

Electrical Blog No. 42 - Motor Starters

When an alternate current (AC) motor starts, it generates high starting current. Motor starter is usually used for limiting the motor starting current. The commonly used motor starters are listed as follows:

Direct-on-line (DOL) starter: The components of DOL starter consist of contactor and thermal or electronic overload relays. The starting current is about 5 to 8 times of the motor full load current. DOL motor starter is suitable for the small rating motor with high starting torque.

Star-delta starter: The components of a star-delta starter consist of three contactors, an overload relay and a timer for setting the time in the star position. The motor winding is configured in star formation to the supply voltage during starting and at delta formation during running. The starting current of using star-delta starter is about 30% of the DOL starter. It is suitable for the motor of high inertia load with a low resistant torque.

Auto-transformer starter: The motor is connected to auto-transformer's tapping, which is started at a reduced voltage according to the auto-transformer tapping ratio. The auto-transformer is usually equipped with selectable tapping such as 80%, 65%, 50% etc. The resulting starting currents and torques will be 64%, 42% and 25% of the full voltage values.

Soft starter: Soft starter enables the motor starting up smoothly without any step from selectable starting value up to 100%. The starting current is about 3 times of the full load current. It enables the motor to accommodate changing load conditions.

Large motor starting current will have an adverse impact on power company's system to other customers, such as light flickering, malfunction of other electrical or electronic equipment connected to the feeder lines, etc. Supply Rules of both power companies in Hong Kong stipulate the requirements on maximum motor starting currents to ensure the quality of their power supply to customers.

The Electrical Blog is contributed by the Electrical Division. If you would like to know more about this topic, please contact the Division Hon Secretary, Ir K.M. LEUNG at 'kmleung@emsd.gov.hk'