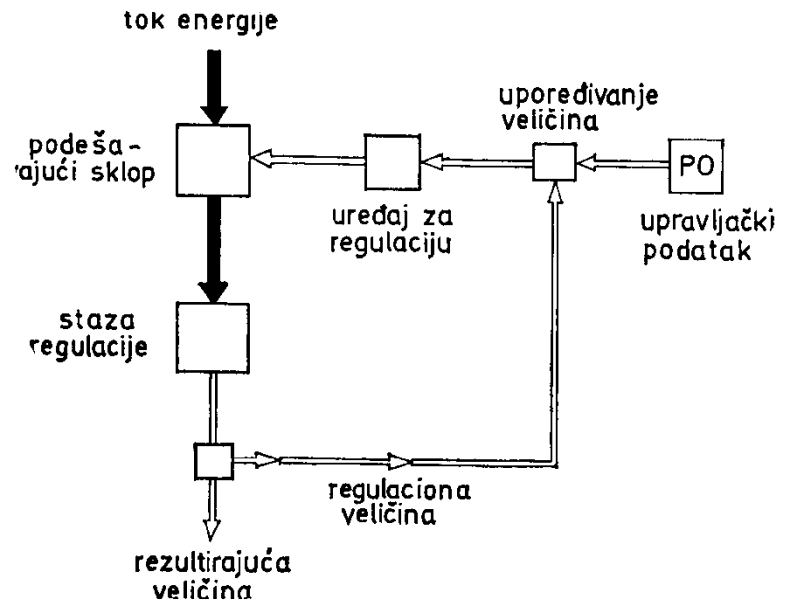
### Shematski prikaz upravljanja pogonom



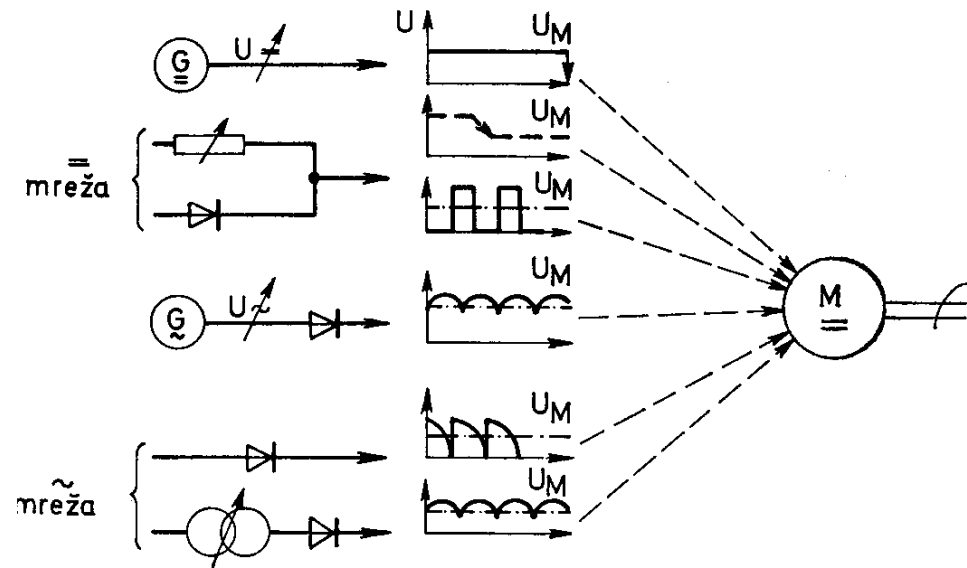
### Izvedba upravljanja elektromotornim pogonom



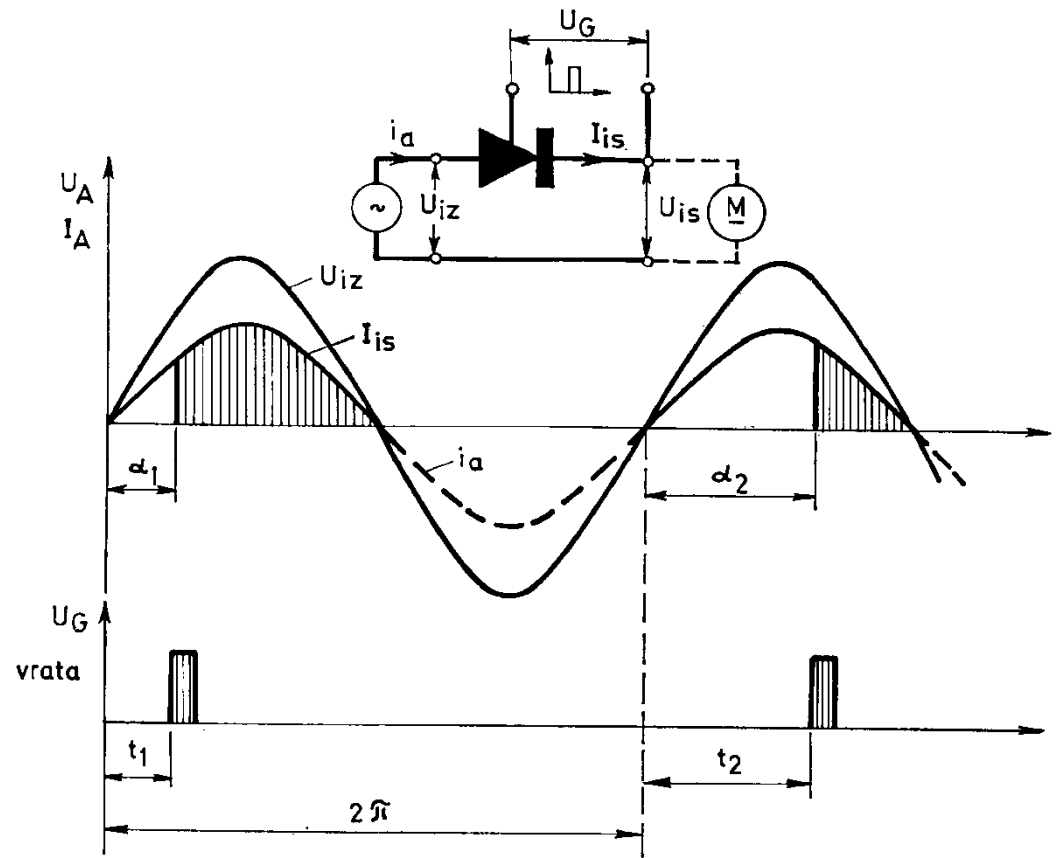
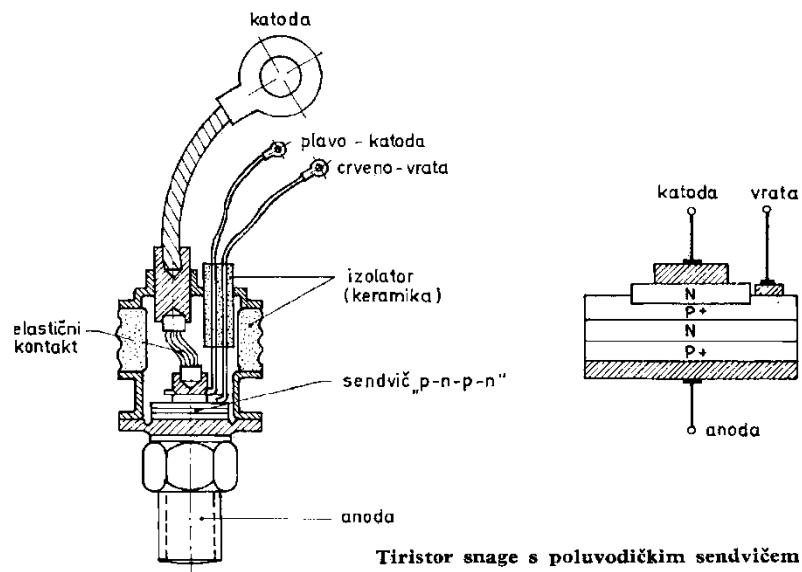
**Shematski prikaz upravljanja pogonom**



