Installation and servicing instructions for LHC-X

Declaration of conformity

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Product: Air oil heat exchanger type Oiltech LHC-X

Oiltech AB declares under sole responsibility that the product above to which this declaration relates is in conformity with the ATEX directive 94/9/EC concerning equipment intended for use in potentially explosive atmospheres.
The product complies with the general Essential Health and Safety Requirements and the supplementary requirements for equipment in category 2 of equipment-group II in Annex II of the directive.

Compliance with the Essential Health and Safety Requirements in 94/9/EC has been assured by compliance with the following harmonized standards.

- Non-electrical equipment for potential explosive atmospheres - SS-EN 13463-1 and SS-EN 13463-5.
- Explosive atmospheres – Explosion prevention and protection - SS-EN 1127-1

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Preface

This document is a complementary document to the document “Installation and servicing instructions for LHC” with P/N 20009202 which also is included in the delivery.
This document deals with special instructions and information regarding the use of the product in potentially explosive atmospheres. Instructions in all documentation must be followed for safe use.

Intended use

Oiltech LHC-X air oil heat exchanger is intended for cooling of hydraulic fluids in industrial systems above ground with a potentially explosive atmosphere.

General information

Oiltech LHC-X is equipped with a hydraulic motor. The hydraulic motors used by Oiltech on the LHC-X are all evaluated by the supplier of the motor and complies with the relevant directives and is marked by the supplier according to the directive.

The Oiltech LHC-X complies with the general Essential Health and Safety Requirements and the supplementary requirements for equipment in category 2 of equipment-group II in Annex II of the ATEX directive 94/9/EC. This means that the Oiltech LHC-X is safe to use in potentially explosive atmospheres caused by gases, vapours or mists classified as zone 1 (and 2) and also in potentially explosive atmospheres caused by air/dust mixtures classified as zone 21 (and 22).

The standard hydraulic motors used by Oiltech for the LHC-X are approved for and can be used in:

a) Zone 2 (Gas-Ex, Category 3 G) in the Explosion Group IIC
b) Zone 22 (Dust-Ex, Category 3 D) in dusts with a minimum firing power of > 3 mJ
c) Zone 1 (Gas-Ex, Category 2 G) in the Explosion Group IIC
d) Zone 21 (Dust-Ex, Category 2 D) in dusts with a non-conductible minimum firing power of > 3 mJ

Qualification in regard to the surface temperature is T3. For all gases, vapours, mists with an ignition temperature of > 200ºC, the motors are not a source of combustion.
In the dust explosion sector, 200ºC is the reference temperature for the further considerations regarding the clearance from the glowing temperature, etc. (only the customer or operator can decide).

Hydraulic motors approved for other application areas can be supplied according to the customer’s request.

Marking

The cooler is marked on the side of the fanhouse. The marking is part number, designation of the cooler, serial number and delivery date all according to “Installation and servicing instructions for LHC”. The cooler is also marked on the same place with marking as to in what explosive atmosphere the cooler with the motor excluded can be used.

II: Group II, intended for use above ground.
2: Category 2 equipment.
G: Suitable for explosive atmospheres caused by gases, vapours or mists.
D: Suitable for explosive atmospheres caused by air/dust mixtures.

c: Ignition protected by constructional safety.
TX: Maximum surface temperature, see “Maximum surface temperature” for more information.
TFR 0001: Reference number of the Technical file.

The hydraulic motor is marked on its motor plate.

For the standard hydraulic motor used by Oiltech for the LHC-X the marking is as follows:
Manufacturer: KRACHT
Model designation: KM …
Job No., Production Date: xxxxxx/xx-xxx xx.xx
Technical File Ref.: TFR:04.04X
Combustion Protection Designation: II 2 GD IIC (T3)

Note!
Make sure by reading the marking on the cooler and on the hydraulic motor that the complete LHC-X, cooler and motor, is suitable to the area classification and the characteristics of the flammable substance and type of explosive atmosphere present.

