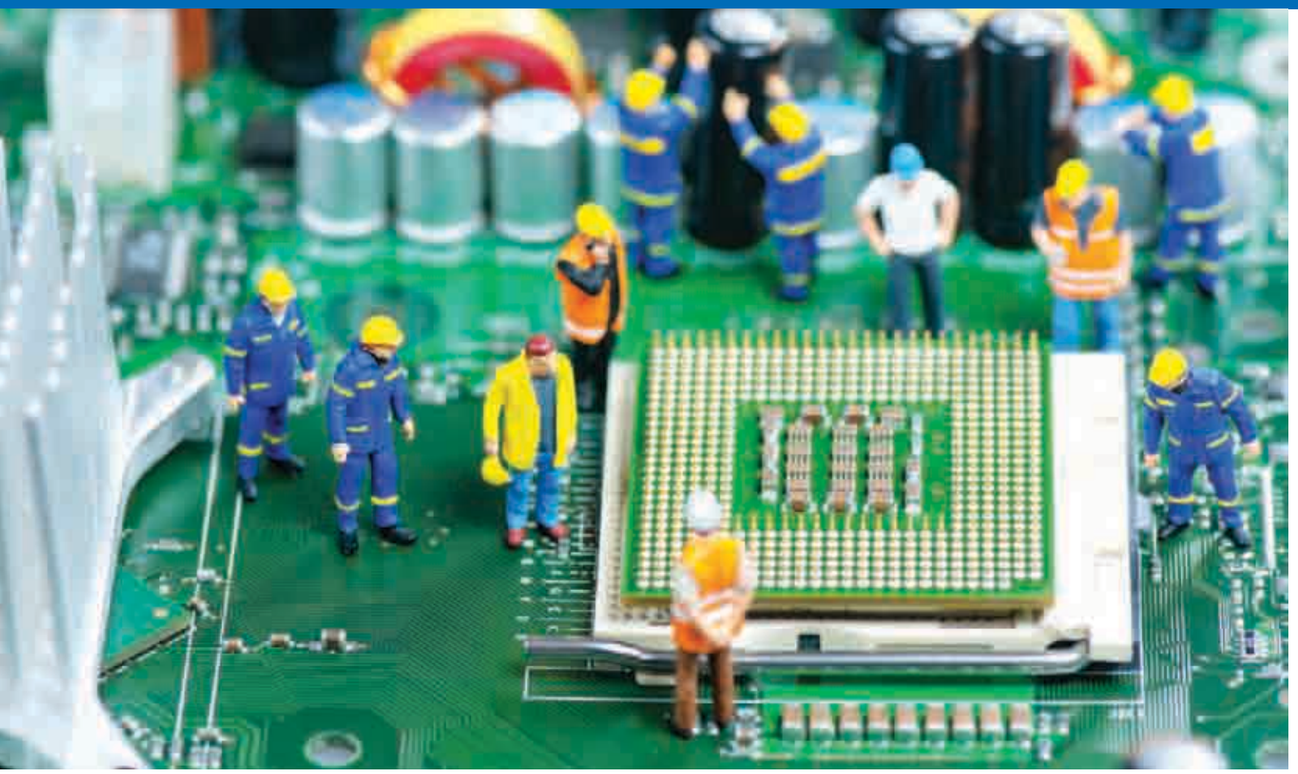
Focus on Maintenance



If you can't stand the heat...

THE FAILURE RATE OF ELECTRONICS RISES EXPONENTIALLY IN RELATION TO THE TEMPERATURE. SO ACCURATE MONITORING OF THE TEMPERATURE WITHIN A DRIVE CABINET – AND ENSURING IT STAYS AT THE SPECIFIED LEVEL – IS ESSENTIAL TO KEEP AN ELECTRONIC DRIVE PERFORMING AT ITS BEST FOR THE LONGEST POSSIBLE TIME.

Excess heat within the drive cabinet can reduce the life expectancy of an electronic drive by as much as 50%. However, careful monitoring and effective repair and maintenance can ensure that a drive achieves something much nearer its specified service life (usually around 40,000 hours or 5 years of continuous operation). In fact, ERIKS' Electronics Development Director, Victor Harris, claims you can actually double the life expectancy of your drives through good maintenance practice and appropriate repair – as a demonstration unit on the ERIKS stand at Maintec will show.

Poor maintenance often arises because of two common misconceptions about drives: that they are 'fit and forget' items, and that they last 'for ever'. Both are wrong.

Firstly, the operating environment can make a huge difference to the life expectancy of fans, boards and components left unchecked and poorly maintained. Secondly, fans and capacitors naturally degrade and need replacing, and boards need inspection and cleaning, which means modern drives have a finite life expectancy.

Fortunately, a simple repair can often put things right, costs half as much as replacement, and extends the life of the drive to the same as a new unit.

Of course you do need to know when it is and isn't economical to repair rather than replace. Which is where the kind of know-how offered by an experienced supplier comes into its own.

ERIKS' years of experience with drives of every type, in all kinds of applications, show that the breakpoint for an economical repair of a standard AC variable speed drive is between 4 and 5.5kW, with the cost of repair as little as 50% of that of a new unit, and the overhauled unit expected to last up to 40,000 hours (MTBF), or five years in continuous operation. Below this size the commodity price, brand interchange ability and wide availability make it more economic to replace, and above 75kW drives are not only modular for easy component replacement, but also often come with maintenance contracts.

As servo drive technology is similar in some respects to AC variable speed drives, the economic viability of repair is comparable and, since servos are higher value products, even repairing smaller units can be cost-effective. It has been proven by ERIKS that – as many servo amplifiers are modules built-in to machines such as robots on automotive production lines – scheduled maintenance on four or five-year cycles can reduce servo control failures to zero on an entire production line. And servicing, which involves cleaning the cards, replacing capacitors and checking PCB integrity, can be carried out during shutdown so there is no interruption to production.

But what are the most common causes of drive failure?
Often it is natural ageing of electrolytic capacitors, or premature ageing due to overheating components. This results from fan failure caused by dust and other airborne pollutants entering the drive casing and precipitating bearing failure.

Poor cooling inside the cabinet can also drastically reduce drive life. Problems commonly include poorly specified cabinets with inadequate ventilation, cabinet filters not being changed, or no allowance made in the design for high ambient temperatures. A modern inverter dissipates about 2% of total power in heat, and older-generation drives even more, so adequate cooling, together with regular checks to prevent dust build-up, is essential.

To help users with a large number of drives onsite keep them well-maintained and operating at their optimum, ERIKS offers a drives management programme. The service includes surveying and cataloguing drive type, age and working conditions, and a thermographic survey to check for tell-tale 'hot' connections and faulty thermal management components. Temperature data loggers are also used over a one-week period, to monitor airflow temperatures into the bottom of drive heat sinks. This test can identify any problems with the airflow circulation design within the cabinet (see sample results graph).

Basic ventilation faults can quickly be remedied, followed during a planned shutdown by any recommended maintenance work. Other elements of the service, such as backing-up software for drive controls before repair, are also taken care of to ensure the entire maintenance operation runs smoothly. Subsequently, setting up a monitoring and maintenance schedule for the site is recommended.

If you are still sceptical that a repair can be as good as a replacement, simply consider the fact that repaired drives carry the same 12 months in-service guarantee as new products. And in addition, unlike a replacement, a repair will require the cause of failure to be identified, so a reputable supplier can provide a recommendation of how to avoid a recurrence of the problem in the future.

The graphs below represent the temperature changes inside two drive cabinets, as measured by ERIKS to help prevent future failure.