



TIN 029

Repair and Reprogramming of Inverters

Most tower cranes manufactured in the last ten years have motor control systems which use inverter drives (variable speed drives) to provide proportional or “stepless” control of the crane functions. These inverters are often proprietary items, which are then specially programmed with bespoke software by the crane manufacturer.

When faced with a faulty inverter there is a temptation to take the unit to the inverter manufacturer’s local service agent for repair. The problem with this is that the service agent will usually not have access to the crane manufacturer’s settings and will programme the repaired unit with standard software.

Unfortunately, over the last few years, there have been a number of incidents where hoist winches on tower cranes have allowed the load on the hook to fall in an uncontrolled manner. Subsequent investigation has shown that, prior to the incident, the inverter has been repaired by a local service agent who has programmed it with standard software. This has prevented the hoist brake from being applied correctly.

To avoid inverter failures which may affect the safety of tower cranes, the following points should be observed:-

- When changing an inverter it is essential that:-
 - The model fitted is the correct model and type specified by the crane Manufacturer.
 - The firmware (the back ground software that configures the drive and is not programmable) is correct for that specific machine.
 - The parameter set (crane specific settings) that is downloaded to the Inverter is the correct one for that specific crane.
 - The parameter set is checked each time an inverter or a control card within the inverter is changed.
 - The crane owner or service agent has obtained necessary information to check each inverter type, firmware and parameter set, against a specific crane’s serial number.
 - The crane owner or service agent has the necessary training, competence, software and equipment to upload, download and check parameter sets.
- Repairs to tower crane inverters, involving resetting of parameters or changing of software, should always be carried out by the crane manufacturer unless they are willing to provide both the firmware and parameter set for the specific crane to facilitate a repair by the inverter manufacturer’s local agent.
- Rewound motors may have different characteristics from those given on the motor data plate and consequently may not be matched to the crane manufacturer’s parameter set.
- Inverters do not like moisture! When tower cranes are powered by generators, arrangements must be made to ensure that panel heaters are left on overnight to avoid condensation and subsequent failures.
- Do not be tempted to replace faulty inverters with units that are not purchased from the tower crane manufacturer. Inverter manufacturers often update their product ranges and a new inverter may not be to the original specification.
- Following the repair or replacement of an inverter, comprehensive functional testing of the crane should be carried out in both the no load and rated load conditions.
- Where a crane has been in long term storage checks should be made to ensure that inverter settings have not changed or been lost over time. Some tower crane manufacturers recommend that the control systems of cranes in long term storage should be powered up at six monthly intervals to avoid this problem.