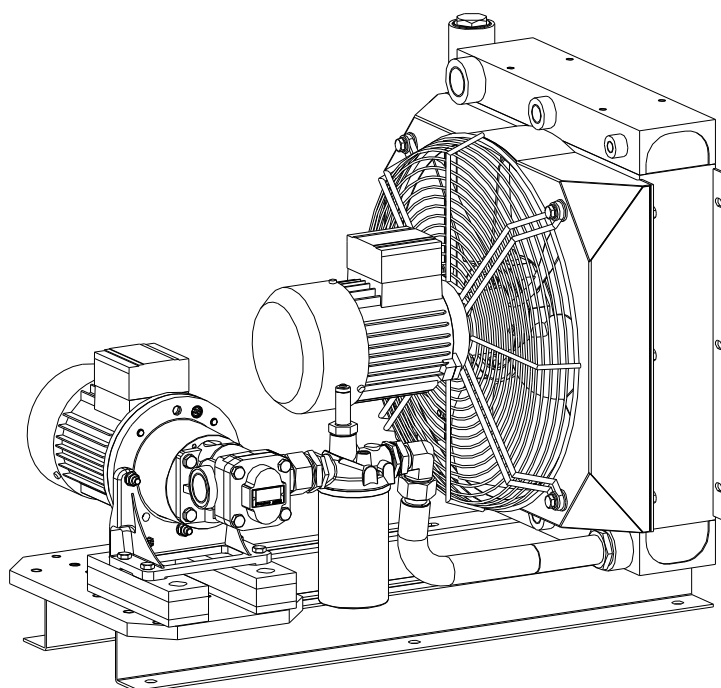


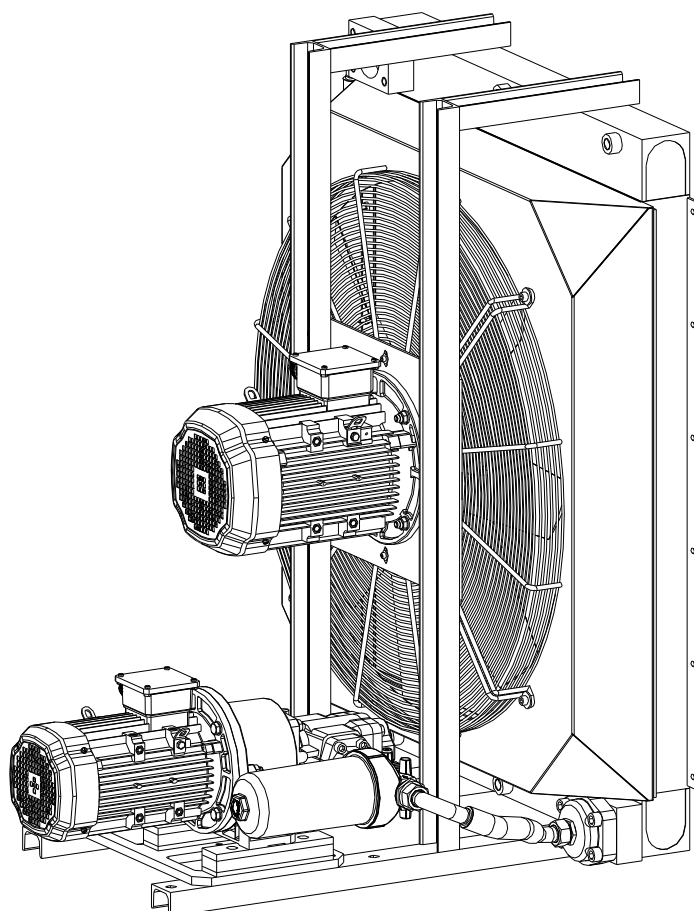


Oil/air cooler

series
OPC2



Oil/air cooler; example: OPC2-300 and OPC2-400



Oil/air cooler; example: OPC2-500 to OPC2-900

 KTR-Group	Oil/air cooler Series OPC2 Operating/Assembly instructions	KTR-N 43213 EN Sheet: 2 of 19 Edition: 3
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The oil/air cooler series OPC2 is an efficient high-performance cooler. It has a compact design and was developed for cooling hydraulic oil, gear oil and lubricating oil.

