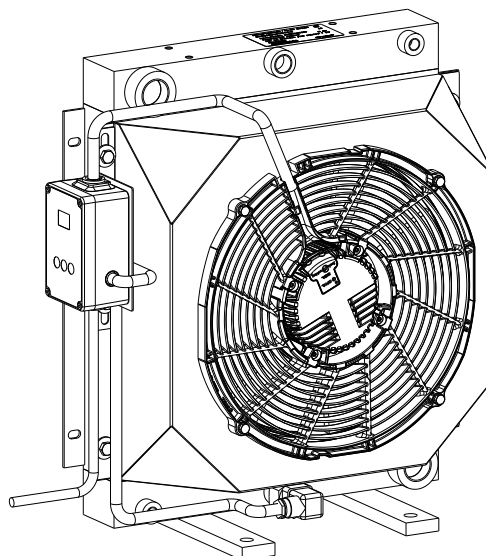


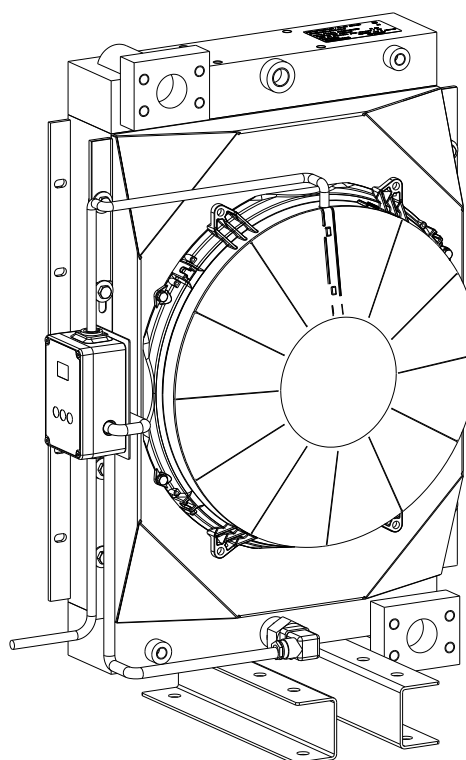


Oil/air cooler

series
OAC eco



Oil/air cooler; example: OAC300 eco



Oil/air cooler; example: OAC500 eco

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The oil/air cooler series OAC eco is an efficient high-performance cooler. It has a compact design and was developed for cooling hydraulic oil, gear oil, lubricant and water-glycol. Due to its control unit it is able to cool the entering medium efficiently, thus to save energy and reduce noise emissions.