Maximum surface temperature

The maximum surface temperature for the hydraulic motor is according to its marking.
The surface temperature of the cooler, with the hydraulic motor excluded, i.e. the cooler matrix will be the same as the temperature of the fluid in the cooler matrix. In other words the temperature depends not on the cooler it self but on operating conditions.
The maximum permissible temperature for the fluid in the cooler matrix is 120°C.

Note!
Make sure that the temperature in the hydraulic system does not override the permissible temperature for the system. Oiltech recommends the use of a temperature sensor and control device in the system.

Explosive atmospheres caused by air/dust mixtures

The temperature of all surfaces that can come in contact with dust clouds shall not exceed 2/3 of the minimum ignition temperature in °C of the dust cloud.
The temperature of all surfaces on which dust can be deposited shall be lower by a safety margin of 75 K between the minimum ignition temperature of the dust layer and the surface temperature if the thickness of the dust layer is 5 mm or less. Larger safety margin is required if the layer thickness is greater than 5 mm.
Dust with lower Minimum Ignition Energy (MIE) than 3mJ may need a special examination.

Hydraulic motor

The special Operation and maintenance manual for the hydraulic motor, High Pressure Gear Motor KM 1/…4NL, in ATEX design, must be followed for safe use. The motor manual is included in the delivery of the cooler.

Note!
Make sure that the hydraulic motor is correct in regards of motor power, pressure, rotation speed etc. Operational limits for the hydraulic motor must not be exceeded under any circumstances.

Motors mounted by the customer
If the hydraulic motor is mounted by the customer the motor must be mounted according to the instructions in “Installation and servicing instructions for LHC”. The hydraulic motor must be connected to the earthing plate on the fanhouse to secure that the fan, fanhub, fanboss and motor (and where applicable the support bearing) has equal potential as the rest of the parts of the cooler.
Follow the motor suppliers instructions when installing and connecting the motor.