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**KTR-Group**

Oil/air cooler Series OPC2 Operating/Assembly instructions

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1 Technical data

Type OPC2-300 and OPC2-400

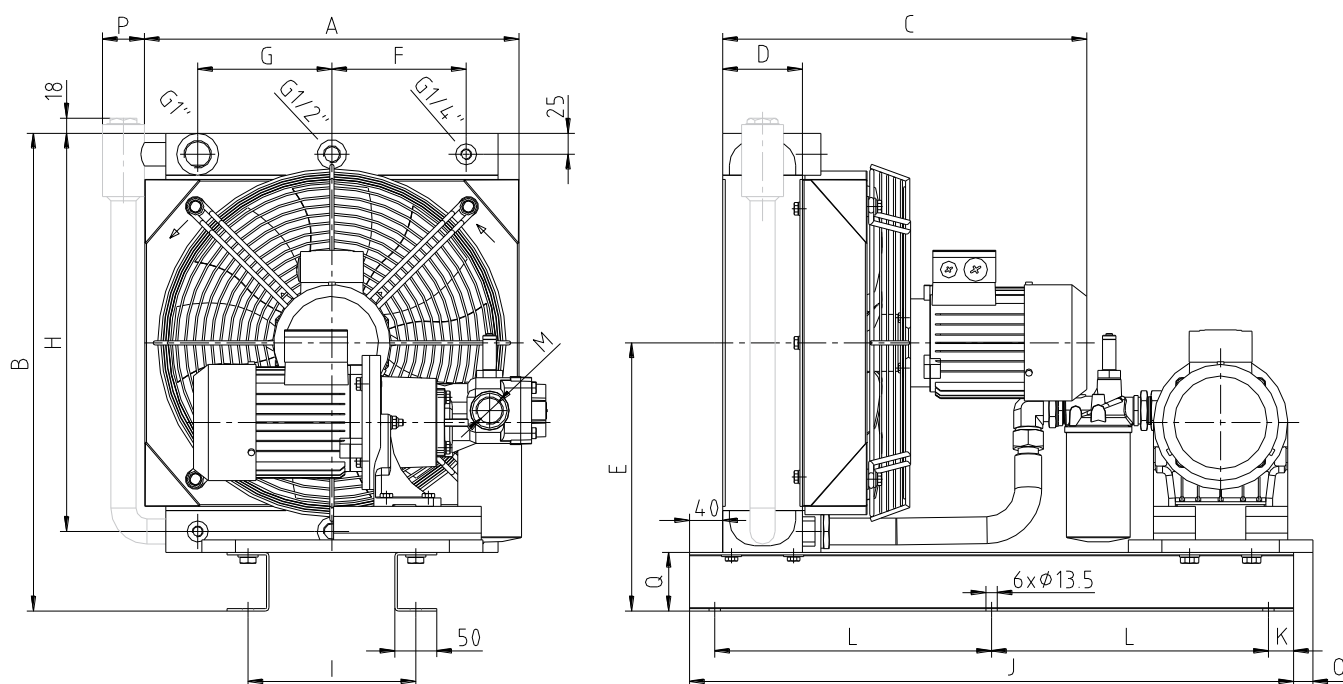


Illustration 1: OPC2-300 and OPC2-400

Table 1: Dimensions - Type OPC2-300 and OPC2-400

Type of cooler	Voltage	Motor cooler		Motor pump		l/min.	kW/°C	Dimensions in mm				
		Current * in A	Speed in rpm	Current * in A	Speed in rpm			A	B	C	D	E
OPC2-300-4	230/400V 50 Hz (460V 60 Hz)	1.03	1385	1.03	1385	5.5	0.13	446	570	417	65	320
OPC2-300-12						17	0.21					
OPC2-400-16				1.77	1420	21.6	0.27				95	
OPC2-400-32						44	0.36					

Type of cooler	Dimensions in mm												Weight in kg
	F	G	H	I	J	K	L	M	N	O	P	Q	
OPC2-300-4	160	160	500	200	720	30	330	G 3/4"	SAE 1 1/2"	23	51	70	53
OPC2-300-12								G 1"					63
OPC2-400-16								SAE 1 1/2"					66
OPC2-400-32								SAE 1 1/2"					66

* Basis 400V

Please observe protection
note ISO 16016.

