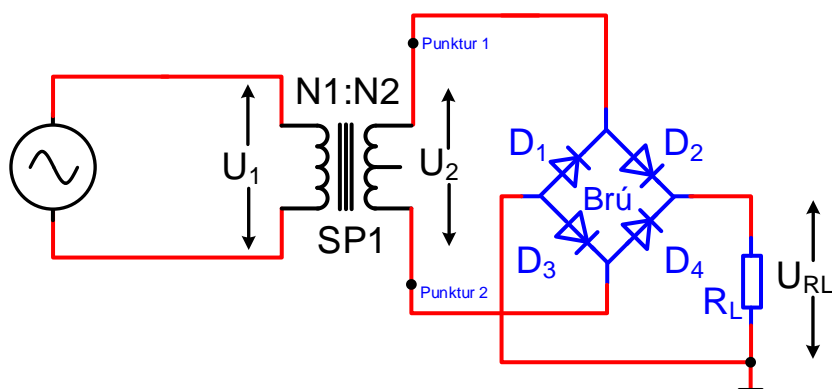


**Rafbók**



**RTM005**

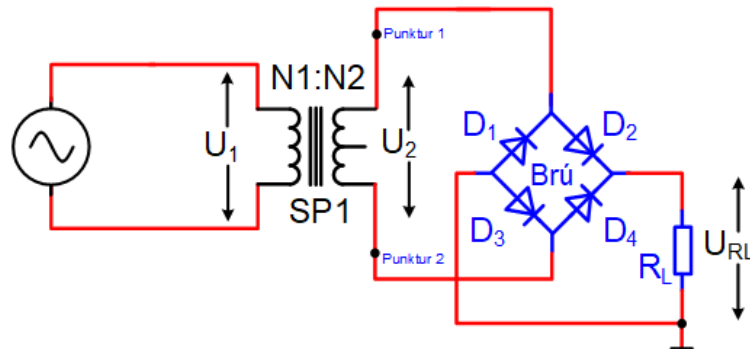
**Heilbylgjuafriðun**

**brúartenging**

**Svör og útreikningar**

**Dæmi 1.4 bls. 8 svör**

1.



a)

$$U_2 = \frac{N_2}{N_1} \cdot U_1 = \frac{1}{5} \cdot 230V = 46V \Rightarrow$$

$$U_{2t} = \sqrt{2} \cdot U_2 = \sqrt{2} \cdot 46V = 65V$$

$$U_{RL_t} = U_{2t} - 1,4V = 65V - 1,4V = 63,6V$$

$$U_{RL_{DC}} = \frac{2 \cdot U_{RL_t}}{\pi} = \frac{2 \cdot 63,6V}{\pi} = 40.5V$$

b)

$$U_{RL_{gára}} = 0,5 \cdot U_{RL_{DC}} = 0,5 \cdot 40,5V = 20,2V$$

c)

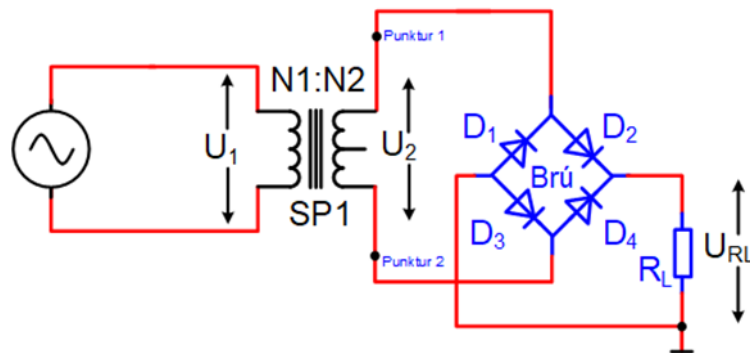
$$U_{PIV} > U_{2t} = 65V$$

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**RTM005 Heilbylgjuafriðun brúartenging svör og útreikningar**


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2.



a)

$$U_2 = \frac{N_2}{N_1} \cdot U_1 = \frac{1}{10} \cdot 230V = 23V$$

$$U_{2t} = \sqrt{2} \cdot U_2 = \sqrt{2} \cdot 23V = 32,5V$$

$$U_{RL(t)} = U_{2t} - 1,4V = 32,5V - 1,4V = 31,1V$$

$$U_{RL_{DC}} = \frac{2 \cdot U_{RL(t)}}{\pi} = \frac{2 \cdot 31,1V}{\pi} = 19,8V$$

b)

$$U_{RL_{gára}} = 0,5 \cdot U_{RL_{DC}} = 0,5 \cdot 19,8V = 9,9V$$

c)

