Rectifier Tables

Diego Trapero

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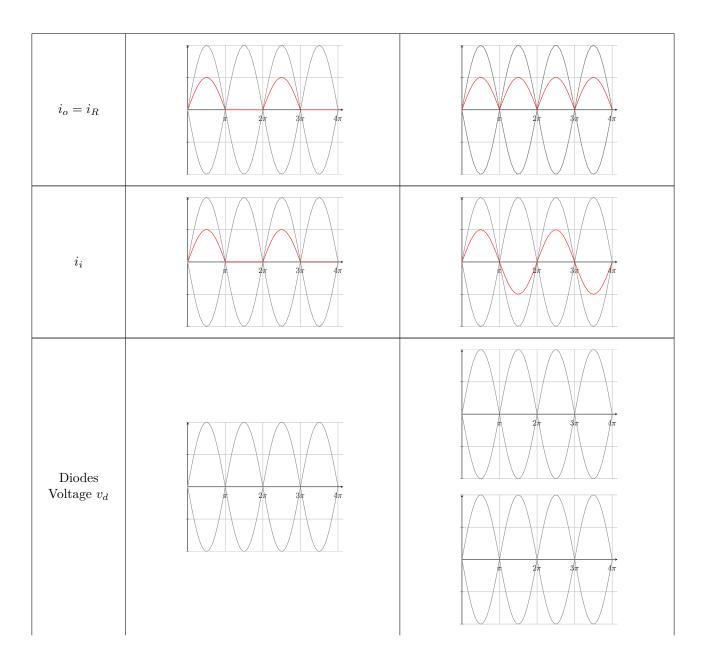
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1 Rectifier Tables

- 1. Monophasic Uncontrolled Rectifiers with R load
- 2. Monophasic Uncontrolled Full Wave Rectifier loads
- 3. Monophasic Controlled Full Wave Rectifier, R vs RL load
- 4. Triphasic Uncontrolled Rectifiers with R load
- 5. Triphasic Controlled Half Wave Rectifier, R vs RL load
- 6. Triphasic Controlled Full Wave Rectifier, R vs RL load

1.1 Monophasic Uncontrolled Rectifiers with R load

What	Half Wave Rectifier	Full Wave Rectifier
Circuit Diagram	$\begin{array}{c c} D \\ \hline \\ v_i \bigodot \\ \hline \\ v_o \swarrow R \\ \hline \\ - \end{array}$	$D1 \boxtimes D2 \boxtimes$ $v_1 \bigoplus D3 \boxtimes D4 \boxtimes$
$v_i > 0$ equivalent	i_{l} v_{l} v_{c} R	
$v_i < 0$ equivalent	$v_i \bigotimes v_c \bigotimes R$	
Diode table		
v_o	2\pi 3\pi 4\pi	2π 3π 4π
$ar{v_o}$	$\bar{v_o} = \frac{V_{ip}}{\pi}$	$ar{v_o} = rac{2V_{ip}}{\pi}$



1.2 Monophasic Uncontrolled Full Wave Rectifier loads

What	R load	RC load	RLC load
Circuit Diagram			
v_o	2h 3h 4n	24 34 4n	2h 3h 4π
v_R	24 34 47	24 34 47	24 34 47
$ar{v_R}$			
i_R	27 37 4m	3π 3π 4π	27 37 4n
i_o	2 3 4π	2x 3x 4π	2+ 3+ 4π

i_i	27 37 47	2x 3x 4π	2π 3π 4π
i_{D1}	24 34 4π	2x 3x 4π	2π 3π 4π
i_{D3}	27 37 47	2π 3π 4π	2π 3π 4π
i_C	No capacitor	2x 3x 4x	27 37 4n

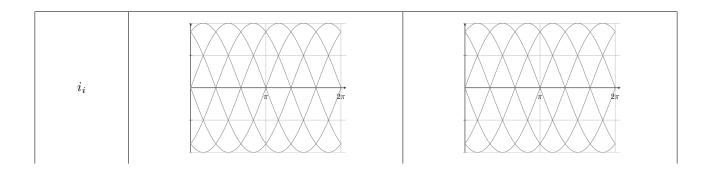
1.3 Monophasic Controlled Full Wave Rectifier, R vs RL load

What	Controlled FWR R load	Controlled FWR RL load
Circuit Diagram	$D1 \times D2 \times D2 \times D3 \times D4 \times D4 \times D4 \times D4 \times D4 \times D4 \times D4$	$D1 \times D2 \times D2 \times D3 \times D4 \times D4 \times D4 \times D4 \times D4 \times D4 \times D4$
v_o	2π 3π 4π	2A 3A 4A
v_R	27 37 47	2A 3A 4A
$ar{v_o}(lpha)$	$\bar{v_o} = \frac{V_i}{\pi} (\cos{(\alpha)} + 1)$	$\bar{v_o} = \frac{2V_i}{\pi} \cos\left(\alpha\right)$
Thyristor table		
$i_o(t)$	24 34	24 3A 4m
$ar{i_o}$		

$i_i(t)$	$\frac{1}{2\pi}$ $\frac{3\pi}{4\pi}$	3 3 4 4 T
$v_{T1}(t)$	2π 3π 4π	24 34 47
Power Factor		

1.4 Triphasic Uncontrolled Rectifiers with R load

What	3Φ Half Wave Rectifier	3Φ Full Wave Rectifier
Circuit Diagram		
v_o	- 1 - 2π	2π
Peaks/period	3 peaks/period	3 peaks/period
Period	$\frac{2\pi}{3}$	$\frac{2\pi}{6} = \frac{\pi}{3}$
Integration limits	$\frac{\pi}{6}, \frac{5\pi}{6}$	
Load Voltage	Phase Voltage	Line Voltage
$ar{v_o}$		
Diode table		
i_o	27	27



1.5 Triphasic Controlled Half Wave Rectifier, R vs RL load

What	3Φ Controlled HWR R load	3Φ Controlled HWR R load
Circuit Diagram		
v_o	27	27
v_R	27	27
Peaks/period	3 peaks/period	3 peaks/period
Period		
Integration limits		
Load Voltage		
$ar{v_o}(lpha)$		
Thyristor table		

i_o	27	27
i_i	φ 1 2 π	27

1.6 Triphasic Controlled Full Wave Rectifier, R vs RL load

What	3Φ Controlled FWR R load	3Φ Controlled FWR R load
Circuit Diagram		
v_o	27	27
v_R	27	27
Peaks/period	6 peaks/period	6 peaks/period
Period		
Integration limits		
Load Voltage		
$ar{v_o}(lpha)$		
Thyristor table		

i_o	27	277
i_i	2π	27