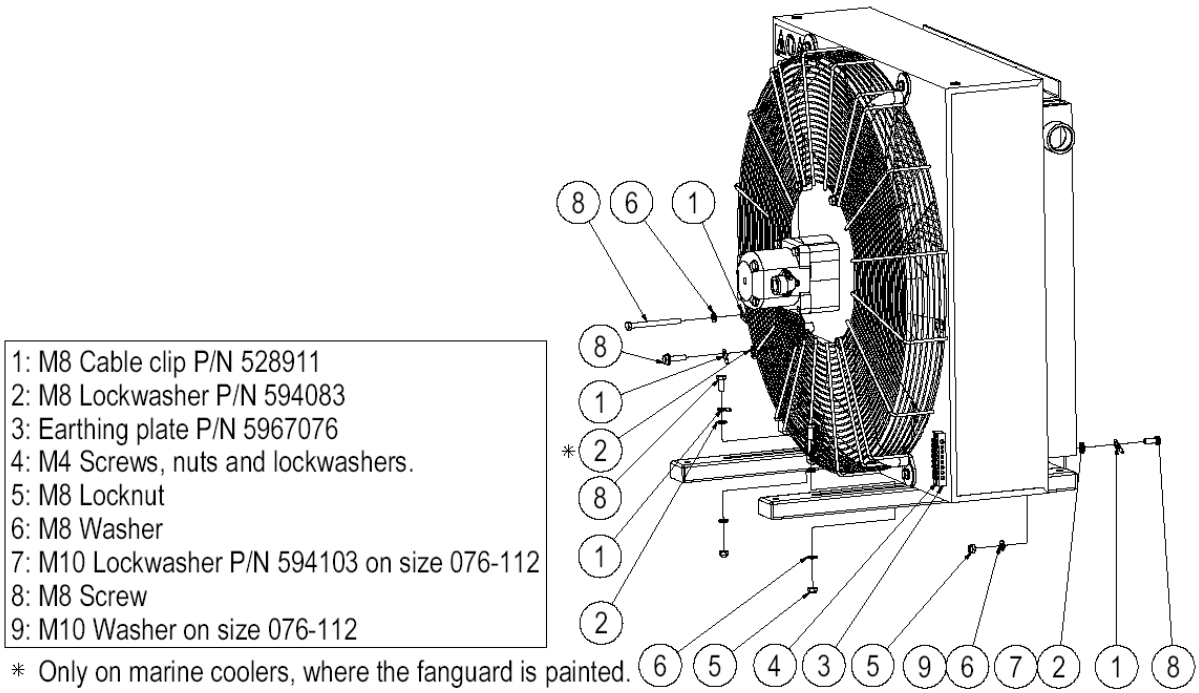
Ambient temperature

The maximum and minimum permissible ambient temperature depends mainly on the type of hydraulic motor used, normally this is – 20°C - + 40°C.

Note!
Oiltech recommends the use of a sensor device to monitor the ambient temperature.

Electrostatic discharge

The parts of the cooler are all connected together to an earthing plate with earthing wires to secure equal potential of all parts. The earthing plate is mounted on the motor side of the fanhouse.



Example of earthing connections.

Fan

The fan used on Oiltech LHC-X is made with fan blades made of an antistatic material.
Maximum permissible rotational speed depends on type of fan, size i.e. diameter of the fan, working temperature for the fan and fan load.
The working temperature for the fan depends on the ambient temperature and the temperature rise for the air by going through the cooler matrix.

Maximum permissible rotational speed for standard fans used by Oiltech on the LHC-X at 40°C and 80°C working temperature for the fan are listed in the table below.

Air Oil Cooler	Max speed [rpm] at 40°C	Max speed [rpm] at 80°C
LHC-X 007	5800	4900
LHC-X 011	4800	4100
LHC-X 016	4400	3600
LHC-X 023	3800	3200
LHC-X 033 och LHC-X 044	2700	2300
LHC-X 056 och LHC-X 058	2200	1900
LHC-X 076 och LHC-X 078	2500	2200
LHC-X 110 och LHC-X 112	2200	1900

The fan power for a specific LHC-X depends mainly on rotational speed and temperature.
Note! In most applications it is the hydraulic motor that limits the maximum permissible rotational speed. Operational limits, pressure or speed, for the hydraulic motor must not be exceeded under any circumstances.

Before start

Connect the earthing plate to a central earthing connection for the system to secure that the Oiltech LHC-X has the same electrical potential as the rest of the system.
Follow start up instructions in “Installation and servicing instructions for LHC”.

Maintenance

Note!
All maintenance must be performed by for the purpose trained personnel, with equipment and tools suitable for use in the specific explosive atmosphere and in compliance with criteria of the relevant standards.

Scheduled maintenance

- Make sure that the earthing connections not are damaged and that they are properly electrically connected to the parts and to the earthing plate to secure equal potential of all parts. This is especially important in corrosive atmospheres.
- In potentially explosive atmospheres caused by air/dust mixtures scheduled cleaning of the cooler must be made so that the thickness of the dust layer always is less than 5 mm, see “Explosive atmospheres caused by air/dust mixtures”.

Dismantling

Note how the earthing wires are connected and connections are placed before dismantling any part.
Follow the instructions in “Installation and servicing instructions for LHC” for the part that is to be dismantled.

Assembling

Follow the instructions in “Installation and servicing instructions for LHC” for the part that is to be assembled and mount the earthing wires and connections as they were prior to the dismantling. Make sure that all earthing connections are made properly to secure equal potential of all parts.

Cooler options

Oiltech LHC-X can be equipped with the following options:

- Two-pass cooler matrix
- By-pass valve type S
- By-pass valve type T
- Dustguard
- Stoneguard

Lifting eyebolts can be ordered as accessories for coolers in size 033-112.

This document may subject to changes.