STARTING MOTORS – KEEP IT SIMPLE

Squirrel cage induction motors draw a starting current that is much higher than the full load running current. In general, they will draw between five and six times the full load current when they start. This current will be drawn for the time it takes for the motor to run up to speed, about 20 seconds for a motor rated at about 5000 kW and about two seconds for a motor rated at 2.2 kW. This time is known as the 'run up time'. The high starting current, known as the 'inrush current' can result in two effects: the power supply, while capable of supplying the running current, cannot supply the starting current without the supply voltage falling to a low value, which means the motor will not accelerate to full speed. Alternatively, the high current trips the supply circuit breaker.

It is therefore desirable to reduce the inrush current. In times gone by, it was more desirable than today – the power supplies of today are much 'stiffer' than in the past. The simplest is to start the motor Direct on Line (known as DOL) by using a contactor to close the supply onto the motor terminals and let it run up.

These days, in general, almost all motors rated at 75 kW or less are started DOL. To reduce the inrush current for motors bigger than 75 kW there are a number of strategies. The newest (and most common) strategy is to use a 'soft starter'. This is an electronic device which, when connected to the main supply and the motor terminals, supplies a low voltage, low frequency output which spins the motor and whatever shaft load (pump set, compressor, etc.) up to speed. In the past, this was done with (a) a Star Delta starter which connected the motor first in star and then, as it ran up to speed, in delta, (b) a Reactor starter where the motor was started with a reactor in series and, when up to speed, the reactor was shorted out, and (c) a Korndorfer starter where the motor was supplied from a tap on an auto transformer and connected to 100% tap when the motor was up to speed.

Not one of these is used much now, which is a pity as they were all robust solutions which worked well. I included a description of these working methods since you could come across one of these starters, and will thus not be totally mystified.

To complete the picture, let's discuss the motor contactor. This is in series with the motor and it closes to start the motor. It is energised by a pulse from the 'start' button and, when it closes, an auxiliary contact of the contactor bridges out the start button so that the contactor holds itself in electrically. This is very important; if there is a power dip the contactor drops out and the motor stops. If this did not happen the motor would slow down in the power dip and then have to start with full load at low voltage, which could damage the motor. The contactor is also fitted with an overload which causes the contactor to drop out if the line current exceeds a given threshold. It must be noted that a circuit breaker cannot be used for this function since it will not trip quickly for overloads of 20% or less, so starting a motor with a circuit breaker instead of a contactor is a very bad idea.

Motor control circuits have been around for decades, much without change. Having said this, there are various people in the industry who will insist on 'fiddling' with established circuit design. They fit the motor control circuit with smart electronics that count the number of times the motor starts and send the value of the motor current via a telemetry link to a control room which has pretty diagrams showing how the motors in the plant are operating… all of which is unnecessary. Simple is better. Simple is reliable. Simple circuits work well.

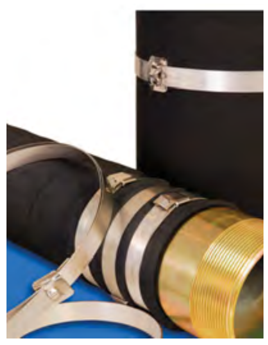
CLAMPING DOWN ON CABLE THEFT

Cable theft costs the South African economy billions of rands each year in lost productivity and replacement of expensive power cables, and endangers lives in many instances. The issue came under the media spotlight in November 2017 when the City of Johannesburg offered a R100 000 reward for information that would lead to the arrest of the suspects who stole R2 million worth of cables from its data centre in Braamfontein.

Banding & ID Solutions Africa Sales Representative Matthew Campbell points out that the Ultra-Lok® clamping system can play an integral role in combating this scourge, as it is designed for quick installation, with the highest clamping force, and a gap-free inside diameter. In addition, it can be used as frequently as every 150 mm of cable for added security.

Ultra-Lok® clamps are made from double-wrapped one-quarter hard 201 stainless steel for superior strength. The lock formed under full tension maximises buckle tightness. The buckles have two to three times the strength of preformed clamps. The smooth inside diameter is designed to eliminate leak paths, while the buckle hood protects the lock from snagging.

Another feature is the Ultra-Lok® installation tool has a built-in tension setting. This means that, depending on the type of material being strapped – whether it has a soft casing or is hard-armoured cable – the tension can be set accordingly. The same tension setting is applied throughout, which is a critical security factor in many installations. This is in contrast to manual installation tools that are completely user-dependent, and which can result in over- or under-tensioning. "Ultra-Lok®" says Campbell, "takes the guesswork out of the entire process, while enhancing the quality and effectiveness of the final installation".



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