



THERMAL SYSTEMS, INC.

Installation and Operation Manual

Revised September 2016

1. GENERAL SAFETY INFORMATION

1.1 Specification

Never exceed the maximum allowable temperature or pressure ratings. Never exceed the maximum flow rate allowed by the size of the fluid ports. Be sure the system pressure is relieved prior to opening the cooler. Disconnect the electrical power and follow designated lock-out tag-out procedures before servicing. The fluid being cooled should be compatible with aluminum.

1.2 Safety Labels

Catalog standard coolers are provided with ISO standard warning labels. Before installation and operation, the labels and their functions **MUST** be read and **UNDERSTOOD**. ISO standard labels are included on catalog standard product where the relevant hazard is in place. Two types of labels are present on AKG Thermal System's (AKGTS) coolers: mandatory action and hazard warning. These are shown in Figures 1 through 5.



Figure 1: Mandatory action: read installation and operation instructions. Label present on all AKGTS catalog standard coolers and cooler assemblies.



Figure 2: Mandatory action: lifting point location. Label present on all AKGTS catalog standard cooler assemblies with provided lifting eyes.



Figure 3: Hazard warning: electrical shock. Label present on all AKGTS catalog standard cooler assemblies with alternating current (AC) or direct current (DC) electric powered motors.



Figure 4: Hazard warning: hot surface. Label present on all AKGTS catalog standard coolers and assemblies.



Figure 5: Hazard warning: rotating blades. Label present on all AKGTS catalog standard cooler assemblies with a rotating fan, regardless of power source.

1.3 Unpacking

Prior to installation, unpack the unit and check for loose or missing pieces. Minor damage to the cooling fins can be corrected by gently bending them straight. Caps should be removed from the fluid connections and visually inspected to check for any debris or corrosion that may have occurred during storage or shipment.

2 INSTALLATION & MOUNTING

2.1 *Place of Installation*

Care must be taken when choosing a location for the cooler assembly. A source of unhindered fresh ambient air flow is required for the cooler to perform to specifications.

2.2 *Mounting in Closed Area*

When installing cooler in an enclosed space, sufficient ventilation must be provided to exhaust the hot air and replenish with cool air. The cooler must be placed no less than one fan diameter within an obstruction (i.e. wall, reservoir tank, machinery); recirculation of the exhaust air can occur as well as reduce the fan performance due to increased resistance. All of the above will result in decreased cooler performance.

2.3 *Outdoor mounting*

Standard motors are totally enclosed fan cooled (TEFC) motors which provide protection from normal weather. Motors must be shielded when exposed to direct jets of water as any moisture ingress has the potential to short the motor. For high ambient temperature environments, the motor must have an insulation rating suitable for operation in those conditions. Please contact AKG Thermal Systems as other motor options may be available for extreme environments.

When exposed to low outside temperatures, over pressurization of the cooler can occur due to the oil or fluid becoming highly viscous. To avoid this, sound engineering practices must be employed. This could include manual, pressure, or temperature controlled bypasses and other hydraulic safety measures to reduce the strain on the cooler in cold start-up conditions.

2.4 *Mounting in Dirty Ambient Conditions*

Coolers installed in environments that have particulates, debris or oil droplets within the airflow will be need to be cleaned regularly to ensure free flow through the cooling fins on the heat exchanger. Blocked air passages will reduce the heat exchange efficiency of the unit. Failure to clean the cooler will result in decreased performance.

2.5 *Manner of Mounting*

Mounting is usually vertical by means of existing legs or mounting brackets. The cooler must be mounted in the manner it was designed to fit the application. The cooler assembly must be fully secured before operation. Improper mounting can result in damage to the cooler and the surrounding environment or bodily harm. It is recommended that a filter be used ahead of the cooler to prevent debris or foreign material from causing blockage in the fluid rows in dirty environments.

All piping must be properly supported to prevent strain on the cooler. Pipe sizes should be based on the oil flow and pressure drop requirements, **not the oil coolers connection size**. Where excessive vibration may be a concern, flexible connectors are recommended to be used to eliminate stress.

2.6 *Electrical Connection*

Installation should be completed by a certified electrician, and must comply with all local codes. The fan motor must be connected to a power supply that matches that of the motor nameplate. Voltage may vary 10% of what is posted on the motor nameplate. Be sure to provide proper fusing to prevent a possible motor burnout.

2.7 **Start-Up**

The fan blade must be spun by hand prior to hookup to make sure it has proper clearance. Check fan air flow to be sure it matches the directional arrow on the unit. Make sure oil connections are properly sealed.