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1 Technical data

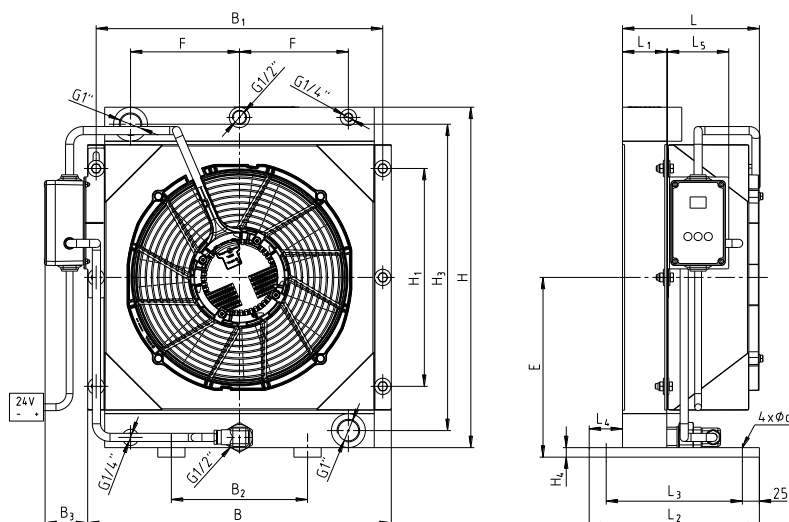


Illustration 1:
OAC300 - 400 eco

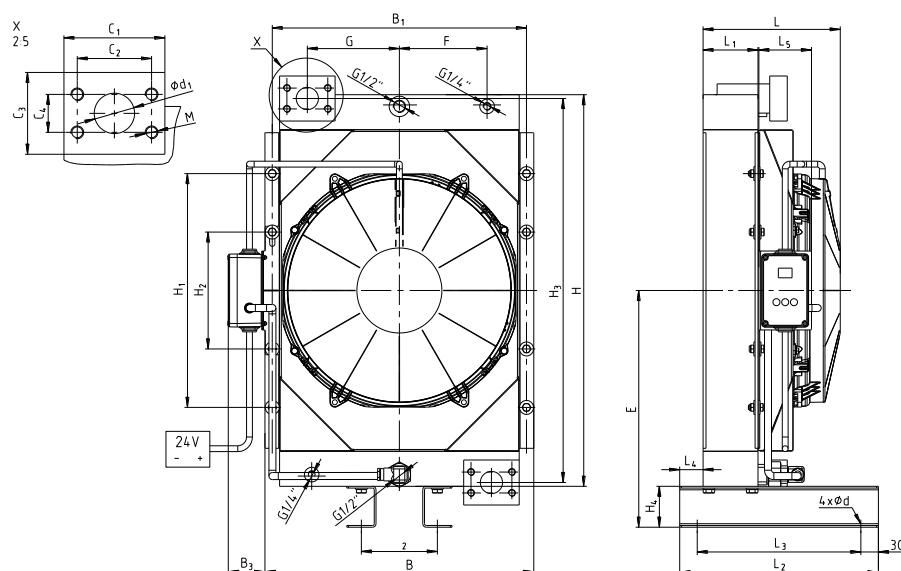


Illustration 2:
OAC500 - 600 eco

Table 1: Dimensions

Cooler type	Dimensions [mm]												
	L	L ₁	L ₂	L ₃	L ₄	L ₅	B	B ₁	B ₂	B ₃	H	H ₁	H ₂
OAC300 eco -02	201	65	250	200	49	90	446	421	200	63	500	320	-
OAC400 eco -02	231	95	280	230	55.5	90	446	421	200	63	500	320	-
OAC500 eco -02	234.7	95	340	280	40	90	460	435	130	63	670	400	200
OAC600 eco -02	294.7	95	340	280	40	90	607	582	280	63	770	500	200

Cooler type	Dimensions [mm]											
	H ₃	H ₄	d	d ₁	C ₁	C ₂	C ₃	C ₄	M	F	G	E
OAC300 eco -02	450	14	14	-	-	-	-	-	-	160	-	264
OAC400 eco -02	450	14	14	-	-	-	-	-	-	160	-	264
OAC500 eco -02	657	70	13.5	38	95	69.9	77	35.7	M12	150	157.5	405
OAC600 eco -02	770	70	13.5	51	105	77.8	90	42.9	M12	225	226	455

Table 2: Power and weight

Cooler type	Drive [V]	Drive [kW]	Speed [rpm]	Amperage [A]	Protection class	Fan Ø [mm]	Weight [kg]
OAC300 eco -02	24	0.4	3400	11	IP 65	305	20
OAC400 eco -02							21
OAC500 eco -02		0.34	2570	13		380	34
OAC600 eco -02							48

Please observe protection
note ISO 16016.

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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.

Please pay special attention to the safety instructions!

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 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. Please 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.
- Please secure the rotating drive components against accidental contact. Please 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
- had technical training
- 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 OAC eco** 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 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.

Please 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 please always make use of proper transport and lifting equipment.

The oil/air coolers are packed differently each depending on size, quantity 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 OAC eco is supplied ready for assembly.

4.1 Components of oil/air cooler

Component	Quantity	Description	Component	Quantity	Description
1	1	Cooling element	12	1	Type plate
2	1	Fan cover	13	1	Connection sheet metal
3	1	Fan	14	1	TFSC (Temperature Fan Speed Control)
4	6	Hexagon screw	15	1	PT100 temperature sensor
5	6	Nyloc nut	16 ¹⁾	5	Base for cable ties
6	12	Disk	17 ¹⁾	5	Cable ties
7	4	Hexagon screw	18 ¹⁾	2	Ferrule
8	4	Washer	19 ¹⁾	1	Connection cable PT 100
9	1	Stand	20 ¹⁾	1	Adapter Ducon Neutrik
10	1	Gasket	21 ¹⁾	1	Cable connector Neutrik
11	1	Sealing lip			