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1 Technical data

Type OPC2-500 to OPC2-900

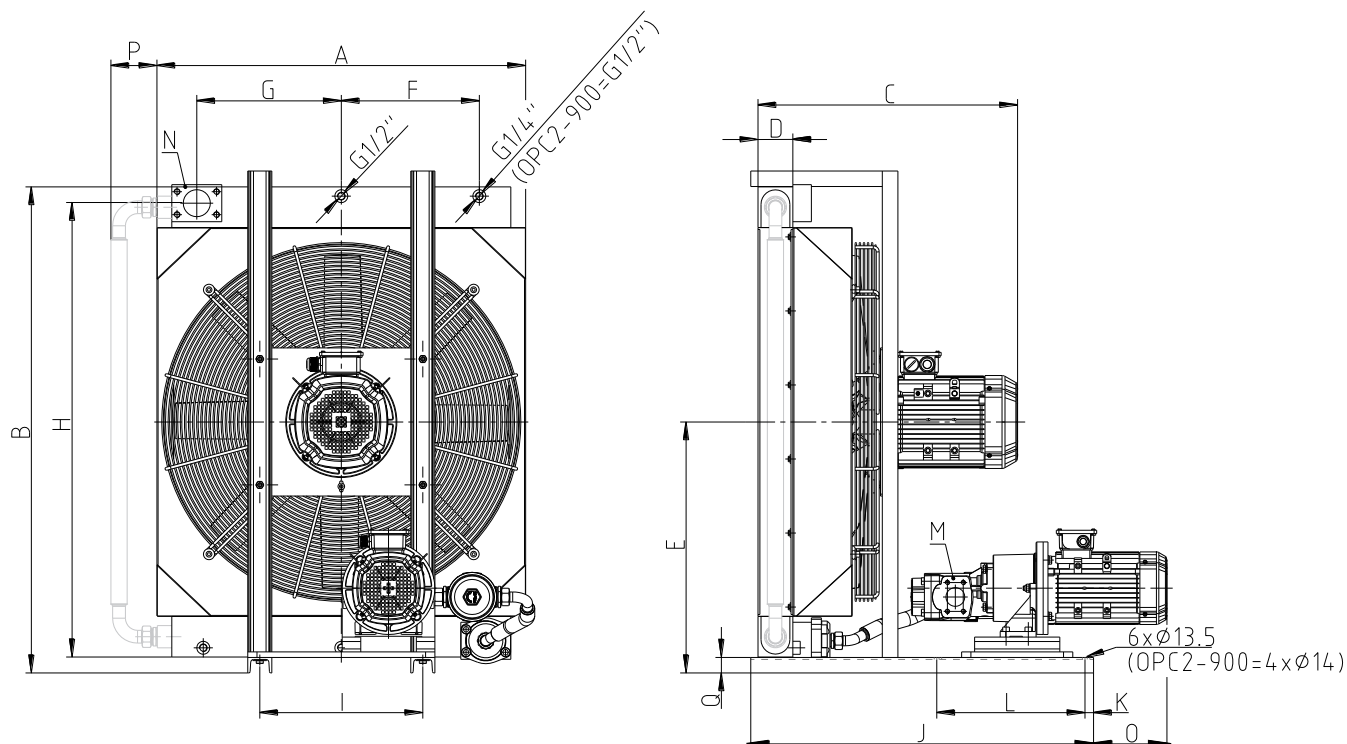


Illustration 2: OPC2-500 to OPC2-900

Table 2: Dimensions - Type OPC2-500 to OPC2-900

Type of cooler	Voltage	Motor cooler		Motor pump		l/min.	kW/°C	Dimensions in mm				
		Current * in A	Speed in rpm	Current * in A	Speed in rpm			A	B	C	D	E
OPC2-500-32	230/400V 50 Hz (460V 60 Hz)	1.03	1382	1.77	1420	44	0.46	460	740	448	94	405
OPC2-500-63				3.43	1445	88	0.54					
OPC2-700-40		1.77	1420	1.77	1420	53.5	0.76	607	990	563		530
OPC2-700-100				4.83	1440	141	0.98					
OPC2-900-63		5.3	955	3.43	1445	88	1.50	995	1313	712		678
OPC2-900-100				4.83	1440	141	1.91					

Type of cooler	Dimensions in mm												Weight in kg			
	F	G	H	I	J	K	L	M	N	O	P	Q				
OPC2-500-32	150	157.5	670	130	720	30	330	SAE 1 ½"	SAE 1 ½"	23	51	70	74			
OPC2-500-63								SAE 2"	SAE 2"				81			
OPC2-700-40													117			
OPC2-700-100	225	226	920	280	795		367.5	SAE 2"	SAE 2"	340			139			
OPC2-900-63	372.5	390	1270	440	925	20	400	SAE 1 ½"	SAE 3"	227	125	42	235			
OPC2-900-100								SAE 2"		206			75			

* Basis 400V

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2 Advice

2.1 General advice

Please read through these operating/assembly instructions carefully before you assemble the oil/air cooler. Pay special attention to the safety instructions!



The oil/air cooler is suitable and approved for the use in potentially explosive atmospheres. With the use in potentially explosive atmospheres observe the special notes and instructions regarding safety as per enclosure A.

The operating/assembly instructions are part of your product. Please store them carefully and close to the oil/air cooler. The copyright for these operating/assembly instructions remains with KTR.

2.2 Safety and advice symbols



Warning of potentially explosive atmospheres

This symbol indicates notes which may contribute to preventing bodily injuries or serious bodily injuries that may result in death caused by explosion.



Warning of personal injury

This symbol indicates notes which may contribute to preventing bodily injuries or serious bodily injuries that may result in death.



Warning of product damages

This symbol indicates notes which may contribute to preventing material or machine damage.



General advice

This symbol indicates notes which may contribute to preventing adverse results or conditions.



Warning of hot surfaces

This symbol indicates notes which may contribute to preventing burns with hot surfaces resulting in light to serious bodily injuries.

2.3 General hazard warnings



With assembly and disassembly of the oil/air cooler it has to be made sure that the entire drive train is secured against accidental switch-on. You may be seriously hurt by rotating parts. Make absolutely sure to read through and observe the following safety indications.

- All operations on and with the oil/air cooler have to be performed taking into account "safety first".
- Please make sure to switch off the power pack before you perform your work on the oil/air cooler.
- Secure the power pack against accidental switch-on, e. g. by providing warning signs at the place of switch-on or removing the fuse for current supply.
- Do not reach into the operation area of the machine as long as it is in operation.
- Secure the rotating drive components against accidental contact. Provide for the necessary protection devices and covers.

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2 Advice

2.4 Intended use

You may only assemble and disassemble the oil/air cooler if you

- have carefully read through the operating/assembly instructions and understood them
- are technically qualified and specifically trained (e. g. safety, environment, logistics)
- are authorized by your company

The oil/air cooler may only be used in accordance with the technical data (see chapter 1). Unauthorized modifications on the oil/air cooler are not admissible. We will not assume liability for any damage that may arise. In the interest of further development we reserve the right for technical modifications.

The **oil/air cooler series OPC2** described in here corresponds to the technical status at the time of printing of these operating/assembly instructions.

3 Storage, transport and packaging

3.1 Storage

The oil/air coolers are supplied in preserved condition and with painting and can be stored at a dry and roofed place for 6 - 9 months.



**The storage rooms must not include any ozone-generating devices like e. g. fluorescent light sources, mercury-vapour lamps or electrical high-voltage appliances.
Humid storage rooms are not suitable.
Make sure that condensation is not generated. The best relative air humidity is less than 65 %.**

3.2 Transport and packaging



In order to avoid any injuries and any kind of damage always make use of proper transport and lifting equipment.

The oil/air cooler are packed differently each depending on size, number and kind of transport. Unless otherwise contractually agreed, packaging will follow the in-house packaging specifications of KTR.

