

PU Bases used in EMTP-EMTPWorks for the synchronous machine model

The base quantities with rms value of a p-pole, three phase machine with rated line-to-line rms voltage V_{rated} , rated value of angular frequency ω_b (ω_{bm} for mechanical), and rated volt-ampere S_{rated} , are as follows (all entered data is first converted to fundamental units, no multiplicative factors):

- Base rotor and stator voltages, rms line-to-line: $V_b = V_{\text{rated}}$
- Base volt-ampere $S_b = S_{\text{rated}}$
- RMS base stator current $i_{\text{bs}} = \frac{S_b}{\sqrt{3}V_b}$
- Base rotor current $i_{\text{br}} = I_{\text{agline}}$
- Base stator impedance $Z_{\text{bs}} = \frac{V_b^2}{S_b}$
- Base torque $T_b = \left(\frac{p}{2}\right) \frac{S_b}{\omega_b}$
- Base flux $\Psi_b = \frac{V_b}{\omega_b}$

The voltage rating is line-to-line for wye-connections. For delta-connections it is necessary to multiply this voltage by $\sqrt{3}$ to assure that the base impedance Z_{bs} is 3 times larger than in the wye-connection.