

INSTALLATION, OPERATION & SERVICE MANUAL

FOR COOLER TYPES

OK, OKA, OKAF; ELD; ELDM; ELH; OKC; SC; SCA; SCAF; OK-LN; OKA-LN; OKAF-LN.

1. Introduction

This manual is a guide for the installation, maintenance and operation of HYDAC coolers.

To obtain the maximum efficiency, optimize the performance and prevent incorrect use, we strongly recommend that this entire manual is read carefully and all safety precautions are implemented before starting installation and putting the cooler into service. This manual must be available at all times: it is a part of the product. If lost, the manual should be replaced immediately.

The cooler may not be used for any purpose other than cooling fluids in accordance with the guidelines and instructions set out in this manual.

This manual illustrates a typical installation procedure for a cooler. Some common options are also included. Refer to separate installation drawings for additional optional equipment. Review all manuals and drawings prior to assembly. Contact your HYDAC sales representative if questions arise.

2. Symbols

 Attention	ATTENTION: Failure to follow the indicated instruction can endanger personal safety.
 Warning	WARNING: In addition to possible serious injury or death, failure to follow the indicated instruction may cause damage to equipment.
 Danger	DANGER: Failure to follow the indicated instruction may result in serious injury or death.

3. Preparing for Installation

Handling the unit:

 Attention	Sharp edges, splinters and exposed fasteners can cause injuries. Only properly trained and qualified technicians wearing appropriate headgear, gloves and shoes, should move, lift, unpack, or prepare the unit for installation.
 Warning	Risk of handling a unit heavier than 25kg (55lb): improper lifting can cause injuries and equipment damage. A lifting device or two properly trained & qualified persons are required to lift or move the cooler.

When unpacking and handling the unit, exercise extra care to prevent damage.

HYDAC recommends using a forklift or pallet jack to lift and move the cooler while it is still in its packaging. If multiple units are delivered, they can be shipped on the same pallet. A pallet jack will be required to move these units to the installation location.

Do not move the pallet without lifting it, otherwise it may be damaged.

- If using a forklift or pallet jack, ensure that the fork length is suitable to safely move the packaged unit.
- HYDAC recommends that the unit is kept in the protective packaging until it has been moved to the installation site.
- Do not lift the unit any higher than 0.15m (6 in) while moving it. If it must be lifted higher than 0.15m (6 in), exercise great care and keep all persons who are not involved in moving the unit at least 5m (16 ft) away.
- Do not use devices other than those already described to handle the cooler.

Unpacking HYDAC coolers:

Do not unpack HYDAC coolers before moving them to their final installation location.

Once at the location:

1. Cut and remove plastic shipping straps (if present);
2. Open the packing carton on the opening side;
3. Remove all protective material from the package;
4. A properly trained person can now lift the cooler from the package and install it;



For units heavier than 25kg (55lb) there is the risk of them falling over, causing personal injury or property damage. Do not leave a cooler standing unattended on its side or end without adequate support to prevent it from falling over. The cooler must be stabilized at all times or laid flat on protective material until it is installed.

4. Installation

Note – Improper installation can cause equipment damage. HYDAC coolers must be installed by properly trained and qualified personnel. Any operating personnel must be instructed according to this manual.

No cutting or drilling operations are necessary in order to install the cooler.

The cooler should preferably be installed vertically on the mounting feet. This is the recommended configuration. Other configurations must be discussed with HYDAC.

If strong vibration is expected during operation (particularly on mobile applications), the cooler must be decoupled from the machine as far as possible with suitable shock absorber elements and by using flexible connections (see the Accessories Catalogue).

The cooler should be fixed to a stable surface, using the bolt holes in the feet or in the cooling element.

Unrestricted airflow should always be ensured. Please refer to the dimensions **W** & **V** in the Standard Coolers product catalog for recommended clearances for the air inlet and outlet.

In closed rooms sufficient ventilation must be provided to prevent a rise in room temperature as a result of heated air dispelled by the cooler.

In case of doubt, ventilation between the cooler and the outside air should be assured by installing ventilation ducts. The size of the ducts must correspond at least to the frontal area of the cooler.

Inappropriate location of the cooler could reduce cooling capacity and increase noise level.