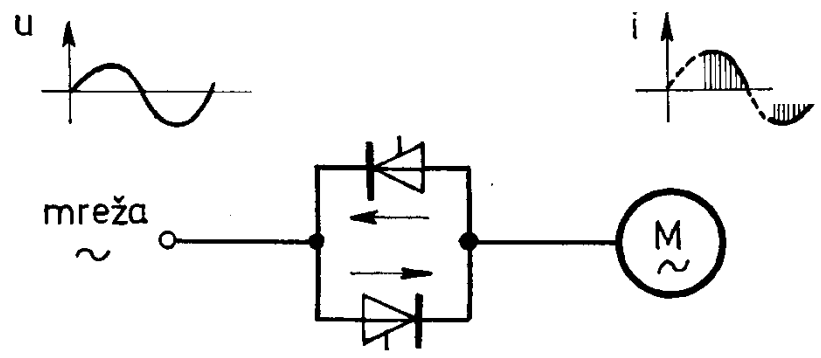
**Shematski prikaz regulacije pogona**



**Regulirani istosmjerni naponi**



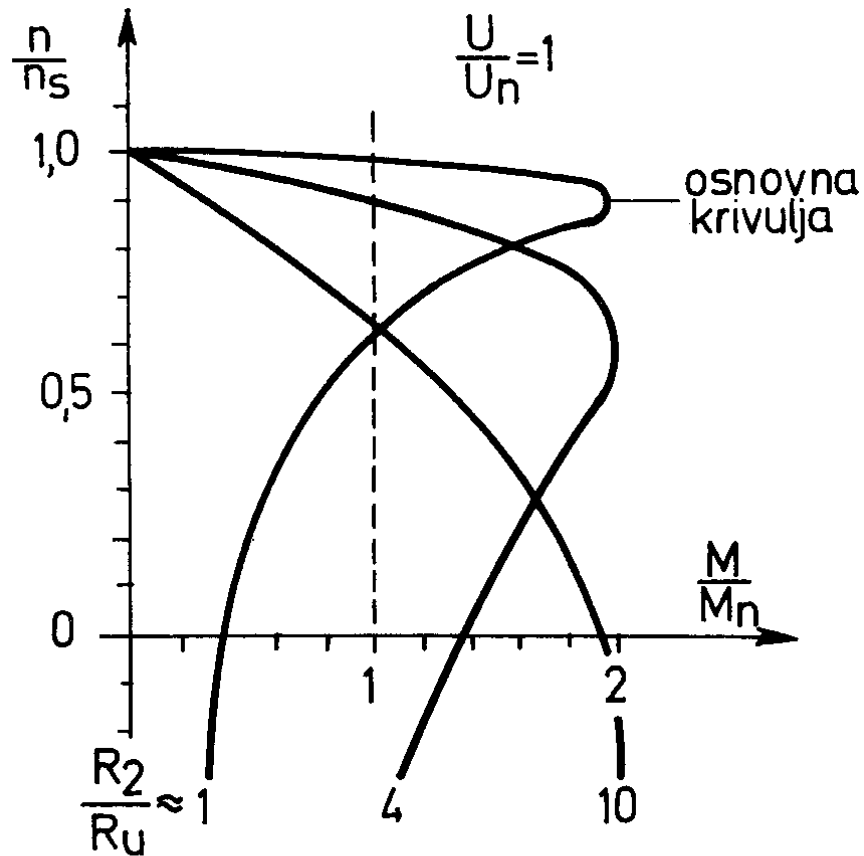
Upravljanje strujom tiristora



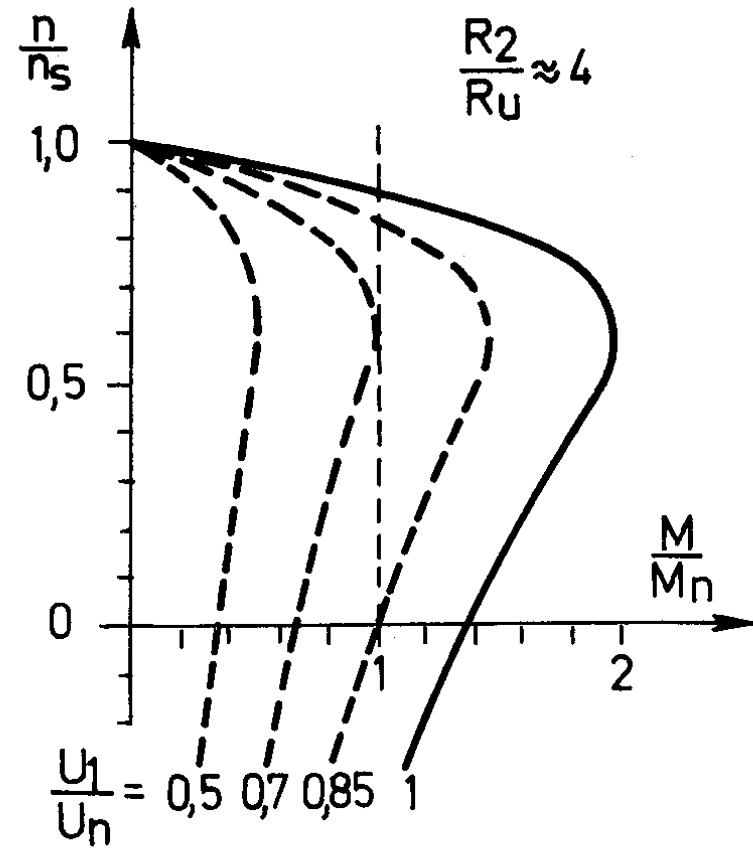
Regulirani izmjenični napon

## Asinkroni motori

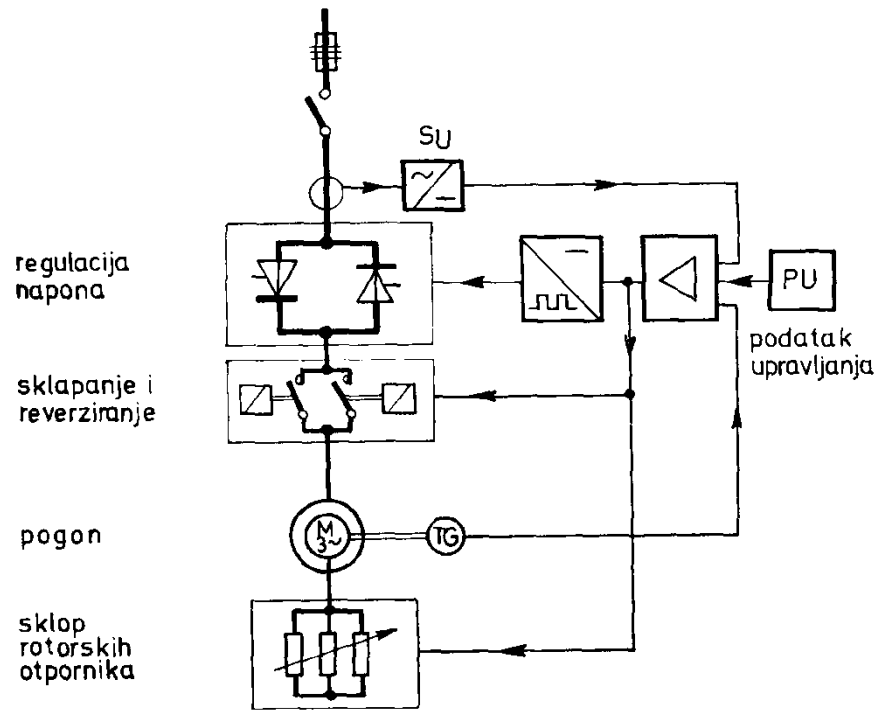
Regulacija brzine vrtnje promjenom otpora rotorskog kruga ili naponom napajanja motora



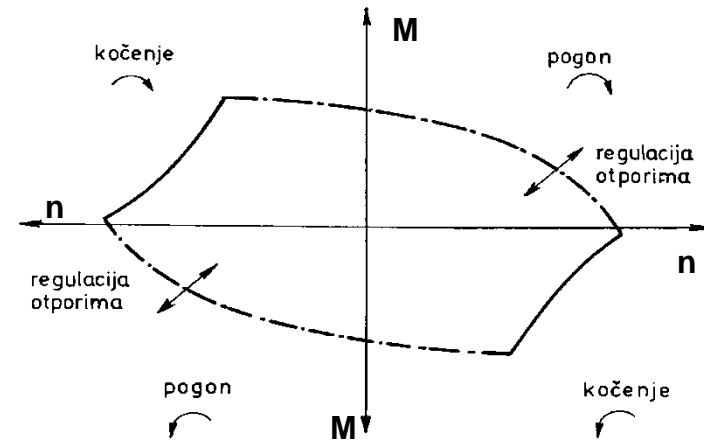
Promjena momentne karakteristike asinhronog motora promjenom otpora u rotorskom krugu



Promjena momentne karakteristike promjenom napona napajanja motora



**Sklop za regulaciju brzine vrtnje kolutnih asinhronih motora, regulacijom napona napajanja**



**Karakteristika momenta i brzine vrtnje za pogon i kočenje u oba smjera vrtnje kod regulacije naponom kolutnog asinhronog motora**

