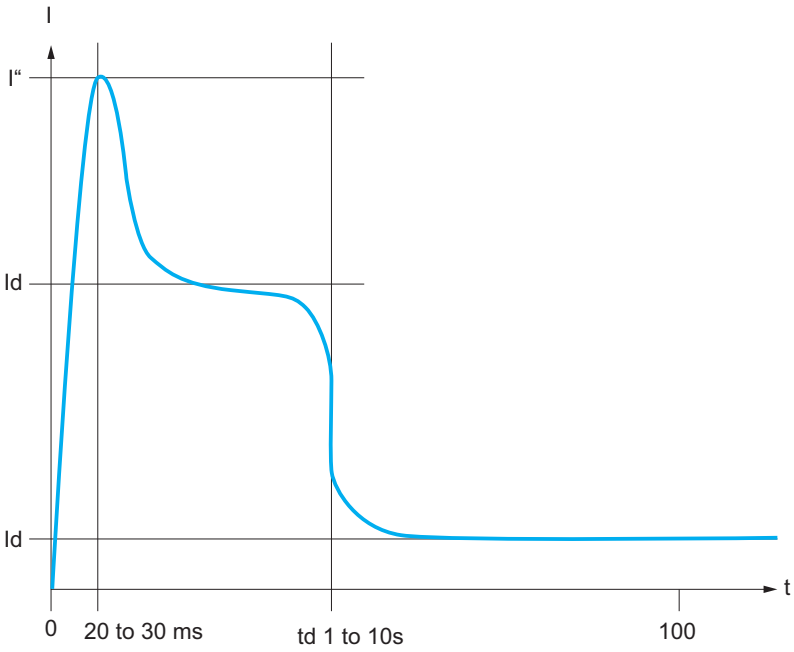
Motor Control

A motor power-supply circuit presents certain constraints not normally encountered in other (common) distribution circuits.

These are owing to the particular characteristics of motors directly connected to the line, such as:

- High start-up current which is mostly reactive, and can therefore be the cause of important voltage drop
- Number and frequency of start-up operations are generally high
- The high start-up current means that motor overload protective devices must have operating characteristics which avoid tripping during the starting period.



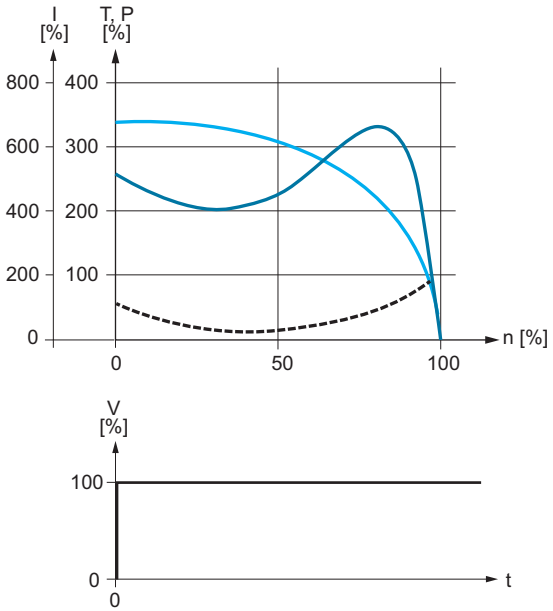
I”	8 to 12 times of In
Id	5 to 8 times of In
In	nominal current of the motor

Technologies

Direct Starter

Direct starting is the simplest way to start your motor.

A Direct Stater often refers to Direct On Line (DOL) Starter (Reverser is also included in this section). It is used to start, stop, reverse, protect a motor with a direct connection to the power supply. Starters are usually composed of a contactor used to switch power and a thermal or electronic overload relay for motor protection.



	torque / starting torque = 1,5 up to 3 times of nominal torque
	current / inrush current = 4 up to 8 times of nominal current
	load torque
	voltage
I	current
T	torque
P	power
V	voltage
n	speed