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**4 Assembly**

The oil/air cooler series OPC2 is supplied ready for assembly.

4.1 Components of the oil/air cooler

Component	Quantity	Description
1	1	Oil/air cooler "type OPC2"

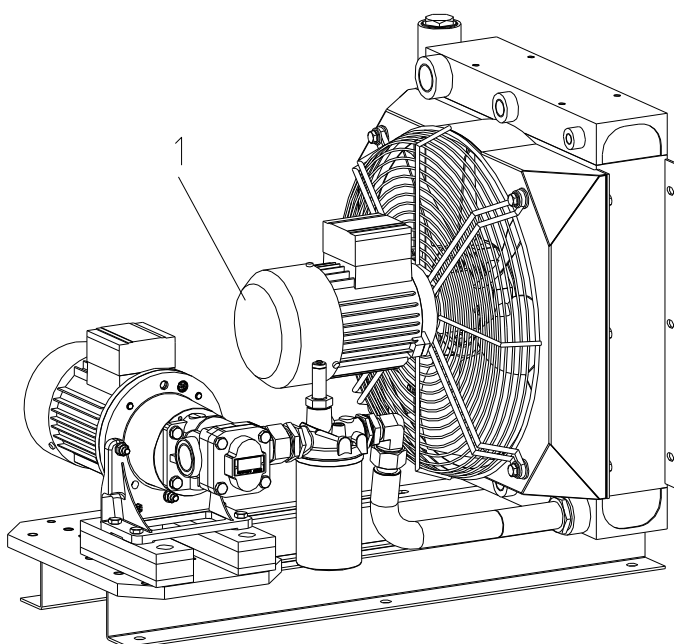


Illustration 3: Oil/air cooler; example: OPC2-300 and OPC2-400

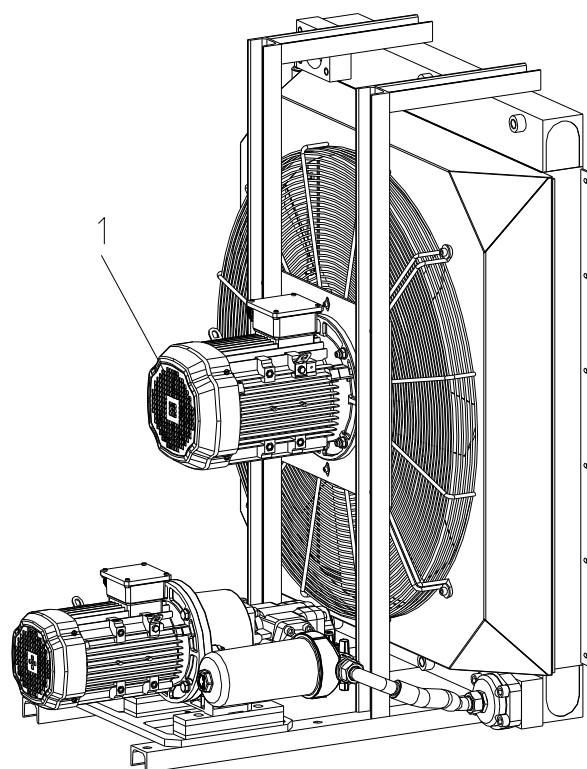


Illustration 4: Oil/air cooler; example: OPC2-500 to OPC2-900

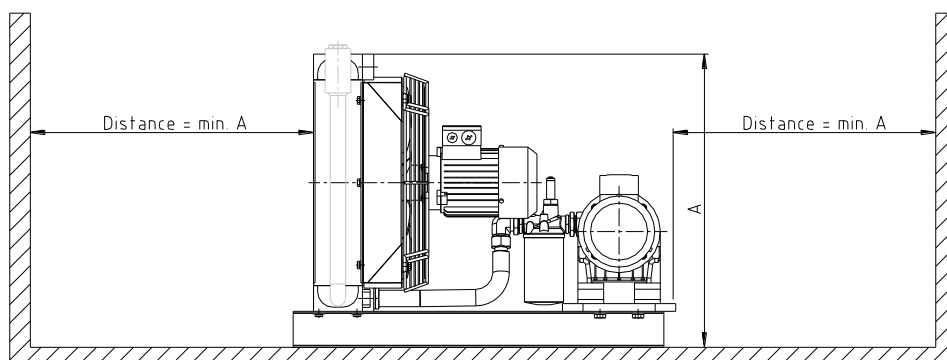
**4 Assembly****4.2 Place of installation**

Illustration 5: Oil/air cooler; example: OPC2-300 and OPC2-400

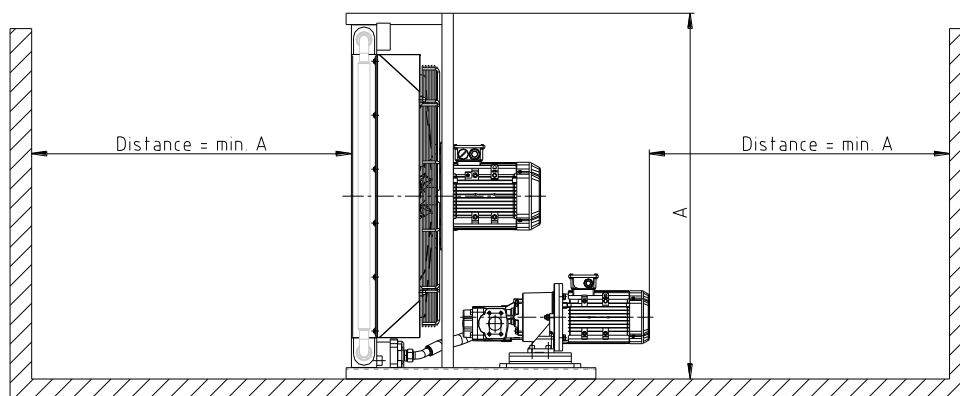


Illustration 6: Oil/air cooler; example: OPC2-500 and OPC2-900

In order to achieve the optimum cooling capacity, the distance to the nearest wall should not fall below the height of the cooling element (dimension A), since only in this way proper air supply is ensured (see illustration 5 and 6).



