

CYCLIC DURATION FACTOR

Cyclic duration Factor (CDF) is defined as follows.

$$\text{CDF} = \frac{\text{Period energized}}{\text{Duration of one complete duty cycle}}$$

Generally the values for the cyclic duration factor used 25%, 40%, 60% and 100%.

STARTING OF WOUND ROTORS

STARTING BY ADDING EXTERNAL RESISTANCE

The slipping motors are generally started by means of variable resistance in the rotor circuit to get required starting torque. The value of external starting resistance can be calculated as under

$$\text{Rext} = K \frac{Rv}{\sqrt{3} \times RA} \times \frac{\text{FLT}}{\text{LRT}} - \text{Rrt}$$

K = Constant depends on line voltage drop ; varies from 0.6 to 1.0. Generally a value 0.8 can be considered.

RV = Rotor voltage (Volts)

RA = Rotor Current

FLT = Full load torque (Kgm)

LRT = Locked Rotor (Starting) Torque

Rrt = Rotor resistance in Ohms per phase

Rext = External rotor resistance per phase to be added (Ohms) to get torque. LRT at standstill.

Rrt is generally small compared to Rext and may be neglected. However if required, can be calculated approximately by following formula.

$$\text{Rrt} = \frac{Rv}{\sqrt{3} \times RA} \times (\text{SLIP in PU})$$

The starting torque can be increased upto the value of maximum torque available for that particular design. Usually starting torque as high as 2.5 times the normal torque can be obtained. The typical examples of curve showing, the increase in starting torque with addition of different rotor resistance & corresponding change in current with respect to speed are given in the figure.