

	Magnetic Induction Heater SCOPE OF WORK	Turbo Gen Services
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Title: **PURCHASE, SUPPLY,
DELIVERY, INSTALLATION &
COMMISIONING OF A
MAGNETIC INDUCTION HEATER**

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1. EXECUTIVE SUMMARY

Eskom Rotek Industries has been mandated to carry out maintenance operations on Eskom's turbine and generator plant equipment. ERI services the Eskom's entire turbine plant fleet.

Due to the nature of the turbine plant design and operation, specialised equipment is required to carry out maintenance activities. Two typical design requirements when components are assembled and dismantled are either large interference fits or assemblies with very small clearances. This condition requires heating of the outer component, resulting in expansion, thus making assembly and disassembly possible.

In all cases, the outer components are heated as fast as possible to enable fitment, assembly or disassembly. A magnetic induction heater is ideal for this task as it does not require physical contact and does not rely on conduction for the heating process.

The preferred means of heating is therefore by magnetic induction.

The purpose of this document is to explain the reasoning for replacing the old induction heating machine with a new machine.

The existing induction heating equipment has reached the end of its useful life and must therefore be replaced. Frequent breakdowns as well as cables that are damaged result in loss of production as well as delays on outages.

To ensure ERI can reliably service Eskom's fleet, it is imperative that a new induction heater is purchased.

2. PURPOSE

The purpose of this document is to define the services required for the supply, delivery, installation, commissioning and maintain an electro-magnetic induction heating system that is specified and design according to the unique and demanding conditions expected during maintenance and refurbishment operations.

3. SCOPE OF WORK

3.1 Design and Specification

3.1.1 Material Interaction Analysis

1. The supplier must investigate, analyses and prove to ERI, that the process of heating components does not in any way transform the material structure of the component.
2. The supplier must in consultation with ERI specify all settings for the equipment supplied for different types of components that ERI Works may encounter.
3. This may include but not limited to the frequency, voltage, current, duration and any other relevant data.

3.1.2 Capacity and Dimensions

Note – the information below is a guide, the actual machine supplied may have different dimensions as per the design requirements.

1. Maximum Machine Height: 1,150mm x Maximum Length: 1,350mm x Maximum Width: 600mm
2. Maximum weight 400kg excluding cabling and cooling pipes.
3. Maximum Chiller Height: 2,150mm x Maximum Length: 1,800mm x Maximum Width: 1090mm

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4. Maximum Chiller Weight 1500kg excluding cooling pipes.
5. The cooling of the machine must be a closed system if water cooled and compatible with an open system.
6. Water pressure is 6 Bar.

3.1.3 Electrical Requirements

1. Voltage: 380V Three Phase AC
2. Current: Max 150A
3. Frequency: 50 Hz

3.1.4 Machine Output Capability :

1. Power Output: 100KW maximum
2. Frequency Range: 3 to 10 KHz

3.2 User Interface Requirements

1. The machine is supplied with a remote pendant with lead to enable operation at work area - 15m cable.
2. The machine and pendant shall have the following user interfaces:

3.2.1 Machine

1. Operator control switch (on/off switch to start and stop machine).
2. Emergency stop button.
3. Power control regulator to adjust power output to suit various sizes of probes.
4. Local / remote switch (switching between front panel and remote pendant control)
5. Fault indicators (as a minimum this should show emergency stop, open circuit errors, ground fault indicators, low water flow rate, cooling water temperature fault, cabinet temperature fault, DC Buss fault, Load station fault, input and output faults, transistor fault, frequency limit indicator, resonance limit indicator, input current limit indicator, etc.)
 - System ready indicator
 - Heat on indicator
 - Power meter
 - Frequency meter
 - 3-Phase voltmeter
 - Temperature sensor indicators

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3.2.2 Remote Pendant

1. Heat on/off switch
2. Emergency stop
3. MIN 15m heat resistant cable and mechanical protection of cable.

3.2.3 Safety

The bolt induction heating machine includes the following safety features:

- a) Overcurrent and short circuit Protection
- b) Proof shall be furnished that the system complies with the essential requirements of relevant health, safety and environmental protection legislation.
- c) Supplier to provide list of risks/hazards associated with machine operation as well as recommended mitigations.
- d) Specify that the unit shall check for power leaking to ground and provide a safe shutdown in the event of unsafe conditions.