If mounted in a contaminated environment (dust, oil, etc.) dirt will accumulate on the cooling surface, therefore reducing cooling performance. In this case frequent cleaning must be carried out.

Connect the cooling element using flexible hydraulic hoses and hydraulic threaded connections. The inlet and outlet of the hydraulic connections are clearly labeled (IN & OUT). Make sure that all connections and hoses are sized according to the working parameters: pressure, flow, temperature and type of fluid.

Please refer to **Table 1** for the maximum permitted torque rating on all the available cooling element threaded connections.

Table 1: Maximum permitted torque rating on the cooling element threaded connections

THREAD TYPE	TORQUE [Ft-lbs]	THREAD TYPE	TORQUE [Ft-lbs]	THREAD TYPE	TORQUE
1/4" G	15	SAE-4	18	1/4" NPT	Place 2-3 Drops Loctite 567 or 545 (or equivalent) on threads turn 2-3 times past "hand tight"
1/2" G	25	SAE-8	30	1/2" NPT	
3/4" G	35	SAE-10	35	3/4" NPT	
1" G	45	SAE-12	40	1" NPT	
1 1/4" G	55	SAE-16	45		
1 1/2" G	65	SAE-20	55		
2" G	100	SAE-24	70		



PLEASE NOTE: DO NOT OVER TORQUE CONNECTIONS. Severe damage to the cooler may result.

If the unit is installed outside, sufficient protection against the weather should be provided; electric motors in particular must be protected against climatic influences.

Coolers with pump:

The minimum and maximum suction pressure for coolers fitted with pumps is shown in **Table 2**. Please ensure adequate sizing of the suction pipe hose for this value (internal diameter, length and pressure drop).

Table 2: Minimum and maximum pump suction line pressure

PUMP TYPE	Minimum Suction Pressure	Maximum Suction Pressure
VANE (SCA 0-1, SCAF 0-1)	-6 psi / -0.4 bar	7 psi / 0.5 bar
SCREW (SCA 2-4, SCAF 2-4, OKA4-6, OKAF 4-6)	-7 psi / -0.5 bar	21 psi / 1.5 bar
SCREW (OKA 7, OKAF 7, OKA-LN 8-11, OKAF-LN 8-11)	-10 psi / -0.7 bar	43 psi / 3 bar

The coolers should be installed close to the tank level (or below). Installations above the tank level (> 2.5 m) are possible but must be discussed with HYDAC. Drain ports, when present, must be plumbed from pump directly to the tank.



Attention

PLEASE NOTE: UNITS WITH PUMPS MUST NEVER OPERATE WITH CLOSED CONNECTIONS. A short dry run with open connections (to check the direction of rotation) will not cause any damage.

Coolers with hydraulic motor:

The hydraulic motor has a drain port which must be connected directly to the tank.

Coolers with DC motor:

Check the correct electrical connection, positive and negative, as indicated on the connectors and the applicable voltage. Check that the current draw is at or below the value listed in the Standard Cooler Catalog. Ensure that the system is fitted with a properly sized fuse or breaker.



Attention

Please ensure that voltage corresponds to the information on the label.

For the ELD series the power supply must be rectified and stabilized in order to achieve the maximum service life.

The product must be powered with the nominal voltage that is $\pm 10\%$ of the recommended voltage (12V-24V DC), with a residual ripple value lower than 1.0 %.

Coolers with 3PH and 1PH motor:

The 3-phase motors for the OK/OKA/OKAF, OK-LN/OKA-LN/OKAF-LN, and SC/SCA/SCAF series are multi-voltage and 50/60Hz.

The single-phase and 3-phase motors of the OKC series are single-voltage and 50Hz or 60Hz.

The electrical connection must be made according to the regulations of the country of installation and the information within the electric motor terminal box.

Coolers Air Filters:

Coolers may be fitted with an optional removable pre-air filters. To ensure proper cooler function the filter should be cleaned or replaced at regular intervals. Service intervals will vary based on environmental conditions.