The height of installation should not exceed the figure ≤ 1000 m.



Return flow of heated circulated air as well as assembly of the cooler core in front of heat sources should be avoided.



The engines have to be protected from direct solar radiation.



An unfavourable place of installation may increase the noise level by reflection of sound.



4 Assembly

4.3 Assembly of oil/air cooler

The oil-air cooler can be assembled in various positions, while the vertical design should be preferred. Sufficient fastening has to be assured.



Some engines have covered holes which serve for draining off condensed water that may be generated.

Use proper hydraulic hoses to connect the oil-air cooler. These are connected on the discharge side of the cooling element (see illustration 7).



Please make sure that the connections and hoses are adapted to the oil/air cooler with regard to pressure, flow rate, temperature and liquidity.

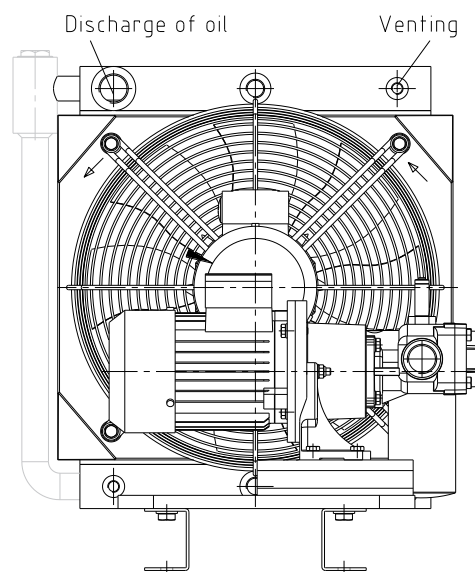


Illustration 7: Oil/air cooler; example: OPC2-300 and OPC2-900



With the use in potentially explosive atmospheres only those hydraulic hoses which comply with the specifications of the overall approval of the machine may be used.



In the case of ATEX motor, a protective roof must be provided for the V1 design.

Motor and pump are supplied by KTR ready for use. With the inspection of the ROTEX® coupling (see KTR-N 40210) disassembly or assembly of the bellhousing has to be performed in accordance with KTR-N 41010.

4.4 Operating pressure and temperature

The maximum static operating pressure must not exceed the load of 26 bars during operation. With size OPC2-900 the maximum static operating pressure is reduced to 21 bar.



With dynamic load maximum torque peaks of 14 bars must not be exceeded.



The maximum permissible temperature of the medium to be cooled must not exceed +90 °C (standard arrangement, NBR gasket). Please consult with KTR when using the FKM gasket (up to +110 °C).



Depending on the pump gasket the maximum permissible medium temperature is +80 °C (NBR gasket) or +110 °C (FKM gasket).



The temperature of the environment and the medium to be cooled should not change rapidly. Please note boiling and freezing point!



4 Assembly

4.5 Electrical connection

Before connecting the motor to the power supply compare the specifications in the type label (see illustration 10) of the motor to the voltage, fuse and frequency of the mains.



With the use in potentially explosive atmospheres only electric motors and pumps with ATEX approval may be used.

The torsional direction of the fan and the air flow have to comply with the arrows specified on the oil/air cooler (see illustration 8).



The electric motors may be connected to the electric supply by qualified personnel only. Observe the universal specifications and electrical safety regulations!



Incorrect connections, damaged cables etc. may energize the connected components resp. make the electric motor rotate in the wrong direction.



The cooler has a separate grounding connection. It has to be connected to the grounding of the machine.



Please observe the operating instructions of the electric motor used by you.



Please observe the operating instructions of the pump used by you.



We recommend to use an overload protection for the electric motor.

