QDC - Quiet DC Cooler

Air fluid cooler series with 24 V DC brushless motor

Parker

ENGINEERING YOUR SUCCESS.

WARNING – USER RESPONSIBILITY

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Parker-Hannifin Corporation, its subsidiaries and authorized distributors provide product or system options for further investigation by users having technical expertise.

The user, through its own analysis and testing, is solely responsible for making the final selection of the system and components and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application, follow applicable industry standards, and follow the information concerning the product in the current product catalog and in any other materials provided from Parker or its subsidiaries or authorized distributors.

To the extent that Parker or its subsidiaries or authorized distributors provide component or system options based upon data or specifications provided by the user, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the components or systems.

Offer of Sale

Please contact your Parker representation for a detailed 'Offer of Sale'.

If you are using an electronic version of this catalogue this icon will take you back to this CONTENTS page upon clicking.

New opportunities for electric propulsion & work functions

Urban

Electric machines are impressively quiet, which makes them prime candidates for work in populated areas — especially on projects that require nighttime work or operation in residential areas. Digging or moving material outside a bedroom window , school zone or hospital room will be no problem at all. As more cities and states work on charging infrastructure for electric passenger vehicles, electric construction equipment can make a logical addition to their equipment fleets as well.

Indoor demolition

Indoor construction jobs cause a unique set of problems for workers. Construction equipment needs to be compact enough to fit through tight spaces, yet powerful enough to complete the job. Ventilation also poses a problem as diesel-powered equipment emits exhaust fumes. Indoor projects can now benefit from the low noise and zero emission levels electric machines offer.
Where it used to take several laborers doing manual work or using smaller electric tools, now an electric compact excavator can dig or an electric loader can move material indoors without polluting enclosed spaces or causing major disruptions.

Agriculture

Because of electric machines' zero-emission factor, they are great for agricultural settings involving valuable livestock. Farmers don't want their livestock breathing in diesel emissions, but still need to get work done around them. With an electric wheel loader, farmers can keep barns or sheds closed for warmth while still moving loads of feed, for example. And they won't have to sacrifice power or reach, because these machines operate at the same level as their diesel counterparts.

Heavy construction and mining

With construction vehicles being powered by electric drives, there's an increased need to extend electric power also to heavy construction and mining vehicles in order to make charging more efficient and easy across the complete fleet. Emission reduction and, in the case of mining, the issue of ventilation are another driver for the electrification process.

High dust environments

A combustion engine can be dangerous in a high-dusting setting because of the possibility of sparking from the exhaust. In a lumber mill or sawmill, workers are keenly aware of safety issues like this. With an electric machine, productivity isn't sacrificed, and neither is safety.

Utility vehicles

Combined motor, inverter and pump technology is quiet and efficient. As a result, vehicles can operate at extended times. For example, refuse trucks can collect household waste much earlier due to low noise emissions, and construction site vehicles may be allowed to operate at weekends.

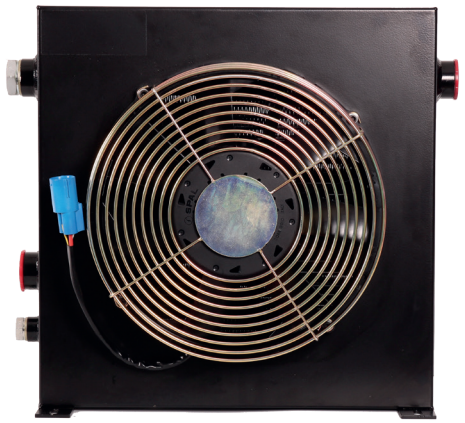
QDC 24 VDC series

The Parker QDC air fluid cooler series offers a unique cooling solution for the electrified, mobile market. Among the series' most outstanding features are:

- High power density: The QDC offers four times higher power density than the LDC series.
- High efficiency. Integrated inverter controls the rotation speed with a standard PWM signal to reduce the power consumption to the minimum required RPM to dissipate the power out of the fluid.
- High noise reduction. The highly efficient design of the Parker heat exchanger turbulator together with the rotation speed control ensures quiet operation, suitable for operation even in noise emission reduced areas.
- This series can be fitted optionally with an IQAN controller, smart 24 V DC water-glycol pump, and a tank system. The maximum cooling capacity is 26 kW at 40°C, difference in temperature between ambient and cooler inlet, size 017
- The 24 VDC series features the same dimensions as the LDC series, yet offers improved matrixoptions. The brushless FAN drive comes with an integrated inverter for ideal efficiency.

Target markets

- Truck cranes
- Body builders
- Mining machinery
- Forestry machines
- Refuse trucks
- Sweepers
- Lawn mowers
- Mini- and Medium sized excavator
- Surface drilling systems
- Hydrogen power fuel cell stack cooling



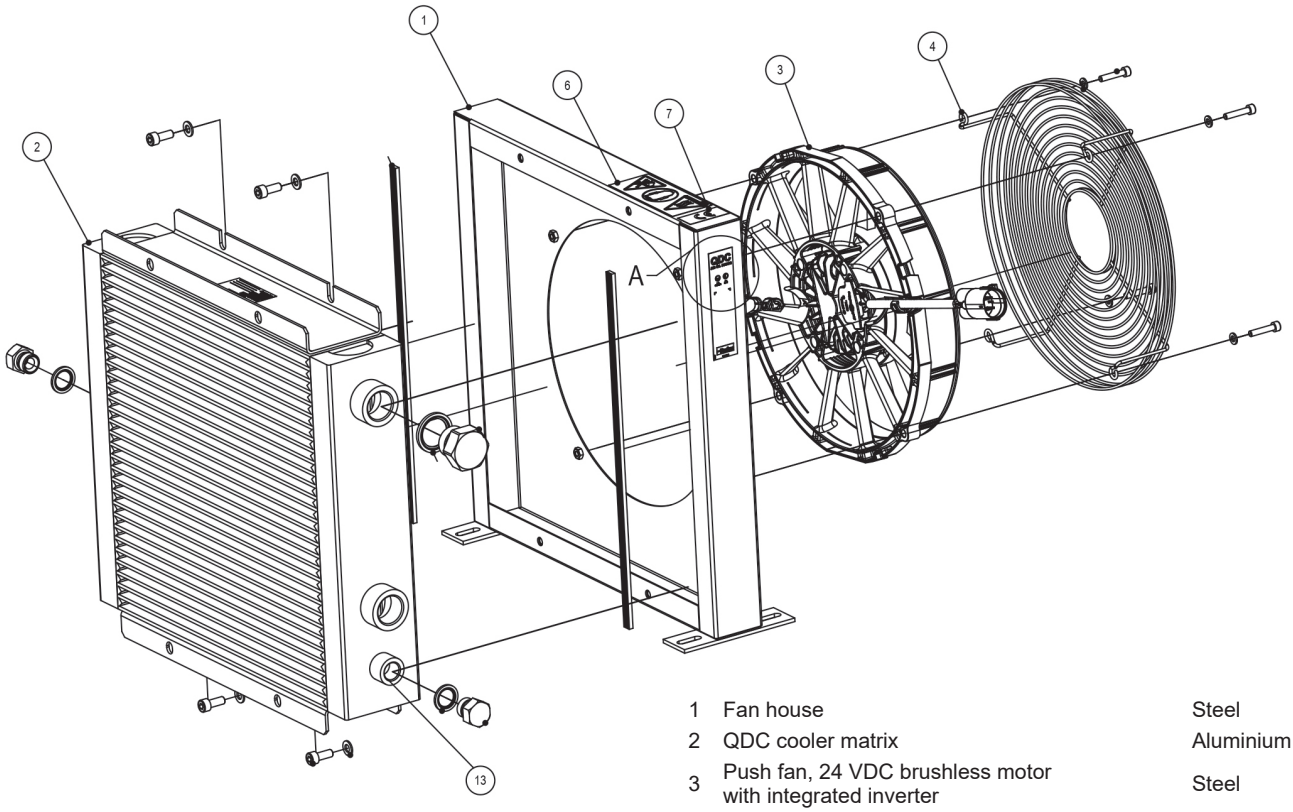
Parker PUSH technology - how it works

Push technology allows the system to function under high ambient temperature and high fluid temperature.

- Reduces the ambient temperature for the motor and the inverter in operation
- Increases the robustness and cleanliness of the system

QDC 24 V on parker.com

QDC Thermal Management Cooling Page



1	Fan house	Steel
2	QDC cooler matrix	Aluminium
3	Push fan, 24 VDC brushless motor with integrated inverter	Steel
4	Finger guard brushless Ø305 mm	Steel
6	Label kit	Plastic
7	Label CE 50 x 24 mm	Plastic
13	Additional fluid ports for sensoric on both sides	

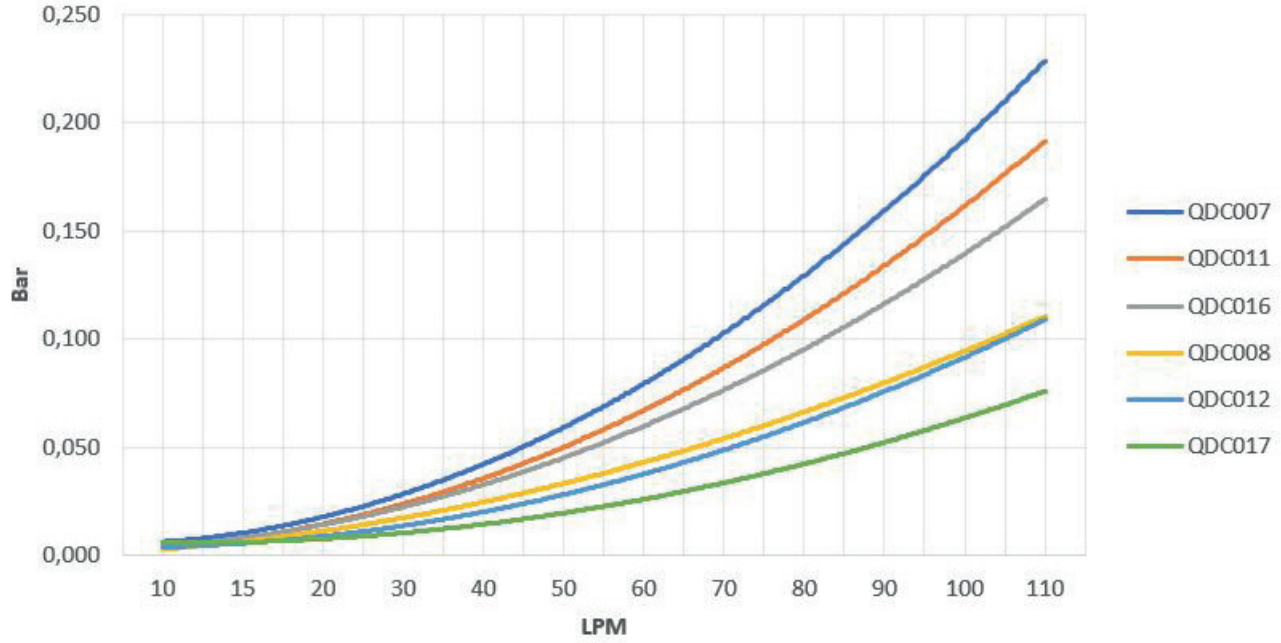
QDC 24 VDC performance overview

- High power 24 V DC brushless fan drive e-motor
- Variable fan speed from 1200 to max. 4750 rpm
- Integrated inverter
- Push fan air flow technology
- RPM control with IQAN (optional)
- 1-3 cooling circle in a single matrix (on request)

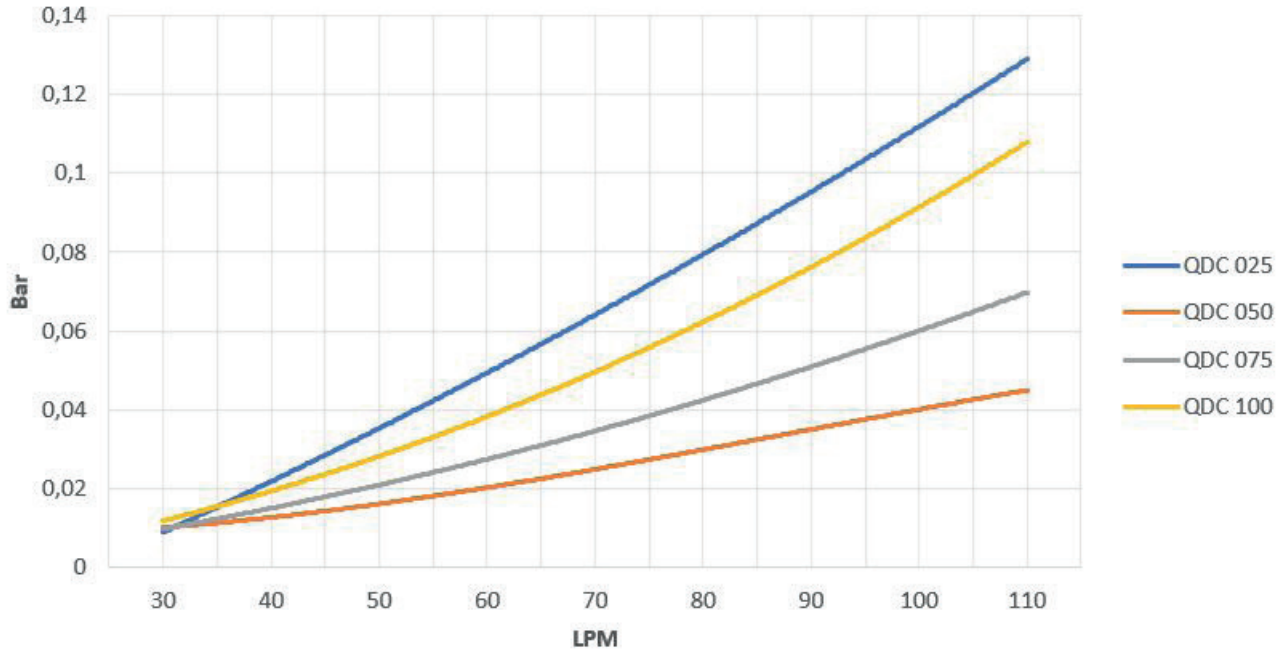
24 VDC high power single matrix	@ delta T 25 °C * [kW]	@ delta T 40 °C * [kW]
QDC 007 matrix 65 mm, part no. 5847007001	7.8	15.6
QDC 008 matrix 95 mm, part no. 5847008001	9.6	19.2
QDC 011 matrix 65 mm, part no. 5847011001	10.5	21.0
QDC 012 matrix 95 mm, part no. 5847012001	13.4	26.8
QDC 016 matrix 65 mm, part no. 5847016001	12.7	24.4
QDC 017 matrix 95 mm, part no. 5847017001	16.4	32.8
24 VDC high power single matrix multi fans		
QDC 025 matrix 95 mm, part no. 5847025001	27.0	43,4
QDC 050 matrix 95 mm, part no. 5847050001	51.0	81.5
QDC 075 matrix 95 mm, part no. 5847075001	73,4	117,4
QDC 100 matrix 95 mm, part no. 5847100001	92.5	148.0
24 VDC high power two matrix two fans		
QDC 025 matrix 95 mm, part no. 5847025002	2x 13.5	2x 21.7

* Temperature difference between ambient / inlet temperature cooler.

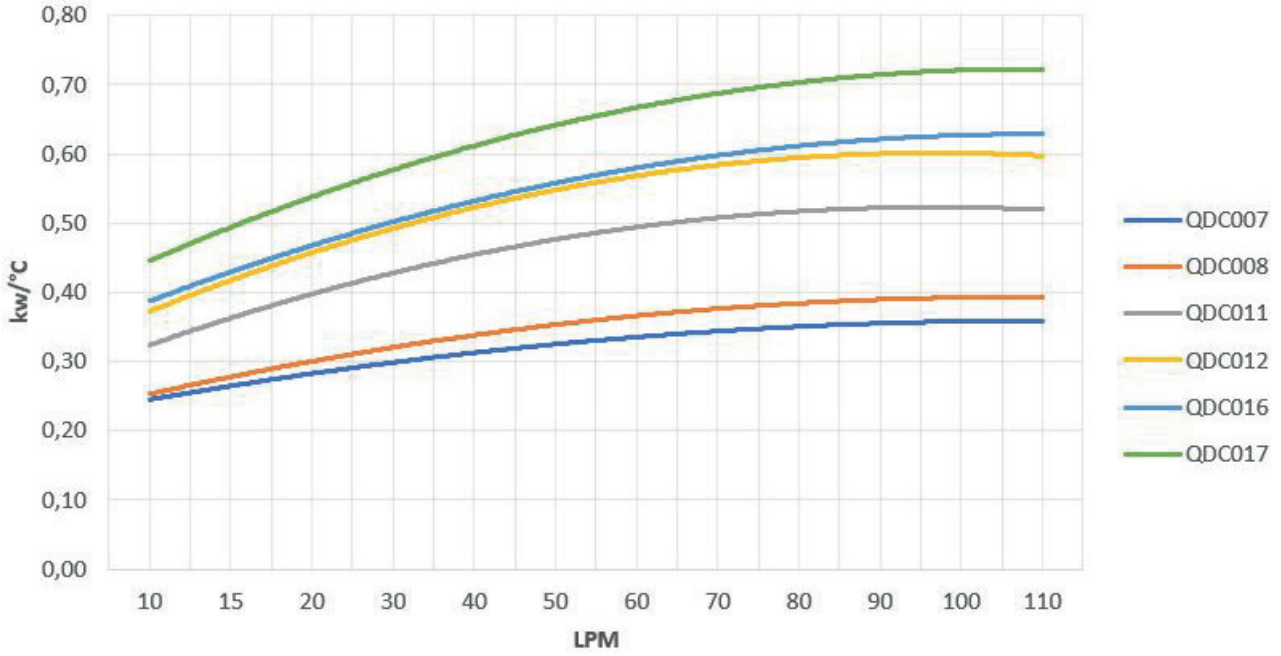
QDC 007 - 017 pressure drop (water glycol mix 50% / 50%)