1) Components are attached in bulk and are not depicted

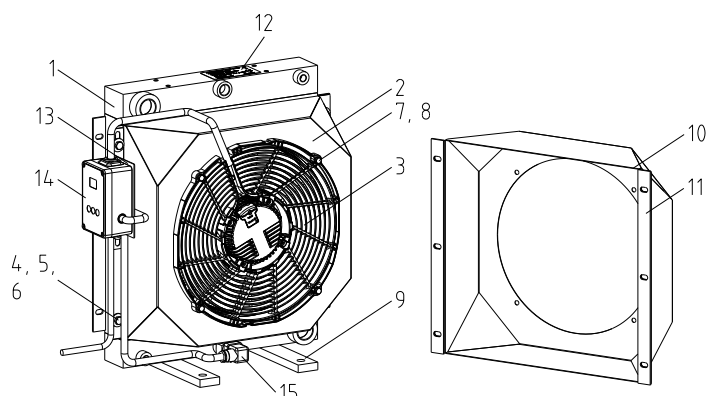


Illustration 3: Oil/air cooler; example: OAC300 eco

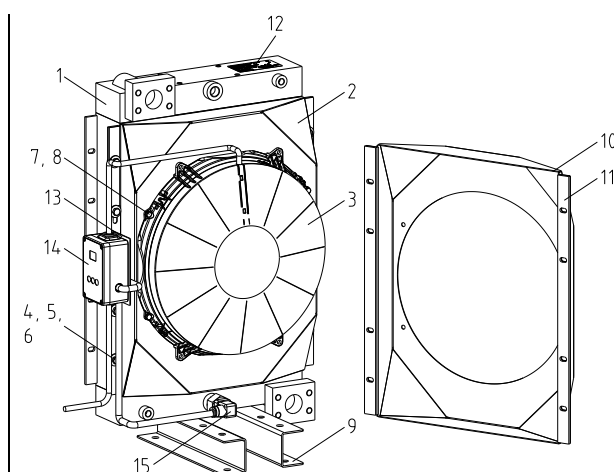


Illustration 4: Oil/air cooler; example: OAC500 eco



Before installing the oil/air coolers, please assemble the feet supplied separately by means of the cap screws. Tighten the cap screws by a suitable torque key to the tightening torques T_A mentioned in table 3.

Table 3: Cap screws DIN EN ISO 4762

Cooler type	OAC300 and OAC400	OAC500 and OAC600
Screw size M	M8	M10
Tightening torque T_A [Nm]	11	22



4 Assembly

4.2 Place of installation

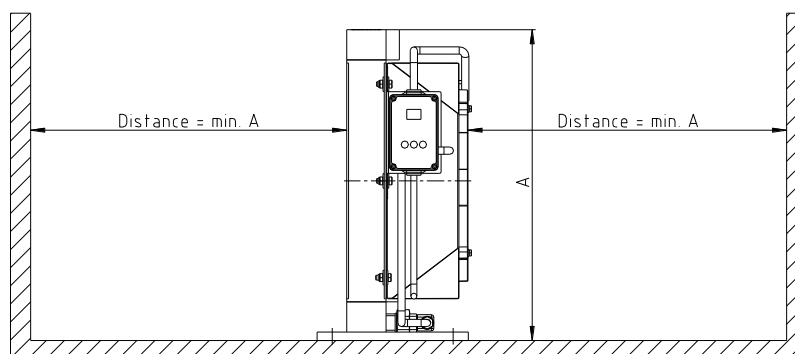


Illustration 5: Oil/air cooler; example: OAC300 eco

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 a proper air supply is ensured (see illustration 5).



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



Return flow of heated air as well as assembly of the cooling network 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.

4.3 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 motors have got covered holes which serve for draining off condensed water which may be generated.



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

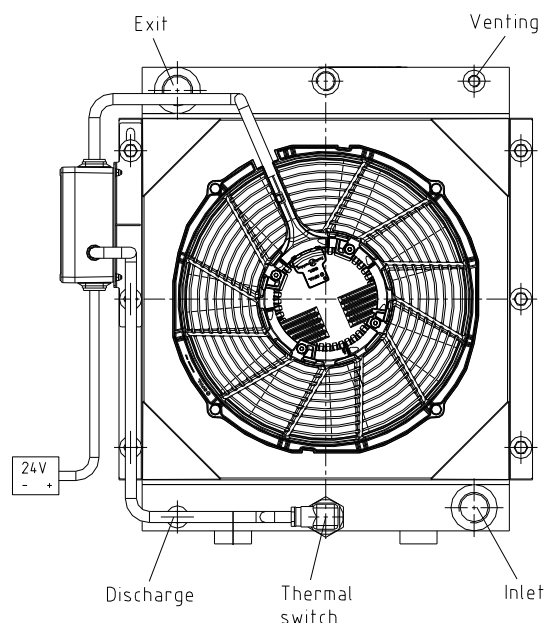


Illustration 6: Oil/air cooler; example: OAC300 eco

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4 Assembly

4.4 Cooling medium

The oil/air cooler is suitable for the use of mineral oil and water-glycol (other media on request).

