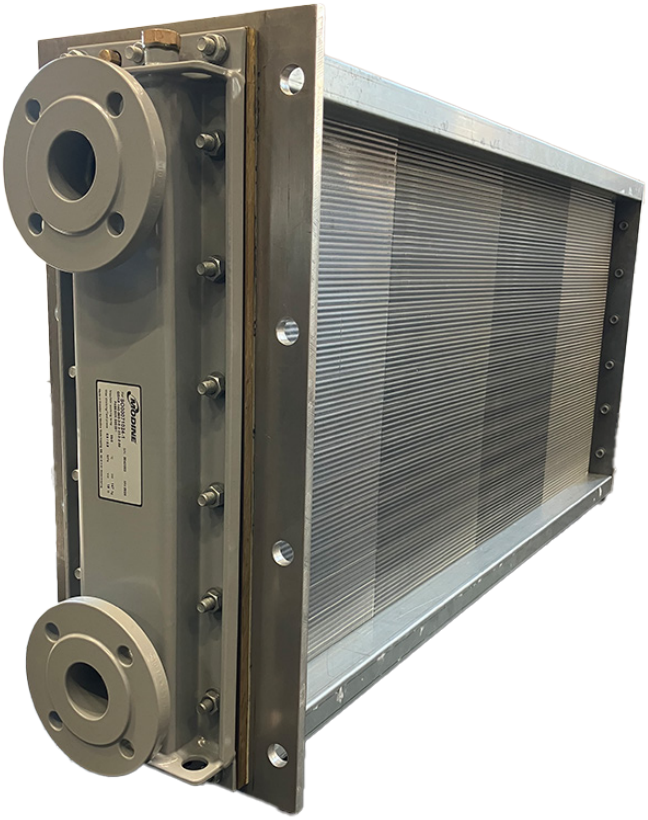
Technical Description

MODINE®
Engineering a Cleaner, Healthier World

MOTOR/GENERATOR COOLER, DOUBLE TUBE (QDKR)

Modine designs and manufactures cleanable coolers for electrical motor and generator cooling, where untreated sea or lake water are often used. Today it's also common to use them with a glycol water where the cleanable design also offer a better possibility for repairing, for example in a ship. The motor/generator coolers are used for cooling air via circulating water and can be installed for either horizontal or vertical flow. The cleanable coolers have removable headers and can be designed with single or double tube, made of different materials depending on the corresponding water conditions. Based on water analysis, Modine can advise the best combination of materials for your cooler.



DESIGN

Due to requirements of mechanical cleaning, the coil body is fixed into tube plates with removable headers. The headers are fitted with partition walls to make the selected cross-flow circuit relative to the air flow. The headers are also equipped with drain- and venting plugs. The tubes are mechanically expanded into the fins to give absolute contact between the two materials that ensure the best heat transfer. The pitch between the fins is selected for the conditions of cooling duty and air pressure drop. The cooler is designed to withstand vibrations, shock loads and thermal movements. No external load is allowed on the cooler flanges. The cooler fulfills the requirements in PED 2014/68/EC. The design is approved by ABS, LR, CCS, RINA, DNV and BV. For other classification societies contact us for more information.

The cooler is made of 1/2" Copper, Copper-Nickel, Stainless Steel or Titanium primary tubes with a circuit sized for the conditions of the cooling water. The primary tube is inserted in a secondary copper tube with internal grooves. These grooves will drain any leakage water from the primary tubes. The water is drained out by a clearance between the primary and the secondary tube plate to any type of leakage detection.

The cooler can be internally cleaned by unbolting the removable headers, followed by mechanically brush the inside of the tubes. The customized brush can be ordered as an accessory.

TECHNICAL DATA	ii*=00	ii*=01	ii*=02	ii*=03
Max. Working Pressure:	0,6 MPa	0,8 MPa	1,0 MPa	1,5 MPa
Design Temperature:	99 °C	99 °C	99 °C	99 °C
Test Pressure:	0,9 MPa	1,2 MPa	1,5 MPa	2,25 MPa

*ii = Pressure class, according to product code key.

Our products can be ordered with a variety of accessories, as with other dimensions and materials than stated in the standard. Contact us for more information.

ENG

STANDARD MATERIAL - QDKR DOUBLE TUBE

Primary Tube
Copper, Copper-Nickel, Stainless Steel, Titanium
Secondary Tube
Copper
Fins
Aluminium, Copper
Primary Tube Plate
Brass, Stainless Steel, Titanium
Secondary Tube Plate
Aluminium, Brass
Header
Rilsan® Coated Steel, Stainless Steel, Titanium
Frame work
Galvanized Steel, Stainless Steel

QDKR double tube cooler.

CODE KEY - QDKR

QDKR-aaa-bbb-c-d-e-ff-g-h-ii

aaa = **Length parallel with tubes (cm)** 040 - 300 (every 10 mm valid)

bbb = **Width perpendicular to tubes (cm)** 030-140 (every 50 mm valid)

c = **Number of tube rows** 2, 3, 4, 5, 6

d = **Fin pitch (mm)**
0 = 1.8
1 = 2.0
2 = 2.5
3 = 3.0

e = **Number of water passes** 2, 4, 6, 8 (with exceptions)