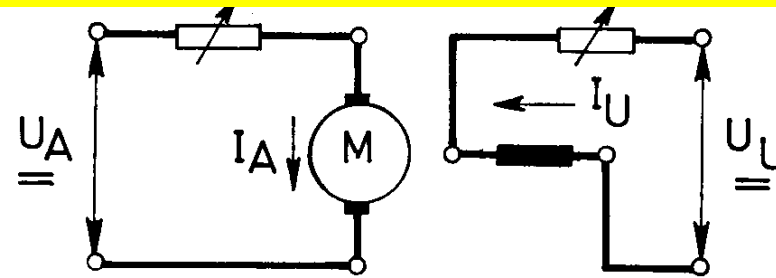
## Istosmjerni motori

### Regulacija brzine vrtnje istosmjernog motora s nezavisnom uzбудom

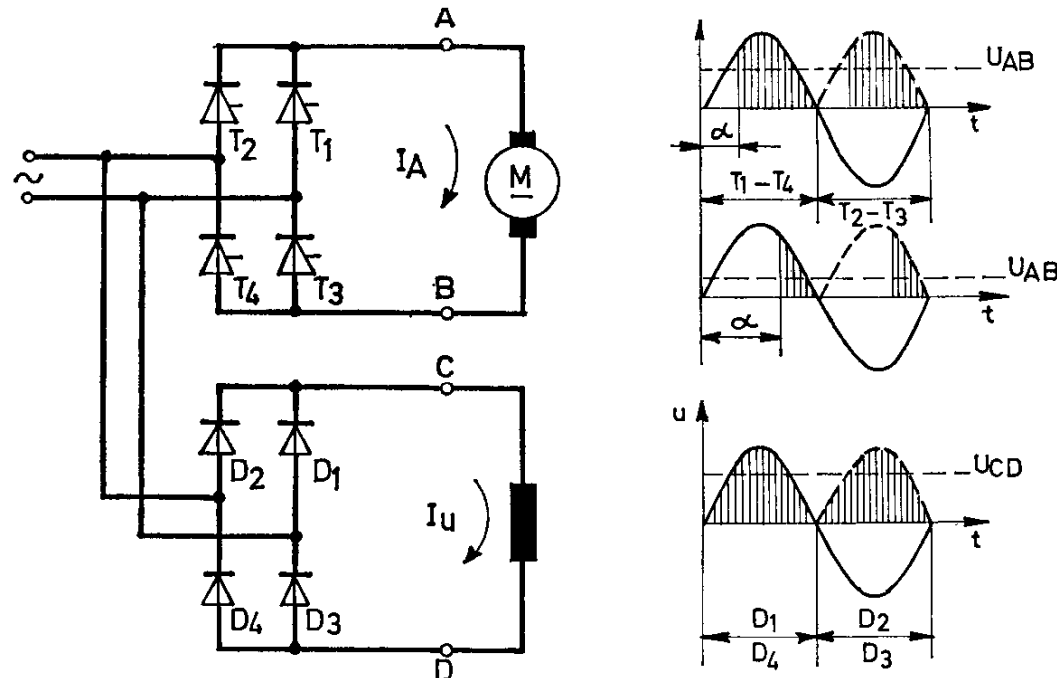
parametri

moment motora

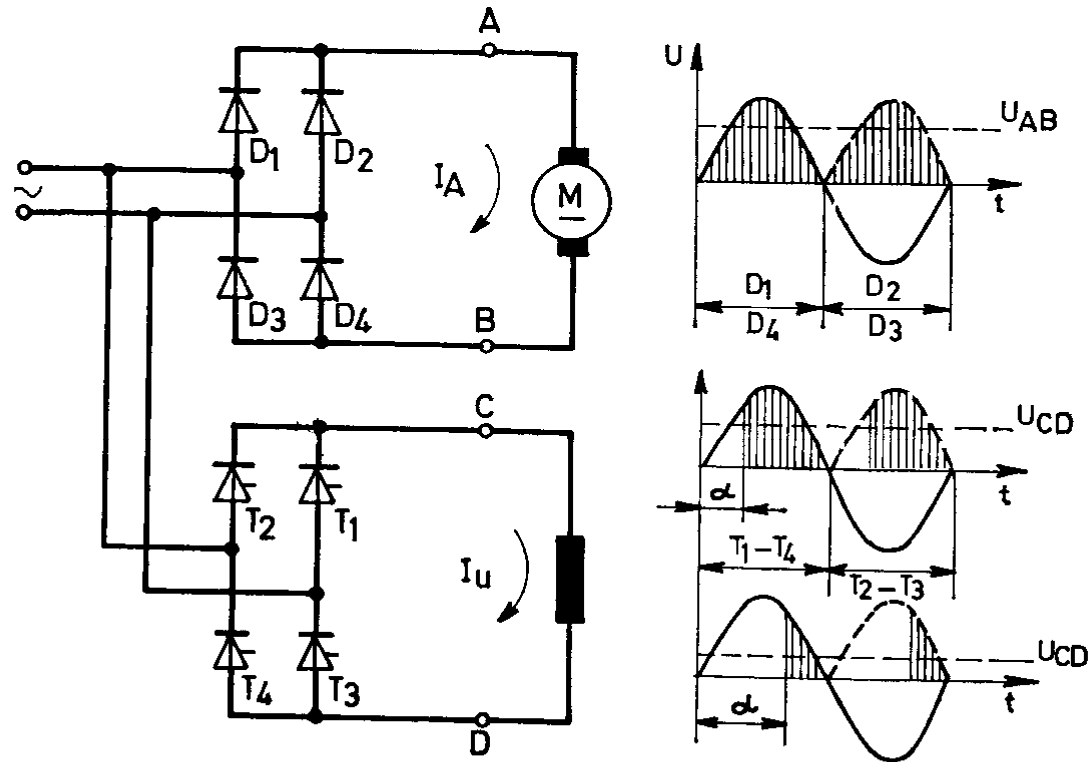
brzina vrtnje motora



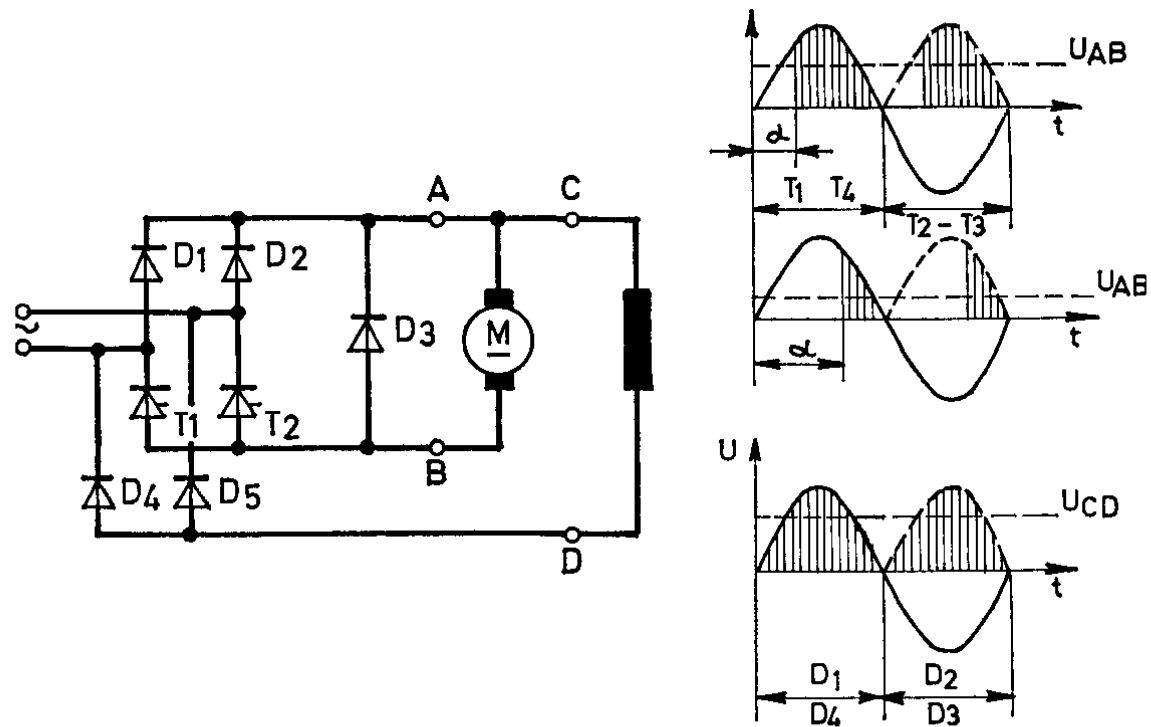
Nezavisno napajanje armature i uzbuđe istosmjernog motora



Regulacija istosmjernog motora promjenom struje armature napajanja tiristorskim mostom s konstantnom uzbuđom



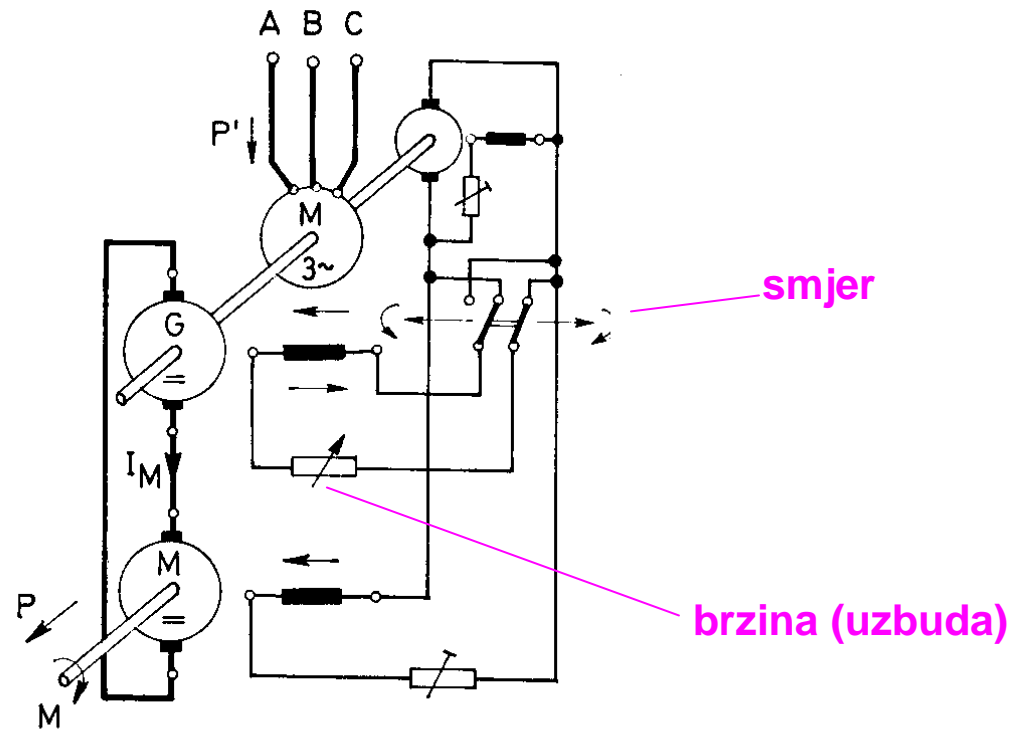
**Regulacija istosmjernog motora promjenom struje uzbude napajanja  
tiristorskim mostom s konstantnom strujom armature**



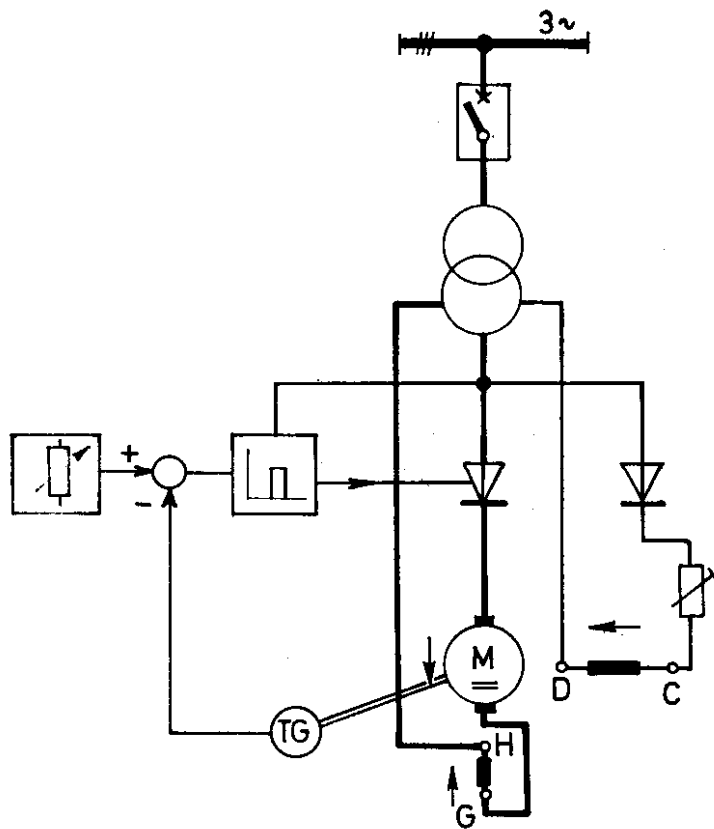
**Primjer izvedbe regulacije istosmjernog motora strujom armature uz konstantnu uzbuđu pomoću dva tiristora i četiri diode**