4.5 Operating pressure and temperature

The maximum operating pressure must not exceed the load of 10 bar during operation.



With dynamic load pressure peaks exceeding 7 bar should be avoided.



The maximum permissible temperature of the medium to be cooled must not exceed 100 °C.



The ambient temperature and the medium to be cooled should not change suddenly. Please note boiling and freezing point.

4.6 Electrical connection



The electric motors may only be connected to the electric supply by qualified personnel. Please observe the specifications and electrical safety regulations that are generally admitted!



The OAC eco series is exclusively selected for a power supply of 24 V. Incorrect connections, damaged cables etc. may energize the components connected or make the electric motor rotate in the wrong direction.



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

The fans of the eco cooler series can generally be operated in two ways:

4.6.1 Operation without temperature control TFSC - OAC... eco (24V)/nc

With an operation without TFSC operating unit the motor must be connected directly with the respective voltage source and the PWM signal. The scope of delivery includes the respective mating plug for the motor plug. Make use of this plug to provide for the connection with the voltage source and the PWM signal. Please observe illustration 7 for correct wiring.

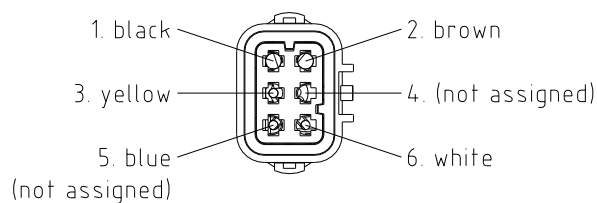


Illustration 7: Pin assignment of plug-in connection



Do not remove the plug that is connected directly with the motor cable.

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4 Assembly**4.6 Electrical connection****4.6.1 Operation without temperature control TFSC - OAC... eco (24V)/nc****Table 4: Pin assignment of motor**

Number	1	2	3	4	5	6
Colour of cable	Black	Brown	Yellow	-	Blue	White
Description	+24V	Mass	Control input by PWM signal	-	°	Error signal output
Strength [mm ²]	2.5	2.5	0.75	-	0.75	0.75

If the control port PWM is connected to 24V as well, the fan will rotate at full speed. If connected to the GND wire, the fan stops.

4.6.2 Operation with temperature control TFSC - OAC... eco (24V)

The **24V** connection feeds the temperature control TFSC and is internally connected to the **FAN** connection for operating the fan.

Subject to high currents the supply line should have a minimum performance of 2.5 mm².

The fan is connected to the **FAN** connection via the adapter cable that is part of the scope of delivery (see illustration 8).

Table 5: Connector plug for TFSC

Designation	Plug type	Specification
24V	Neutrik NAC3FX-W	24V DC (20-28V DC)
FAN	Neutrik NAC3MX-W	24V, max. 15A
PT100	M12 4 poles. plug	PT100



Illustration 8

Table 6: Connection of power supply

Connection 24V NAC3FX-W	Description of connector plug	Specification
24V	L	20-28V, max. 15A
GND	GND	Mass



Illustration 9

Table 7: Connection of fan

Connection FAN NAC3MX-W	Description of connector plug	Specification	Connection of SPAL motors
24V	L	20-28V, max. 15A	Black
GND	GND	Mass	Brown
PWM	N	PWM signal TFSC	Yellow



Illustration 10

Table 8: Connection of PT100 sensor

Connection of PT100 M12 plug 4 poles	Description of connector plug	Specification
1	1	Connection 1
1	2	Connection 1
2	3	Connection 2
2	4	Connection 2

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4 Assembly

4.7 Cleaning



Before cleaning please 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.

For cleaning the cooling network the fan may rotate opposite to its usual direction, please observe the advice specified in chapter 5.2 *Operation* (reversing operation).

