

Soft starters are the ideal cost saving tool for mechanical engineers

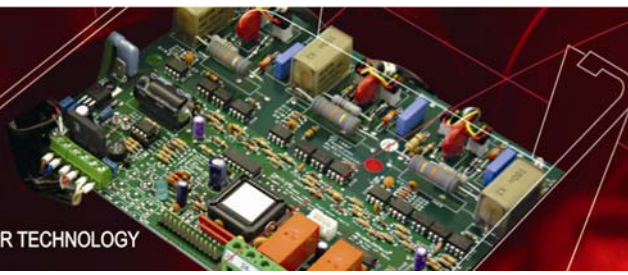


Statistics show that over 90% of the motors in UK industrial use have no form of control, other than simple electro-mechanical switching. The result of this in maintenance and equipment replacement costs to industry is huge.

Overnight these costs could be reduced dramatically by fitting soft starters. But where should the initiative to fit these units come from: the electrical engineer or the mechanical engineer? If this seems a strange question consider for a moment where the main benefits of fitting soft starters accrue. The electrical engineer benefits in two ways. Firstly, by avoiding the dips in mains voltages that occur due to current peaks inherent in direct-on-line (DOL) starting. Secondly, by avoiding the considerable stresses on the motor windings, and the iron cores of the stator and rotor, which result in reduced motor life.

Whilst these benefits are considerable, those accruing to the mechanical engineer are greater still. This is because the sudden impact at start up of uncontrolled starting, followed by the rapid acceleration to full speed, causes problems across a wider range of equipment types.

Sudden torque stresses cause excessive wear on belts, pulleys, gears, chains, couplings and bearings, and also cavitation in pumps, which reduces their efficiency and life. Similarly, shock waves can be generated and transmitted along hydraulic pipework, weakening joints in pumping systems. In conveyor systems, too, loads may be displaced or damaged upon start-up, and products may become contaminated.



Clearly then, mechanical engineers have more reasons to press for the fitting of soft starts in fixed speed motor applications. Especially so, as the cost savings resulting from reduced downtime and from not having to replace bearings, gears, pulleys and bearings so frequently, will ensure quick payback on any soft starter unit.

A further argument for the mechanical engineer in fitting soft starts is that equipment previously left running, due to concerns about it restarting - *and concerns, also, regarding belts braking, shafts shearing and bearings failing* – can now be switched off, enabling real savings in energy to be achieved. Similar savings can also result in breakdown situations. Taking the example of a blockage in a mill, historically motors have been left running when this situation occurred, even though the time required to remove the blockage was considerable. Today, this cost can be avoided simply by employing soft starters on the motors, enabling them to be switched off with no negative consequences for restarting.

The above example deals with a breakdown situation. Prevention, however, is always better than cure. Modern manufacturing processes employ large numbers of pumps to convey everything from water to hazardous fluids. In many applications these pumps are driven by motors, which have no form of speed control during their starting and stopping. As a result, pressure surges and water hammer occur, which can damage pipe work and equipment. Soft starters such as Fairford's QFE and XFE units provide a solution to this problem with a feature known as "Ramp Down". Intended for use where heavy dynamic loads are encountered, ramp down is particularly useful in pumping applications where it ensures that pump motors stop progressively, thus minimising fluid shocks.

Another soft starter feature especially relevant to mechanical engineers is Electronic Shear Pin. Included as standard on most Fairford controllers, electronic shear pin enables the soft starter to cater for situations where loads are likely to jam suddenly, such as in wood sawing, rock crushing etc. The traditional method of achieving this protection was via a mechanical 'shear pin' that consisted of a pin of a deliberately weak material inserted into two concentric shafts at a convenient point in the drive train to the load. If the load became jammed, the sudden rise in torque would cause the pin to shear so that the two shafts could then rotate independently, thereby disconnecting the motor from its load. Before the load could be re-started, the old pin would need to be removed and a new one inserted – an obviously inconvenient and time-consuming process. The 'Electronic Shear Pin' facility eliminates the need for a mechanical shear pin entirely because the speed and extent of a sudden and rapid rise in motor torque is immediately detected by the Soft Starter which will then decide on a course of actions ranging from instantaneous shutdown to monitoring for recurrences if the blockage is released rapidly.

Soft starters provide an electronic solution to mechanical problems at relatively low cost. They can extend the life of belts, chains, gearboxes, shafts, bearings and machine mountings. In addition, soft starters can achieve real savings in energy for users by providing the facility to switch motors off, without fears for their restarting. Added to these factors, traditional fit and forget reliability ensures security of operation even in the most critical of tasks.