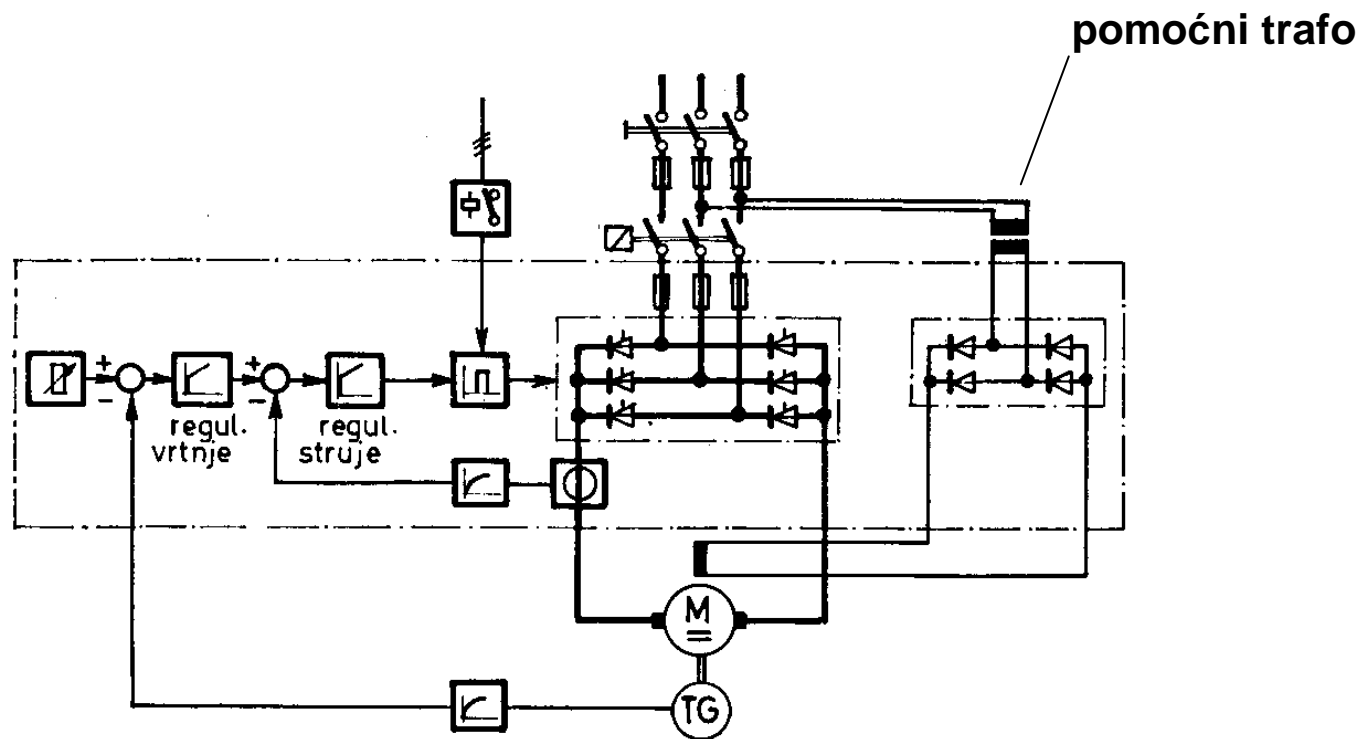
## Regulirani elektromotorni pogon s istosmjernim motorom



