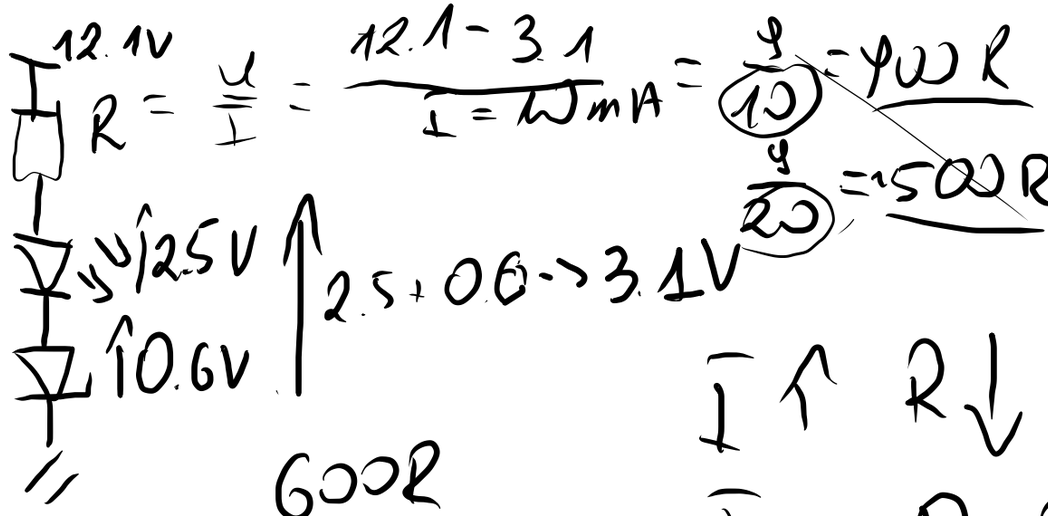
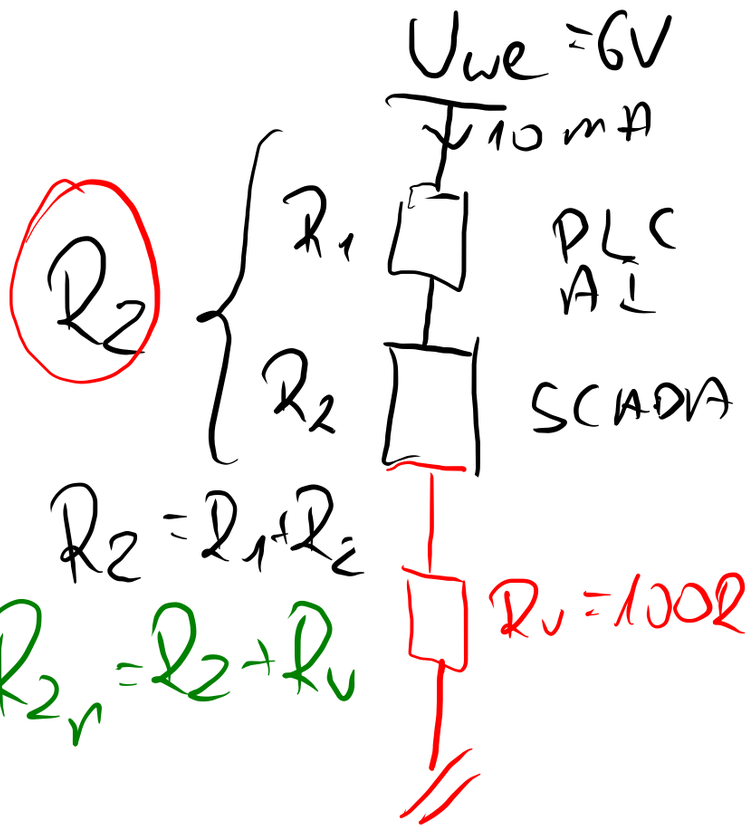
4 ... 20 mA