5. The Operating Conditions

The following operating conditions should never be exceeded:

- Max. process liquid temperature without pump: 266°F (130°C);
- Max. process liquid temperature with pump: 176°F (80°C);
- Min. / Max. ambient temperature: 50-104°F (10 to +40°C) for standard coolers;
- Viscosity: See product catalog for viscosity range based on cooler type;
- Max. dynamic working pressure for oil coolers: please refer to the data label on the cooler;

- Cleanliness class ISO/DIS 4406 Code 19/16- Filtration Grade B25>75;

To reduce the effect of pressure peaks and/or cold start problems on the cooling element, optional devices [IBP/IBT] can be used together with special cooling elements (see Standard Coolers Catalog).



These devices cannot provide complete protection for the cooling element. The customer must check that pressure peaks do not exceed the values indicated above.



The product must not be subject to vibration levels exceeding 4.5 mm/s on each axis.

6. Before Start-Up

Before starting the cooler:

- Check that the cooler is securely mounted and correctly connected;
- Check that all cooler parts are free from damage;
- Check that the fan rotates freely;
- Check that inside the housing there are no parts that could be thrown around and cause injuries to persons or damage to property;
- Check that all electrical connections are made according to the motor data sheet (inside the terminal box);
- Check that the cooler is fitted with a grounding system;
- Check that hoses are properly attached and tight (refer to **Table 3** for the max. permitted torque rating on the threaded connections);

HYDAC recommends the following:

- Operate the cooler only with fluids listed under **SECTION 10**;
- Filter the fluid before it passes through the cooler;

Table 3: Maximum permitted torque rating on steel fittings and hose connections

THREAD TYPE	TORQUE [Ft-lbs]	THREAD TYPE	TORQUE [Ft-lbs]	THREAD TYPE	TORQUE
¼" G	22	SAE/JIC-4	26	¼" NPT	Place 2-3 Drops Loctite 567 or 545 (or equivalent) on threads turn 2-3 times past "hand tight"
½" G	36.5	SAE/JIC -8	51	½" NPT	
¾" G	51	SAE/JIC -10	58	¾" NPT	
1" G	62.5	SAE/JIC -12	65.5	1" NPT	
1 ¼" G	80	SAE/JIC -16	80		
1 ½" G	95	SAE/JIC -20	102		
2" G	145	SAE/JIC -24	131		



WARNING: Protect the torque on the cooling elements. Do not exceed the torque on Table 1 on cooling element ports.

7. At Start-Up

Ensure:

- The correct fan rotation as indicated on the adhesive label on the housing. Incorrect rotation may damage the cooler permanently and/or reduce its cooling capacity;
- The correct air flow direction as indicated on the label on the housing;
- That the hoses are properly attached with no leaks;
- The correct voltage, current draw, frequency, operating system pressure where applicable;
- That the cooler is free from abnormal noise and vibrations;

8. During Operation

IMPORTANT: The customer must ensure that the product is used according to this manual.

The customer must check that once the cooler is installed and running, the operating conditions of the cooler correspond to the specified values and are not exceeded.



Warning

It is not permitted to use HYDAC coolers in potentially explosive areas. Contact Hydac engineering for customized solutions for hazardous environments.



Danger

Disregarding the warning above can cause danger to life & limb and damage to the system.



Attention

Risk of severe burns. The cooler can become extremely hot during operation. Ensure that the unit is cool before touching.

Do not overload the electric motor (see label on the electric motor).

Wear ear protection when standing in the immediate vicinity of a running cooler for long periods of time.

9. Monitoring

Check the specified temperatures of the fluid after commissioning. If these values are not stable and the system reaches excessive temperatures, please check the following:

- Fan direction of rotation (fan rpm if possible);
- Electrical connections;
- Thermostats and pressure bypass valves;
- Cooling air flow and direction (if possible);
- Fluid flow rate;
- I/O temperatures of fluid and air;
- Cleanliness of the cooling element surfaces;
- Maximum pressure of the system;

10. Fluid Compatibility

OIL / WATER

Recommended: Mineral oil to DIN 51524 Part 1 and 2

Additional fluids are available, contact Hydac for compatibility information



Attention

For coolers equipped with a pump or a pump & filter OKA, OKAF, SCA, SCAF, OKA-LN, or OKAF-LN please contact the Technical Department before using alternate fluids. Unapproved fluids can severely damage internal components.

