

SAFETY IS CRITICAL FOR ELEVATORS, ESCALATORS AND OTHER PEOPLE MOVING EQUIPMENT

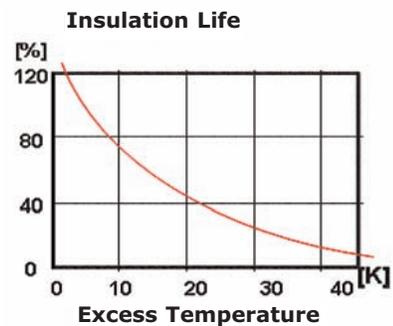
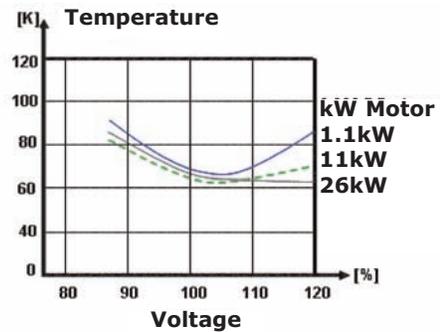
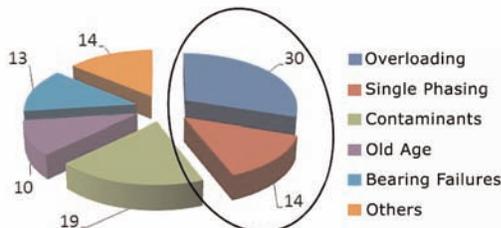


Safety is a critical aspect for any escalator or elevator manufacturer. The National Electrical Code (NEC) specifies that elevators driven by poly-phase AC motors must be prevented from starting when there is a phase reversal or phase failure condition present. The reversal of three phase voltage can lead to a sudden change in direction, which could lead to a disastrous hazard when the transportation of people is involved. A phase failure could lead to a sudden or uncontrolled stop, which is another possible hazardous condition. The same types of precautions should also be implemented in other types of people moving equipment, such as people conveyors (typically found at airports) and overhead trams.

The National Electrical Code also requires that hydraulic elevators driven by poly-phase AC motors should be designed in a fashion to prevent overheating of the drive system by single phasing or low voltage conditions. These very common conditions will

ultimately lead to motor failure and they are responsible for approximately 14% of all motor failures, while 30% are due to overloading. A motor failure is a more troubling situation, because in addition to an uncontrolled hazardous stop, it also brings with it costly downtime and repair.

Main Factors for Electrical Motor Failures



Effect of exceeding the highest permitted winding temperature on insulation life

In every case the code suggests to shut the motor down if it is in operation or, in other instances, to allow it to run the elevators to the next landing before

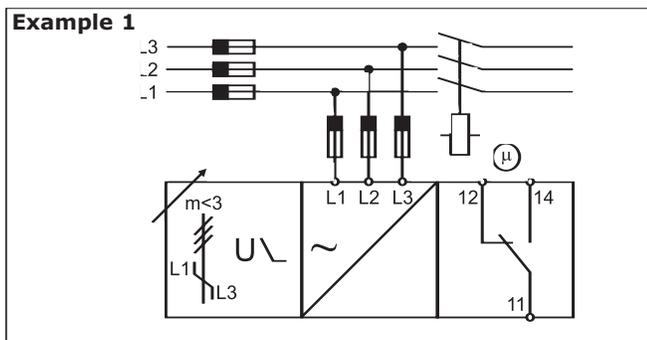
stopping. Therefore, it is imperative to monitor for the following critical situations:

- Phase reversal
- Phase loss
- Under-voltage

Given these considerations, Carlo Gavazzi has designed a three-phase monitoring relay DPA53. In a compact DIN rail mount housing of just 17.5 millimeters wide, the DPA53 is capable of monitoring all of the above conditions and provide a relay type output, which can be set as NC or NO. Voltage monitoring ranges are available for: 150-230V AC and 320-480V AC. An LED visual indication provides a diagnostic alert of an alarm condition. A built-in time delay for the relay activation is available as a special option in order to prevent relay chattering around the set point for under-voltage monitoring. Upon activation, the relay can shut the motor down, turn on

space is an issue, a comprehensive monitoring of the aforementioned conditions, except over-loading, can be performed with a DPC02 monitoring relay. This space saving device is extremely convenient when standard phase monitoring must be combined with frequency monitoring in the same package. Frequency monitoring is most likely not an issue in North American-based applications, but it may very well be in other parts of the world as recently seen in applications based in Central and South America. In summary, basic but critical voltage and phase monitoring for applications involving transporting people or heavy equipment such as escalators or elevators is not only imperative, but mandated by the NEC. A simple monitor doesn't cost a fortune, but should something go wrong, failure to provide one could be quite costly in liability claims.

Wiring Diagram



an alarm and/or perform the switch over to a backup power system.

Depending upon the application, there are other possible hazardous conditions required to be monitored, such as:

- Over-loading (easily monitored with an inexpensive over-current monitor DIA53, no transformer required up to 100A)
- Under-frequency (monitored either with a frequency relay such as DFB01 or more complex device such as DPC02)

For highly critical applications or when mounting