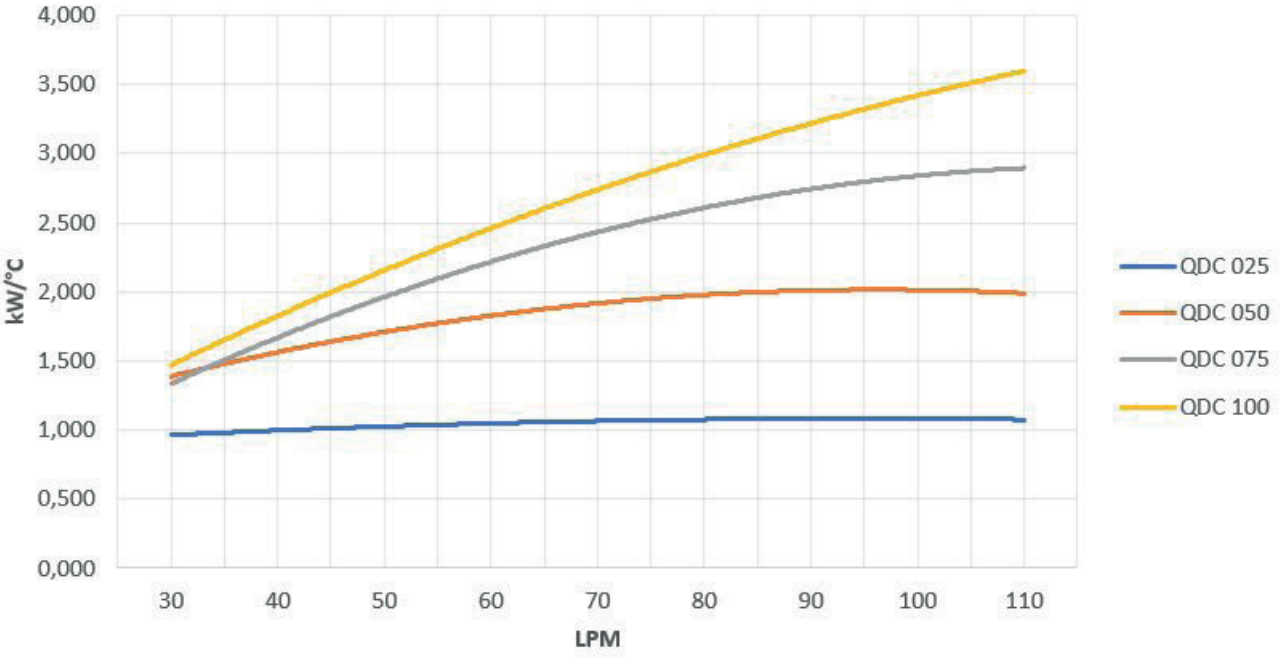
QDC 025 - 100 pressure drop (water glycol mix 50% / 50%)



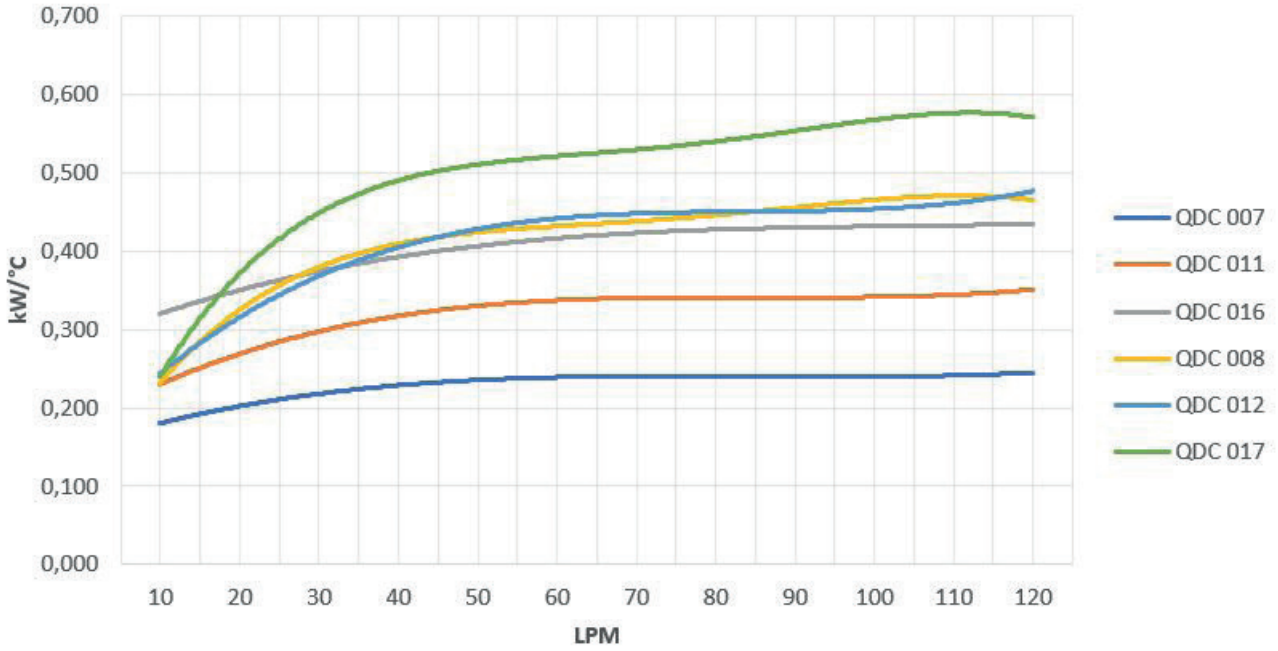
QDC 007 - 017 cooling capacity (water glycol mix 50% / 50%)



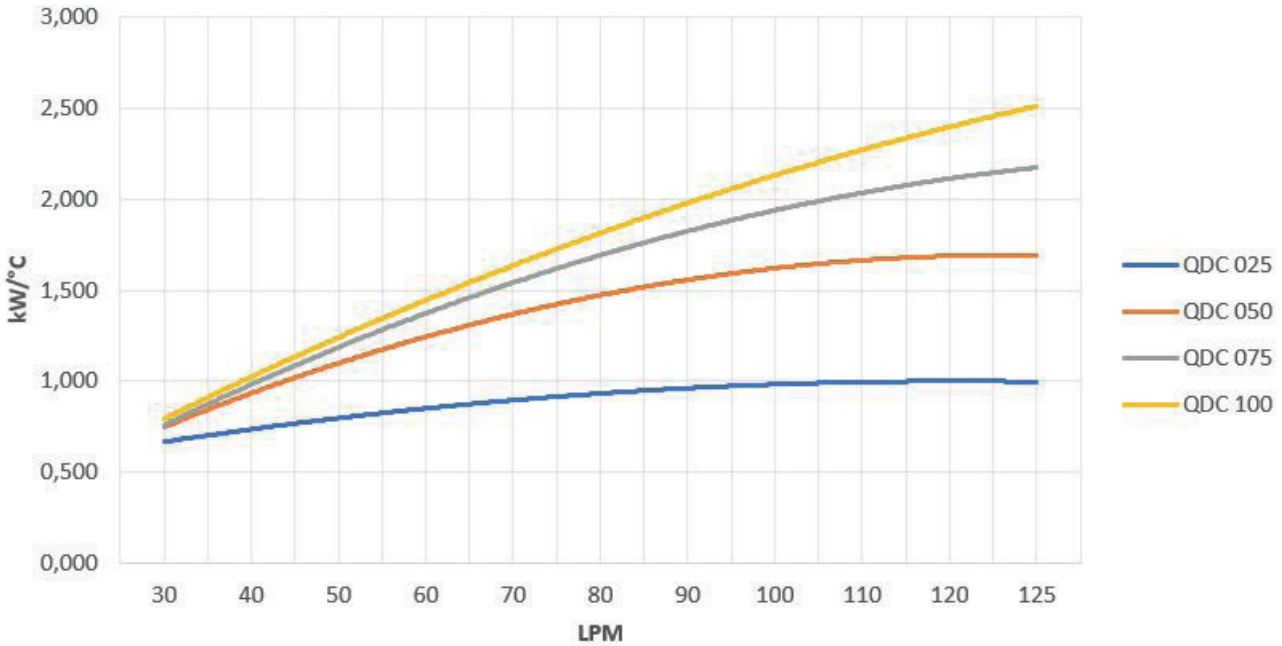
QDC 025 - 100 cooling capacity (water glycol mix 50% / 50%)



QDC 007 - 017 range cooling capacity (mineral oil)



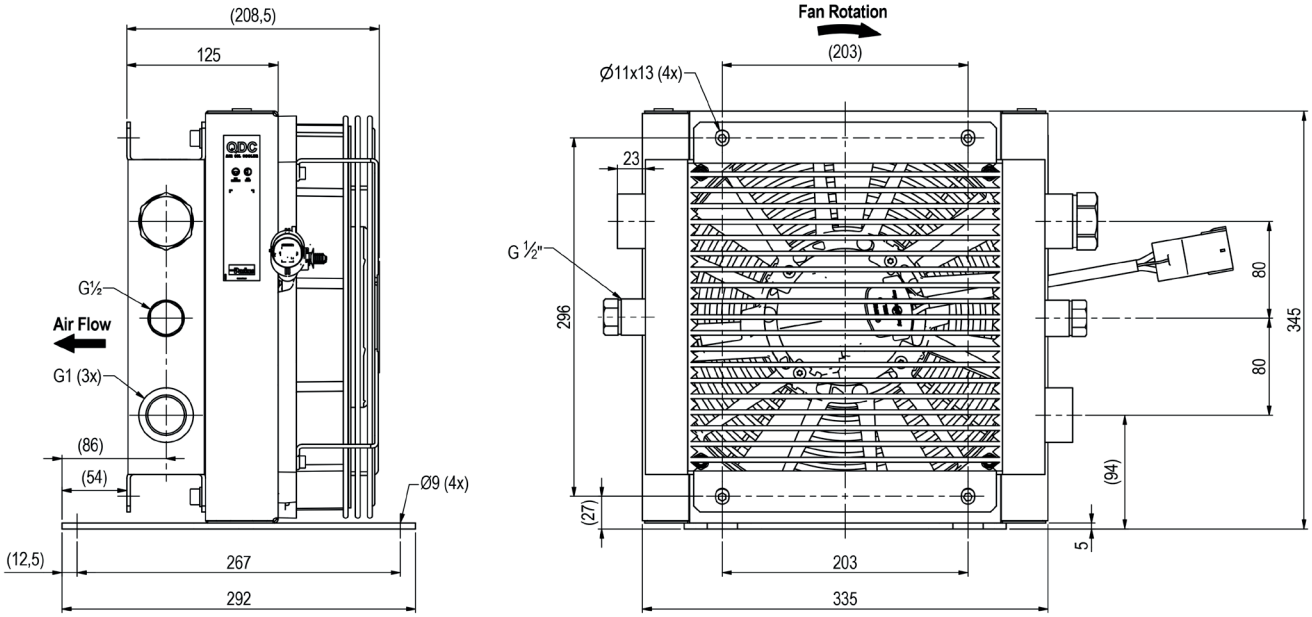
QDC 025 - 100 range cooling capacity (mineral oil)



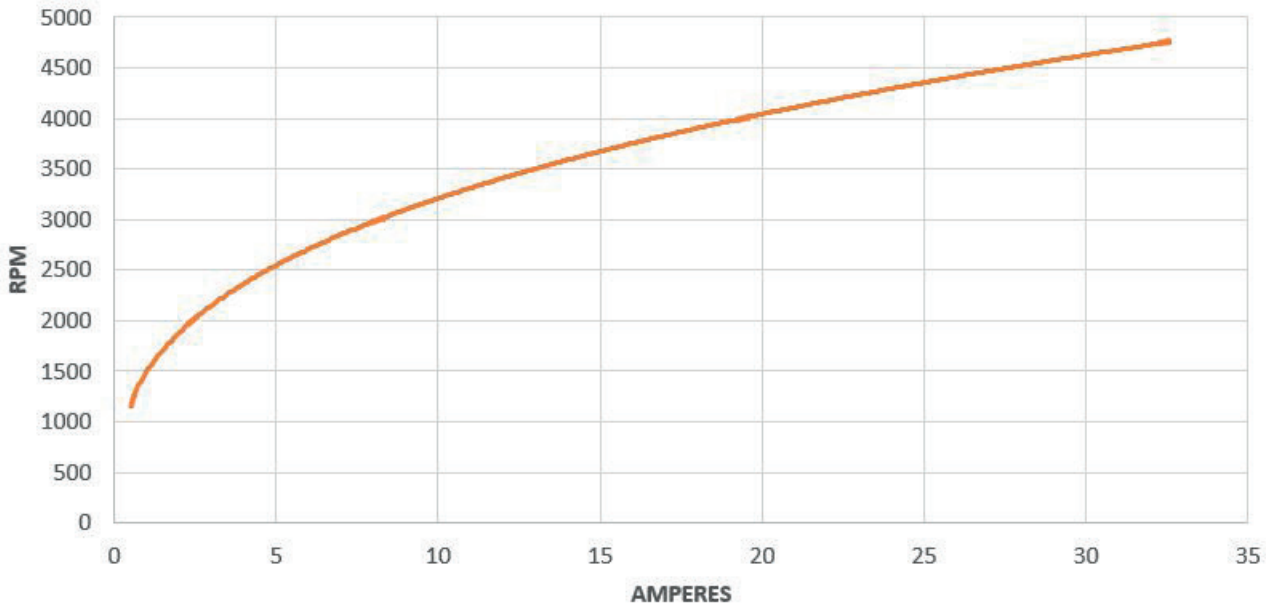
QDC 007

Type	P/N	Total dimension [mm]	Weight [kg]	LpA dB(A)1 m
QDC 007	5847007001	345 x 335 x 208.5	9	50 - 86*

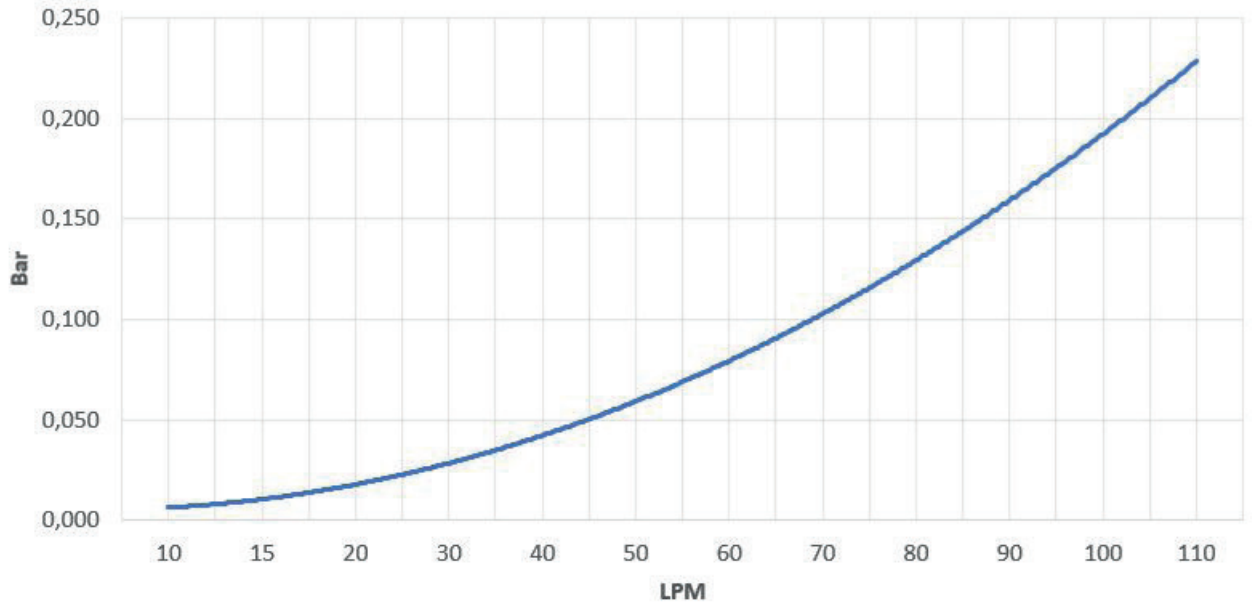
* max. speed 4750 RPM / noise level tolerance ± 3 dB(A). Components in the vicinity can change the sound values significantly.



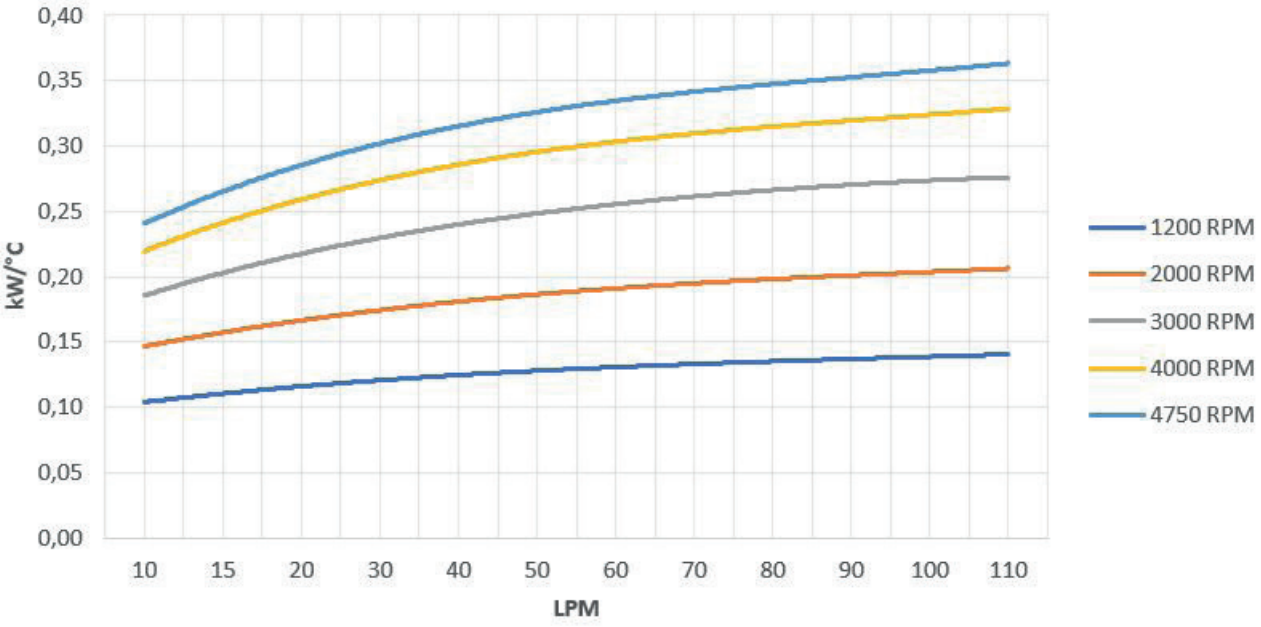
QDC 007 A/RPM



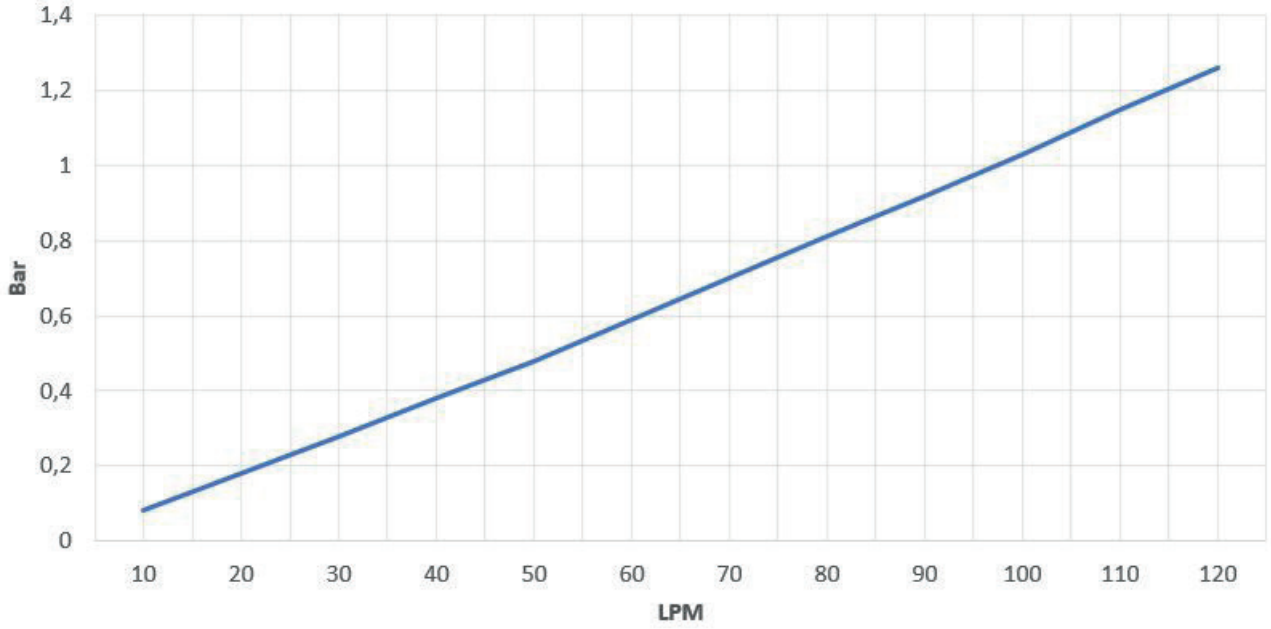
QDC 007 pressure drop (water glycol mix 50% / 50%)