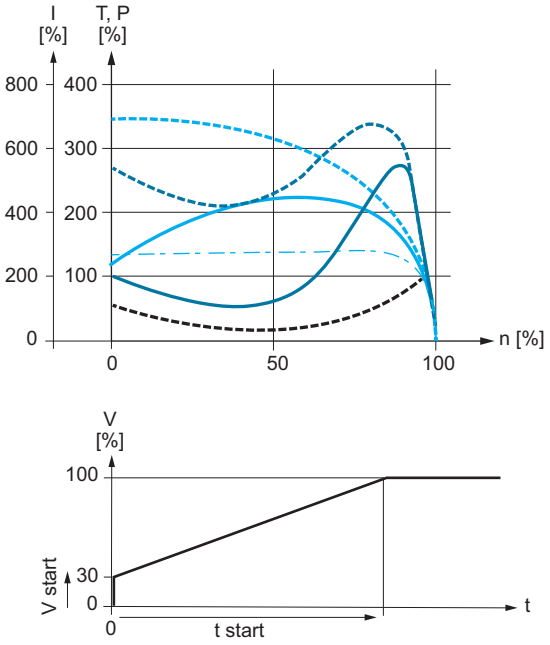
Technologies (continued)

Soft Starter

A soft starter let you smoothly start your engine.

Disturbing inrush currents and unwished strokes on the shaft are eliminated.

A soft starter allows you to set up a Voltage/time for ramp up and in some cases for ramp down for a smooth start and stop.



	torque / starting torque = 0,1 up to 1 times of nominal torque
	current / inrush current = 2 up to 6 times of nominal current (due voltage control)
	load torque
	voltage
I	current
T	torque
P	power
V	voltage
n	speed

Technologies (continued)

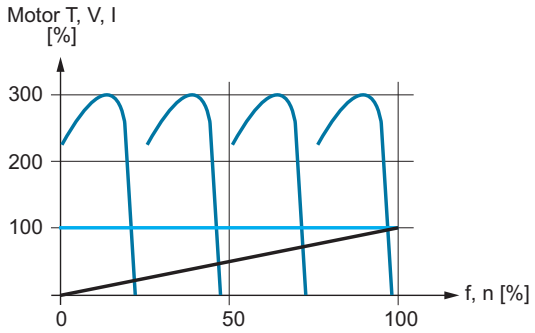
Variable Speed Drive

A variable speed drive provides flexible control of your motor with a wide range of possibilities.

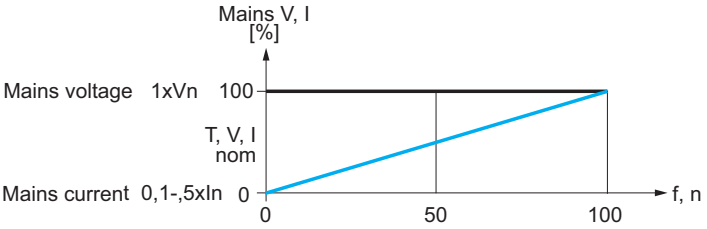
It allows you a guided start, operation and stop with adjusting the speed and/or the torque smoothly.

A frequency drive converts the voltage and frequency of the mains into a new adjustable supply voltage and frequency for the motor.

Several monitoring, control and protection functions are already included within the variable speed drive. It allows you to inbound external actors and sensors to the control of your engine via I/O cards. As well it allows you to get your drive connected to several field busses due to a huge offer of communication cards.



	Motor Torque 0-1.5 Tn
	Motor Current 0,3-1,5xIn
	Motor Voltage 0-1xVn



	Mains current 0,1-1,5xIn
	Mains voltage 0-1xVn
I	current
T	torque
P	power
V	voltage
n	speed

Technologies (continued)

Technical differences

Direct Starter starting is mostly based on electromechanical products like contactor or motor circuit breaker.

Pro & Cons

	Pro	Cons
Direct starter	■ Direct Starter starting is simple and cost-effective solution. It is usually used for smaller loads but then star delta configuration can be used to lower the starting current.	■ Direct Starter starting can create power supply fluctuation and stress on the mechanical parts as the torque is high at startup.
Soft / Starter	■ Adaptable starting characteristics for a smooth ramp up. As well ramp down possible. ■ Needed for machines or application with a adapted starting for reducing inrush currents or avoiding shocks on the motor shaft.	■ Inrush current up to two to six time of the nominal current.
Variable Speed Drive	■ Flexible control of your engine with a wide range of possibilities. ■ Used for simple and complex application and allows huge possibilities in monitoring and control. ■ A Variable Speed Drives provides you a high torque at low current and allows you to adapt the starting and operating characteristics.	■ Complex Device that need well skilled people for commissioning