



Cardinal

PUMPS & EXCHANGERS

A **Wabtec** company



Pump it Up

Centrifugal and Axial Flow
Transformer Oil Pumps

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2 Equally Reliable Options to Meet Your Specific Requirements and Needs:

New Pumps

- Heavy-duty class 30 cast iron construction for long life
- Large thrust face sleeve bearings for long life and minimum wear
- Pump continuous duty operation temperatures ranging from -40°C (-40°F) to 100°C (212°F)
- Pump and motor units pressure-tested to assure integrity
- Pumps designed to permit thermo-siphon for natural convection flow
- Motor windings Hi-Pot tested to assure electrical integrity
- Special coatings applied to protect against rust inside and outside



Remanufactured Pumps

- Either yours or from our direct replacement core stock
- Exactly the same manufacturing processes as new pumps
- Incorporates renowned **HARLEY** sleeve bearing system, shaft, motor, internal elastomers and electrical connector
- Value-added internal component design changes to correct shortfalls of original designs
- New or rewound motor windings with high insulation class ratings
- Optimized high-strength materials using proper tolerances and surface finishes
- Tested to assure the integrity of the hydraulic, electrical & sealing systems
- Re-nameplated and carries a full 12/18 month warranty

Both options available with
TecSonics™ Bearing Wear Monitoring System

Product Features

A division of Unifin International, Cardinal Pumps and Exchangers both manufactures and remanufactures hundreds of different configurations of pumps used in conjunction with our wide range of transformer oil coolers. These are applied for either Transformer OEM cooler/pump applications or directly to electric utility/industrial transformer end users. They are available in both centrifugal and axial flow designs and are designed to perform in extreme temperatures, with extra long life and very low maintenance.



Rugged Cast Iron Body

All Cardinal pumps offer a rugged casting design with heavy-duty class 30 cast iron used for the pump casing, motor enclosures and impeller to provide long life in the field.

Precision-Made Sleeve Bearings

Cardinal offers three bearing types: standard sleeve bearing, the **HARLEY** by Cardinal sleeve bearing, and the **HARLEY** sleeve bearing with **TecSonics** bearing wear monitoring



Ground Shafts & Dynamic Balancing

All Cardinal sleeve bearing pumps have the bearing journals and thrust surfaces ground between centers to assure alignment and surface finish. All pump shaft, impeller and motor assemblies are dynamically balanced for long term operation.



Fully Pressure-Tested

All Cardinal pump and motor units are pressure-tested to 50 PSIG to ensure the integrity of the complete unit.

Electrical Tested

Motor windings are all tested for 60 seconds at (2 x voltage + 1000) to assure electrical integrity and continuity. Winding resistance readings are taken both before and after the pump is built.

All Cardinal pumps are meggar tested to assure the integrity of the motor insulation.

Operating Temperatures

The pumps' continuous duty operating temperature ranges from -40°C (-40°F) to 100°C ($+212^{\circ}\text{F}$)



Rust-Proofing

A special coating is applied to both the inside and outside of the pump to protect it from rust.

High-Efficiency Motors

Highly efficient oil-immersed motors with superior rated insulation class materials are available in single or dual voltage, single or three phase, and 50 or 60 hertz frequencies.

Motor Cooling

All Cardinal pump designs have an inherent oil circulation feature within the motor enclosure to positively circulate the oil for an even better cooling effect on the motor windings.

Thermo-Siphon Flow

All pumps are designed to permit thermo-siphon flow when the pump is not operating, allowing natural convection even when the pump is completely shut off.



Proper Pump Rotation

All pumps have rotation indication arrows on the casing and motor enclosure as well as a shaft rotation sight plug at the rear of the motor to facilitate checking of the shaft rotation.

Optional Features Include:

- **HARLEY** by Cardinal Sleeve Bearing (Standard or Remanufactured)
- **TecSonics** Bearing Wear Monitoring System
- Performance run-in testing (Standard on Remanufactured)
- Certified Performance Curves
- **WeatherAll** Power Cords and Installation Gaskets
- Epoxy Paint Systems
- Export Packaging
- Metric-sized flange connections for international compatibility

A World Leader

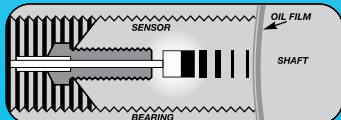


TecSonics™

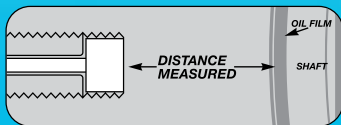
A Precision Bearing Monitoring System

Six precision, ultrasonic sensors are mounted in both thrust and radial bearings at strategic points, becoming part of the bearing surface.

A signal from the TecSonics™ instrument excites a piezoelectric crystal in each sensor which



emits a high-frequency sound wave which echoes off the face of the sensor, re-exciting the crystal which sends a signal back to the instrument.



The instrument translates the echo time into distance (sensor length) and bearing condition. A multiple array of sensors provides the safety of redundancy and accuracy of +/- .0002". Measurements are compared to the baseline readings to determine if bearing wear has occurred.

WeatherAll®

Power Cords



Helps to ensure transformer pump and cooling fan motor performance. The cords have been field-tested to withstand ultraviolet rays, oil, water and extreme weather conditions.

A unique Overmold Protectant restricts moisture from entering at the connecting points and prevents any movement of cord leads.



Replacement Valves

Avoid future forced outages by replacing the valves during your next transformer outage.

Replacement valves have the following features:



- Viton elastomers
- New back-to-back lip seal packing design
- Strengthened valve stems
- In-service maintenance ability

Field retrofit kits available for Westinghouse and McGraw Edison valves.

The Hottest Name in Cooling



Unifin
A **Wabtec** company

Corporate Head Office: 1030 Clarke Road,
London, Ontario, Canada N5V 3B2
Tel: (519) 451-0310
Fax: (519) 451-1732
unifin@unifin.com

www.unifin.com



Cardinal
PUMPS & EXCHANGERS
A **Wabtec** company

Sales Office: 9321 Ravenna Rd. Suite H
Twinsburg, OH 44087 USA
Tel: (330) 425-7146 Fax: (330) 425-0900

Manufacturing Plant:
1425 Quaker Court, Salem, OH 44460 USA

www.cardinalpumps.com

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