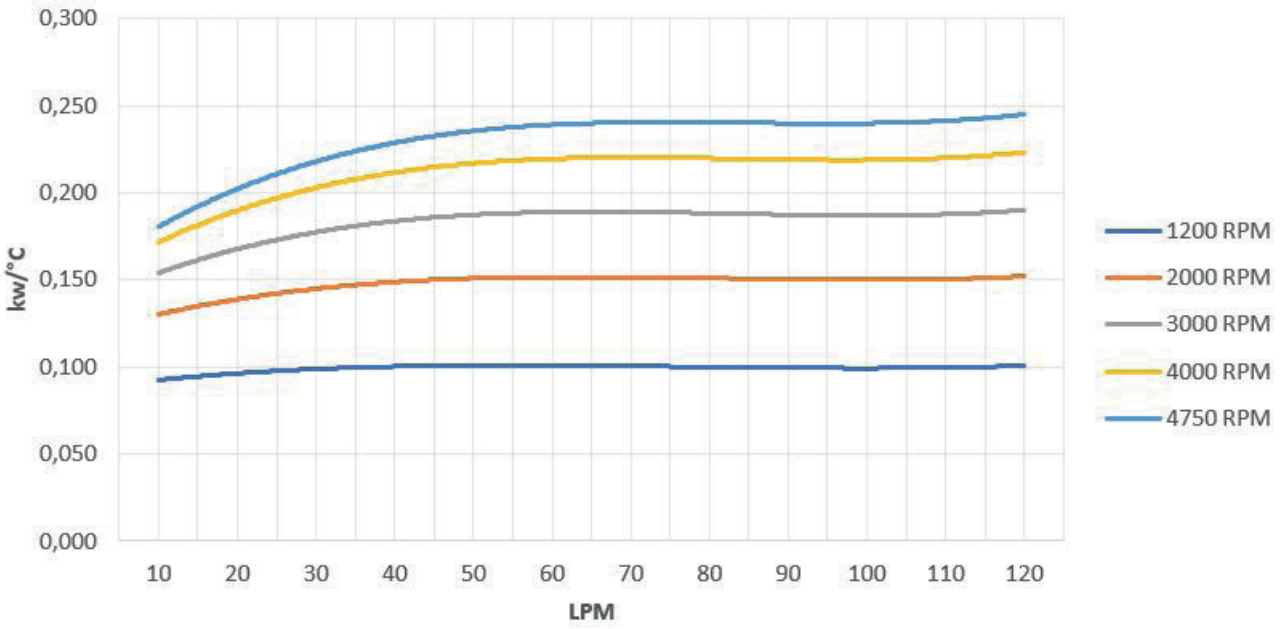
QDC 007 cooling capacity (water glycol mix 50% / 50%)



QDC 007 pressure drop (mineral oil)



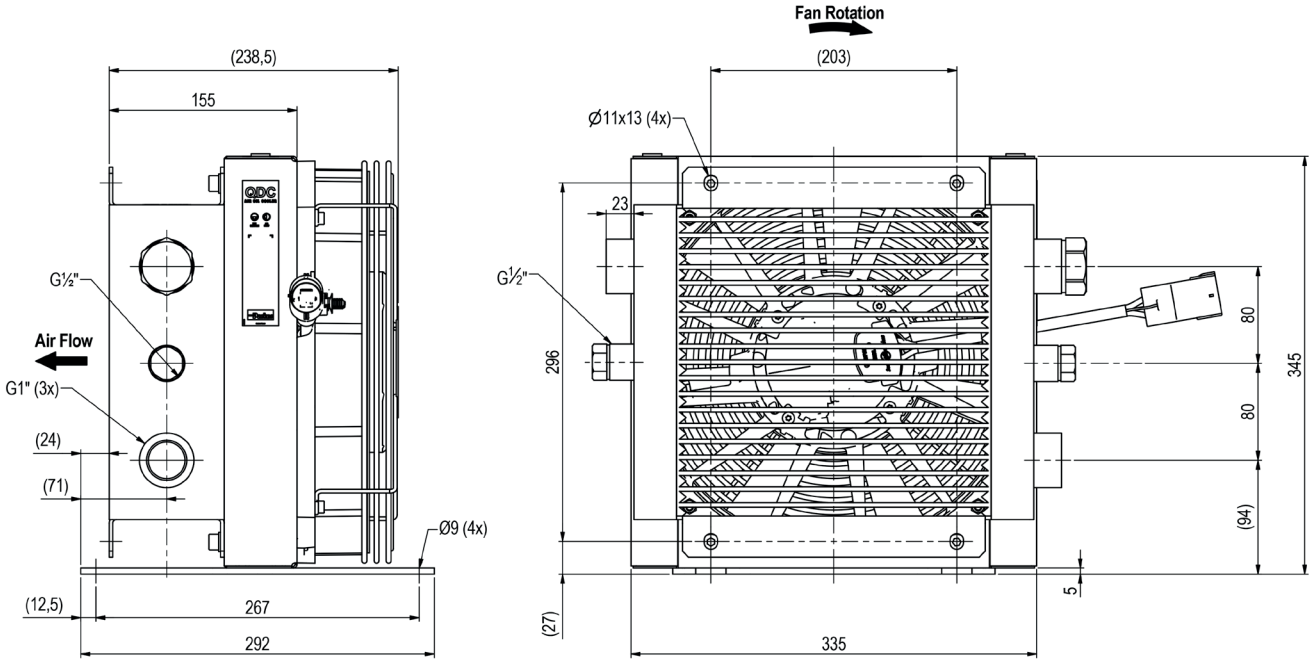
QDC 007 cooling capacity (mineral oil)



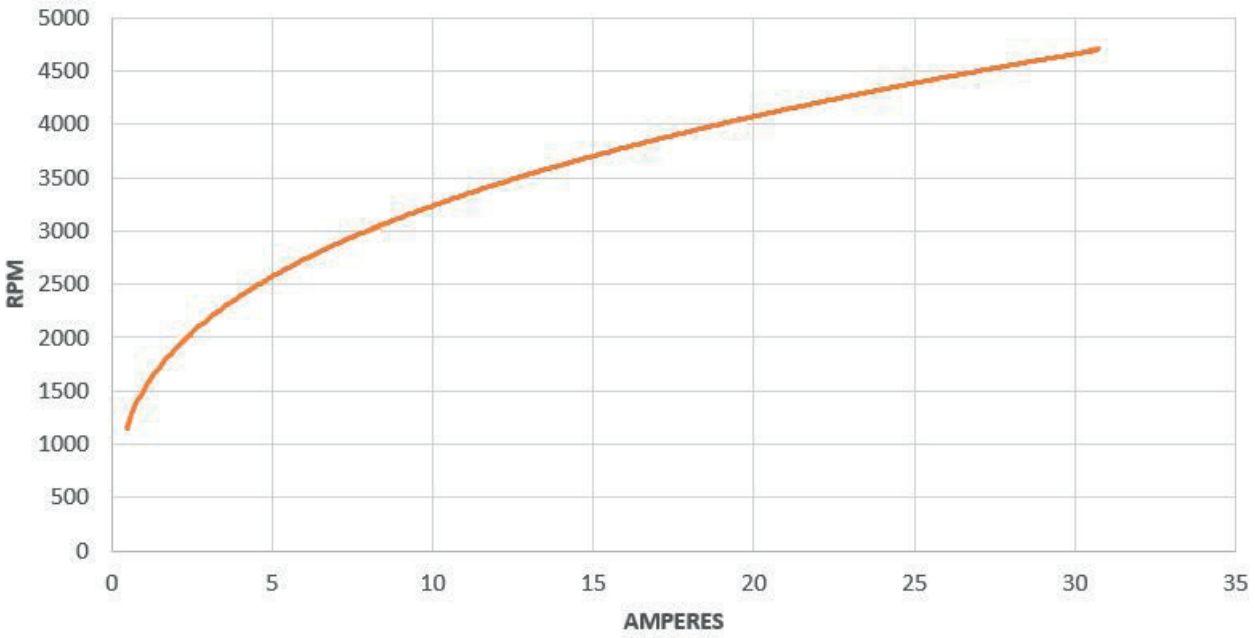
QDC 008

Type	P/N	Total dimension [mm]	Weight [kg]	LpA dB(A)1 m
QDC 008	5847008001	345 x 335 x 238.5	11.7	50 - 86*

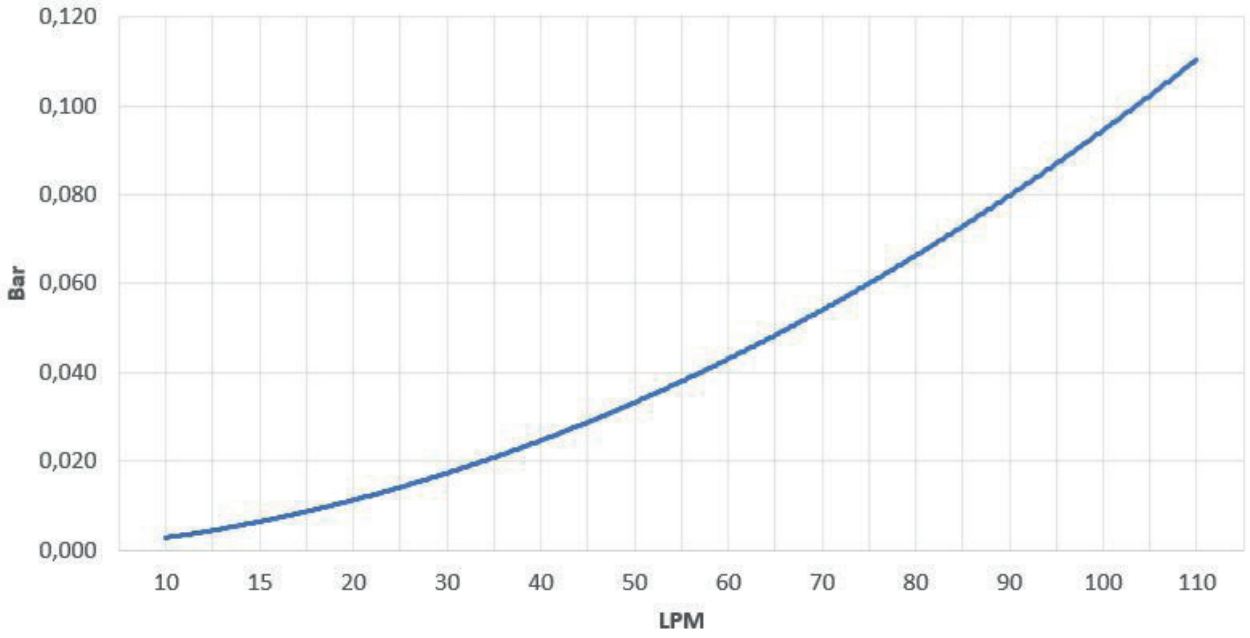
* max. speed 4750 RPM / noise level tolerance ± 3 dB(A). Components in the vicinity can change the sound values significantly.



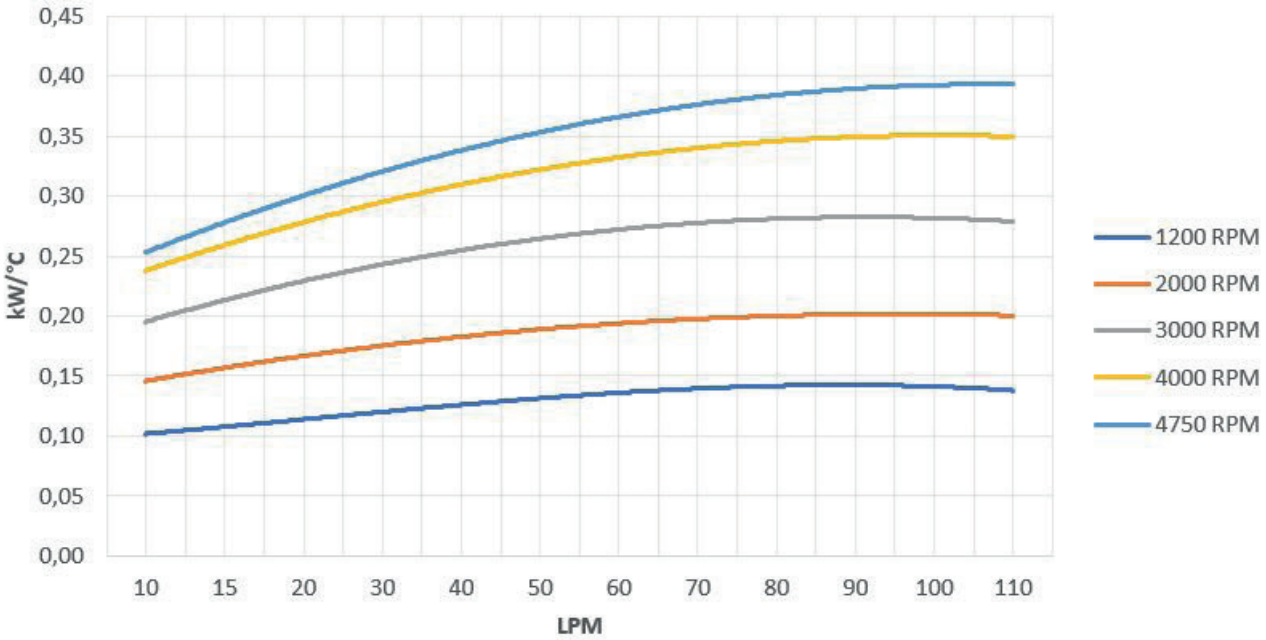
QDC 008 - A/RPM



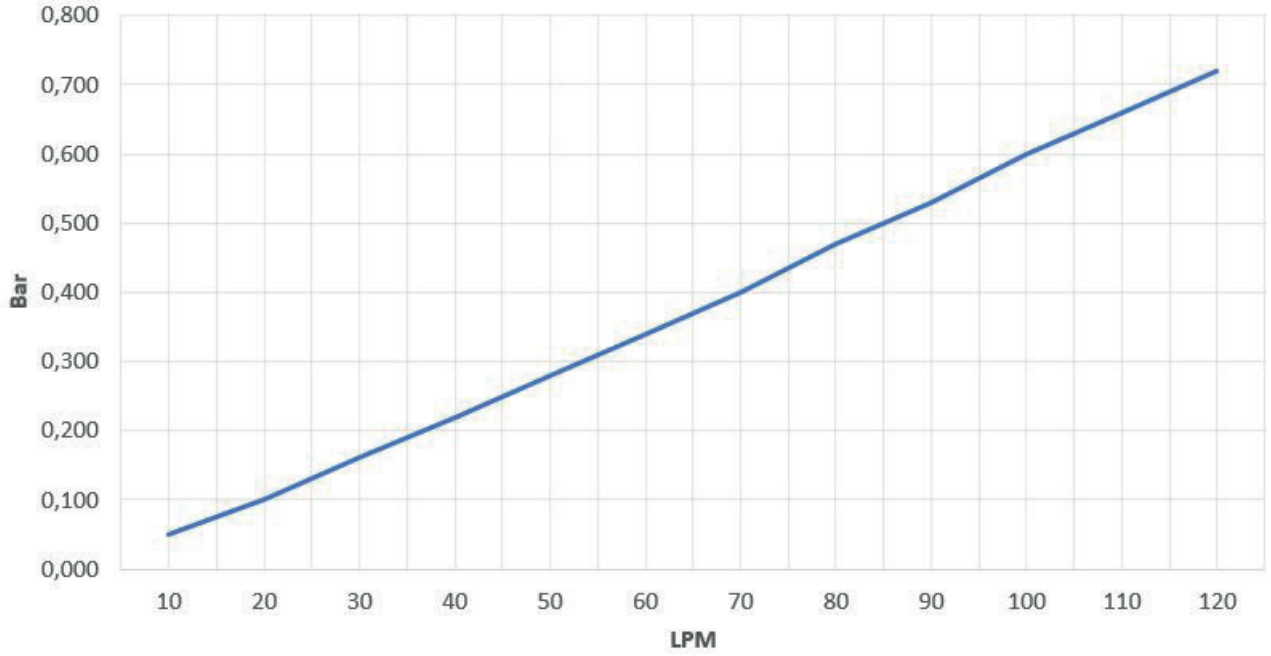
QDC 008 pressure drop (water glycol mix 50% / 50%)



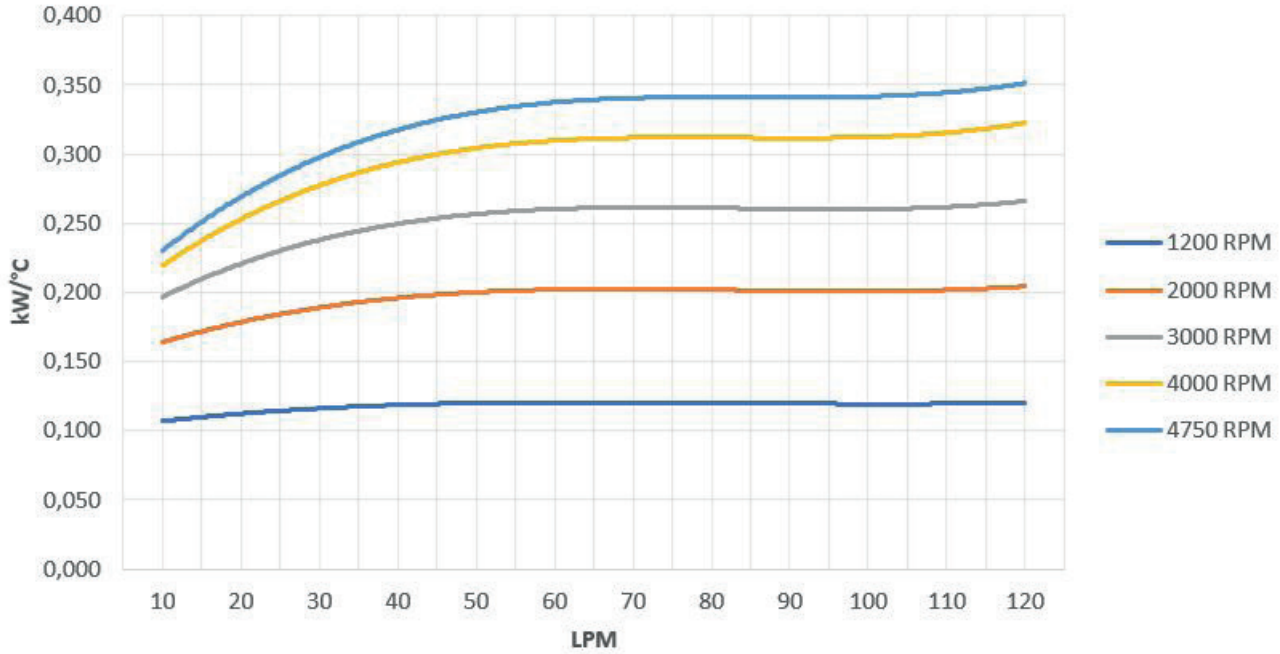
QDC 008 cooling capacity (water glycol mix 50% / 50%)