Side of air fins

The air fins can be cleaned with compressed air.

Oil side of cooling element

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

4.8 Diagrammes - pressure loss and power

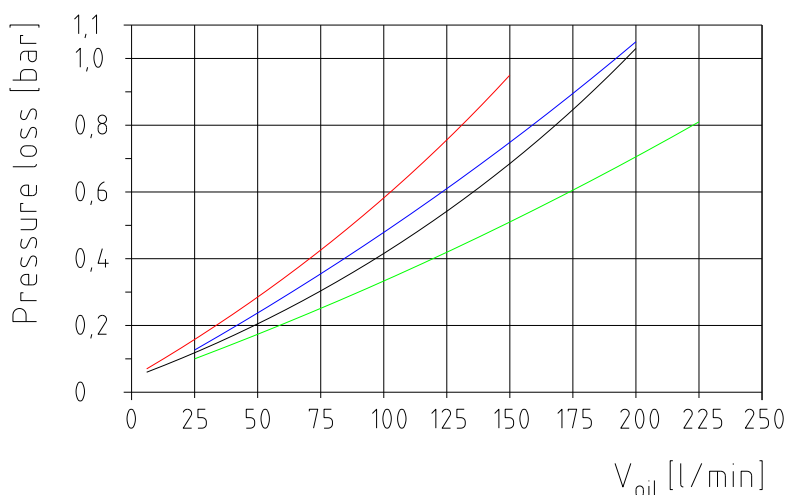


Diagram 1: Pressure loss

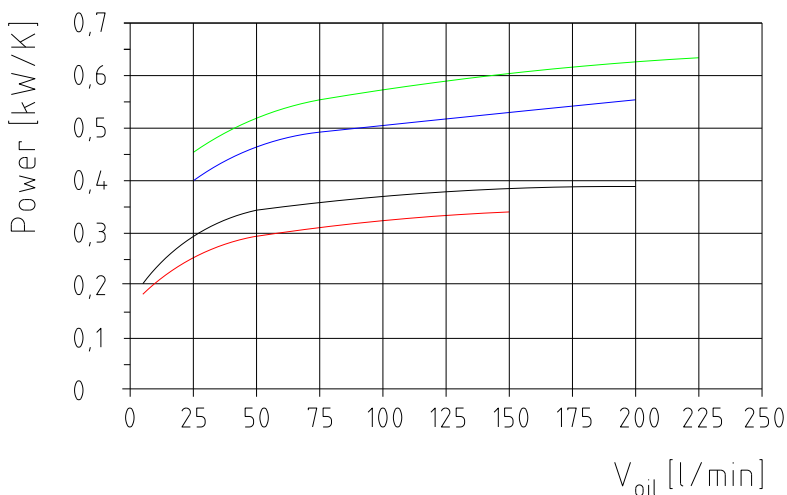


Diagram 2: Power

5 Start-up

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

Please observe the following procedure:

- Flush the oil/air cooler with the same fluid/medium as the other systems.
- Filter the fluid/medium after flushing.
- 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 internal side of the fan housing has to be free from any objects.



Rotating particles may cause danger to life or damage to adjacent components.

5.1 Temperature control TFSC

The temperature control *TFSC* (*Temperature Fan Speed Control*) is part of the cooler series eco and serves for controlling the motor speed.

The temperature figure of the thermal switch is directly assigned to a motor speed. For different loads various characteristic curves may be selected.

Apart from the three characteristic curves illustrated the fan can be permanently switched on and off. The operation *Reversing operation* shifts the motor into reversing operation during 60 seconds to clean the cooling network. On termination of this period the operating mode preset is resumed.

During the operation the temperature of the thermal switch connected is permanently displayed.