Regulirani elektromotorni pogon u Ward-Leonardovu spoju

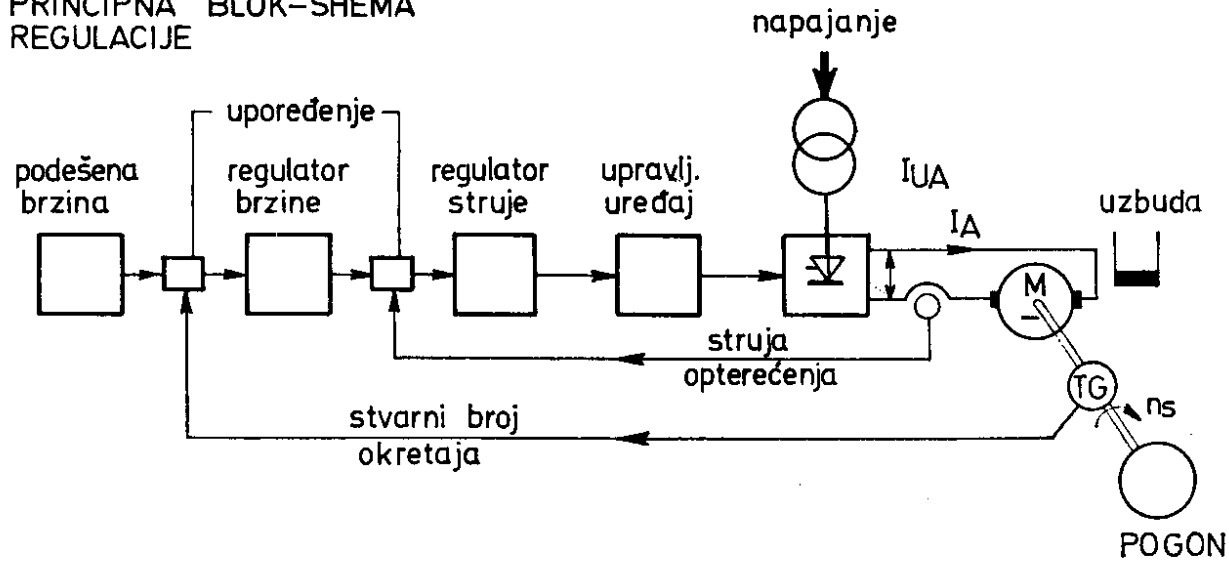


**Izvedba reguliranog elektromotornog pogona pomoću tiristora ekvivalentno postrojenju prema slici 108.**

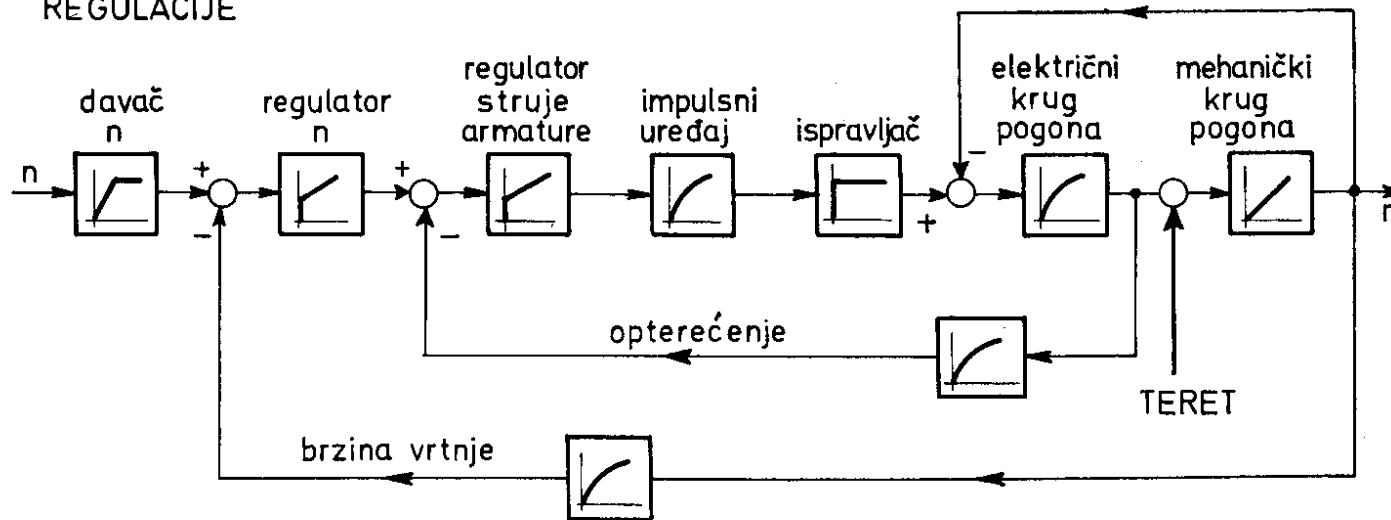


**Blok shema automatske regulacije istosmjernog elektromotornog pogona s regulacijom armature**

PRINCIPNA BLOK-SHEMA  
REGULACIJE



STRUKTURNA BLOK-SHEMA  
REGULACIJE



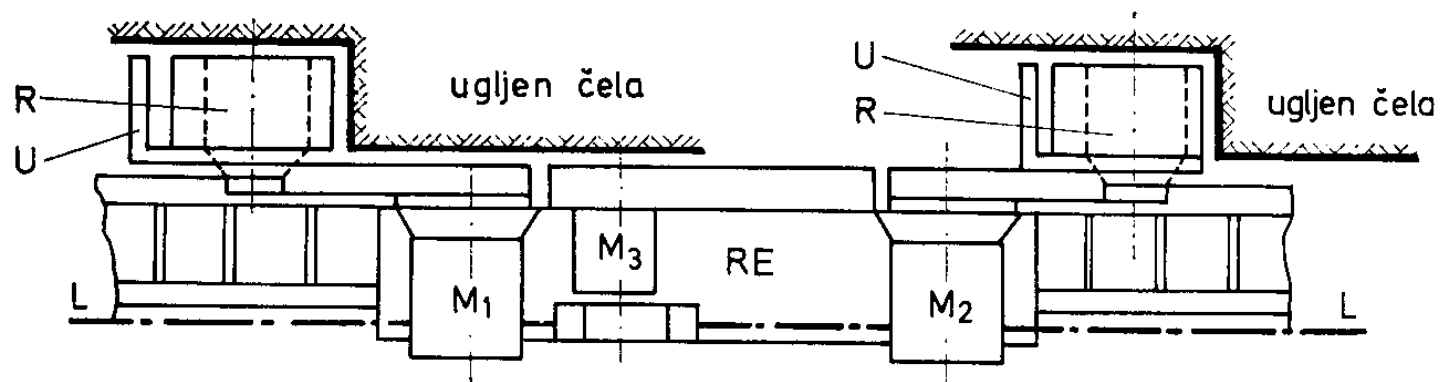
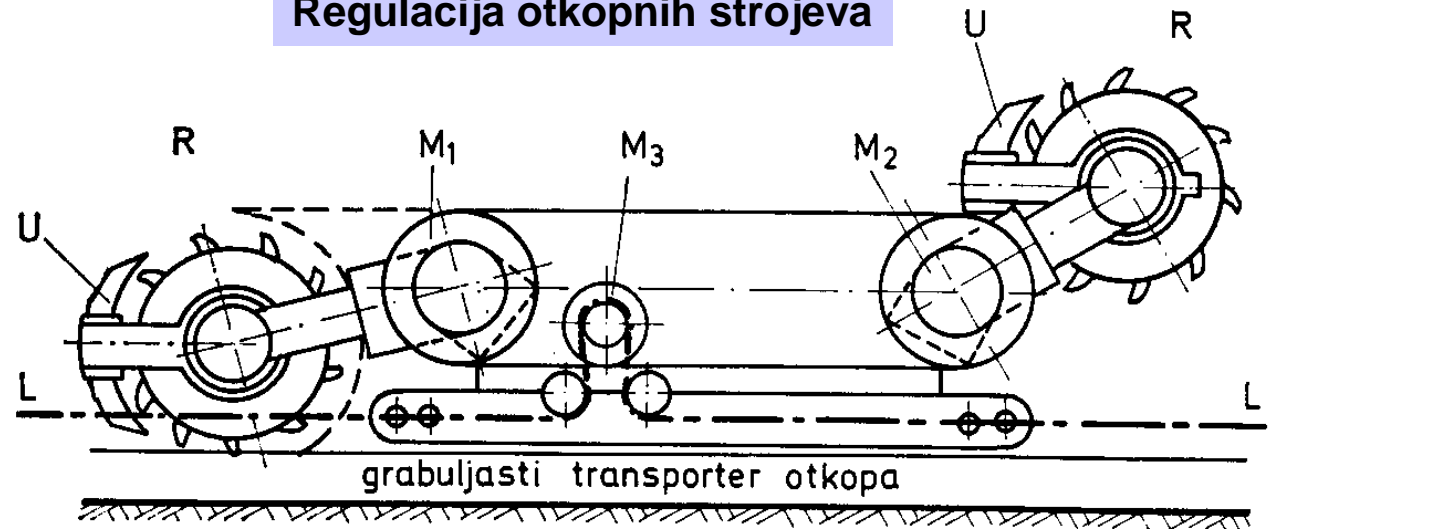
**Principijelna i strukturalna blok shema jednog regulacijskog kruga reguliranog istosmjernog elektromotornog pogona**

## Regulacija i automatska regulacija rudničkih pogona

automatska elektronička regulacija elektromotornih pogona kod strojeva za kopanje rude

- u podzemnom radu: otkopni strojevi i strojevi za probijanje hodnika
- na površinskim kopovima: bageri (rotacijski, žličari)

### Regulacija otkopnih strojeva



Otkopni stroj s valjkastim rezačima

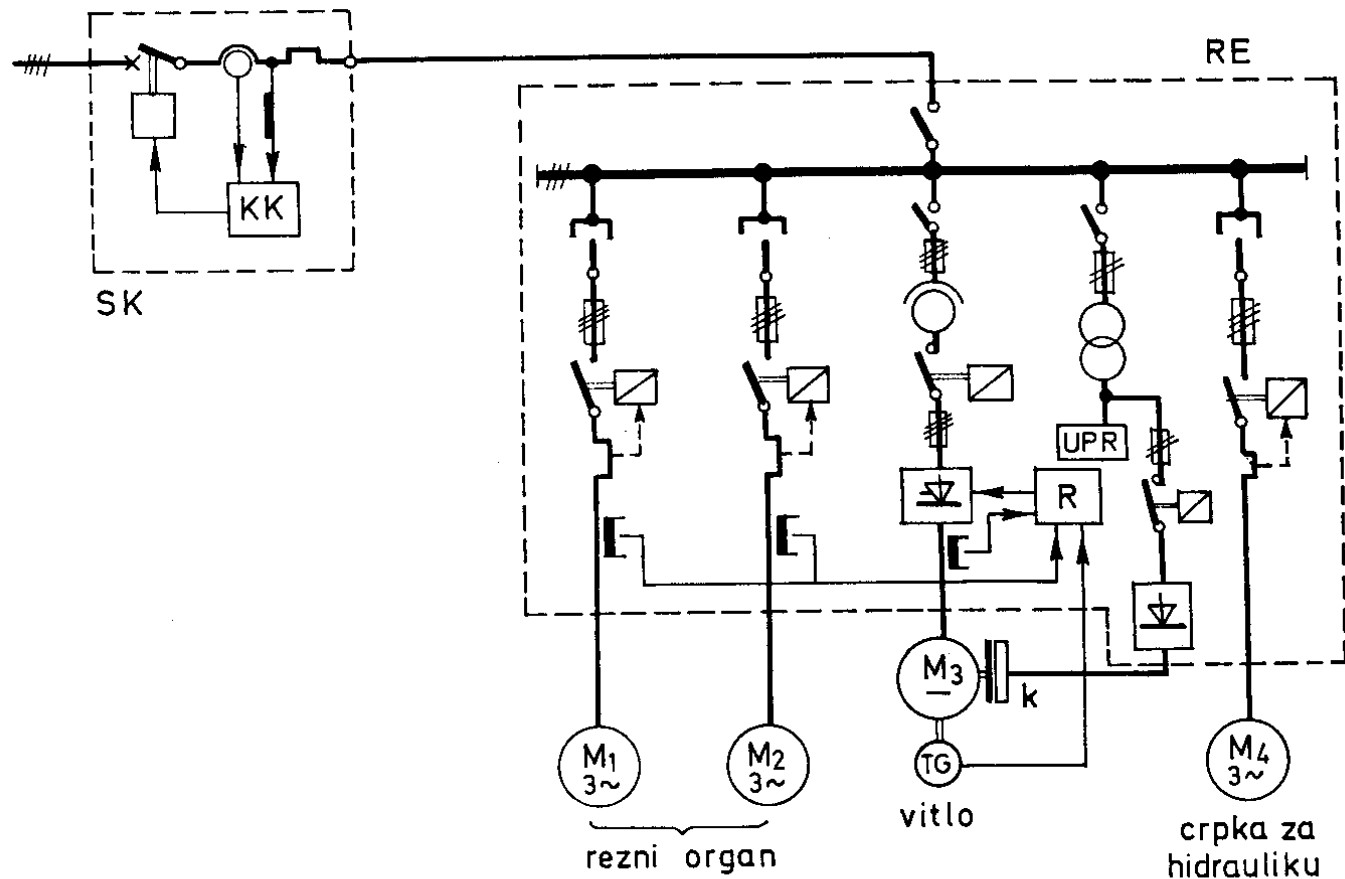
## regulacija kretanja stroja vitlom - regulacija opterećenosti reznih organa