I ↑ R ↓

I max R = 0



600R = R2 => Uwe = R2 · I

const const 10mA

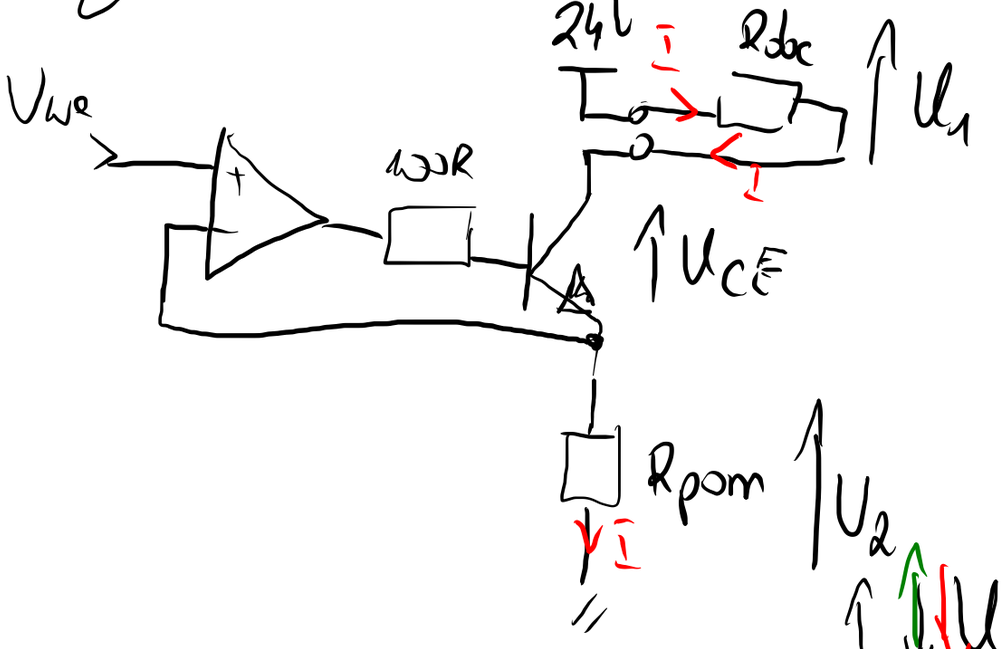
Uwe = 600 · 10m = 6V

6V = R2n · I ↓

6V = 400 · I ↓ -> 6/400

4 .. 20 mA

1. Układ nadający ze zmianami R_2
2. Stabilne wyjście prądowe $I = const$
   możliwość zmiany U stałe



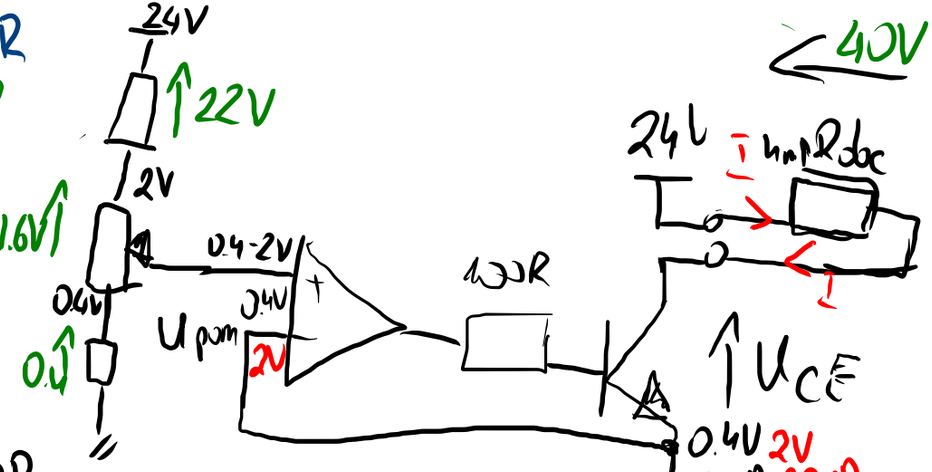
$I = const$
$R_{obc} \neq const$

$U = R \cdot I$
U = const
R = const