QDC 008 pressure drop (mineral oil)



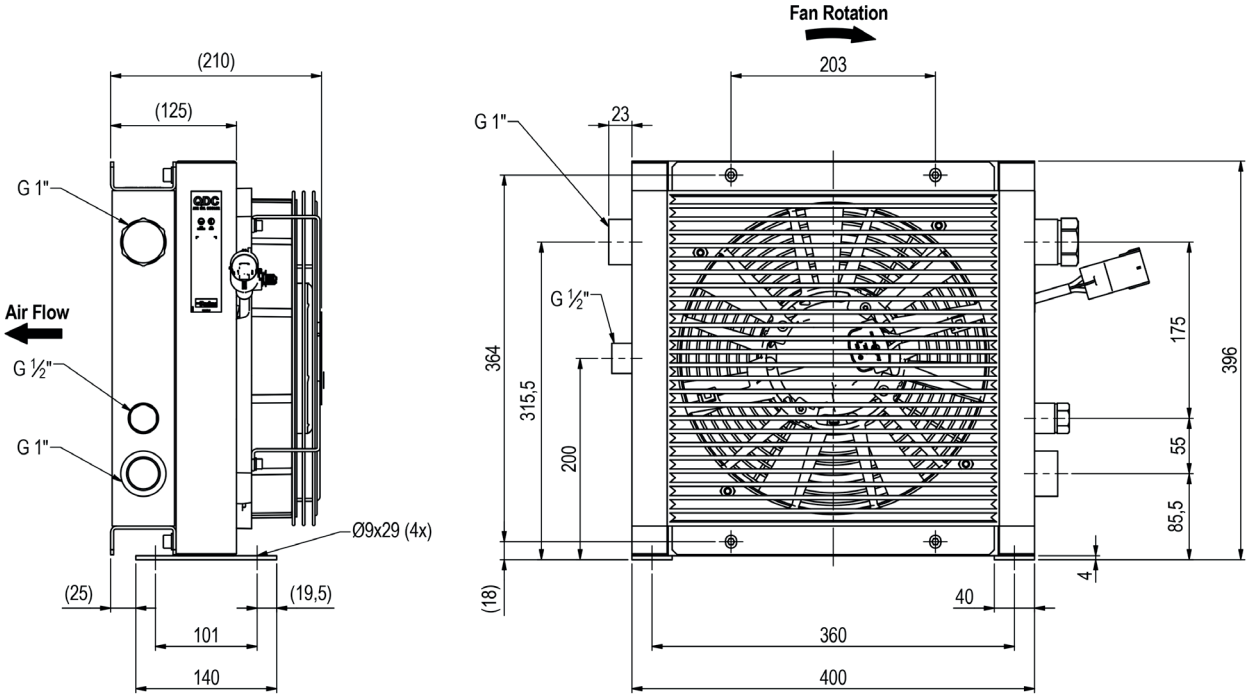
QDC 008 cooling capacity (mineral oil)



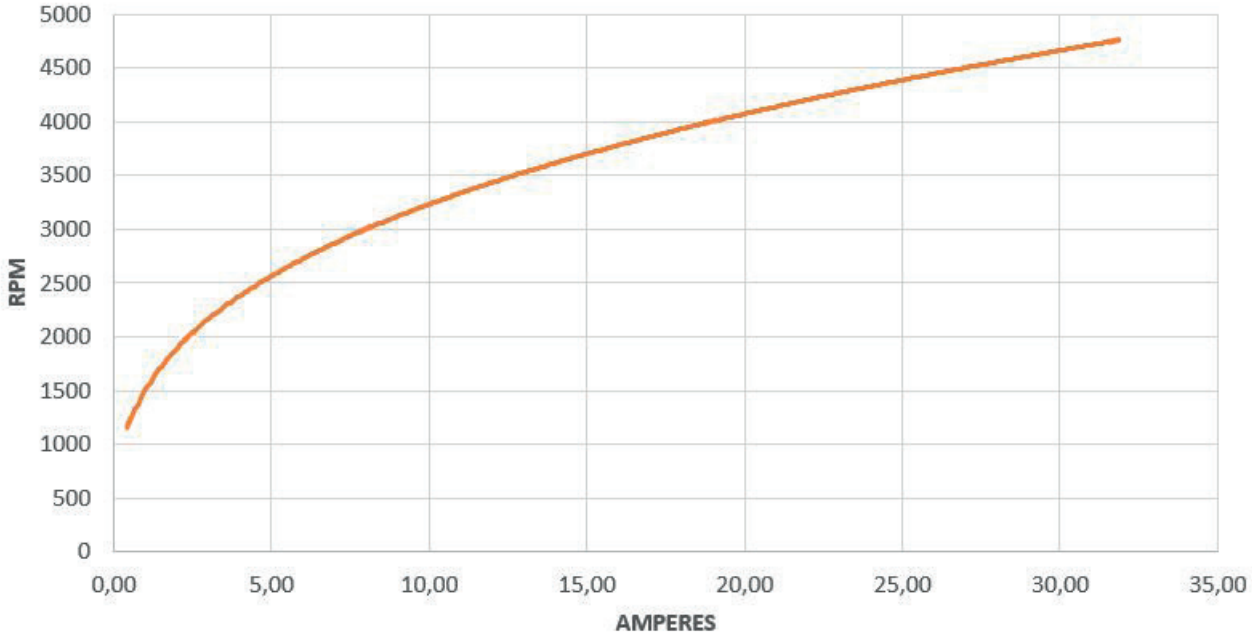
QDC 011

Type	P/N	Total dimension [mm]	Weight [kg]	LpA dB(A)1 m
QDC 011	5847011001	396 x 400 x 210	12	50 - 86*

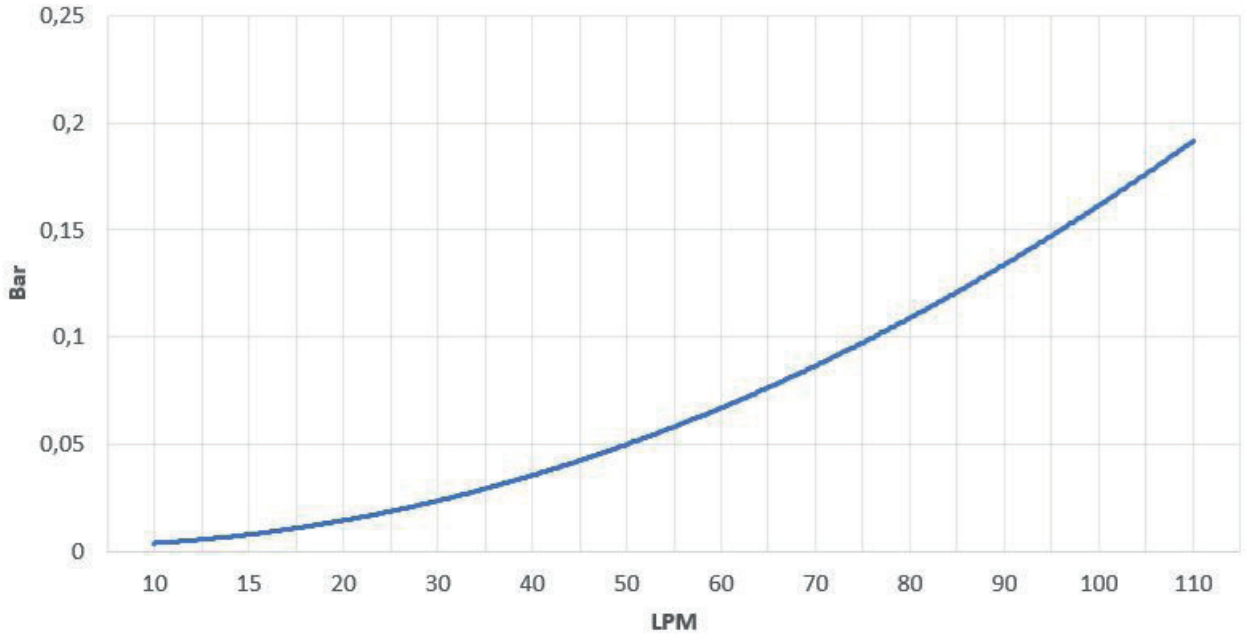
* max. speed 4750 RPM / noise level tolerance ± 3 dB(A). Components in the vicinity can change the sound values significantly.



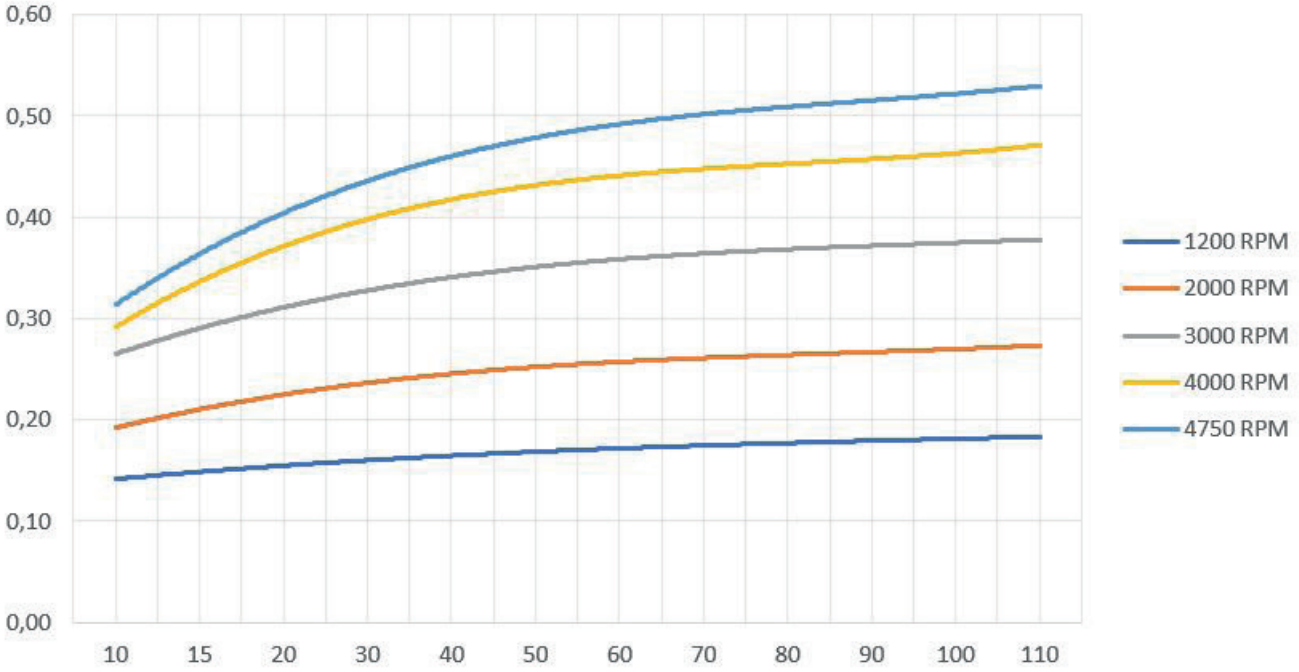
QDC 011 - A/RPM



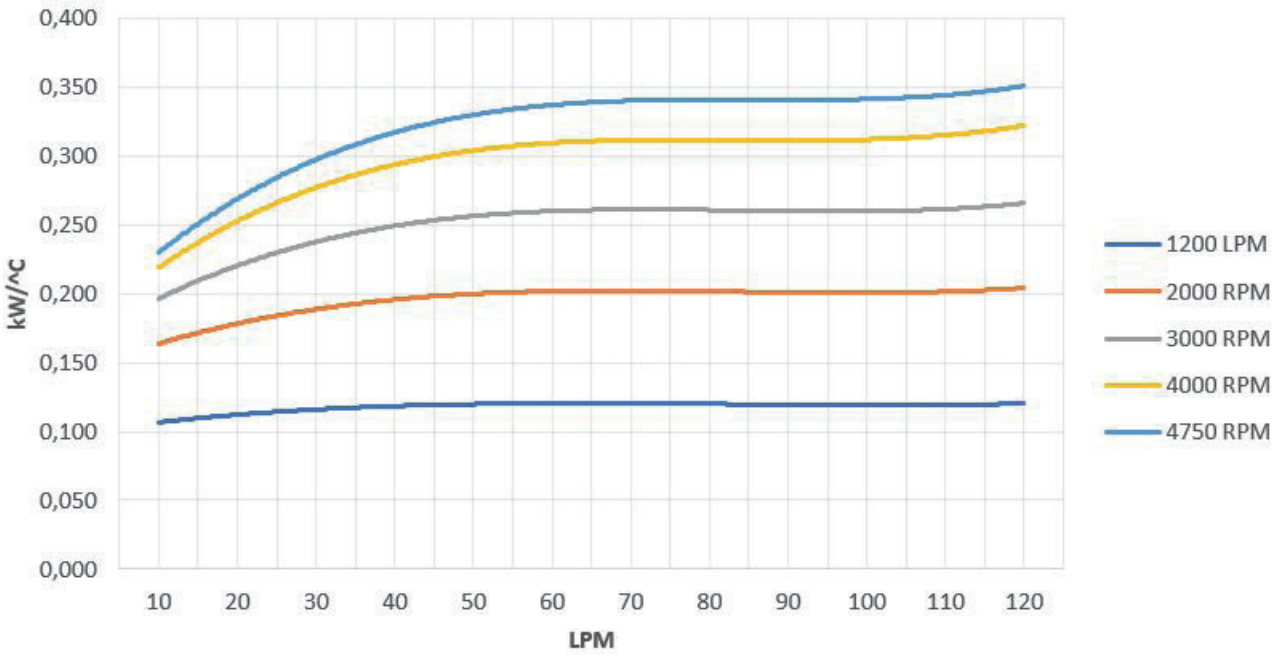
QDC 011 pressure drop (water glycol mix 50% / 50%)



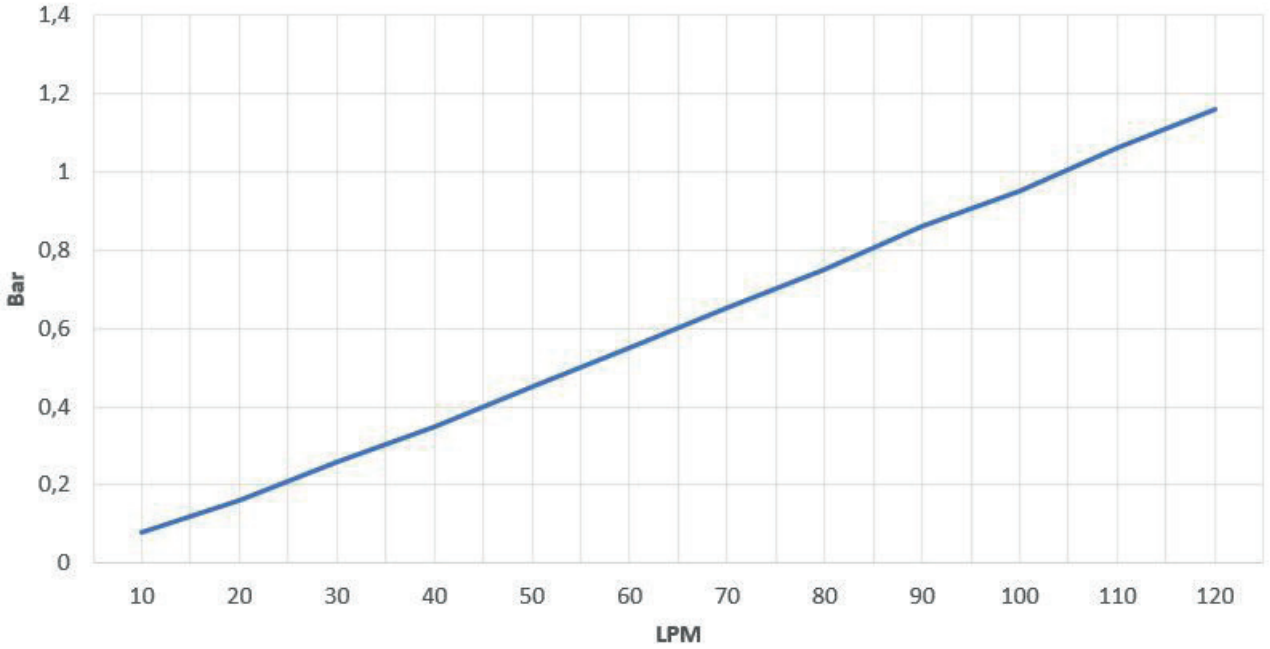
QDC 011 cooling capacity (water glycol mix 50% / 50%)



QDC 011 cooling capacity (mineral oil)



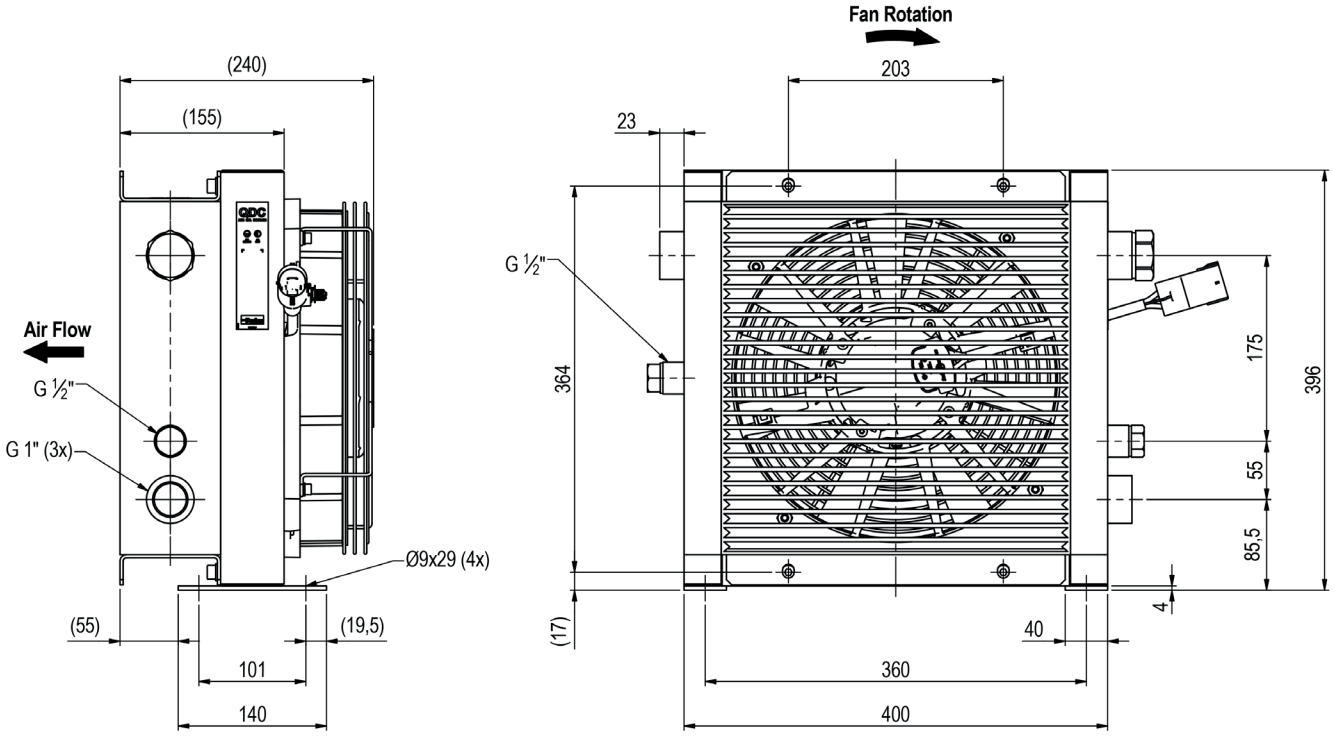
QDC 011 pressure drop (mineral oil)