motori rezača 2 x 150 kW do 2 x 300 kW

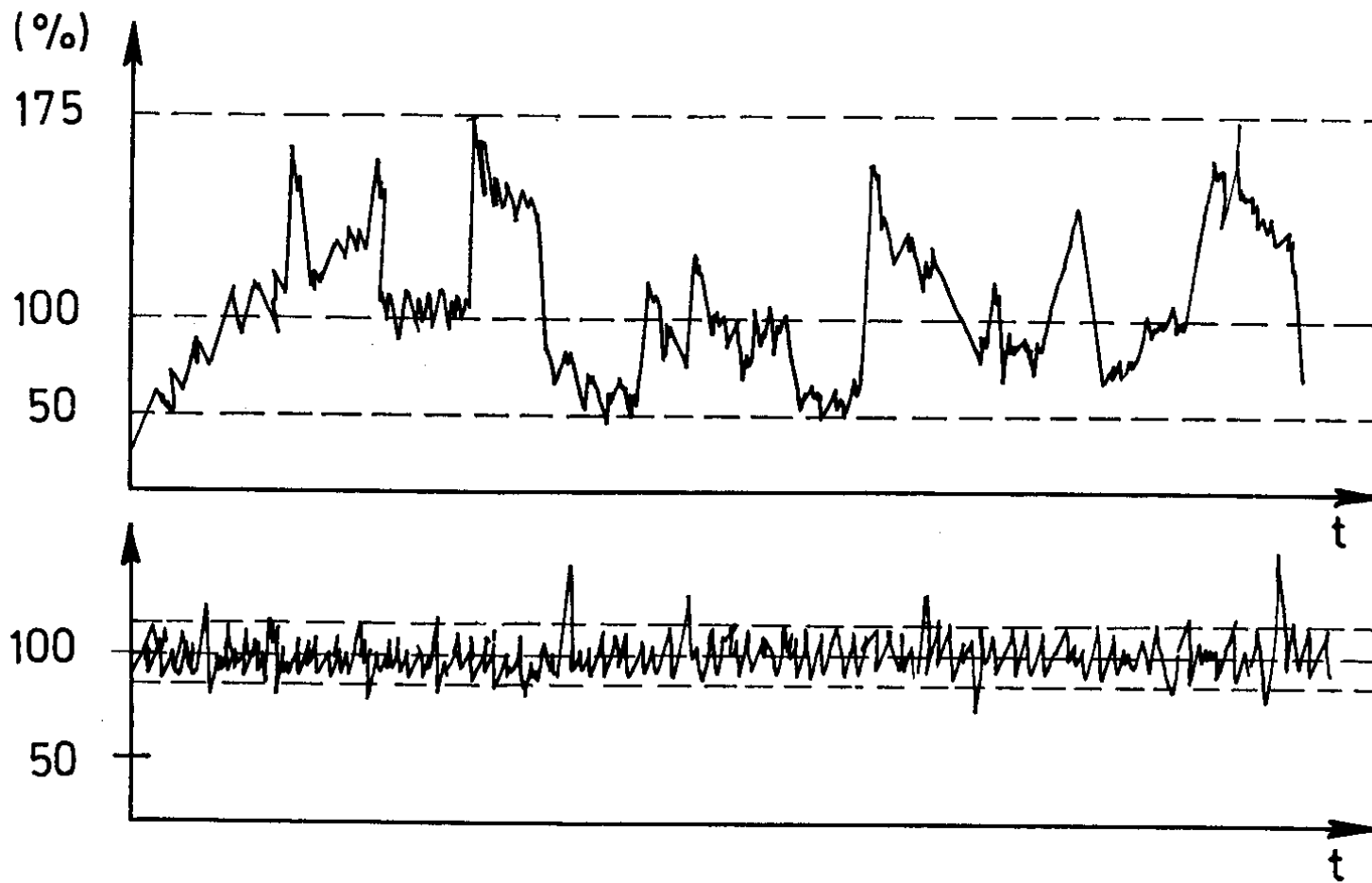
motori vitla 25 kW - 30 kW do 50 kW - 60 kW (horizontalan pomak rezača)

motori hidrauličkih crpki oko 5 kW (visina rezača)

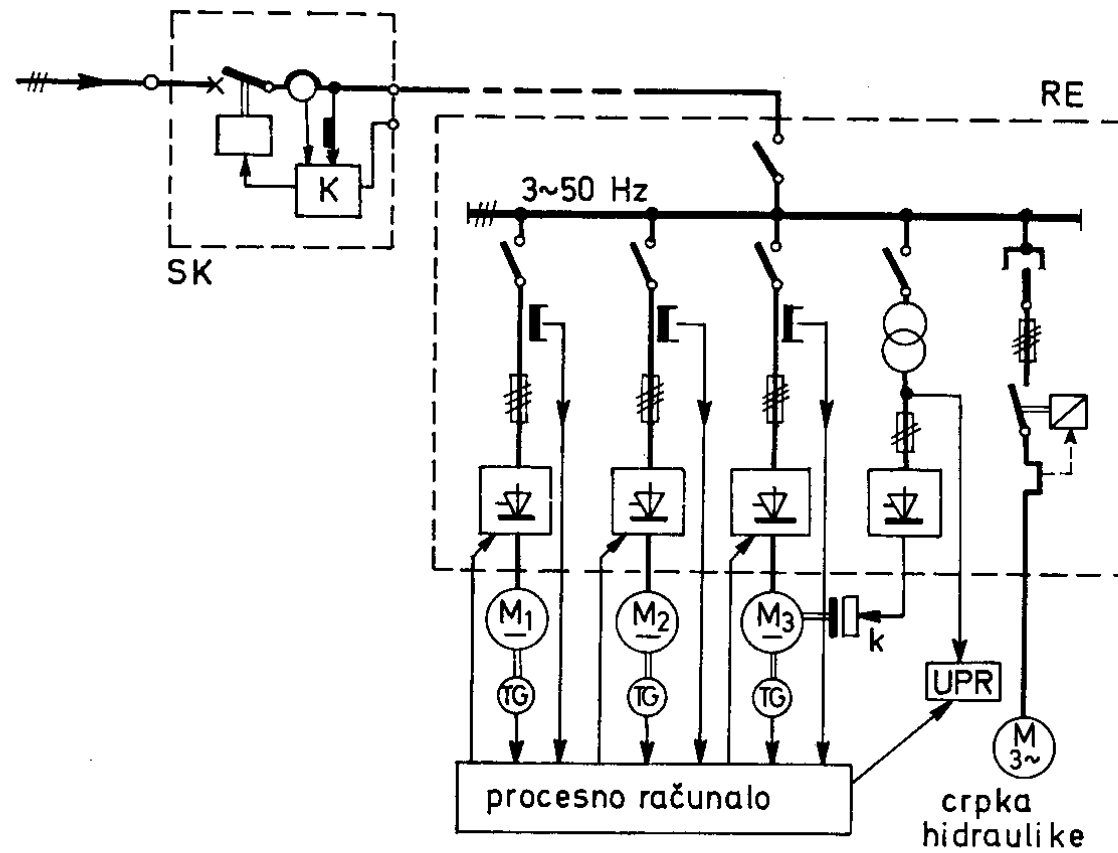
upravljanje hidraulikom elektro-ventilima



**Automatska (i ručna) regulacija pogona otkopnog stroja**



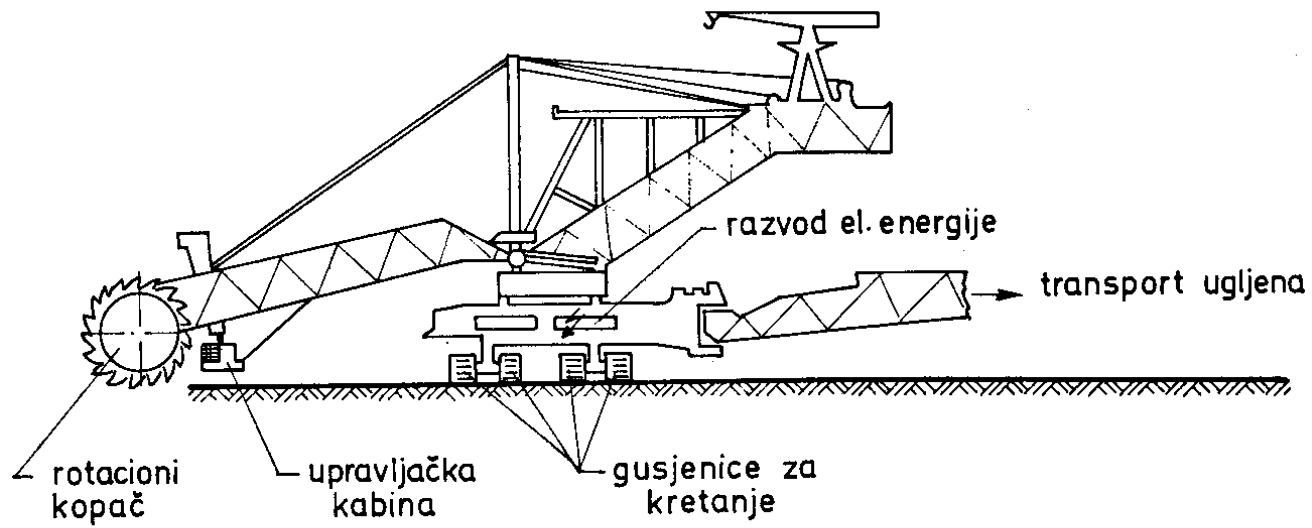
**Efekti regulacije u odnosu na vremenski tok opterećenja stroja za vrijeme rezanja**



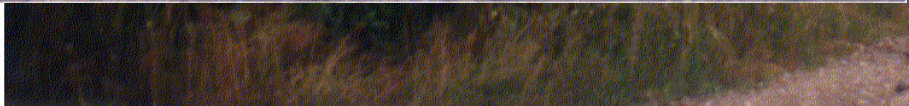
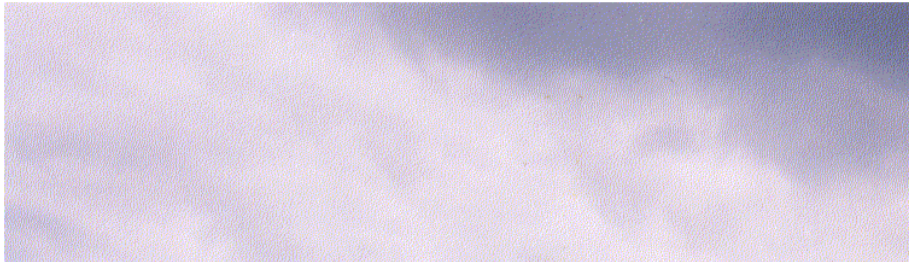
**Automatska regulacija pogona reznih organa i povlačenje stroja po otkopu**

