Maintenance Guidelines for Laser and Plasma Cutting Tables

Laser and plasma cutting tables are commonly found in the metalworking industry. If a breakdown occurs, this equipment may require costly and sometimes lengthy repairs. Developing a maintenance program based on manufacturer recommendations and industry-accepted standards can help reduce the likelihood of an unexpected breakdown.

The following information describes common safeguards and controls along with applicable preventative maintenance guidelines to help keep this equipment operating safely and efficiently.

Recommended Protective Devices and Features

- Electrical protective features on the power system to help reduce the risk of power quality issues damaging sensitive electronic controls:
  - Transient over-voltage protection (surge protection) installed on the main electrical switchgear, the distribution system and at the equipment connection point;
  - Ground fault protection;
  - Overcurrent protection.
- Temperature monitoring system with alarm. This can help prevent over temperature conditions that may damage optics or other components.
- Flow monitoring system for cooling water with shutdown functionality. This can help protect optics and resonators or plasma head components from thermal damage due to inadequate cooling water.
- Cleaning system for optics. This system can help prevent buildup that may lead to overheating and damage to optics.

Maintenance Guidelines

A maintenance program should include both preventative and predictive maintenance of the machine and ancillary equipment, along with inspection and testing of protective features to help keep the equipment operating safely and efficiently. The manufacturer should be consulted for specific maintenance requirements and frequencies. Maintenance activities should be performed by a qualified technician

Recommended Preventative Maintenance

- Daily visual inspections of the following components according to the manufacturer's recommendations:
  - Cleanliness of the machine components and surrounding area.
  - Condition of supports, including any footings, grout or supporting slab.
  - Fluid levels. Any automatic oilers should be tested and monitored for proper operation.
  - Electrical wiring and connections. Check for signs of overheating, loose connections, and physical damage.
  - Gas and fluid hoses should be inspected for kinks, cracking and leaks.
  - Ensure all wiring and hoses are protected from molten material.
  - Air filters and vents should be clear of debris that may be reducing air flow.
  - Cooling fan operation.

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Any visual or audible abnormalities noted during daily checks should be investigated prior to continued operation.

- Controls and protective devices, such as safety limits, trips, interlocks and alarms, should be tested and calibrated at least annually following the manufacturer's guidelines.
- Maintain proper cooling water chemical treatment. Replace or clean coolant filters or screens according to the manufacturer's recommendations. Water treatment is important to help prevent scale and other contaminates that can reduce cooling system effectiveness.
- The alignment of guides, rails, cutting head and mounting brackets should be checked periodically following manufacturer's recommendations.

Recommended Predictive Maintenance

- Electrical system thermographic inspections and amp draw testing. Thermographic inspections may reveal loosening electrical connections. Amp draw testing can help predict premature aging of motors and rotating equipment.
- Lube oil analysis for high-speed gearboxes can be used to monitor wear particles and allow for prediction of overhaul needs.
- Vibration analysis for high-speed rotational equipment when trended over time may be able to detect incipient conditions that could lead to future failure if not corrected.

Maintenance services can be completed by the manufacturer's authorized service providers or by in-house maintenance personnel. Where maintenance is completed in house, special training may be required through the supplier or manufacturer for warranty purposes.