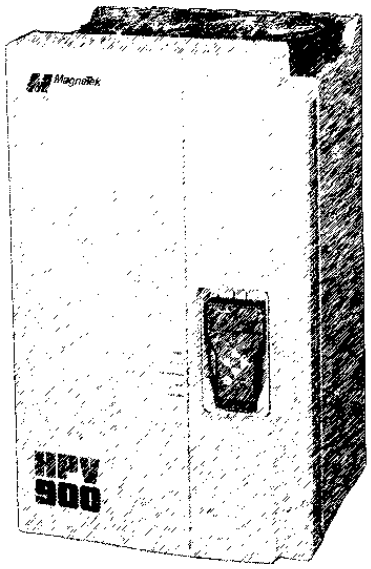
MagneTek



HPV 900
Motor Parameter Calculation

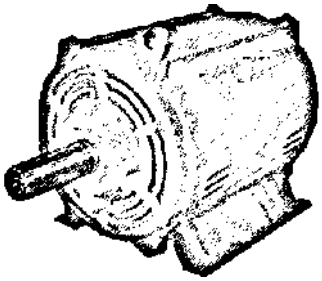
from the motor's equivalent circuit

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)

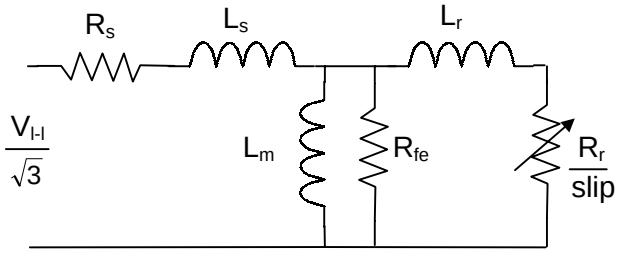
Also,

- 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 ($V_{l\text{-}l}$)
- 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)

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

note: KW = HP $\times$ 0.746

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

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

note: R_s is per phase (Y connected)

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

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

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

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

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

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

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

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

note: KW = HP × 0.746

Calculate Percentage No Load Current

as a percentage of the motor's rated current

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

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

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