11. Maintenance & Cleaning

HYDAC coolers generally require **low maintenance** if installed and used properly. The following instructions are only a guideline, as individual operating conditions will determine the appropriate interval for cleaning and maintenance.

12. Preventive Maintenance

The following preventive maintenance should be carried out at regular intervals to ensure long lifetime:

- Check the cooler is not damaged. Replace damaged components immediately (contact our After Sales Department);
- Check for abnormal noise or unusual vibrations;
- Ensure the cooler is securely mounted;
- Check the mounting bolts are securely tightened;
- Ensure that the cooler is free from leaks. Damaged cores or damaged seals must be replaced or repaired immediately;

- Make sure that the warning labels are in good condition;

Replace any damaged/missing label immediately.

- Check the electrical installation. This must be done by a qualified electrician only;
- Check the cleanliness of the cooling element. Dust, debris, etc. will reduce the cooling capacity. Clean the cooler if necessary;

13. Cleaning

Air side

A dusty environment might necessitate periodic cleaning of the heat exchanger. A contaminated / clogged cooling element leads to a reduction of the cooling capacity. Its condition should be checked as part of daily/weekly/monthly inspection.



Attention

Risk of injury. Prior to cleaning, disconnect all power supplies to the motor.



Attention

The cooler might be hot! Please allow it cool down before cleaning. The cooling element can be cleaned with a soft brush, compressed air or water jet.



Attention

Be careful not to damage the air-fins of the element. This reduces the performance of the unit.

When cleaning the exterior of the cooler using water, disconnect from power supply. Comply with the electric motor protection standard. Motor and electronic devices must be protected during the cleaning process.

The air fins of the core can be cleaned by blowing through with compressed air.

If necessary, a high-pressure washing system and degreasing agent can be used.

A pressure washer must be set to moderate working pressure and the water jet stream should be directed parallel to the cooling air fins (vertical to the cooler face area) to prevent any damage.

Cleaning agents can increase the cleaning effect. Please note that any detergent must be compatible with aluminum.

Filter Side

OKF, OKAF, OKF-LN, OKAF-LN, SCF, and SCAF coolers are fitted with an oil-filter element. Its contamination must be monitored. Please refer to the oil-filter instruction manual for cleaning and changing instructions.

To resolve faults without our prior written consent shall invalidate the warranty.

Coolers Air Filters:

To clean filters wash in warm soapy water. Allow filter to dry completely before reinstalling. Contact Hydac for filter replacement instructions.



Attention

Service pre-air filters at regular intervals to avoid reducing cooler efficiency.

14. Accessories

On customer request, various accessories (e.g. AITR, IBP/IBT, TS) can be mounted on HYDAC coolers.

For further technical details and available accessories, for each cooler type, please refer to our Standard Cooler and Accessories Catalogs, available on request.

15. Storage

HYDAC coolers must be stored in dry conditions (constant temperature and constant humidity). Fluctuations in temperature from cold to warm and vice versa must be avoided. This may result in condensation and cause potential corrosion problems.

When storing for less than one year, we recommend flushing inside the cooling element with a suitable preserving fluid which is compatible with aluminum (see **SECTION 10**). Take into account the intended operating fluid. Always seal the ports.

When storing for more than one year, HYDAC recommends filling the cooler with a preserving fluid and sealing the ports. The preserving fluid (see **SECTION 10**) must be removed completely before using the cooler again. If necessary use a suitable cleaning agent.

16. Disclaimer



The operating conditions and installation instructions described in this manual are the basis for safe working practice and should not be deviated from without HYDAC's permission.

HYDAC is not responsible for any damage due to external causes, including but not limited to, improper use, problems with electrical power, accident, neglect, alteration, repair, improper installation, or improper testing.

Any change to the product shall invalidate the warranty.

HYDAC reserves the right to make technical modifications without prior notice.

IMPORTANT: Please contact us in case of faults.

Check that the connections are correct and the oil is flowing freely.

17. Warranty & Notification of Faults

All coolers sold are subject to the HYDAC "GENERAL CONDITIONS OF SALE AND DELIVERY".

Any notification of fault under warranty should be made to the Hydac Customer Service Department.

We will not accept liability for improper usage. Any changes and/or repairs carried out on products in order.