_f = **Material combination (tube, tube plate and fins)**

_f	*Tube*	*Secondary tube*	*Primary tube plate*	*Secondary tube plate*	*Fin*
1f	Copper	Copper	Brass	Aluminium	Aluminium
2f	Copper nickel	Copper	Brass	Aluminium	Aluminium
3f	Titanium	Copper	Titanium	Aluminium	Aluminium
4f	Stainless steel	Copper	Stainless steel	Aluminium	Aluminium
5f	Titanium	Copper	Titanium	Brass	Copper
6f	Stainless steel	Copper	Stainless steel	Brass	Copper
9f	Copper	Copper	Brass	Brass	Copper
0f	Copper nickel	Copper	Brass	Brass	Copper

f_ = **Header material**
f2 = Stainless steel
f3 = Rilsan coated carbon steel
f4 = Titanium

g = **Installation type**
1 = Duct installation, vertical mounting
2 = Hood installation, connection inwards, vertical mounting
3 = Hood installation, connection outwards, vertical mounting
6 = Hood installation, connection outwards, horizontal mounting

h = **Connection flange**

EN 1092-1 type 11*	EN 1759 type 11 (ASME B 16.5)**
1 = DN 32	6 = 1 1/4”
A = DN 40	B = 1 1/2”
2 = DN 50	7 = 2”
3 = DN 65***	8 = 2 1/2”
4 = DN 80	9 = 3”
5 = DN 100	0 = 4”

*** 4 mounting holes to fit against the old std. (DIN2633)

ii = **Pressure class**

00 = 0,6/0,9 Mpa	*(PN16) **(150lbs)
01 = 0,8/1,2 Mpa	*(PN16) **(150lbs)
02 = 1,0/1,5 Mpa	*(PN16) **(150lbs)
03 = 1,5/2,25 Mpa	*(PN40) **(150 or 300lbs depending on material)

Accessories QDKR, Packing and Software Coils

ACCESSORIES - QDKR DOUBLE TUBE

QLKZ-01, gasket set, EDPM rubber.
QLKZ-02, set of counter-flanges.
QLKZ-03, fin structure protection guard, hot dip galvanized steel.
QLKZ-04, a number of different vents/drains, 1/2” ball valve.
QLKZ-06, set of sacrificial anodes.
QLKZ-07, stainless steel nameplate.
QLKZ-08, cleaning brush with rod.
QLKZ-11, safety valve.
QLKZ-15, connection with G 1/2” socket.
QDKZ-09, level switch leakage detector, type Kübler.

More information about the accessories, can be found in our selection program Coils.

QDKR with mounted leakage detector, type QDKZ-09-3.

PACKING

The motor/generator coolers are delivered with different wood packing options depending on the specific transportation mode.

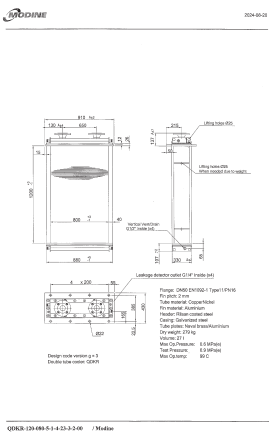
Standard wood packing.

COILS SELECTION SOFTWARE

The motor/generator cooler QDKR is available in a wide range of configurations. Modines software Coils is used to select and size the correct cooler. It is a reliable and flexible software and generates a print-out of technical data and a dimensional drawing of the selected cooler. Some variables to be considered while sizing and selecting include:

- Cooling capacity
- Water flow rate and temperatures
- Air temperature
- Water quality condition
- Cooler size
- Mounting alternatives
- Environmental conditions

Contact us and we can supply the Coils software or help you in selecting the optimal cooler.



Dimensional drawing.

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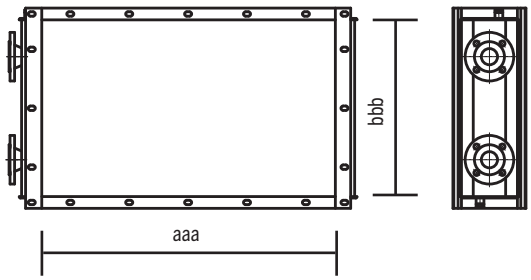
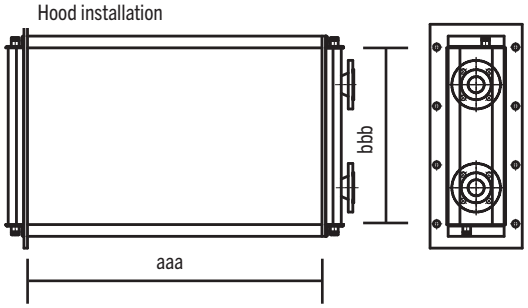
ATTACHMENT 1 - INSTALLATION TYPE (g)

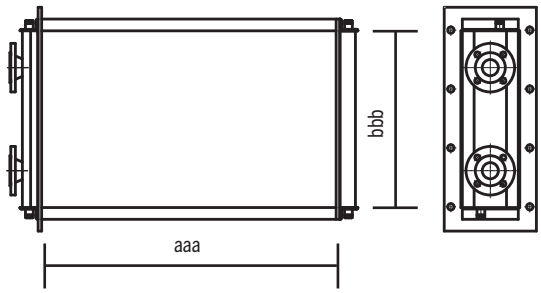
QDKR g=1
Vertical mounting
Dust installation



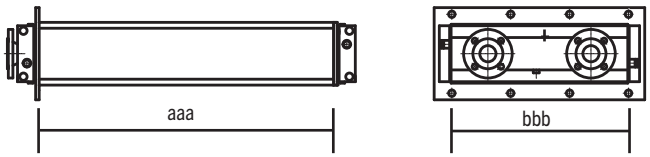
QDKR g=2 & 4
Vertical mounting
Hood installation



QDKR g=3 & 5
Vertical mounting
Hood installation



QDKR g=6
Horizontal mounting
Hood installation



Contact us for more information.

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