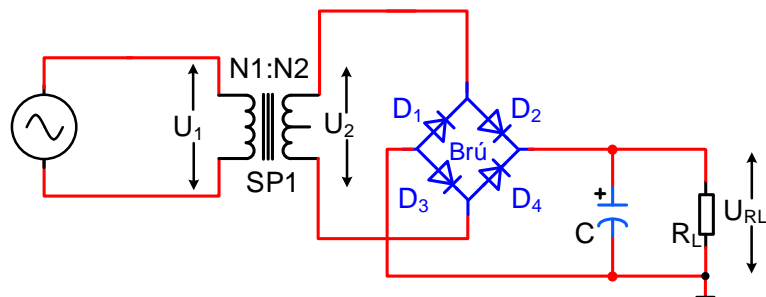
$$U_{PIV} > U_{2t} = 32,5V$$

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**RTM005 Heilbylgjuafriðun brúartenging svör og útreikningar**


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3.



a)

$$U_2 = \frac{N_2}{N_1} \cdot U_1 = \frac{1}{5} \cdot 230V = 46V$$

$$U_{2t} = \sqrt{2} \cdot U_2 = \sqrt{2} \cdot 46V = 65,1V$$

$$U_{RL(t)} = U_{2t} - 1,4V = 65,1V - 1,4V = 63,6V$$

$$U_{RL_{DC}} = \frac{U_{RL(t)}}{1 + \frac{1}{2 \cdot f \cdot C \cdot R_L}} = \frac{63,6V}{1 + \frac{1}{2 \cdot 100[hz] \cdot 470 \cdot 10^{-6}[uF] \cdot 1000[\Omega]}} = 62,9V$$

b)

$$U_{RLgára(t)} = U_{RL_t} - U_{RL_{DC}} = 63,6V - 62,9V = 0,7V$$

$$U_{RLgára} = \frac{U_{RLgára(t)}}{\sqrt{2}} = \frac{0,7V}{\sqrt{2}} = 0,49V$$

c)

$$r[\%] = \frac{U_{RLgára}}{U_{RL_{DC}}} \cdot 100 = \frac{0,49V}{62,9V} \cdot 100 = 0,79\%$$

d)

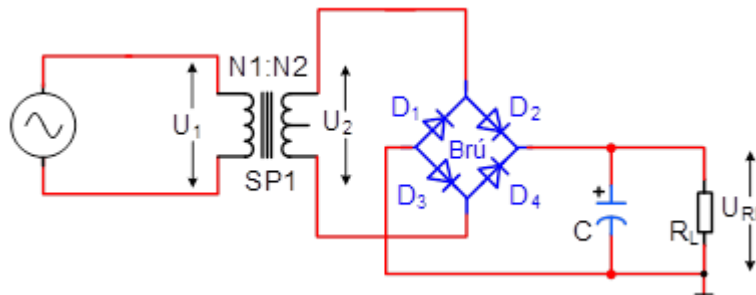
$$U_{PIV} > U_{2t} = 65V = 65V$$

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**RTM005 Heilbylgjuafriðun brúartenging svör og útreikningar**


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4.



a)

$$U_2 = \frac{N_2}{N_1} \cdot U_1 = \frac{1}{10} \cdot 230V = 23V$$

$$U_{2t} = \sqrt{2} \cdot U_2 = \sqrt{2} \cdot 23V = 32,5V$$

$$U_{RL(t)} = U_{2t} - 1,4V = 32,5V - 1,4V = 31,1V$$

$$U_{RL_{DC}} = \frac{U_{RL(t)}}{1 + \frac{1}{2 \cdot f \cdot C \cdot R_L}} = \frac{31,1V}{1 + \frac{1}{2 \cdot 100[hz] \cdot 220 \cdot 10^{-6}[uF] \cdot 5000[\Omega]}} = 30,96V$$

b)

$$U_{RLgára(t)} = U_{RL_t} - U_{RL_{DC}} = 31,1V - 30,96V = 0,14V$$

$$U_{RLgára} = \frac{U_{RLgára(t)}}{\sqrt{2}} = \frac{0,14V}{\sqrt{2}} = 0,1V$$

c)

$$r[\%] = \frac{U_{RLgára}}{U_{RL_{DC}}} \cdot 100 = \frac{0,1V}{30,96V} \cdot 100 = 0,32\%$$

d)