I = const

$U_1 + U_2 + U_{CE} = 24V$
const

R_{max} { 20mA -> ~1100R
4mA -> ~5700R

$\frac{23.5V}{4} \cdot 10^3 \cong 5700R$

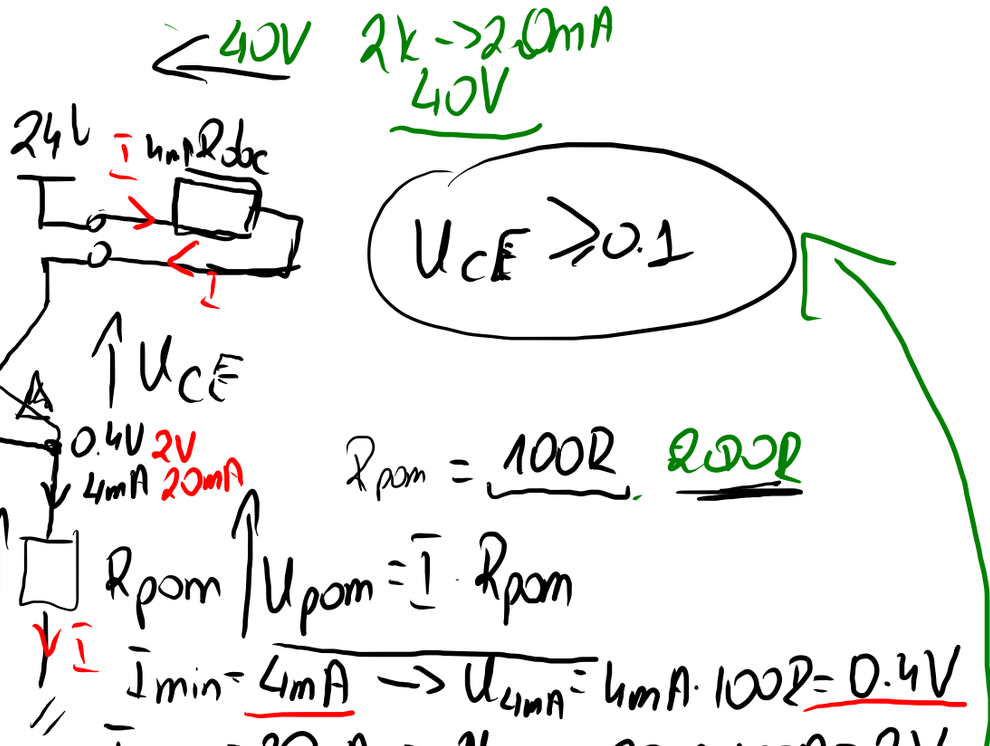


$R_{dbc} = 2k$
$I = 10mA$
$R_{pom} = 100R$

$24V - R_{dbc} \cdot I - U_{CE} - R_{pom} \cdot I = 0$
$24 - 2k \cdot 10m - U_{CE} - 100 \cdot 10m$
$24 - 20 - U_{CE} - 1 = 0$
$3 - U_{CE} = 0 \rightarrow \underline{U_{CE} = 3V}$