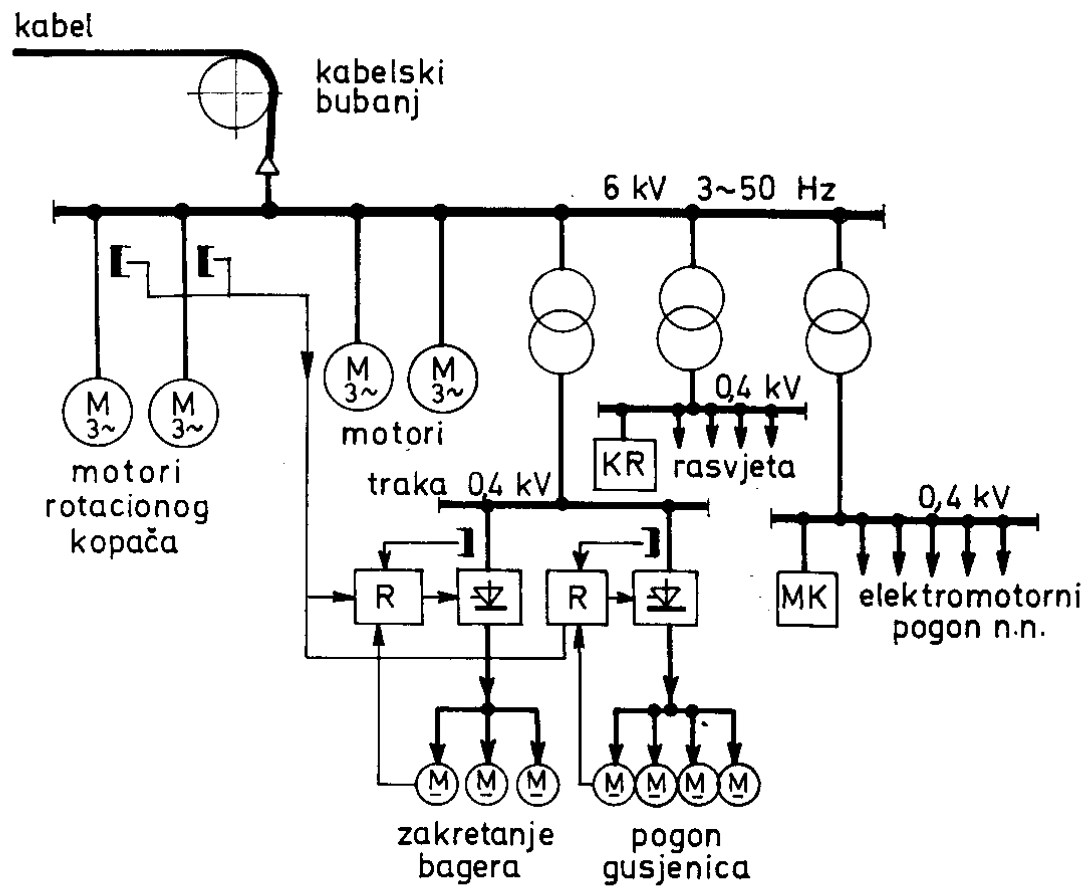


## Regulacija elektromotornih pogona velikih bagera



**Shematski prikaz velikih otkopnih bagera za dnevne kopove**

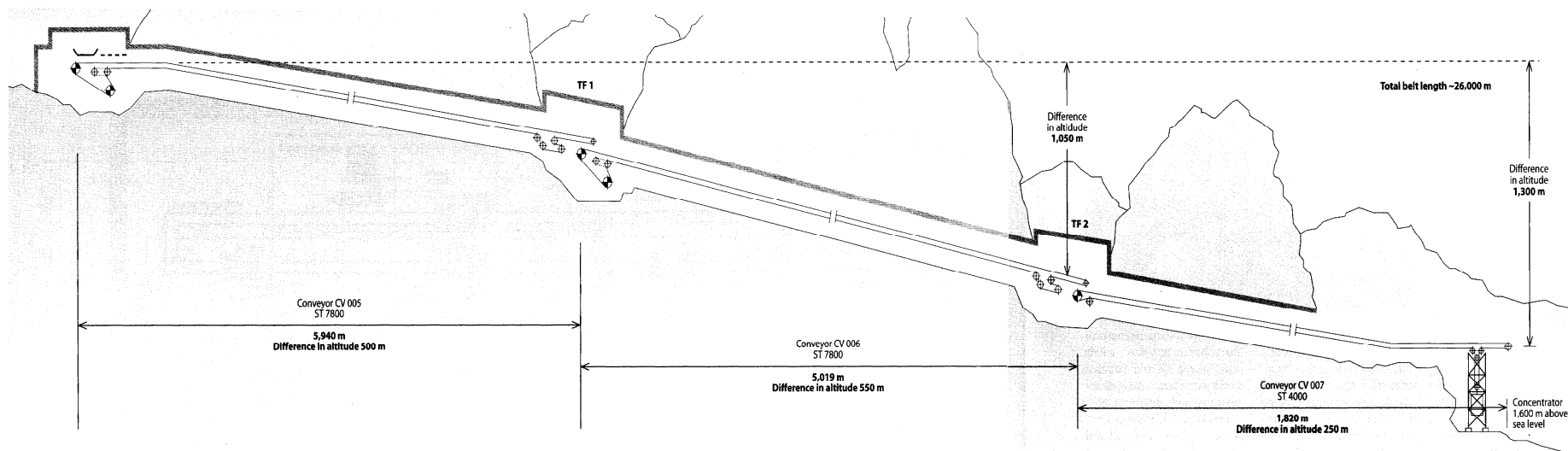




**Razvod električne energije i regulacija pogona velikih bagera za dnevne kopove**

## Regulacija elektromotornih pogona u transportu

### transportne trake rudnika bakrene rudače Les Pelambres Čile



**8.700 t/h    širina trake 1,8 m    brzina trake 6 m/s**

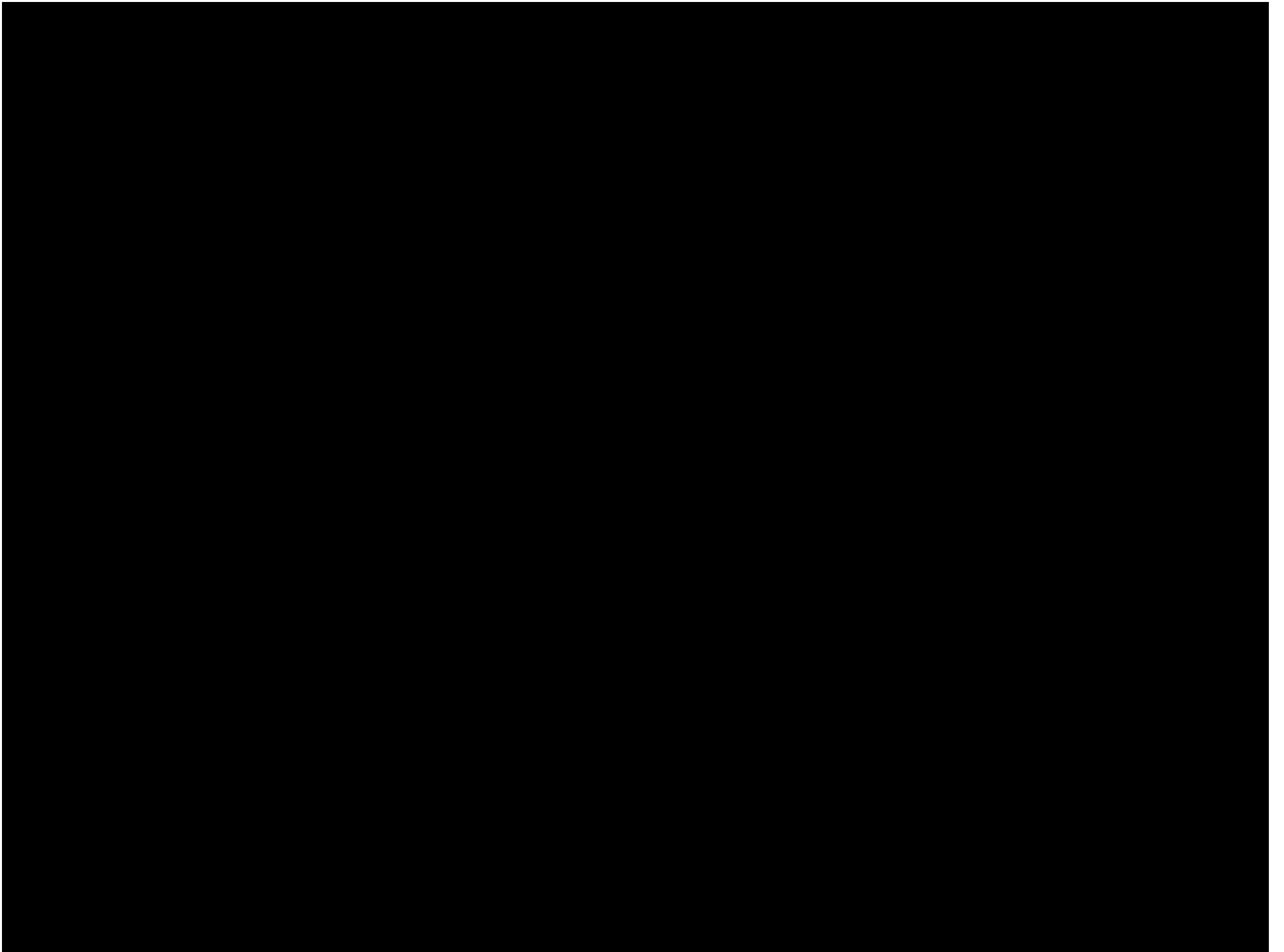
**10 motora svaki snage 2,5 MW    2 motora mlinova svaki snage 13 MW**

