Inrush Current (19:34)

Draw a general purpose graph of inrush current as a function of time upon closure of a full voltage/direct online starter.

Identify common reduced voltage starting methods used to reduce inrush current.

Identify the formula used to accurately calculate inrush current for a 3 phase AC motor.

Code	kVA/hp
A	0 - 3.14
B	3.15 - 3.54
C	3.55 - 3.99
D	4.0 - 4.49
E	4.5 - 4.99
F	5.0 - 5.59
G	5.6 - 6.29
H	6.3 - 7.09
J	7.1 - 7.99
K	8.0 - 8.99
L	9.0 - 9.99
M	10.0 - 11.19
N	11.2 - 12.49
P	12.5 - 13.99
R	14.0 - 15.99
S	16.0 - 17.99
T	18.0 - 19.99
U	20.0 - 22.39
V	22.4 and up

Use the above chart to determine the lowest, highest, and average inrush one might expect for a ¼ hp motor intended to operate at 208V with a locked rotor (kVA/hp) code of M.

Use the above chart to determine the lowest, highest, and average inrush one might expect for a 1 hp motor intended to operate at 230V with a locked rotor (kVA/hp) code of P.

Use the above chart to determine the average inrush one might expect for a 3 hp motor intended to operate at 208V with a locked rotor (kVA/hp) code of K.

Use the above chart to determine the average inrush one might expect for a 15 hp motor intended to operate at 460V with a locked rotor (kVA/hp) code of G.

Identify the entry on a motor nameplate used to directly specify inrush current without calculation.

Draw a chart of CEMF as a function of rotational speed. Identify how the magnitude of CEMF at different rotational speeds influences inrush current magnitude.

Given this model of the windings of a 3 phase AC motor intended to operate at 208V$_{LL}$ at rest calculate the inrush current. Explain how CEMF influences this value.

7Ω∠0° — LOSSES & REAL
19Ω∠90° — REACTIVE
0V — CEMF
@ n = 0 rpm
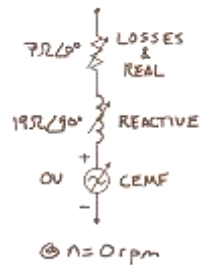
Given this model of the windings of a 3 phase AC motor intended to operate at 208V$_{LL}$ in the no load condition calculate the no load current. Explain how CEMF influences this value.

27Ω∠0° — LOSSES & REAL
66Ω∠90° — REACTIVE
70V — CEMF
@ n = 1770 rpm
NO LOAD CONDITION
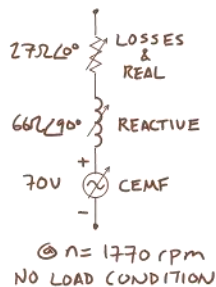
Given this model of the windings of a 3 phase AC motor intended to operate at 208V$_{LL}$ in the rated condition calculate the rated current. Explain how CEMF influences this value.

41Ω∠0° — LOSSES & REAL
34Ω∠90° — REACTIVE
67V — CEMF
@ n = 1700 rpm
RATED CONDITION
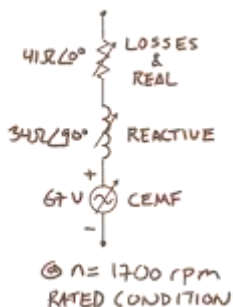
Explain how long the inrush phenomenon occurs for unloaded and lightly loaded motors.