

APPLICATION TIPS

Soft start

Soft starting of any application protects the mechanical drive system reducing wear and tear on bearings, belts, etc. Soft starting also reduces direct on line starting currents from 600% to 100 - 150% of motor rated current.

Motor-drive selection

The number one problem experienced by inexperienced drive users is matching the motor and drive voltage; ensure that the motor terminal box connection (star or delta) corresponds with the drive voltage.

Low speed motor operation

When an application requires a motor to run for long periods of time at low speeds, typically less than 1/3 base speed, and particularly when additional boost is applied, the motor should be force cooled.

EMC

Good cable management is the key to solving EMC problems. Always use screened cable between the drive and the motor and keep control and power cabling separated by at least 100mm. Where control and power cables must cross, ensure that they do so at 90°.

Generators

Soft starting is key in reducing generator costs as a system can be dimensioned for continuous rather than start-up operation (4 - 6 times reduction). A contactor should be placed between the generator and the drive, which should be activated by the Optidrive's drive healthy output relay. Thus, in the event of a generator over-voltage, the drive will trip causing the contactor to open removing the potentially harmful over-voltage from the drive.

Freewheeling Fans

For Optidrive E, use dc injection braking on enable to bring free-wheeling fans to rest before starting to control. Starting a drive into a free-wheeling motor creates a direct short-circuit, which damages the drive and the motor.

Variable torque (radial & axial fans)

Variable torque mode can be used to drive radial fans and pumps. Axial/ centrifugal fans or displacement pumps should be driven in constant torque mode (ie heavy duty/ 150% overload).

1 phase supplies

Optidrive offers high power single phase input, three phase output operation up to 45kW.

Energy Saving

In general, reducing the speed of a process will save energy. Using PI/ feedback control, energy saving can be maximised by running a motor at its optimum speed for a particular situation.

Variable feedrate

It is often useful to run a particular process at optimum power/ load ie a wood-saw. A first Optidrive can be used to drive the primary process and a second Optidrive can be used to control the feed of the work piece into the primary process. A PI controller uses the load output from the primary Optidrive as the feedback parameter and then changes the speed of the feed drive to keep the primary process at optimum load.

Harmonics

Drives inherently create harmonic distortion, however the effects can be significantly reduced using input line chokes. Size 4, 5 & 6 drives have integral line chokes giving rise to a significant advantage over other products which require external line chokes. 12 pulse systems can be employed to further reduce harmonic distortion.

Enclosure design

Drive system enclosure design requires a compromise between 1, managing the heat created by the drive(s) in order to keep the enclosure cool to increase component lifetime and 2, the need to seal the enclosure for environmental and safety reasons. "Through hole" mounting where the heatsink is put through a hole in the panel allows the sensitive control electronics to be totally sealed in the front of the panel, whilst the heat generating components in the rear of the panel can be kept cool with "dirty" air.

Long Cables

Ideally a drive should be placed as close as possible to the driven motor. The maximum cable length is specified in the manual, this is for armoured or screened cable. If a non screened cable is used the length can be increased by 50%. When using an output filter the cable length can be doubled.

Parallel Motors

When parallel motors are connected to a drive the extra capacitance of the parallel motors can cause problems. To rate a drive, sum the power ratings of all the motors and add 10 - 15% extra. Take care in checking the total length of the parallel motor cables does not exceed the maximum specified in the user manual – see above "Long Cables". The capacitance effect can be reduced if the motor cabling is "daisy chained" ie connected from the drive to motor 1, then motor 1 to motor 2, etc. rather than each motor being connected directly to the drive output directly.