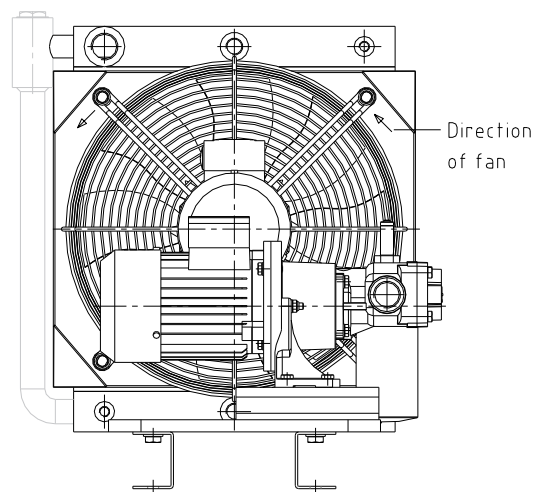


Illustration 8: Torsional direction - fan

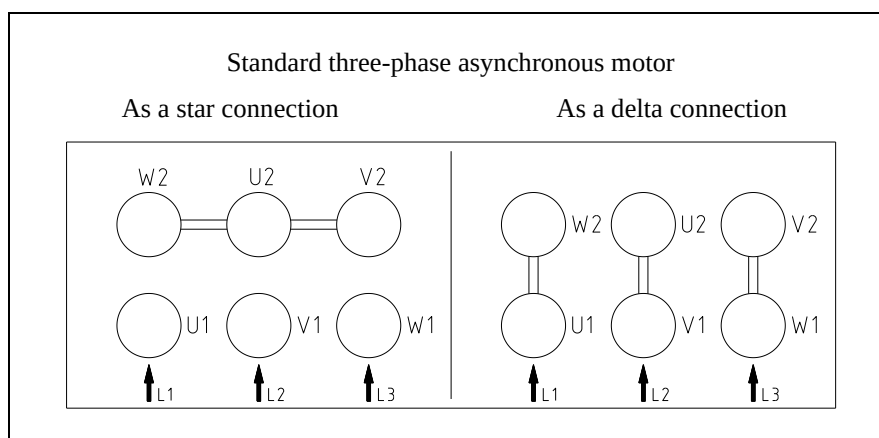


Illustration 9: Electrical connection- three-phase asynchronous motor



4 Assembly

4.6 Cooling medium

The oil/air cooler is suitable for the use of mineral oil, synthetic oil and water glycol.

4.7 Cleaning



Before cleaning make sure that the oil/air cooler has cooled down.
Touching the heated components causes burns.



With cleaning processes, e. g. with water, disconnect the cooler from the main power supply. The protection class needs to be observed.

Side of air laminas

The air laminas can be cleaned with compressed air. If seriously soiled, cleaning should be done by means of a high-pressure cleaner and degreasing agent. The jet should be kept carefully and in parallel with the air fin.

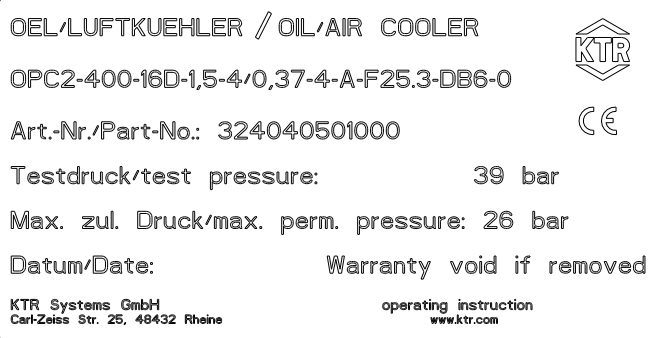
Oil side of cooling element

The oil side of the cooling element is cleaned by flushing with a degreasing agent.
Afterwards flush with the liquid/medium which is used later.

4.8 Standard marking of oil/air cooler

The oil/air cooler of series OPC2 is marked as follows:

Illustration 10:
Examples - type label



4.9 Assembly - disassembly of the oil/air cooler in components

The cooler is assembled by KTR. The oil/air cooler is supplied ready for use.

A repair of the cooler by the plant operator/an external fitter is only permissible after written authorization by KTR.

During interim storage the oil/air cooler needs to be protected against environmental impacts (moisture, solar radiation, etc.) as well as excessive dust exposure.

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5 Start-up

Make sure that the oil/air cooler is properly connected and fastened.



A grounding cable has to be connected to the oil/air cooler in the position marked (on the yellow grounding symbol).

Please observe the following procedure:

- Flush the oil/air cooler with the same liquid/medium as the other systems.
- Filter the liquid/medium after flushing.
- Vent the cooling element after filling (see illustration 7).
- The oil/air cooler and the protective grid have to be free from damage.
- The fan needs to rotate freely.
- Hydraulic connections have to be tightened.
- The inside of the fan housing has to be free from any objects.
- The cooler has to be free of ice and snow. Ice or snow on the impeller may cause imbalance, vibrations and damage on the machine.



Components which are hurled may cause personal injuries, damage other components or generate sparking.

6 Maintenance and service

Preventive maintenance operations have to be regularly performed by the user.

The following items have to be reviewed:

- Unusual noise or vibrations must not be generated.



The oil/air cooler has to be regularly inspected for mechanical vibrations and monitored, if necessary, to prevent leakages and fatigue fracture of liquid supply and drainage reliably.



**In case if vibrations arise inspect the screw connection of motor and pump.
If the damage has not been repaired in this way, consult with KTR.**



During operation pay attention to changes in operating noise of the ROTEX® coupling.

- Proper fastening of the oil/air cooler has to be assured.
- Impurity of the oil/air cooler reduces the cooling power, make sure to clean your cooler (see item *cleaning*).
- Inspect the oil/air cooler for damages, defective components have to be replaced.
- Inspect the cooler core, the pump and the screw connection on the pipeline for leakages.



Leakages have to be eliminated immediately.

Oil which has escaped has to be removed properly, since oil residues may vaporize on hot components and ignite.



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6 Maintenance and service

- Inspect distances between fan and protective grid. The fan needs to rotate freely.
- Inspect the individual components of the device for electrically conductive connections (including the grounding cable connection).
- The motor temperature has to be inspected with the device operating.



It must not exceed the temperature class specified in the type label (see illustration 10).

- The bearings of the motors are permanently lubricated.



Re-lubrication is not possible. Observe the service life of the motor bearing as per the data sheet of the motor manufacturer.
The bearings must be inspected, maintained and replaced, if necessary, as per the specifications of the motor manufacturer.