2.8 **Circuit Connection**

In hydraulic systems and also in intermittent operation of lubricant oil systems, peak pressures may rise in excess of the permissible operating pressure. Due to their short duration, these spikes are traceable only by a data acquisition system capable of sampling data at 500 to 1000 hz. Experience has proven that spring loaded excess pressure valves are often not sufficient for reducing spikes and intermittent pressure spikes.

3 **CHECKS**

If required coolant temperature is not attained after start of operation, or if the temperature gradually rises during operation, check for the following:

1. Speed and direction of fan
2. Fan engagement within shroud
3. Electrical connection
4. Coolant quantity
5. Cooling air flow restrictions
6. Soiling condition of cooling surface
7. Entering temperatures of cooling air and coolant

Deviations from given installation data, blocking to coolant or coolant air flow, or soiling of cooling surfaces can cause reduced cooler performance. Such deviations must be eliminated for safety and proper cooling function.

4 MAINTENANCE

AKGTS cooling systems require no particular maintenance. However, in operation with heavy soiling, regular cleaning must be carried out. Be sure to disconnect the power supply and follow any designated lockout and tag out procedures prior to servicing. Inspect the product regularly for corrosion and clogged heat transfer surfaces.

4.1 *External Cleaning of Air Side*

This can be done by either washing the cooler with a mild cleaner (compatible with aluminum), or with compressed air. A power spray washer works well. Care should be taken not to damage the fins. The direction of stream shall be parallel to the fins in order not to damage. Cooler needs to be dried completely before restarting operation.

4.2 *Internal Cleaning of Coolant Side*

The cooler must be disconnected from the cooling circuit and flushed with clean oil compatible with the cooling system. Flushing in the opposite direction of typical flow is recommended to remove any blockages.

4.3 *Motor Lubrication*

Most of the fan motors 5 horsepower and below have sealed bearings and do not require any lubrication. For Motors that require lubrication, add grease every 2000 hrs. Follow instructions for grease specifications posted on the motor tag. **Do not over grease the motor bearings.**

4.4 *Storage*

Product should be stored in a dry area that has a constant temperature. Temperature changes in the storage area cause condensation to form inside the heat exchanger. This condensation then causes corrosion which causes product failure. This failure is not covered by the guarantee.

If these criteria cannot be met, the cooler should be stored in a sealed plastic bag with desiccant added to absorb the moisture.

Storage term:

6 Months: No specific internal corrosion protection procedures are required. All openings should be sealed with plastic plugs

7-24 Months: Coolers should be flushed with oil and all openings re-sealed with plastic plugs.

25+ Months: Coolers should be completely filled with oil and sealed.

These coolers should be flushed, inspected and re-sealed every 24 Months.

5 PRODUCT WARRANTY

All heat transfer products manufactured by AKG Thermal Systems, Inc. are guaranteed against defective material or workmanship for one year of service after purchase by validated end user or 2000 hours service, whichever comes first. Warranty will not apply after 18 months from original ship date from AKG Thermal Systems, Inc. Warranty for components such as fans, motors, and other components when used on an AKG Thermal Systems, Inc. product will be provided by component manufacturer. Any product alleged defective under the warranty period must be returned to AKG Thermal Systems, Inc. unless otherwise specified by AKG Thermal Systems, Inc. Transportation charges are to be prepaid by the customer, unless previously agreed by AKG Thermal Systems, Inc. Warranty consideration is subject to factory inspection.

AKG Thermal Systems Inc. is not responsible or liable for products damaged through carelessness or abuse. Careful inspection of products should be made by the customer before returning to AKG Thermal Systems, Inc. for warranty. If factory inspection proves any parts defective, repair or replacement of defective parts will be made without charge to the customer. Transportation charges will be prepaid for returning product back to the customer. Liability under this guarantee is limited to the repair or replacement of the defective parts, and shall in no event include consequential damages of any nature. AKG THERMAL SYSTEMS, INC WARRANTY IS "AS IS" AND WILL BE BOUND BY NO OTHER WARRANTY, EXPRESSED OR IMPLIED, EXCEPT THOSE HEREIN SET FORTH. Any attempt at local repairs automatically cancels this warranty. Returned products must be properly packaged. Adjustments cannot be made on any returned product which is damaged in transit due to poor packaging, and a charge will be made to cover cost of repair. If after factory inspection, product is found not to be defective, an inspection and packaging charge will be made and return freight is not prepaid.

6 CONTACT INFORMATION

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