Illustration 11

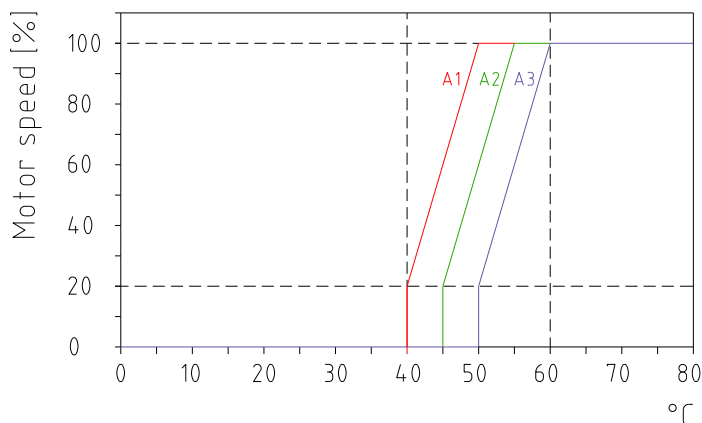


Diagramme 3: Characteristic curve



5 Start-up

5.2 Operation

The TSFC is operated via 3 buttons. The device is switched on and off via the button "ON/OFF" and operates in the control mode set before. You can switch between the control mode and the setting mode via the button "MENU". The button "SET" serves for changing the parameters. The control mode displays the current temperature of the PT 100 sensor. The setting mode displays the setting mode selected.

In addition to the five operating modes the reversing operation can be called by pressing the SET button for a long time. Here the fan rotates in opposite direction at full speed for a period of 60 seconds. The reversing operation can only be activated in the control mode. During the reversing operation the display counts down the balance of time in seconds. On termination of the reversing operation the control mode set before is resumed. The reversing operation can be interrupted at every time by pressing the menu button.

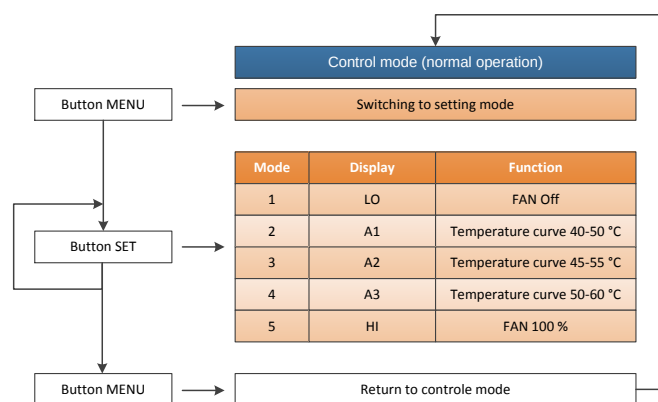


Illustration 12

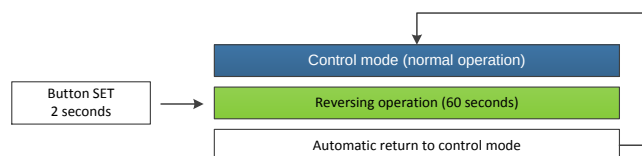


Illustration 13

6 Maintenance and service

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

The following items have to be reviewed:

- Unusual noise or vibrations must not be generated.



With vibrations inspect the screw connection of the motor. If the damage has not been repaired in this way, please consult with KTR.

- 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 chapter 4.7 *Cleaning*).
- Inspect the oil/air cooler for damages, defective components have to be replaced.
- Inspect the cooling network for leakages on the oil/air cooler and the screwing on the pipelines.



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.

- Inspect the individual components of the device for electrically conductive connections.
- The motor temperature has to be inspected with the device operating.
- The bearings of the motors are permanently lubricated.



Re-lubrication is not possible. Please observe the service life of the motor bearing as per the data sheet of the motor manufacturer.

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6 Maintenance and service

Illustration 14:
Examples - type plates

OEL/LUFTKUEHLER / OIL/AIR COOLER		
OAC300eco-02-1-0-0		CE
Art.-Nr./Part-No.: 323000400200		
Testdruck/test pressure:		10 bar
max. zul. Druck/max. perm. pressure:		7 bar
Datum/Date:		Warranty void if removed
KTR Systems GmbH Carl-Zeiss-Str. 25, 48432 Rheine		operating instruction www.ktr.com



Please make use of the factory fitted motors.

7 Spares inventory, customer service addresses

A basic requirement to ensure the readiness for use of the oil/air cooler is a stock of the most important spare parts on site.

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.

8 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 - OAC eco

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 as long as 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/guidelines:

2006/42/EC	Machinery Directive (MRL)
2014/68/EU	Directive for Pressure Equipment (DGRL)
2014/30/EU	Directive for electromagnetic compatibility (EMV directive)
DIN EN ISO 12100	Safety of machines

Rheine,
Place

2017-01-02
Date

i. v.


Christoph Bettmer
Product Manager

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