$I = 20mA$

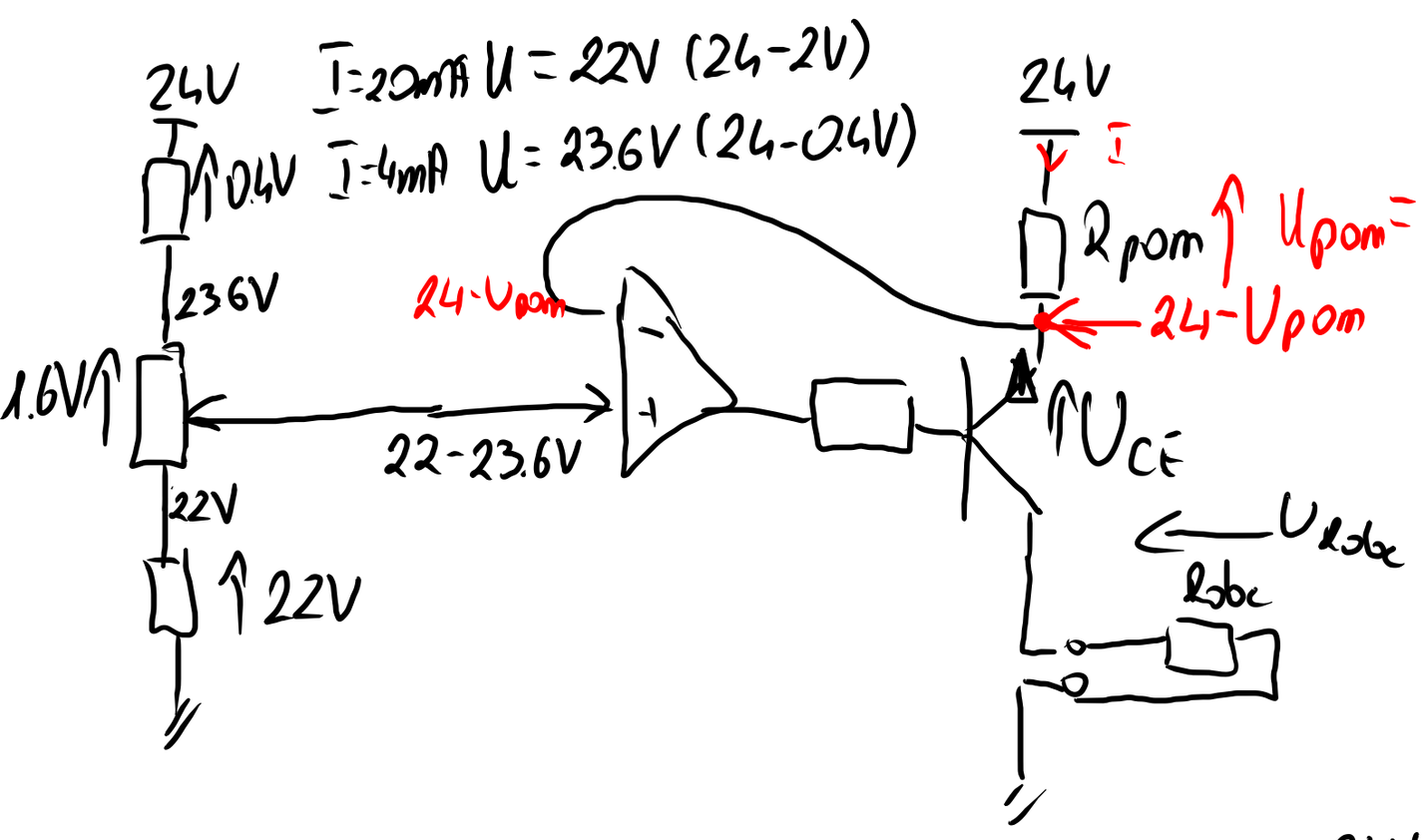
$R_{pom} = 100R$ $R_{max\,20mA} = 24 - R_{max} \cdot 20m - 0.1V - 2V = 0$
$21.9 = R_{max} \cdot 20mA$
$R_{max} = \frac{21.9}{20} \cdot 10^3 \cong 1100R$
$I_{max} = 20m$



$R_{pom} = \underline{100R}$ 200R

$I_{min} = 4mA \rightarrow U_{4mA} = 4mA \cdot 100R = 0.4V$
$I_{max} = 20mA \rightarrow U_{20mA} = 20mA \cdot 100R = 2V$

$24V - R_{dbc} \cdot I - U_{CE} - R_{pom} \cdot I = 0$
$24 - 2k \cdot 20m - U_{CE} - 2V = 0$
$24 - 40 - 2 - U_{CE} = 0 \rightarrow -18 - U_{CE} = 0$
$\underline{U_{CE} = -18V}$



R = 100R

I = 4mA

$U_{I=4mA} = 100R \cdot 4mA = 0.4V$

$U_{I=20mA} = 100R \cdot 20mA = 2V$

$24 - U_{pom} - U_{CE} - U_{Robc} = 0$

$24V - R_{obc} \cdot I - U_{CE} - R_{pom} \cdot I = 0$

U_{Robc}