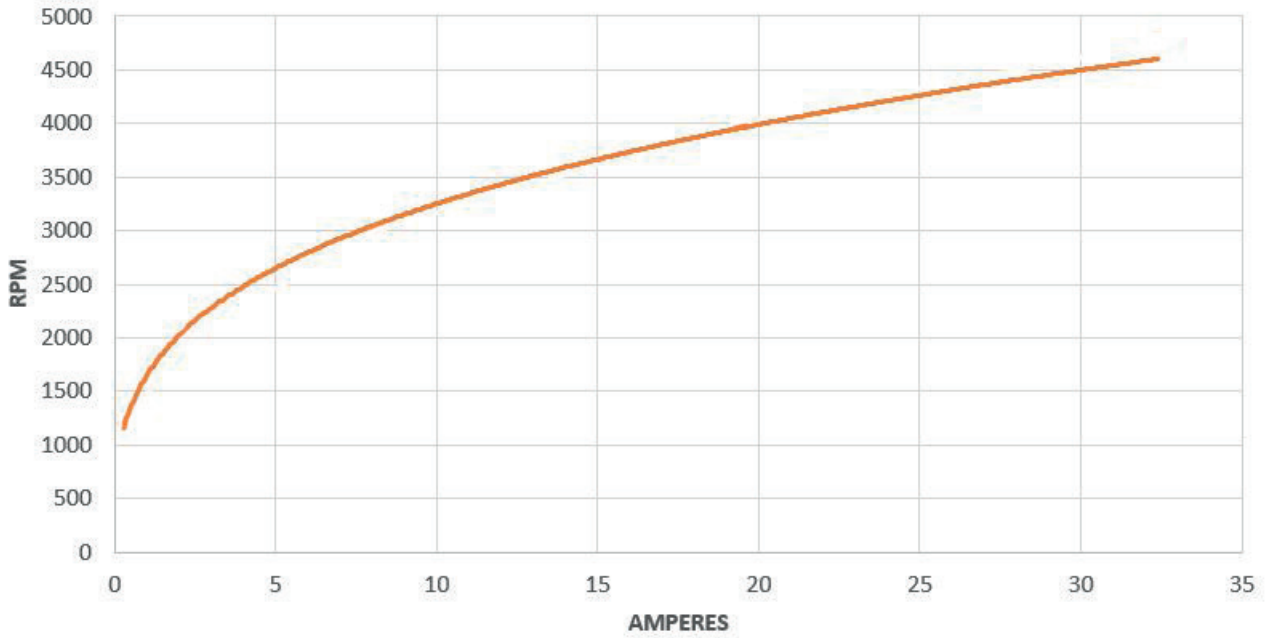
QDC 012

Type	P/N	Total dimension [mm]	Weight [kg]	LpA dB(A)1 m
QDC 012	5847012001	396 x 400 x 240	14.3	50 - 86*

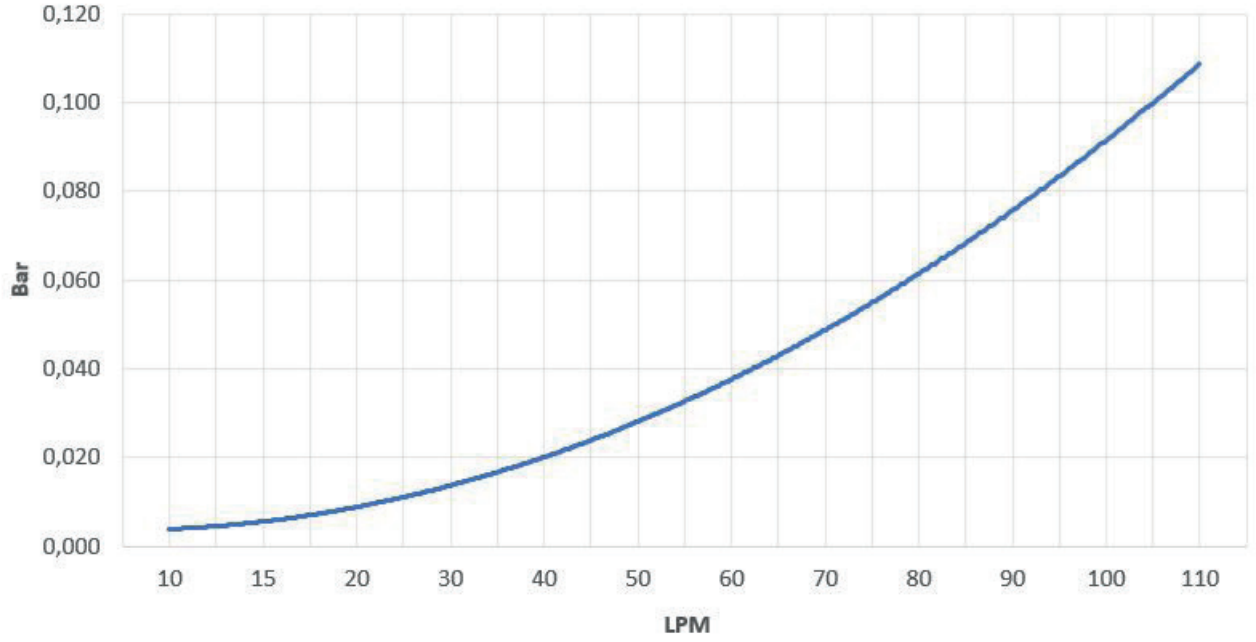
* max. speed 4750 RPM / noise level tolerance ± 3 dB(A). Components in the vicinity can change the sound values significantly.



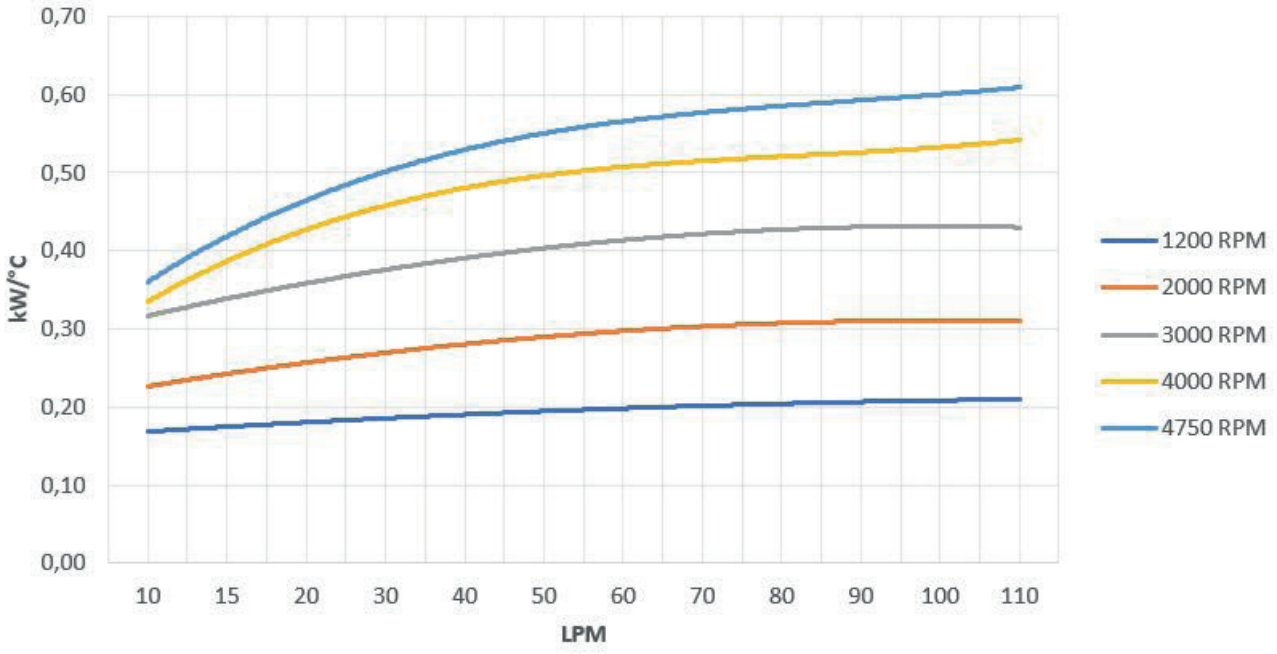
QDC 012 - A/RPM



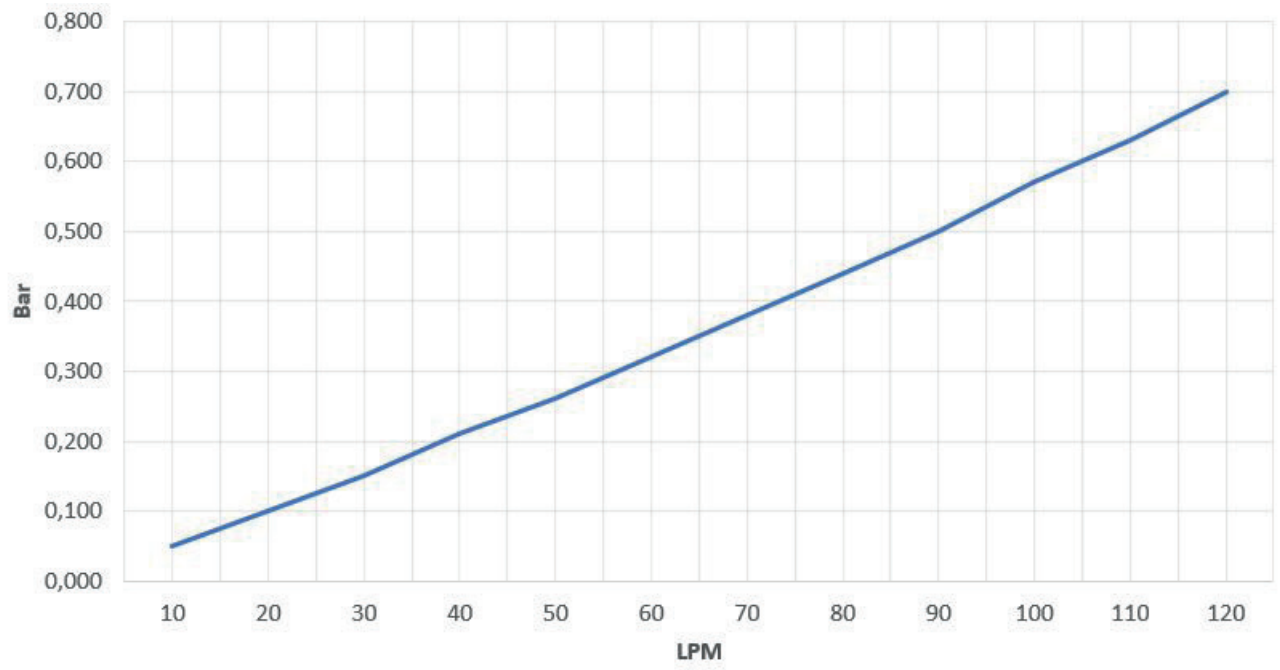
QDC 012 pressure drop (water glycol mix 50% / 50%)



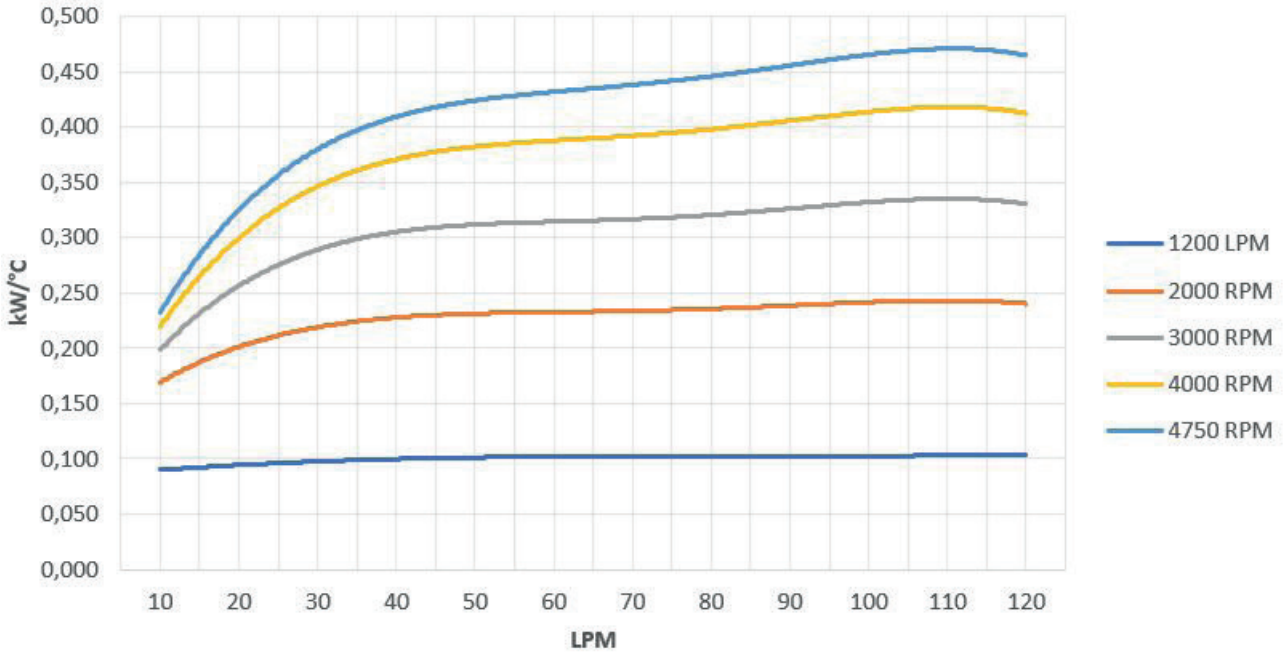
QDC 012 cooling capacity (water glycol mix 50% / 50%)



QDC 012 pressure drop (mineral oil)



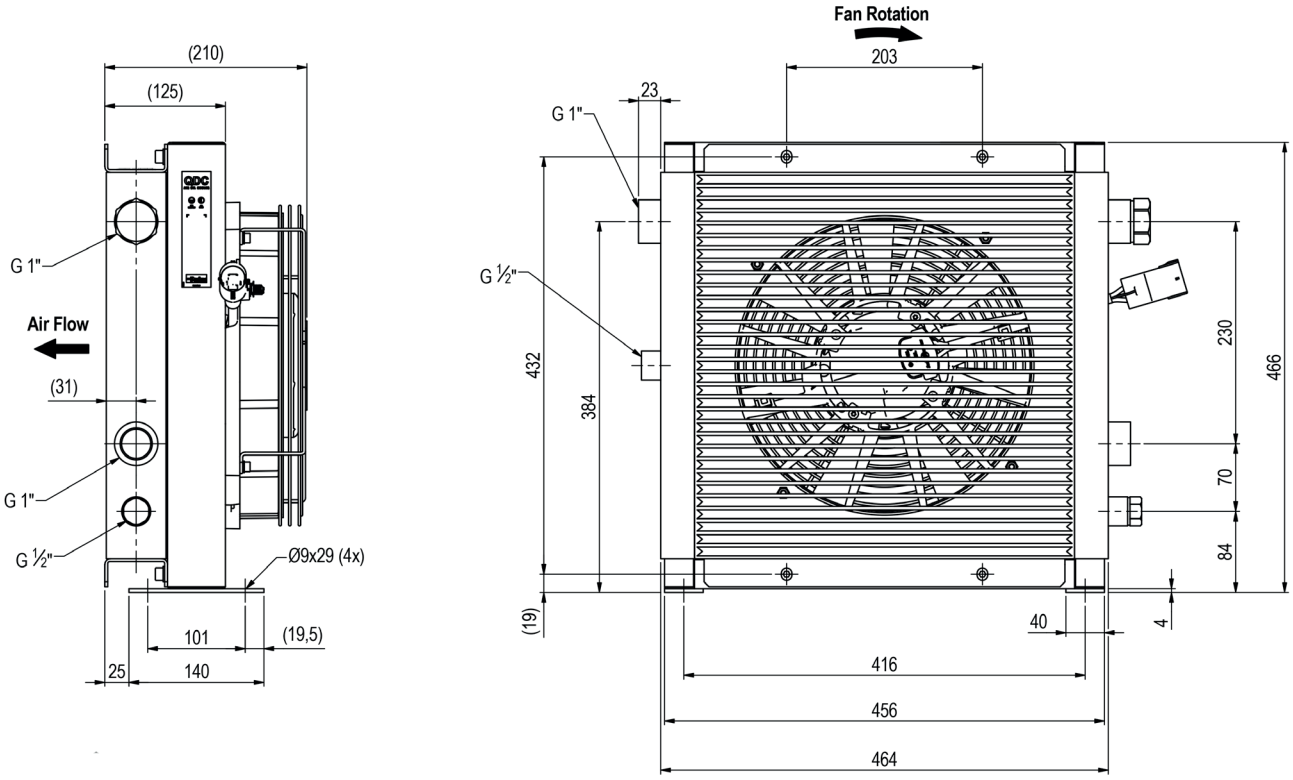
QDC 012 cooling capacity (mineral oil)



