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Three Phase Uncontrolled Rectifiers Formulas

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List of 21 Three Phase Uncontrolled Rectifiers Formulas

Three Phase Uncontrolled Rectifiers ⎘

6 Pulse ⎘

1) Average Output Power of Three Phase 6 Pulse Diode Rectifier ⎘

Open Calculator ⎘

fx $\boxed{P_{avg} = 0.912 \cdot V_{m(phase)} \cdot I_{m(phase)}}$

ex $\boxed{430.9068W = 0.912 \cdot 115.1V \cdot 4.105A}$

2) Average Output Voltage of Three Phase 6 Pulse Diode Rectifier ⎘

Open Calculator ⎘

fx $\boxed{V_{dc} = \left(\dfrac{3}{\pi}\right) \cdot V_{m(phase)}}$

ex $\boxed{109.9124V = \left(\dfrac{3}{\pi}\right) \cdot 115.1V}$

3) Output DC Power of Three Phase 6 Pulse Diode Rectifier ⎘

Open Calculator ⎘

fx $\boxed{P_{dc} = \left(\dfrac{3}{\pi}\right)^2 \cdot V_{m(phase)} \cdot I_{m(phase)}}$

ex $\boxed{430.8551W = \left(\dfrac{3}{\pi}\right)^2 \cdot 115.1V \cdot 4.105A}$

4) Ripple Voltage of Three Phase 6 Pulse Diode Rectifier 🔗

Open Calculator 🔗

fx $V_r = 0.0408 \cdot V_{m(phase)}$

ex $4.69608V = 0.0408 \cdot 115.1V$

5) RMS Output Current of Three Phase 6 Pulse Diode Rectifier 🔗

Open Calculator 🔗

fx $I_{rms} = 0.9558 \cdot \dfrac{V_{m(phase)}}{R}$

ex $7.858041A = 0.9558 \cdot \dfrac{115.1V}{14\Omega}$

6) RMS Output Voltage of Three Phase 6 Pulse Diode Rectifier 🔗

Open Calculator 🔗

fx $V_{rms} = 0.9558 \cdot V_{m(phase)}$

ex $110.0126V = 0.9558 \cdot 115.1V$

Full Wave 🔗

7) Average Diode Current of Three Phase Uncontrolled Rectifier 🔗

Open Calculator 🔗

fx $I_{d(avg)} = \dfrac{\sqrt{3} \cdot n \cdot V_{max}}{2 \cdot \pi \cdot R_L}$

ex $130.142A = \dfrac{\sqrt{3} \cdot 15 \cdot 220V}{2 \cdot \pi \cdot 6.99\Omega}$

8) Average Load Current of Three Phase Uncontrolled Rectifier ⟳

$$fx \quad I_{L(avg)} = \frac{3 \cdot \sqrt{3} \cdot n \cdot V_{max}}{2 \cdot \pi \cdot R_L}$$

$$ex \quad 390.426A = \frac{3 \cdot \sqrt{3} \cdot 15 \cdot 220V}{2 \cdot \pi \cdot 6.99\Omega}$$

9) Load Current of DC Three Phase Uncontrolled Rectifier ⟳

$$fx \quad I_{L(dc)} = \frac{3 \cdot \sqrt{3} \cdot V_{max}}{2 \cdot \pi \cdot R_L}$$

$$ex \quad 26.0284A = \frac{3 \cdot \sqrt{3} \cdot 220V}{2 \cdot \pi \cdot 6.99\Omega}$$

10) Load Voltage of DC Three Phase Uncontrolled Rectifier ⟳

$$fx \quad V_{L(dc)} = \frac{3 \cdot \sqrt{3} \cdot V_{max}}{2 \cdot \pi}$$

$$ex \quad 181.9385V = \frac{3 \cdot \sqrt{3} \cdot 220V}{2 \cdot \pi}$$

11) Load Voltage of Full Wave Three Phase Uncontrolled Rectifier ⟳

$$fx \quad V_{ac} = \frac{2 \cdot n \cdot V_{max}}{\pi}$$

$$ex \quad 2100.845V = \frac{2 \cdot 15 \cdot 220V}{\pi}$$

12) Power Delivered to Load in Three Phase Uncontrolled Rectifier 🗗

Open Calculator 🗗

$$fx \quad P_{out} = V_{ac} \cdot V_{dc}$$

$$ex \quad 230882.9W = 2100.845V \cdot 109.9V$$

13) RMS Diode Current of Three Phase Uncontrolled Rectifier 🗗

Open Calculator 🗗

$$fx \quad I_{d(rms)} = \frac{n \cdot V_{max}}{R_L \cdot \sqrt{2}} \cdot \sqrt{\frac{1}{3} + \frac{\sqrt{3}}{4 \cdot \pi}}$$

$$ex \quad 229.144A = \frac{15 \cdot 220V}{6.99\Omega \cdot \sqrt{2}} \cdot \sqrt{\frac{1}{3} + \frac{\sqrt{3}}{4 \cdot \pi}}$$