7 Spares inventory, customer service addresses

We recommend to store major spare parts on site to ensure the readiness for use of the machine in case if a cooler fails.

Contact addresses of the KTR partners for spare parts and orders can be obtained from the KTR homepage at www.ktr.com.



KTR does not assume any liability or warranty for the use of spare parts and accessories which are not provided by KTR and for the damages which may incur as a result.

KTR Systems GmbH
Carl-Zeiss-Str. 25
D-48432 Rheine
Phone: +49 5971 798-0
E-mail: mail@ktr.com

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8 Enclosure A

Advice and instructions regarding the use in  potentially explosive atmospheres

Sizes: OPC2-300 to OPC2-900

8.1 Intended use in potentially explosive atmospheres

Conditions of operation in potentially explosive atmospheres

The oil/air coolers are suitable for the use according to EU directive 2014/34/EU.

Industry (with the exception of mining)

- Equipment group II of category 2 and 3 (oil/air cooler is not approved/not suitable for equipment group 1)
- Substance group G (gases, fogs, vapours), zone 1 and 2 (oil/air cooler is not approved/not suitable for zone 0)
- Media class D (dusts), zone 22 (oil/air coolers are not approved/not suitable for zones 20 and 21).
- Explosion group IIC (explosion class IIA and IIB are included in IIC)

Temperature class:

Temperature class of the oil/air cooler (excluding drive and pump) ¹⁾	max. perm. medium temperature	Max. surface temperature of the oil/air cooler to be considered (excluding drive and pump) ¹⁾
T3	$\leq +110\text{ °C}$	+110 °C
T4	$\leq +108\text{ °C}$	+108 °C
T5	$\leq +80\text{ °C}$	+80 °C
T6	$\leq +68\text{ °C}$	+68 °C

1) Additional surface temperatures and temperature classes may arise on the attachments of the device. e. g. on the motor or pump. The highest surface temperatures resp. temperature classes on the overall machine each have to be considered.

Explanation:

- The permissible ambient temperature T_a for the use of oil/air coolers is intended from -40 °C to +55 °C.
- Subject to the operation, the medium temperature may be considerably higher than the ambient temperature.
- The component with the lowest temperature class is decisive for the operation.

In potentially explosive atmospheres

- the ignition temperature of dusts generated must at least be 1.5 times the surface temperature to be considered
- the glow temperature must at least be the surface temperature to be considered plus a safety distance of 75 K.
- the gases and vapours generated must amount to the temperature class specified.

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8 Enclosure A

Advice and instructions regarding the use in  potentially explosive atmospheres

8.2 Marking for potentially explosive atmospheres

The ATEX marking of the oil/air coolers series OPC2 is made on one component.

For the complete marking refer to the operating/assembly instructions.

Marking is as follows:

Oil/air cooler OPC2
<Year>


 II 2G Ex h IIC T6 ... T3 Gb X
 II 3D Ex h IIIC T68 °C ... T110 °C Dc X
 -40 °C ≤ T_a ≤ +55 °C
 KTR Systems GmbH, Carl-Zeiss-Straße 25, D-48432 Rheine

Illustration 13:
Examples - type label

CE OIL/AIR Cooler OPC2-300ExG/ExD-12-0,75-4/ 0,37-4-A-F25,3-DB4-0-xx3 Directive 2014/68/EU		Made for Motion  KTR Systems GmbH Carl-Zeiss-Str. 25 D-48432 Rheine	
Customer Mat. No.:	KTR Mat. No.:	Mfg. Date: 11-2024	
KTR Ident No.:		Warranty void if removed	
Medium	TS [°C]	PS stat. [bar]	PT [bar]
Oil	80,00	26,00	39,00
Weight [kg]	V [dm³]		
47	3,00		
 II 2G Ex h IIC T6...T3 Gb X  II 3D Ex h IIIC T68...110 °C Dc X (-40 ≤ T _a ≤ +55 °C) DIN EN 14986: 2024-10			

Comments on marking

Equipment group II	Non-mining
Equipment category 2G	Equipment ensuring a high level of safety, suitable for zone 1
Equipment category 3D	Equipment ensuring a normal level of safety, suitable for zone 22.
D	Dust
G	Gases and vapours
Ex h	Nonelectrical explosion protection
IIC	Gases and vapours of class IIC (including IIA and IIB)
IIIC	Electrically conductive dusts of class IIIC (including IIIA and IIIB)
T6 ... T3	Temperature class to be considered, depending on the ambient temperature
T68 °C ... T110 °C	Maximum surface temperature to be considered, depending on the ambient temperature
-40 °C ≤ T _a ≤ +55 °C	Permissible ambient temperature -40 °C to +55 °C.
Gb, Db	Equipment protection level, analogous to the equipment category
X	Special conditions apply for a safe use of the oil/air cooler.

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**8 Enclosure A**

Advice and instructions regarding the use in  potentially explosive atmospheres

8.2 Marking for potentially explosive atmospheres**Substance group - gases, fogs and vapours:**

The marking with explosion group IIC includes the explosion groups IIA and IIB.

Substance group - dusts:

The marking with explosion group IIIC includes the explosion groups IIIA and IIIB.

8.3 Start-up for the use in potentially explosive atmospheres

The oil/air cooler may only be used in the locations marked in the type label of the oil/air cooler and motor and pump. The element with the least favourable class is decisive. The decision of assessment of the place of operation is subject to the user.



The start-up of the coolers is permissible by qualified personnel only.