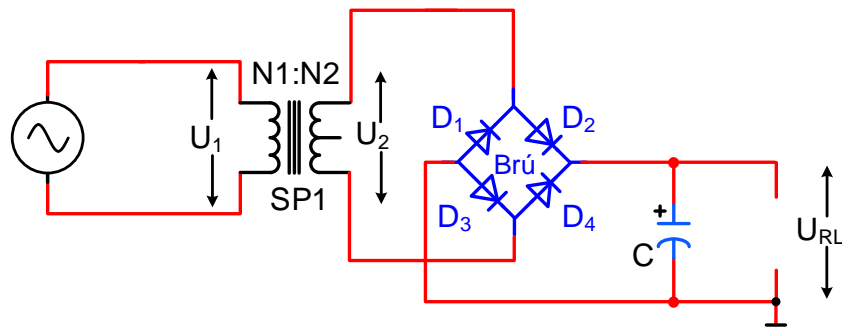
$$U_{PIV} > U_{2t} = 32,5V$$

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**RTM005 Heilbylgjuafriðun brúartenging svör og útreikningar**


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5.



*ATH Það verður ekkert spennufall yfir díóður þar sem engin straumur rennur í rásinni.*

a)

$$U_2 = \frac{N_2}{N_1} \cdot U_1 = \frac{10}{1} \cdot 230V = 2300V$$

$$U_{2t} = \sqrt{2} \cdot U_2 = \sqrt{2} \cdot 2300V = 3253V$$

$$U_{RL(t)} = U_{2t} - 0V = 3253V - 0V = 3253V$$

$$U_{RL_{DC}} = \frac{U_{RL(t)}}{1 + \frac{1}{2 \cdot f \cdot C \cdot R_L}} = \frac{3253V}{1 + \frac{1}{2 \cdot 100[Hz] \cdot 220 \cdot 10^{-6}[uF] \cdot \infty[\Omega]}} = 3253V$$

b)

$$U_{RLgára(t)} = U_{RL_t} - U_{RL_{DC}} = 3253V - 3253V = 0V$$

$$U_{RLgára} = \frac{U_{RLgára(t)}}{\sqrt{2}} = \frac{0V}{\sqrt{2}} = 0V$$

c)

$$r[\%] = \frac{U_{RLgára}}{U_{RL_{DC}}} \cdot 100 = \frac{0V}{3253V} \cdot 100 = 0\%$$

d)

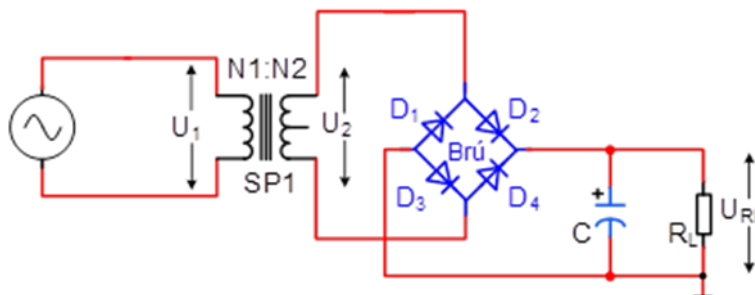
$$U_{PIV} > U_{2t} = 3253V$$

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**RTM005 Heilbylgjuafriðun brúartenging svör og útreikningar**


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6.



a)

$$U_2 = \frac{N_2}{N_1} \cdot U_1 = \frac{1}{15} \cdot 230V = 15,3V$$

$$U_{2t} = \sqrt{2} \cdot U_2 = \sqrt{2} \cdot 15,3V = 21,7V$$

$$U_{RL(t)} = U_{2t} - 1,4V = 21,7V - 1,4V = 20,3V$$

$$U_{RL_{DC}} = \frac{U_{RL(t)}}{1 + \frac{1}{2 \cdot f \cdot C \cdot R_L}} = \frac{20,3V}{1 + \frac{1}{2 \cdot 100[hz] \cdot 2200 \cdot 10^{-6}[uF] \cdot 220[\Omega]}} = 20,1V$$

b)

$$U_{RLgára(t)} = U_{RL_t} - U_{RL_{DC}} = 20,3V - 20,1V = 0,2V$$

$$U_{RLgára} = \frac{U_{RLgára(t)}}{\sqrt{2}} = \frac{0,2V}{\sqrt{2}} = 0,14V$$

c)

$$r[\%] = \frac{U_{RLgára}}{U_{RL_{DC}}} \cdot 100 = \frac{0,14V}{20,1V} \cdot 100 = 0,7\%$$

d)

$$U_{PIV} > 2 \cdot U_{2t} = 21,7V$$

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## RTM005 Heilbylgjuafriðun brúartenging svör og útreikningar

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Þetta hefti er án endurgjalds á rafbókinni.

[www.rafbok.is](http://www.rafbok.is)

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Höfundur er Sigurður Örn Kristjánsson.

Eftirvinnsla og umbrot í rafbók Báru Halldórsdóttir.

Vinsamlegast sendið leiðréttingar og athugasemdir til höfundar

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