14) RMS Load Current of Three Phase Uncontrolled Rectifier 🗗

Open Calculator 🗗

$$fx \quad I_{L(rms)} = \frac{n \cdot V_{max}}{R_L \cdot \sqrt{2}} \cdot \sqrt{1 + \frac{3 \cdot \sqrt{3}}{2 \cdot \pi}}$$

$$ex \quad 451.222A = \frac{15 \cdot 220V}{6.99\Omega \cdot \sqrt{2}} \cdot \sqrt{1 + \frac{3 \cdot \sqrt{3}}{2 \cdot \pi}}$$

15) RMS Load Voltage of Three Phase Uncontrolled Rectifier 🔗

fx $\quad V_{L(rms)} = \dfrac{n \cdot V_{max}}{\sqrt{2}} \cdot \sqrt{1 + \dfrac{3 \cdot \sqrt{3}}{2 \cdot \pi}}$

Open Calculator 🔗

ex $\quad 3154.042V = \dfrac{15 \cdot 220V}{\sqrt{2}} \cdot \sqrt{1 + \dfrac{3 \cdot \sqrt{3}}{2 \cdot \pi}}$

Half Wave 🔗

16) Average Output Power of Three Phase Half Wave Diode Rectifier with R Load 🔗

fx $\quad P_{avg} = 0.684 \cdot V_{m(phase)} \cdot I_{m(phase)}$

Open Calculator 🔗

ex $\quad 323.1801W = 0.684 \cdot 115.1V \cdot 4.105A$

17) Average Output Voltage of Three Phase Half Wave Diode Rectifier with R Load in Line Voltage Terms 🔗

fx $\quad V_{dc} = \left(\dfrac{3}{2 \cdot \pi} \right) \cdot V_{m(line)}$

Open Calculator 🔗

ex $\quad 114.2191V = \left(\dfrac{3}{2 \cdot \pi} \right) \cdot 239.22V$

18) Average Output Voltage of Three Phase Half Wave Diode Rectifier with R Load in Phase Voltage Terms ⚹

Open Calculator ⚹

fx $$V_{dc} = \left(\frac{3 \cdot \sqrt{3}}{2 \cdot \pi}\right) \cdot V_{m(phase)}$$

ex $$95.18693V = \left(\frac{3 \cdot \sqrt{3}}{2 \cdot \pi}\right) \cdot 115.1V$$

19) Ripple Voltage of Three Phase Half Wave Diode Rectifier ⚹

fx $$V_r = 0.151 \cdot V_{m(phase)}$$

Open Calculator ⚹

ex $$17.3801V = 0.151 \cdot 115.1V$$

20) RMS Output Current of Three Phase Half Wave Diode Rectifier with R Load ⚹

fx $$I_{rms} = 0.4854 \cdot I_{m(phase)}$$

Open Calculator ⚹

ex $$1.992567A = 0.4854 \cdot 4.105A$$

21) RMS Output Voltage of Three Phase Half Wave Diode Rectifier with Resistive Load ⚹

fx $$V_{rms} = 0.84068 \cdot V_{m(phase)}$$

Open Calculator ⚹

ex $$96.76227V = 0.84068 \cdot 115.1V$$

Variables Used

- $I_{d(avg)}$ Average Diode Current *(Ampere)*
- $I_{d(rms)}$ RMS Diode Current *(Ampere)*
- $I_{L(avg)}$ Average Load Current *(Ampere)*
- $I_{L(dc)}$ DC Load Current *(Ampere)*
- $I_{L(rms)}$ RMS Load Current *(Ampere)*
- $I_{m(phase)}$ Peak Phase Current *(Ampere)*
- I_{rms} Root Mean Square Current *(Ampere)*
- n Winding Ratio
- P_{avg} Average Output Power *(Watt)*
- P_{dc} DC Power Output *(Watt)*
- P_{out} Delivery Power *(Watt)*
- R Resistance *(Ohm)*
- R_L Load Resistance *(Ohm)*
- V_{ac} AC Voltage *(Volt)*
- V_{dc} Average Output Voltage *(Volt)*
- $V_{L(dc)}$ DC Load Voltage *(Volt)*
- $V_{L(rms)}$ RMS Load Voltage *(Volt)*
- $V_{m(line)}$ Peak Line Voltage *(Volt)*
- $V_{m(phase)}$ Peak Phase Voltage *(Volt)*
- V_{max} Peak Input Voltage *(Volt)*
- V_r Ripple Voltage *(Volt)*

- **V$_{rms}$** RMS Output Voltage *(Volt)*

Constants, Functions, Measurements used

- Constant: **pi**, 3.14159265358979323846264338327950288
  Archimedes' constant

- Function: **sqrt**, sqrt(Number)
  Square root function

- Measurement: **Electric Current** in Ampere (A)
  Electric Current Unit Conversion ↗

- Measurement: **Power** in Watt (W)
  Power Unit Conversion ↗

- Measurement: **Electric Resistance** in Ohm (Ω)
  Electric Resistance Unit Conversion ↗

- Measurement: **Electric Potential** in Volt (V)
  Electric Potential Unit Conversion ↗

Check other formula lists

- **Single Phase Uncontrolled Rectifiers Formulas**
- **Three Phase Uncontrolled Rectifiers Formulas**

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