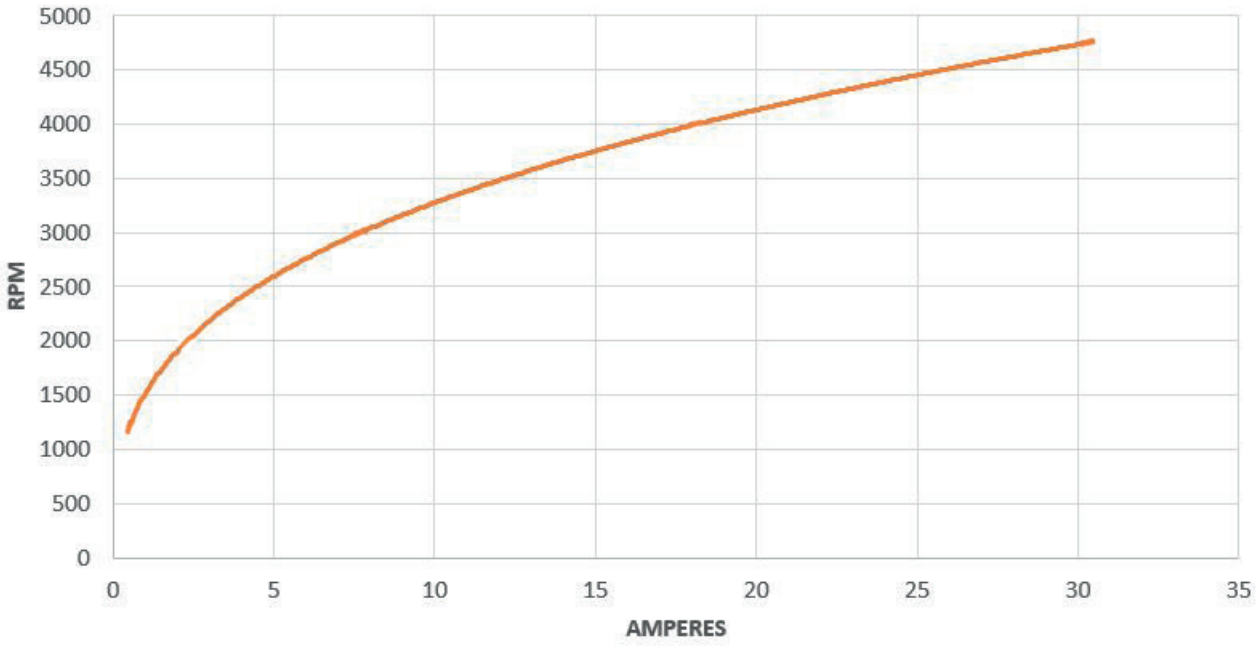
QDC 016

Type	P/N	Total dimension [mm]	Weight [kg]	LpA dB(A)1 m
QDC 016	5847016001	464 x 466 x 210	15	50 - 86*

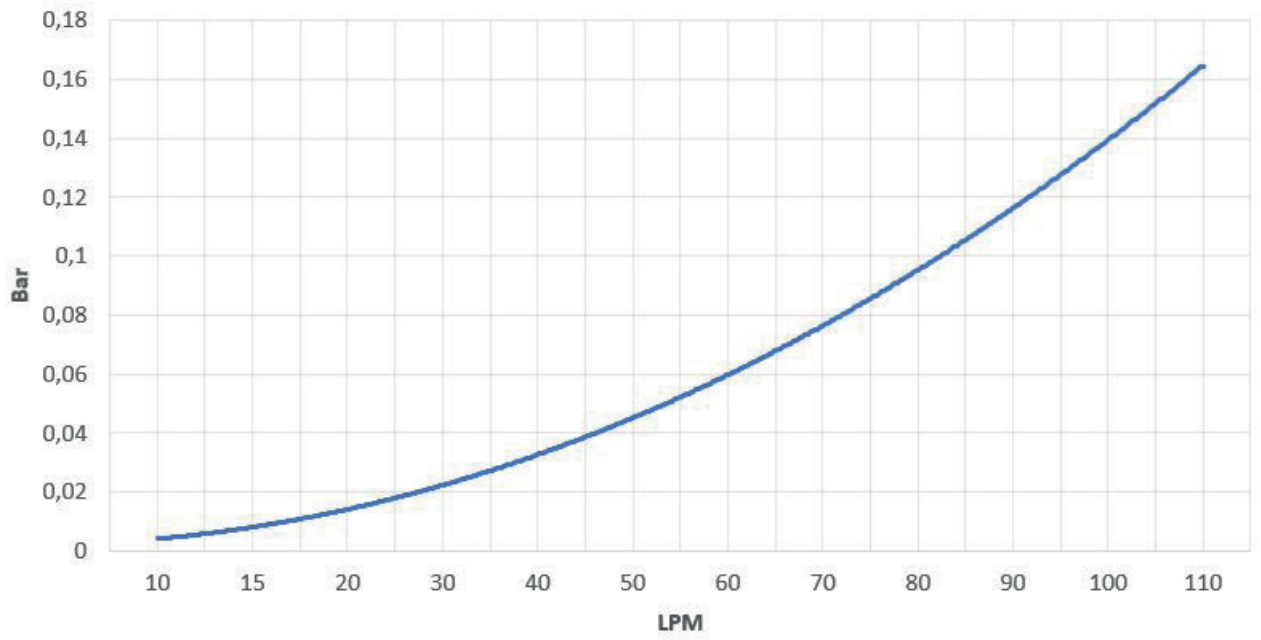
* max. speed 4750 RPM / noise level tolerance ± 3 dB(A). Components in the vicinity can change the sound values significantly.



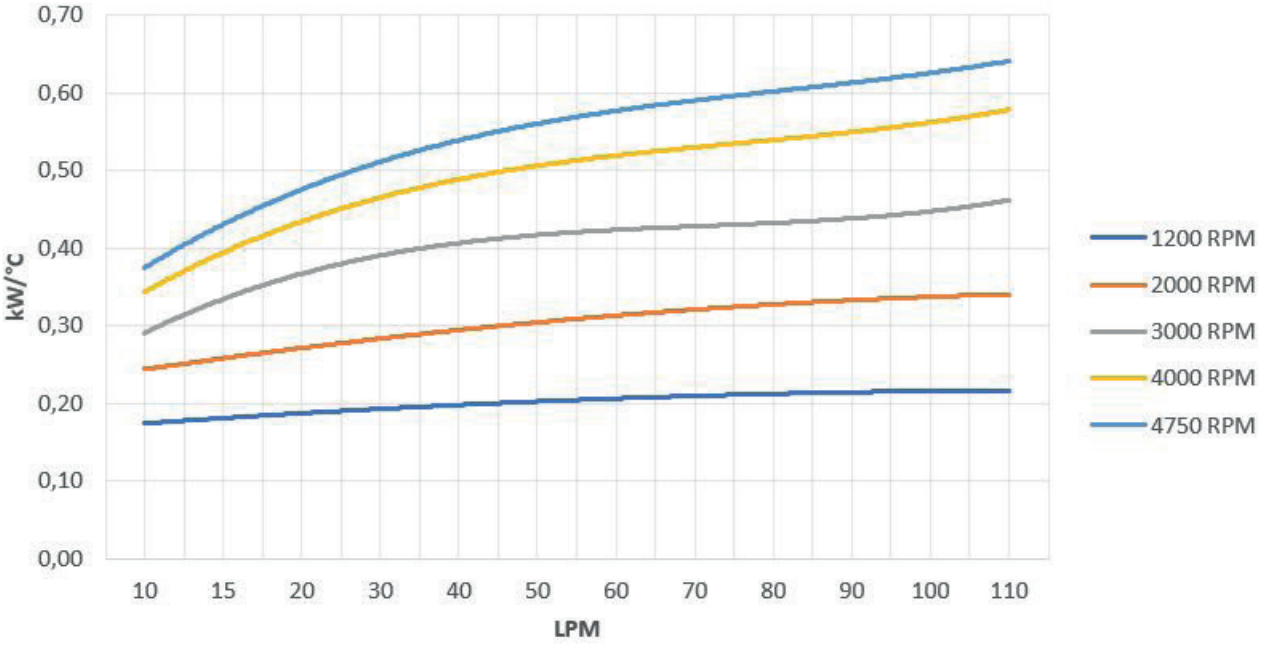
QDC 016 - A/RPM



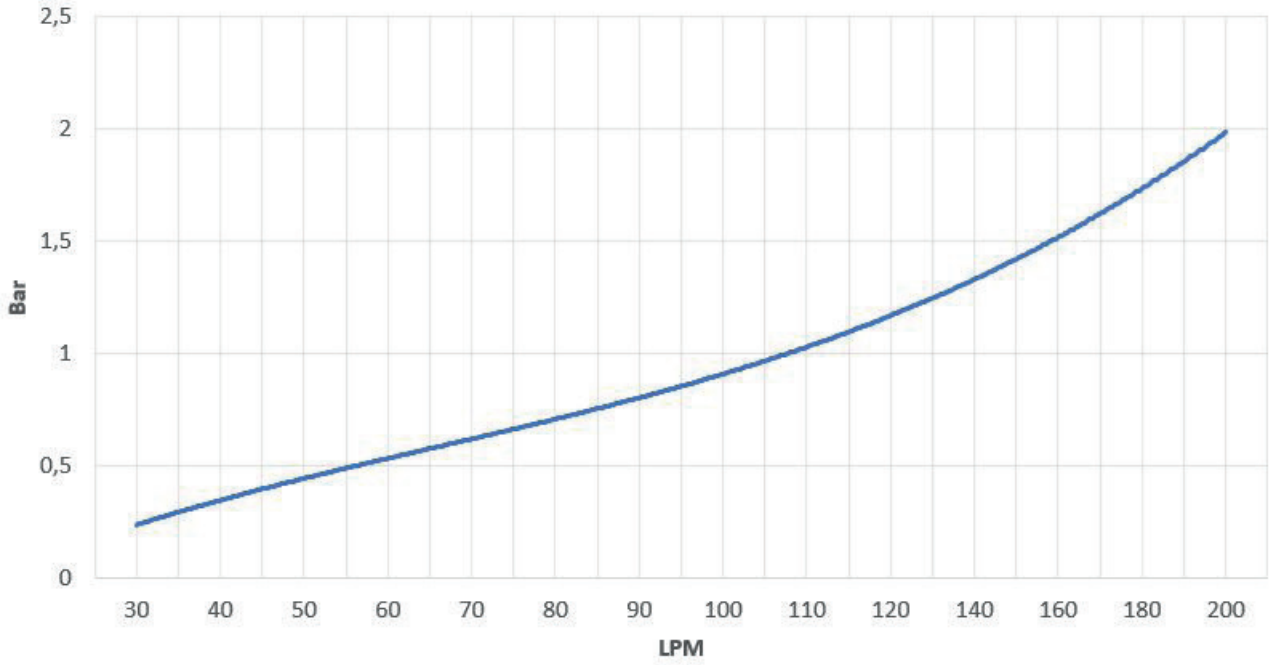
QDC 016 pressure drop (water glycol mix 50% / 50%)



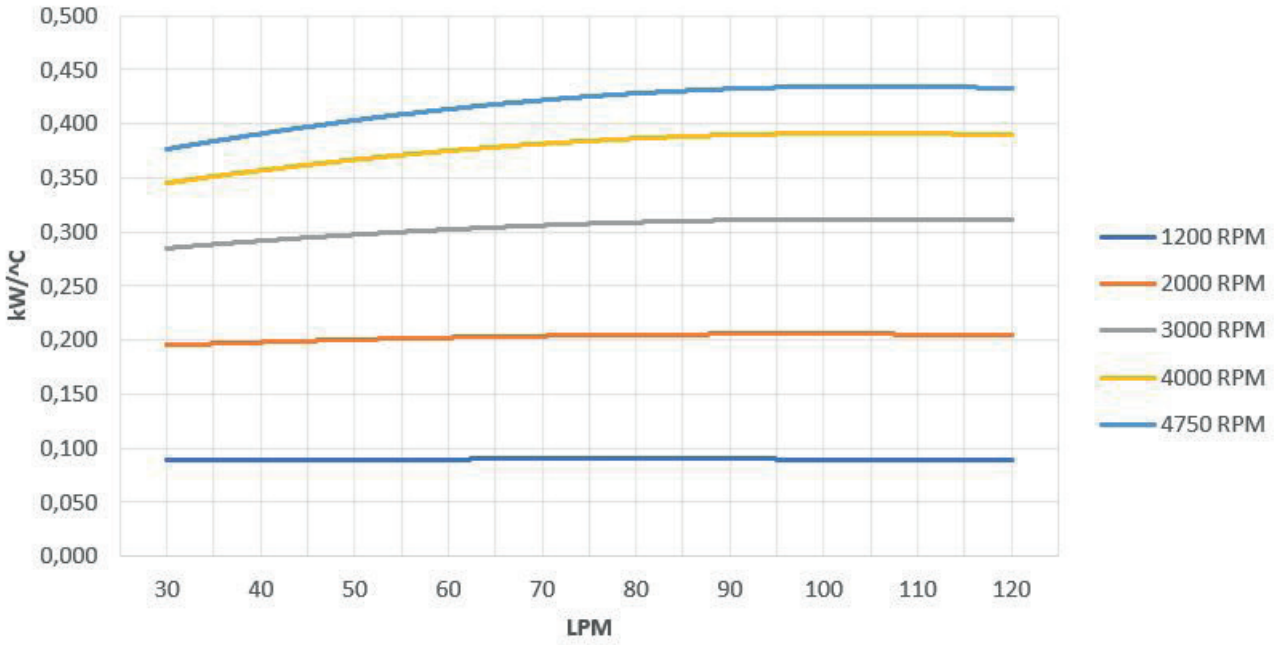
QDC 016 cooling capacity (water glycol mix 50% / 50%)



QDC 016 pressure drop (mineral oil)



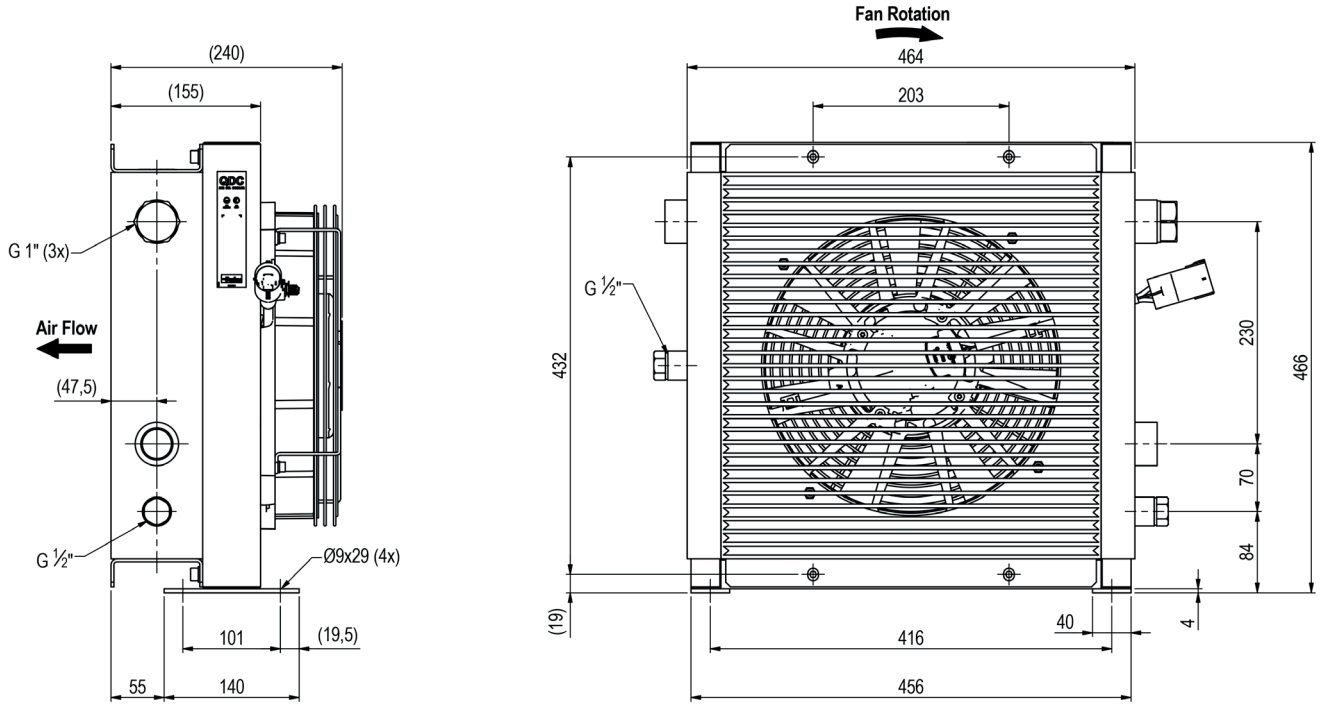
QDC 016 cooling capacity (mineral oil)



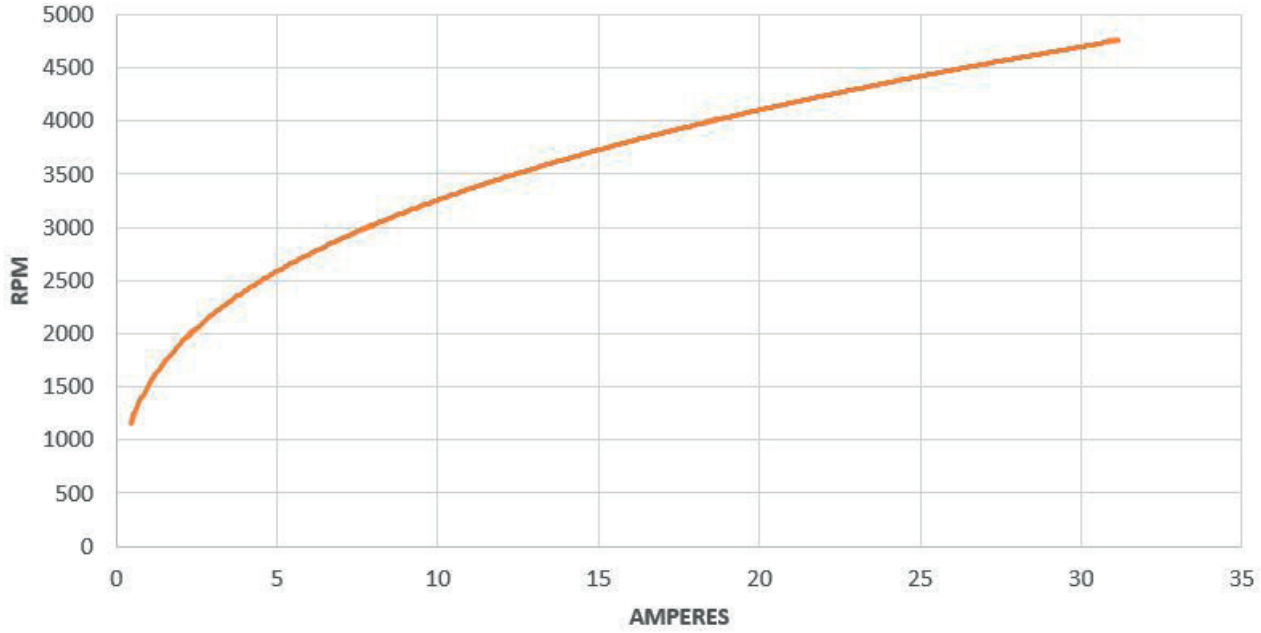
QDC 017

Type	P/N	Total dimension [mm]	Weight [kg]	LpA dB(A)1 m
QDC 017	5847017001	464 x 466 x 240	19.8	50 - 86*

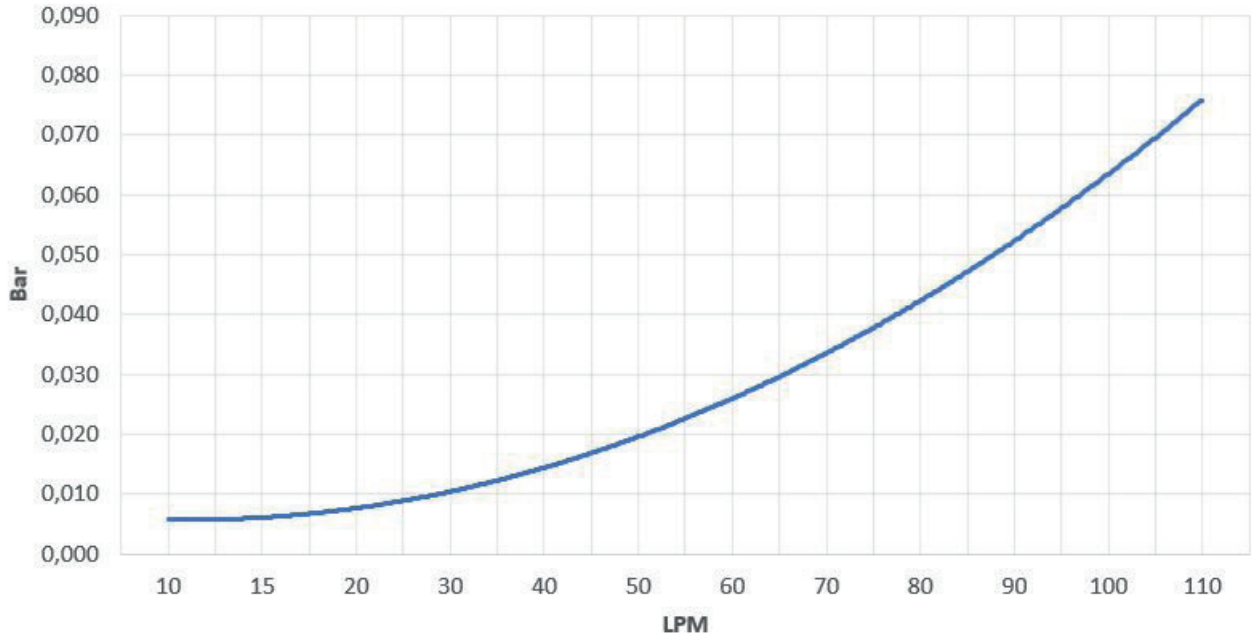
* max. speed 4750 RPM / noise level tolerance ± 3 dB(A). Components in the vicinity can change the sound values significantly.



