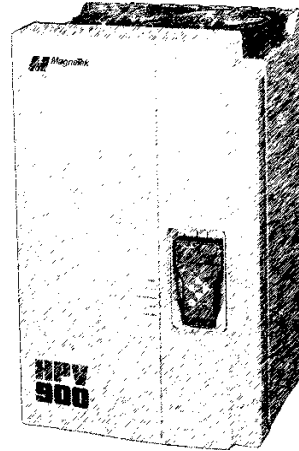


HPV 900 Motor Parameter Calculation

from the motor's equivalent circuit



The document details how to calculate the following HPV 900 motor parameters, which are entered as a percentage of the base impedance:

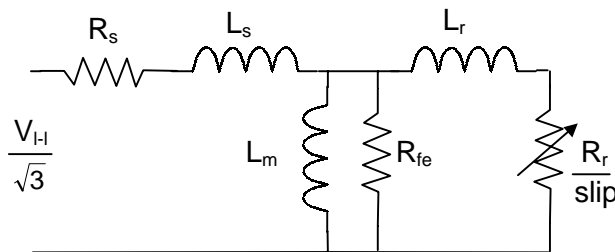
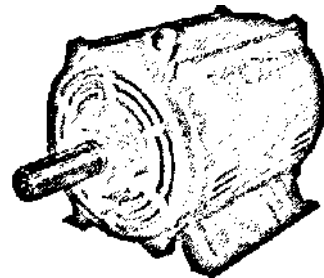
- Stator Leakage Reactance (STATOR LEAKAGE X)
- Rotor Leakage Reactance (ROTOR LEAKAGE X)
- Stator Resistance (STATOR RESIST)

Also,

- Motor Iron Loss (MOTOR IRON LOSS)
- Motor Mechanical Loss (MOTOR MECH LOSS)
- Initial value for Percentage No Load Current (% NO LOAD CURR)

The following data is required:

- Rated motor power in KW (or HP)
- Rated motor frequency (f)
- Rated motor current (I_{rated})
- Rated motor line-to-line voltage (V_{l-l})
- Equivalent single-phase circuit of the motor



Equivalent single-phase circuit of the motor
(Y connected)

R_s, R_{fe}, R_r in ohms

L_s, L_m, L_r in henry

Calculate Z_{base} (base impedance)

$$Z_{base} = \frac{V_{l-l}^2}{\text{power (in kW)} \times 1000}$$

note: $KW = HP \times 0.746$

Calculate R_s (stator resistance)
as a percentage of the base impedance

$$R_s(\%) = \frac{R_s \text{ (in ohms)}}{Z_{base}} \times 100$$

note: R_s is per phase (Y connected)

Calculate L_s (stator reactance)
as a percentage of the base impedance

$$L_s(\%) = \frac{2\pi f \times L_s \text{ (in henry)}}{Z_{base}} \times 100$$

note: if XL_s are available then do not use $(2\pi f)$
 L_s is per phase (Y connected)

Calculate L_r (rotor reactance)
as a percentage of the base impedance

$$L_r(\%) = \frac{2\pi f \times L_r \text{ (in henry)}}{Z_{base}} \times 100$$

note: if XL_r are available then do not use $(2\pi f)$
 L_r is per phase (Y connected)

Calculate Motor Iron Loss

as a percentage of the motor's rated power

$$\% \text{ Iron Loss} = \frac{V_{I-I}^2 \times \frac{1}{R_{fe} \text{ (in ohms)}}}{\text{power (in KW)} \times 1000} \times 100 = \frac{\text{total iron loss (in kW)}}{\text{power (in KW)} \times 1000} \times 100$$

note: KW = HP × 0.746

R_{fe} is per phase (Y connected)

Calculate Motor Mechanical Loss

as a percentage of the motor's rated power

$$\% \text{ Mechanical Loss} = \frac{\text{total loss (in kW)}}{\text{power (in KW)} \times 1000} \times 100$$

note: KW = HP × 0.746

Calculate Percentage No Load Current

as a percentage of the motor's rated current

$$\% \text{ no load current} = \frac{\left(\frac{V_{I-I}}{\sqrt{3}} \right)}{2\pi f \times L_m \times I_{rated}}$$

note: if XL_m are available then do not use (2πf)

L_m is per phase (Y connected)

After this initial value is entered, use the adaptive tune procedure to properly tune.