4. Quality

The suppliers of all components/systems quality management system shall provide proof of adherence to ISO 9001:2015 or latest t standard.

5. Training Requirements

The supplier shall include training of ERI personnel in their pricing.

The training shall be for at least 6 ERI personnel.

Training shall be conducted on ERI premises, on the installed facility.

The training must include normal operations, fault finding, routine maintenance and any other aspect necessary for the efficient operation of the scanning system.

The trainer/s must be certified as trainers by the OEM.

6. Warranties and guarantees

The OEM warranties and guarantees shall apply with the following amendment. The warrantee and guarantee period shall be for a minimum of 2 years.

7. Hardware Maintenance Requirements

The following requirements shall be applicable once the warranty and guarantee period has expired.

The supplier shall include a comprehensive maintenance schedule for all hardware supplied.

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The hardware maintenance shall form part of the supply contract. ERI will request a quotation from the supplier and ERI will issue an order to the supplier to carry out such maintenance.

The supplier shall provide maintenance on all hardware equipment supplied for a period of 3 years with the option to renew the maintenance provision.

The maintenance shall include any spares, consumables, and labour.

8. Software Maintenance

All software shall be maintained to the latest version on an annual basis.

The maintenance shall include any software support and routine updates.

The supplier will provide a quotation for the annual software maintenance and upon approval of the quotation, ERI will issue an order for the software update.

9. Tooling Requirements

The supplier shall supply all tools required for efficient operation of all hardware supplied.

A comprehensive list of all tools shall be included with the documents supplied for this order.

10. PROOF OF COMPLIANCE WITH THE LAW

10.1 The contractor shall ensure that:

1. All employees are registered with the Workmen's Compensation Commissioner in a manner which is acceptable to the Department of Labour, and which satisfies the requirement of the compensation for occupational injuries and diseases act.
2. All employees are registered for unemployment.
3. All unskilled/casual staff must be paid in accordance with the Labour Act. The contractor will be responsible for their training.
4. All personnel shall wear the necessary protective clothing in accordance with Occupational Health and Safety Act No.85 / 1993 and the Construction Regulations of 2003 and which is required in the workshop.

10.2 HEALTH AND SAFETY

The Contractor shall at all times comply with the requirements of the Occupational Health & Safety Act (1993), Construction Regulations (2003) and the Employer's Pre-construction Health and Safety Specification. In pursuit of the aforementioned, the Contractor shall allow for:

- Carrying out and documenting risk assessments of all work to be carried out under the contract.
- Preparation of safe work procedures for all work to be carried out under the contract.

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- Preparation of an Health and Safety plan, discussing it with the Employer, and then amending it as agreed.
- Preparation for and conducting “toolbox talks” with relevant employees.
- Induction and training as and where required.
- Preparation of a Project Health and Safety File.
- Regular updating of all the foregoing.
- Provision of PPE and protective clothing for employees
- Complying with all H&S requirements for the duration of the contract
- Storage of cleaning material / equipment

10.3 PERSONAL PROTECTIVE CLOTHING

- Overalls
- Heavy duty safety gloves
- Reflective bibs
- Safety Shoes
- Any other PPE over and above

11. REPORTING

Reporting shall be done in writing at the end of every shift to the TGS CED Project Manager. Major finding on the work provided shall be communicated to the TGS CED Project Manager. All contract information according to the signed NEC will be provided to the service provider.

12. SUPPORTING DOCUMENTS

NB: The following documentation must be returned for the purpose of technical evaluation:

- Quality report with recommendations
- Weekly Reports

13. Equipment related documents

The following, but not limited to, documents shall be supplied with the order:

1. All operating manuals for all components supplied.
2. All operating manuals for software supplied.
3. Maintenance schedule for all hardware supplied.
4. Calibration certificates for as required.
5. Comprehensive tools list.

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