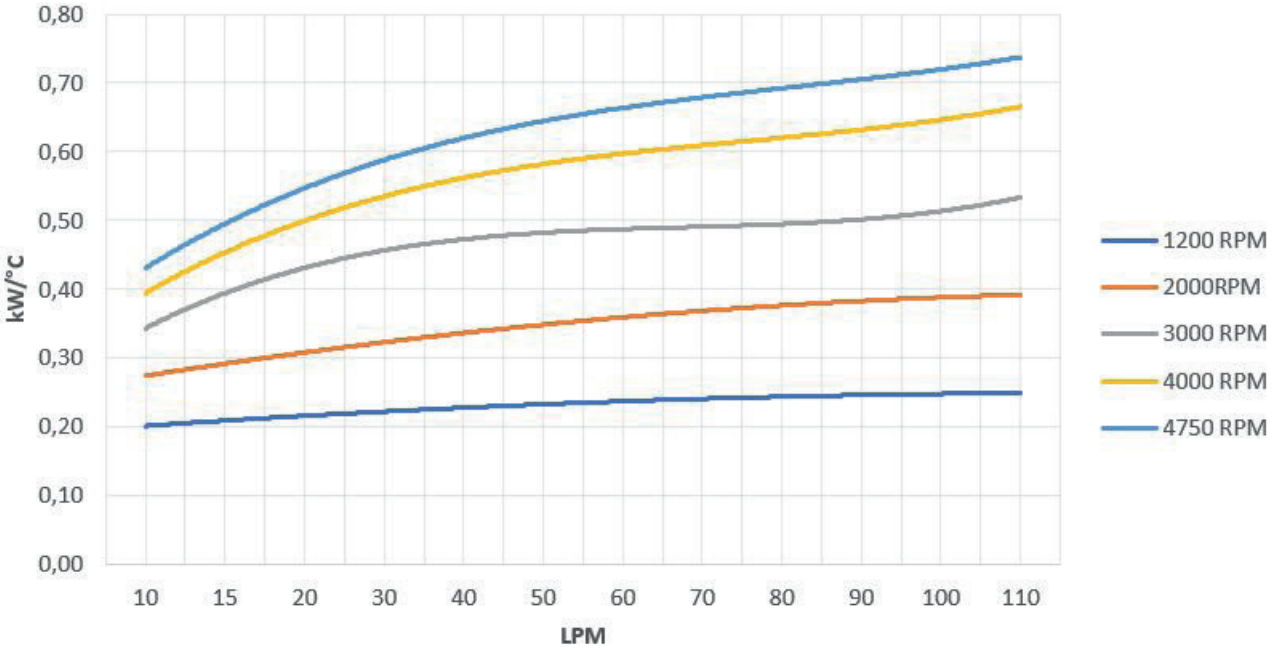
QDC 017 - A/RPM



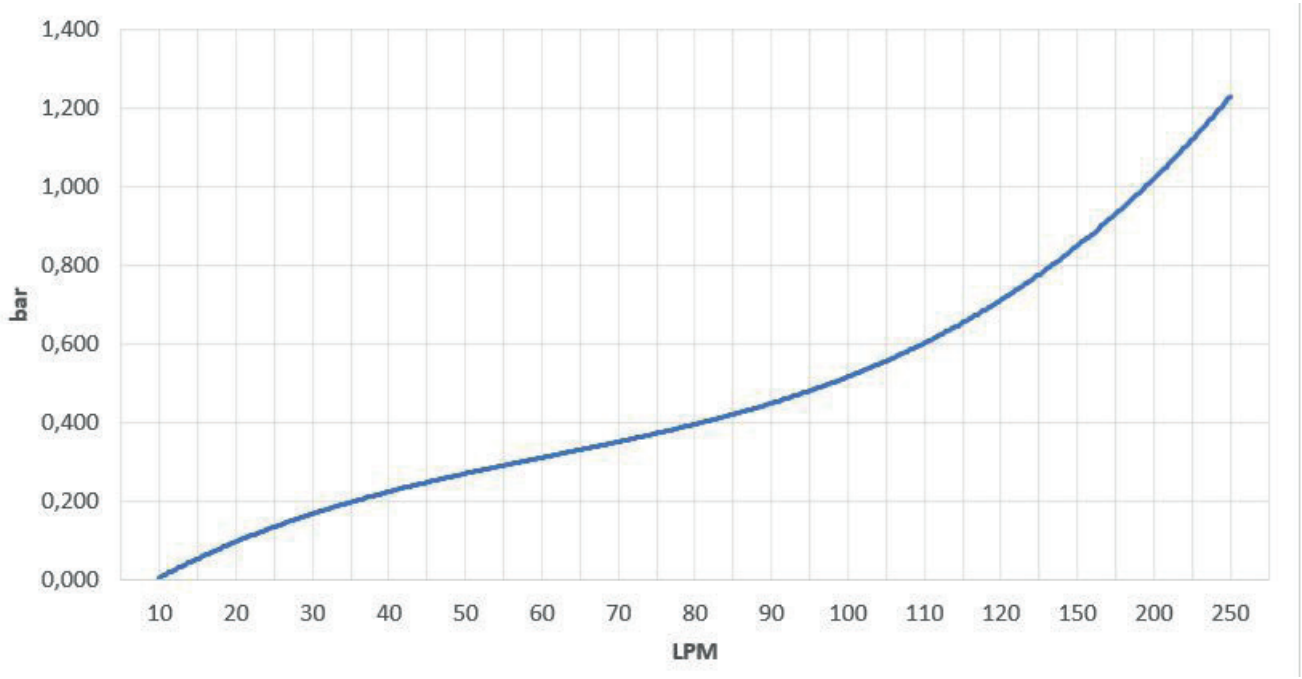
QDC 017 pressure drop (water glycol mix 50% / 50%)



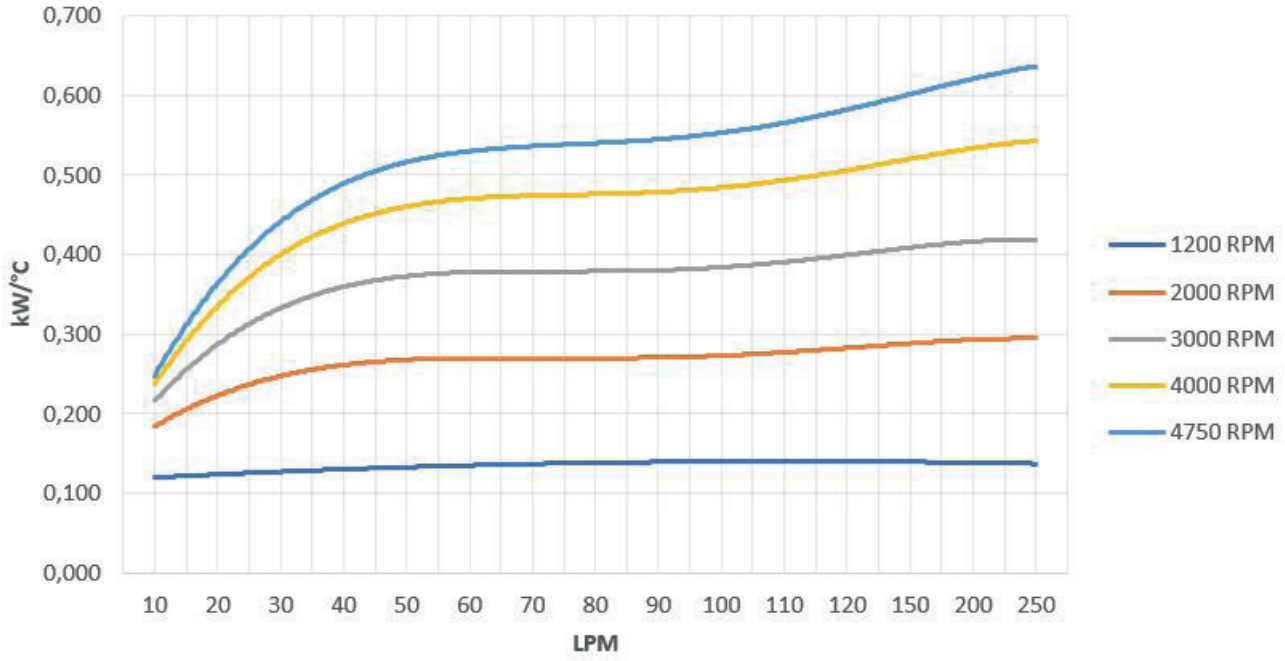
QDC 017 cooling capacity (water glycol mix 50% / 50%)



QDC 017 pressure drop (mineral oil)



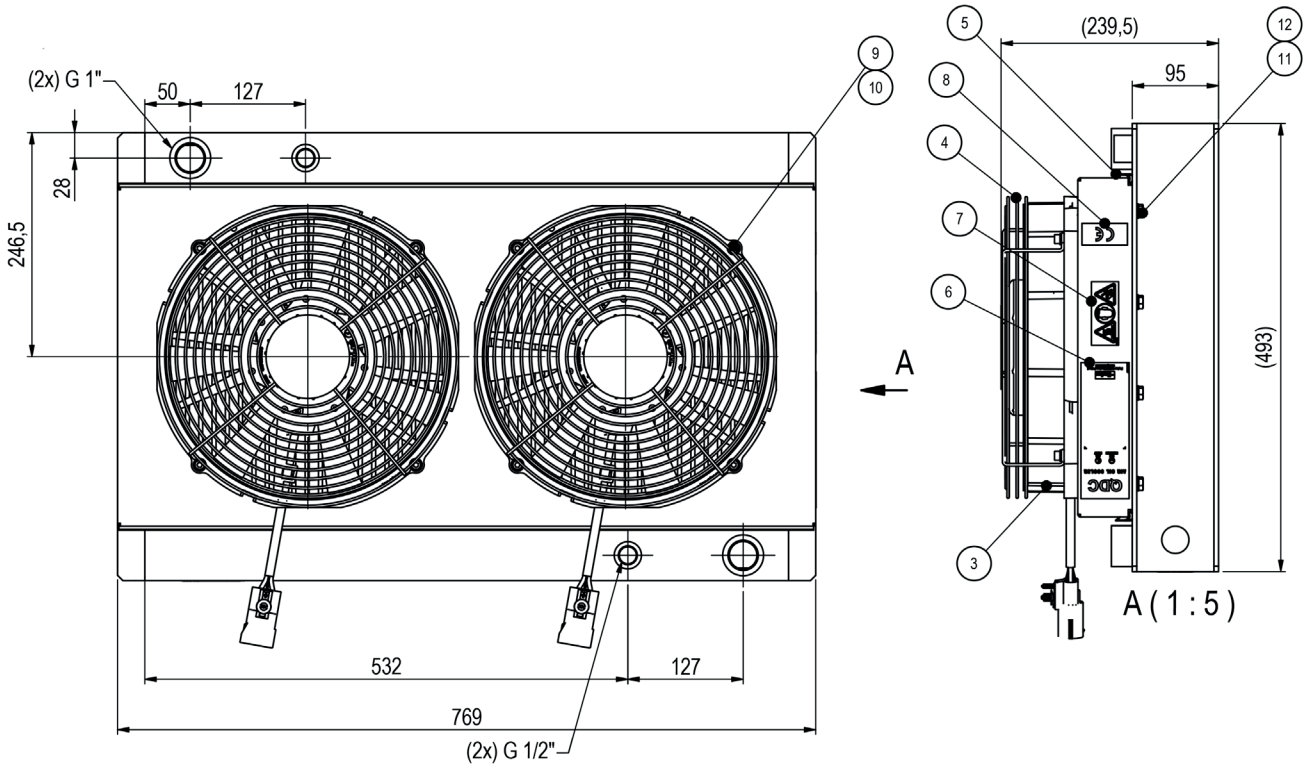
QDC 017 cooling capacity (mineral oil)



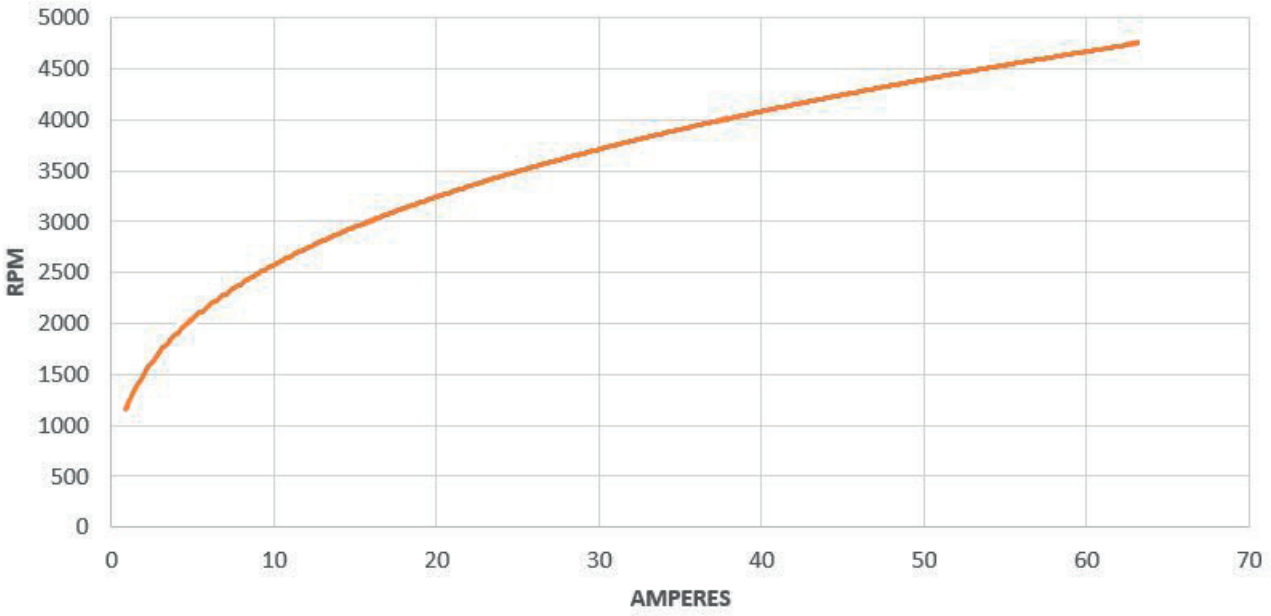
QDC 025

Type	P/N	Total dimension [mm]	Weight [kg]	LpA dB(A)1 m
QDC 025	5847025001	769 x 493 x 239.5	13.4	50 - 86*

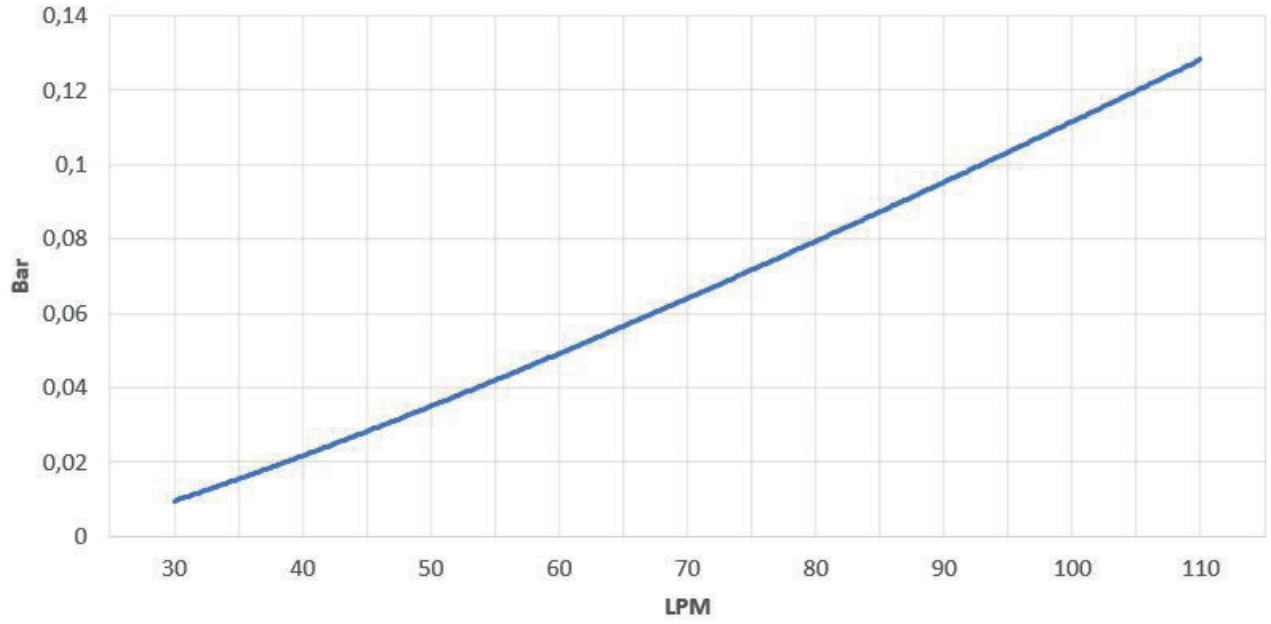
* max. speed 4750 RPM / noise level tolerance ± 3 dB(A). Components in the vicinity can change the sound values significantly.