- It has to be made sure that oil supply and discharge are properly connected.
- The connections as well as the cooling element and pump have to be tested for leakages after start-up.
- The electric motor is to be connected in that the torsional direction marked on the oil/air cooler is observed as described in *Electrical connection*.
- The cooler has to be grounded separately in the position marked (equipotential bonding of cooler).
- Inspect the oil motor for leakages.



Leakages have to be eliminated immediately.

Oil which has escaped has to be removed properly, since oil residues may vaporize on hot components and ignite.

- When the motor is running vibrations and unusual noise (frictional noise, squeaking, etc.) must not arise.



The oil/air cooler has to be regularly inspected for mechanical vibrations and monitored, if necessary, to prevent leakages and fatigue fracture of liquid supply and drainage reliably.



In case if vibrations arise inspect the screw connection of motor and pump. If the damage has not been repaired, the oil/air cooler must not be operated any longer. Please consult with KTR.



During operation pay attention to changes in operating noise of the ROTEX® coupling.

**8 Enclosure A**

Advice and instructions regarding the use in  potentially explosive atmospheres

8.3 Start-up for the use in potentially explosive atmospheres

- The oil/air cooler may be set up vertically only and must be screwed to the base through all fastening holes.
- It has to be assured that the suction distances and discharge distances (distance A, as described in place of arrangement) are observed.
- The cooler core must not be sealed by foreign substances.
- Inspect distances between fan and protective grid.



The minimum gap width between rotating components and non-mobile components is at least 1 % of the relevant contact diameter (see table 4).

Table 4

Size of cooler	Fan Ø in mm	Minimum gap to be observed
OPC2-200	280	≥ 2.8 mm (corresponds to 1 %)
OPC2-300 to OPC2-500	380	≥ 3.8 mm (corresponds to 1 %)
OPC2-600 to OPC2-700	520	≥ 5.2 mm (corresponds to 1 %)
OPC2-800	630	≥ 6.3 mm (corresponds to 1 %)
OPC2-850	750	≥ 7.5 mm (corresponds to 1 %)
OPC2-900 to OPC2-1000	900	≥ 9.0 mm (corresponds to 1 %)

- With the trial run make sure the permissible motor temperature is not exceeded.
The temperature classes of cooler and motor specified in the type label have to be definitely observed.

8.4 Permissible accessories for the use in potentially explosive atmospheres

Only those accessories certified by ATEX and complying with the temperature class (example: thermal switch, etc.) may be mounted to the oil/air cooler.



Any modifications on the design of the oil/air cooler intended for the use in potentially explosive atmospheres are not permissible.



The customer bears the sole responsibility for all machining processes performed subsequently by the customer. KTR does not assume any warranty claims.

**KTR-Group**

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8.5 EC Certificate of incorporation

EC Certificate of incorporation

according to EC machinery directive 2006/42/EC dated May 17, 2006, annex II B

The manufacturer - KTR Systems GmbH, D-48432 Rheine - states that the

Oil/air cooler - OPC2

described in the present operating/assembly instructions is an incomplete machine complying with the Machinery Directive 2006/42/EC. The oil/air cooler is exclusively intended for installation in a machine so that it does not comply with all specifications of the Machinery Directive. It is forbidden to start up the oil/air cooler until it is stated that the machine which the oil/air cooler is installed in complies with all basic specifications of the Machinery Directive 2006/42/EC.

The oil/air cooler complies with the specifications of the following standards/rules:

2006/42/EC	Machinery Directive (MD)
2014/30/EU	Directive for electromagnetic compatibility (EMC directive)
2014/35/EU	Low-voltage directive (LVD)
2014/68/EU	Directive for Pressure Equipment (PED)

DIN EN ISO 12100 Safety of machines

Rheine,
Place

2024-11-14
Date

ppa. 
Dr. Norbert Partmann
Head of Engineering and
R&D

i. v. 
Christoph Bettmer
Product Manager

Please observe protection
note ISO 16016.

Drawn: 2024-07-11 Ka/Str
Verified: 2025-07-09 Ka

Replacing: KTR-N dated 2021-06-24
Replaced by:

**KTR-Group**

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8.6 EU Declaration of conformity

EU Declaration of conformity

corresponding to EU directive 2014/34/EU dated 26 February 2014
and to the legal regulations adopted for its implementation

The manufacturer - KTR Systems GmbH, D-48432 Rheine - states that the

Oil/air cooler - OPC2

in an explosion-proof design described in these operating/assembly instructions are devices corresponding to article 2, 1. of directive 2014/34/EU and comply with the general safety and health requirements according to enclosure II of directive 2014/34/EU.

This declaration of conformity is issued under the sole responsibility of the manufacturers KTR Systems GmbH.

The oil/air cooler described in here complies with the specifications of the following standards/rules:

DIN EN ISO 80079-36:2016-12
DIN EN ISO 80079-37:2016-12
CLC/TR 60079-32-1:2019-01
DIN EN 14986:2024-10

The oil/air cooler complies with the specifications of the directive 2014/34/EU.

According to article 13 (1) b) ii) of directive 2014/34/EU the technical documentation is deposited with the notified body (Project No.: IB-24-2-0101):

IBExU
Institut für Sicherheitstechnik GmbH
Identification number: 0637
Fuchsmühlenweg 7

09599 Freiberg

Rheine,
Place

2025-07-09
Date

ppa.


Dr. Norbert Partmann
Head of Engineering and
R&D

i. v.


Christoph Bettmer
Product Manager