**za > 30% kapaciteta trake → motori kao generatori → napajaju mlinove + 13 MW u mrežu**



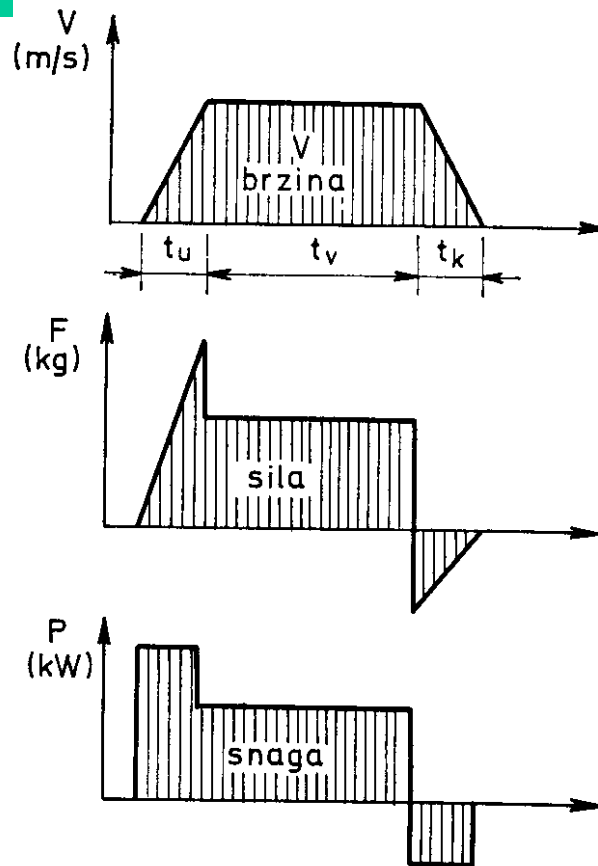




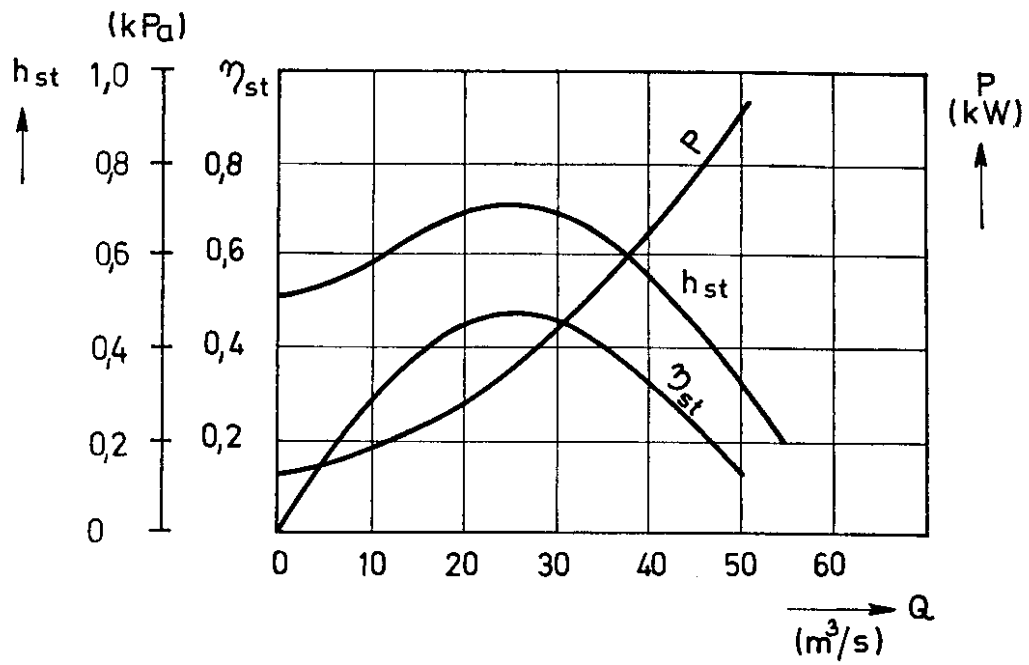


# POTROŠNJA ELEKTRIČNE ENERGIJE I OSNOVNI RUDNIČKI POGONI

Općenito

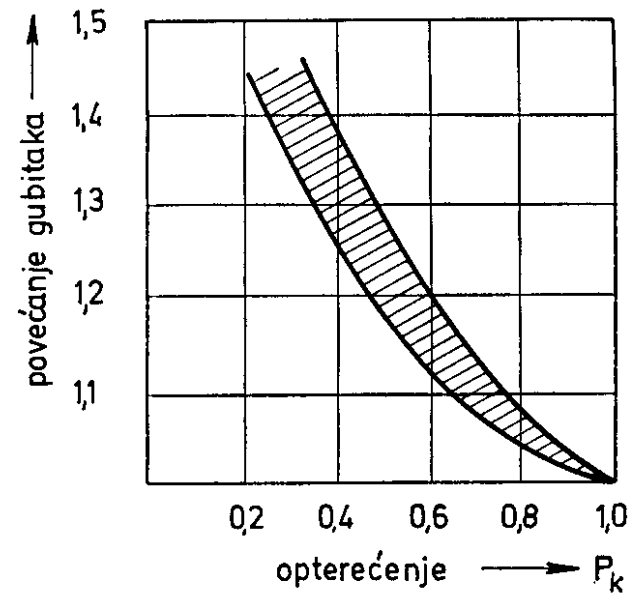


Dijagram ciklusa vožnje izvoznog stroja

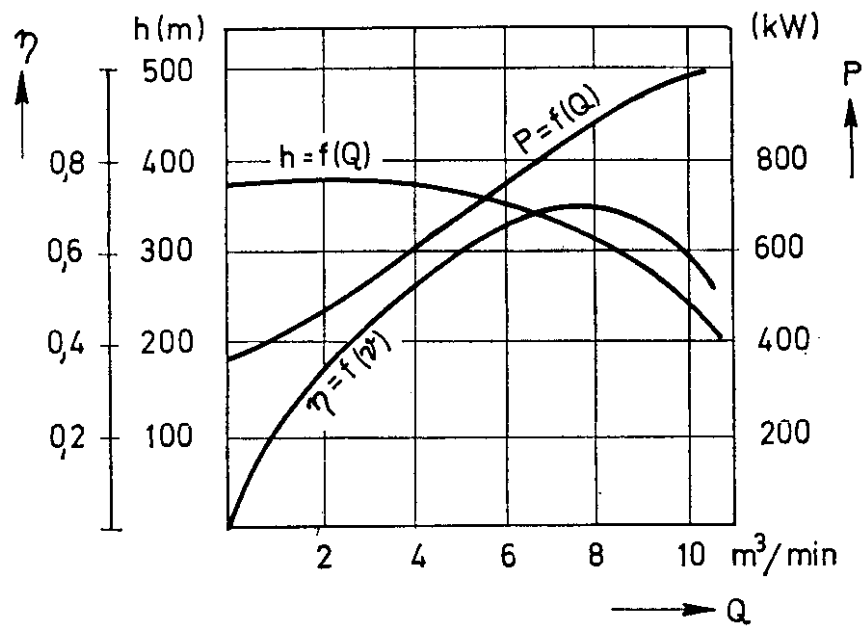


**Karakteristika ventilatora**

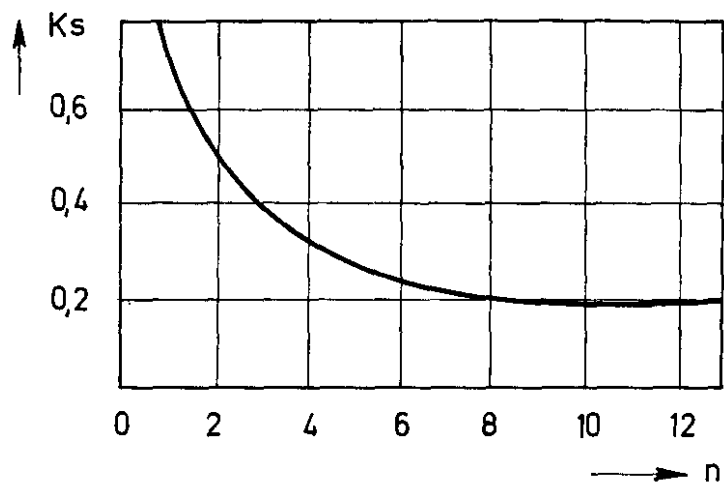




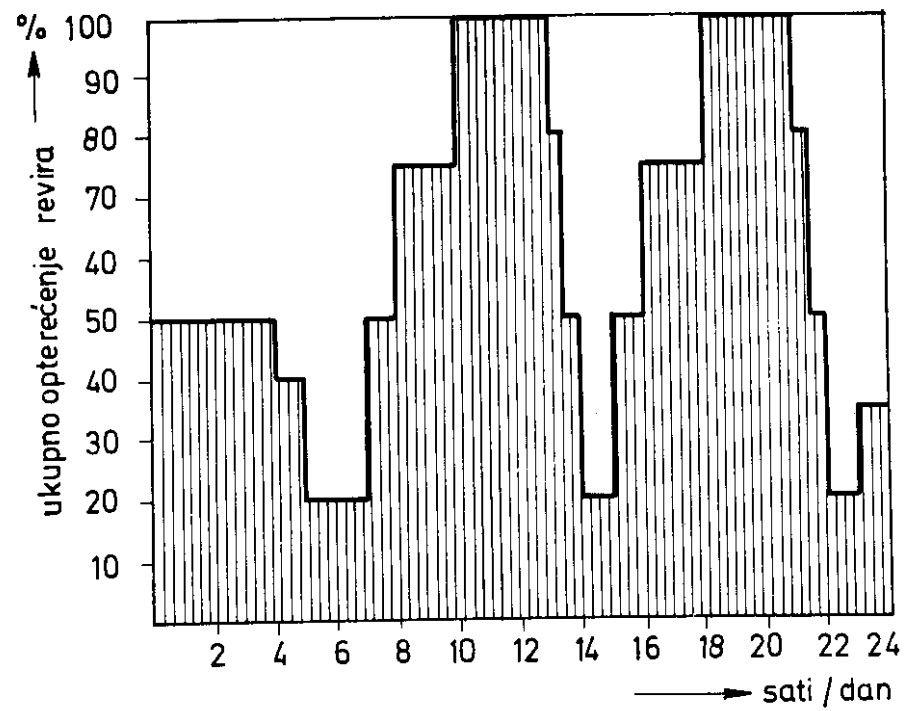
**Energija sabijanja kompresora u odnosu na opteretivost kompresora**



**Karakteristika visokotlačnih crpki za odvodnjavanje rudnika**



**Koeficijent potrošnje električne energije u odnosu na broj električnih lokomotiva u pogonu**



**Primjer toka revirnog opterećenja za ciklus dvije proizvodne smjene i pripremlne smjene u danu**