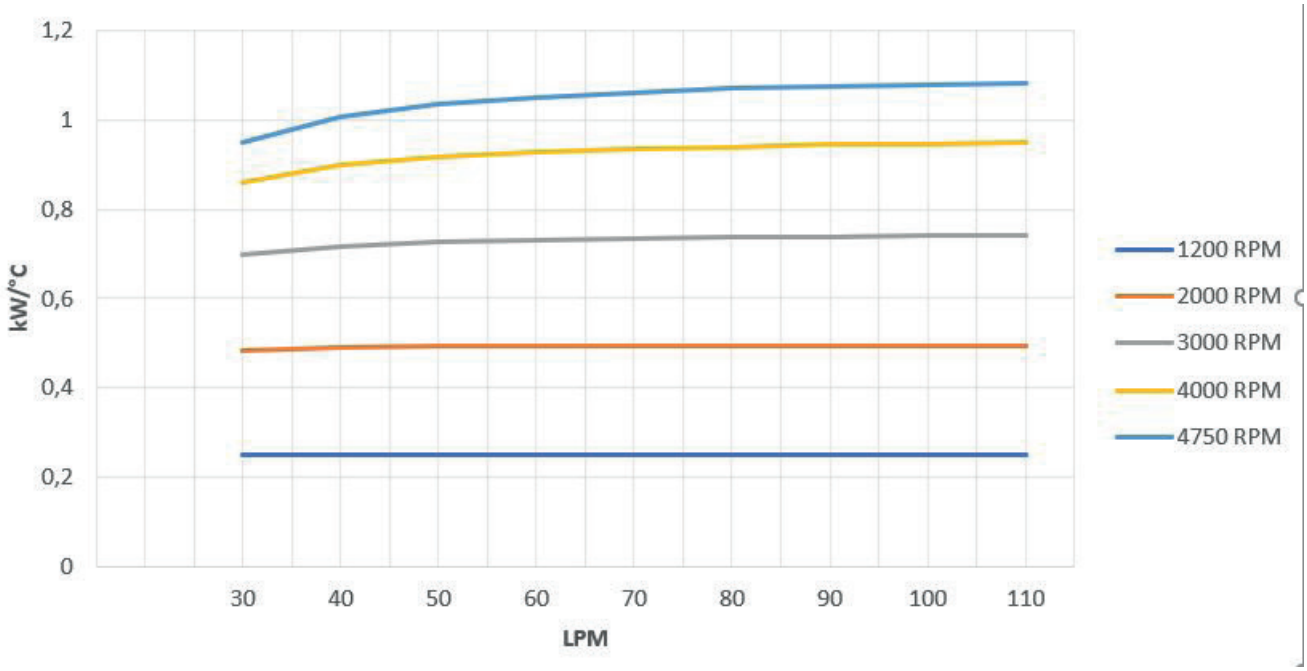
QDC 025 - A/RPM



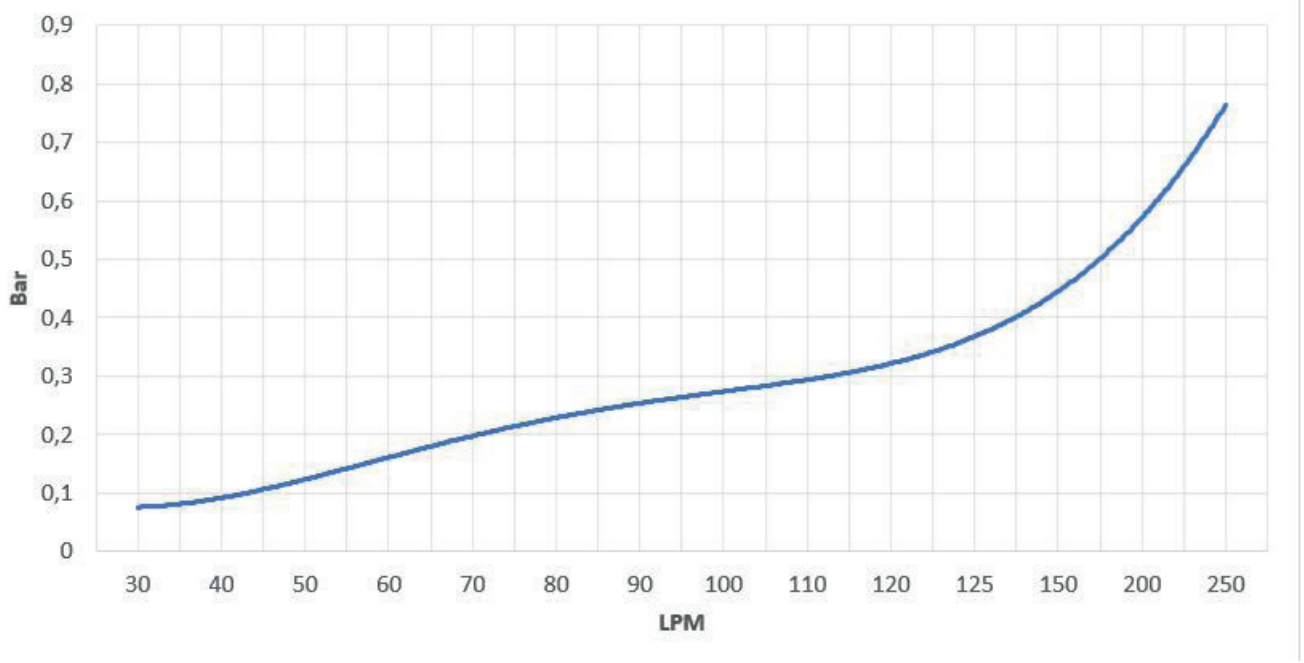
QDC 025 pressure drop (water glycol mix 50% / 50%)



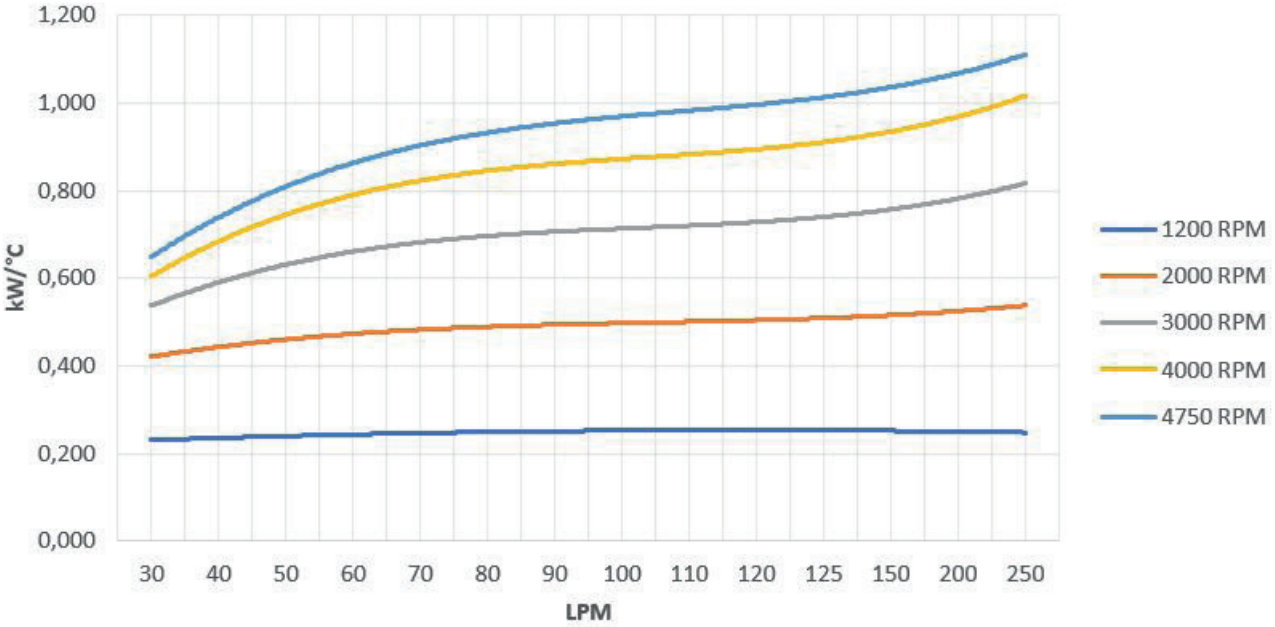
QDC 025 cooling capacity (water glycol mix 50% / 50%)



QDC 025 pressure drop (mineral oil)



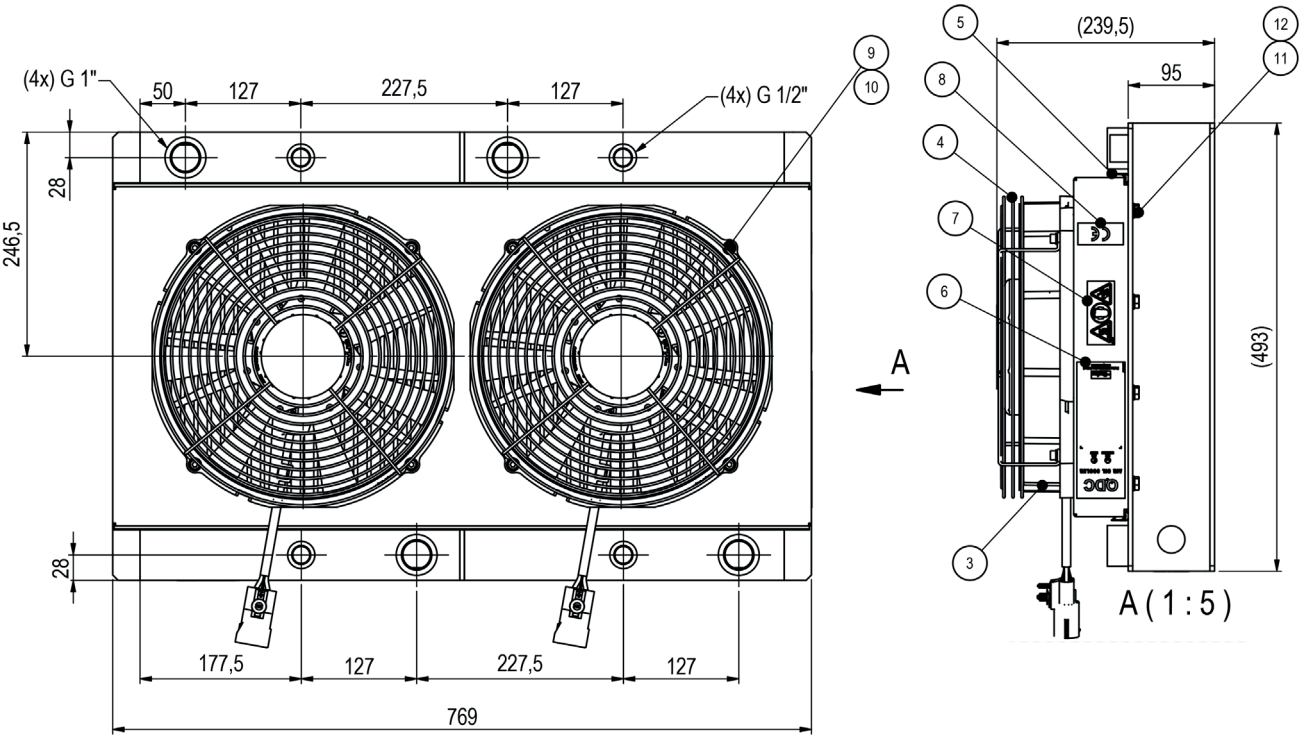
QDC 025 cooling capacity (mineral oil)



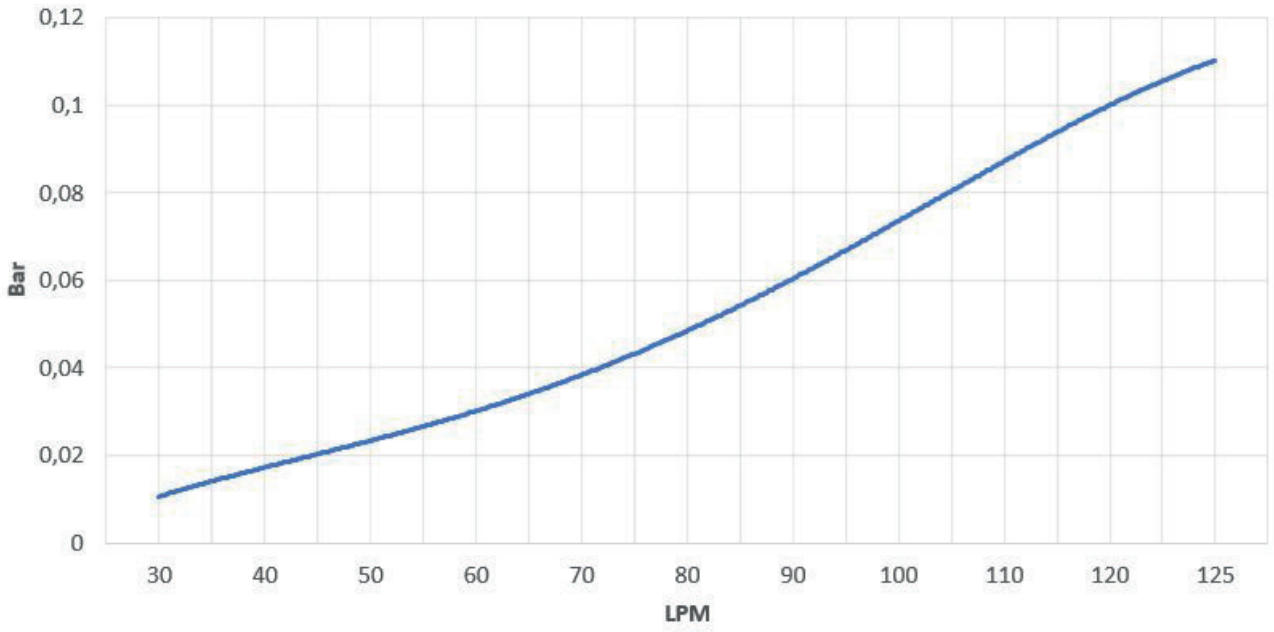
QDC 025 with 2 segments

Type	P/N	Total dimension [mm]	Weight [kg]	LpA dB(A)1 m
QDC 025	5847025002	464 x 466 x 240	19.8	50 - 86*

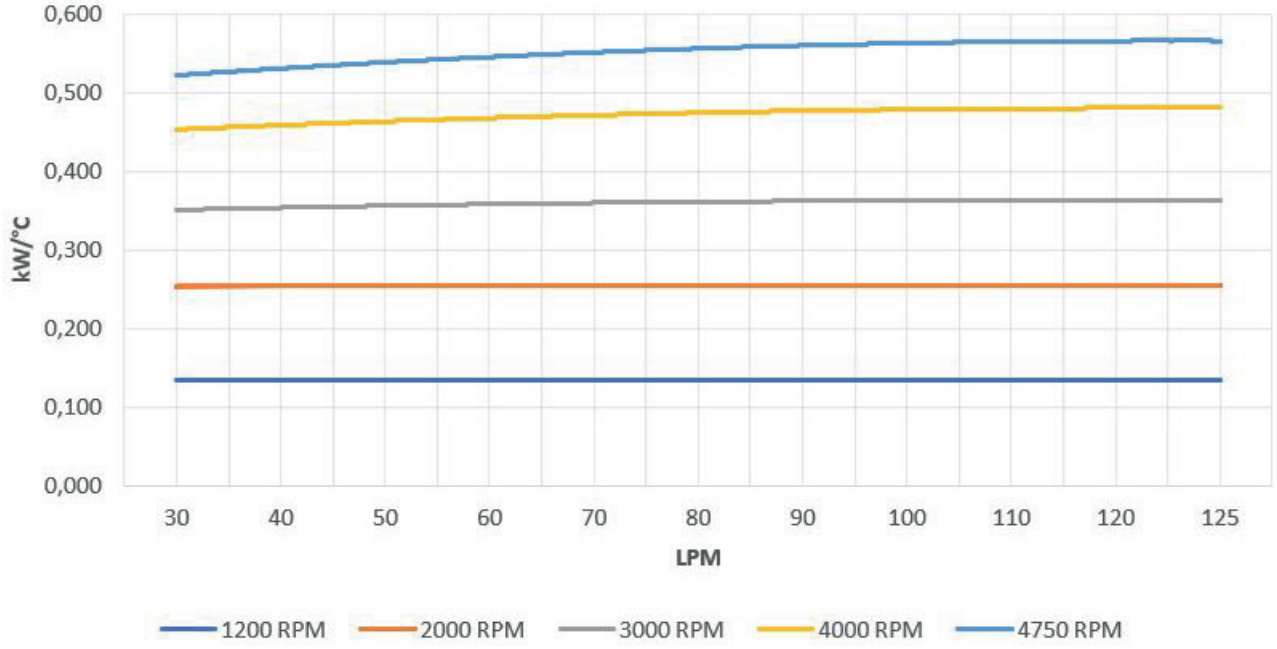
* max. speed 4750 RPM / noise level tolerance ± 3 dB(A). Components in the vicinity can change the sound values significantly.



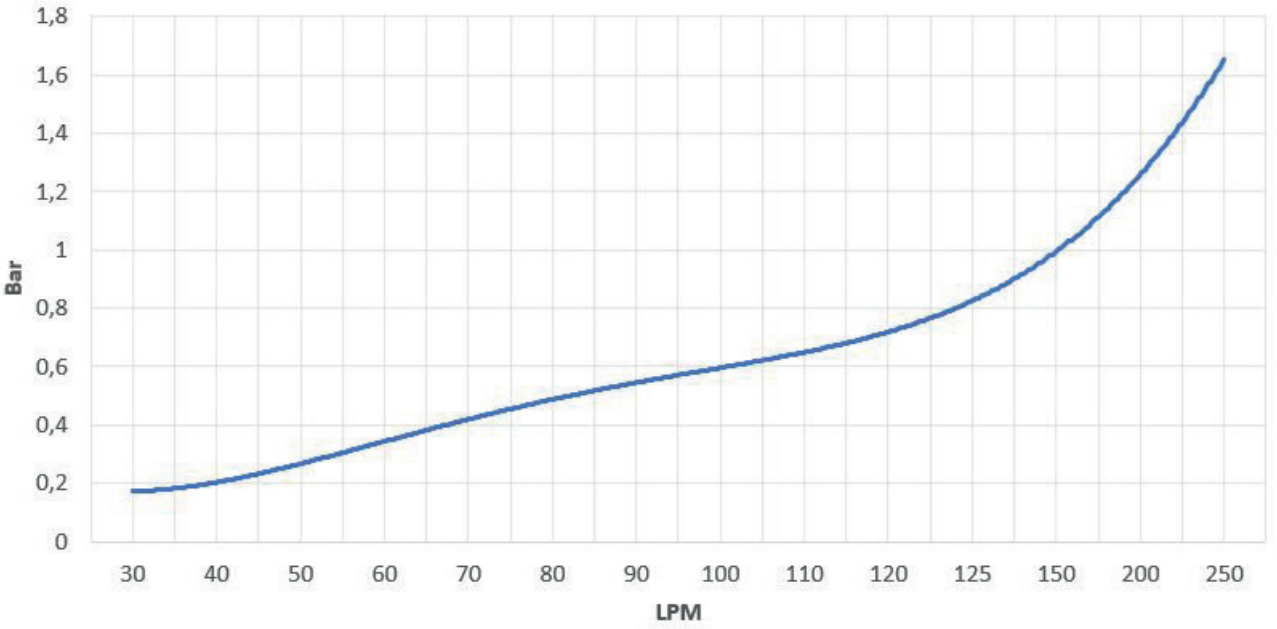
QDC 025 segment 1 pressure drop (water glycol mix 50% / 50%)



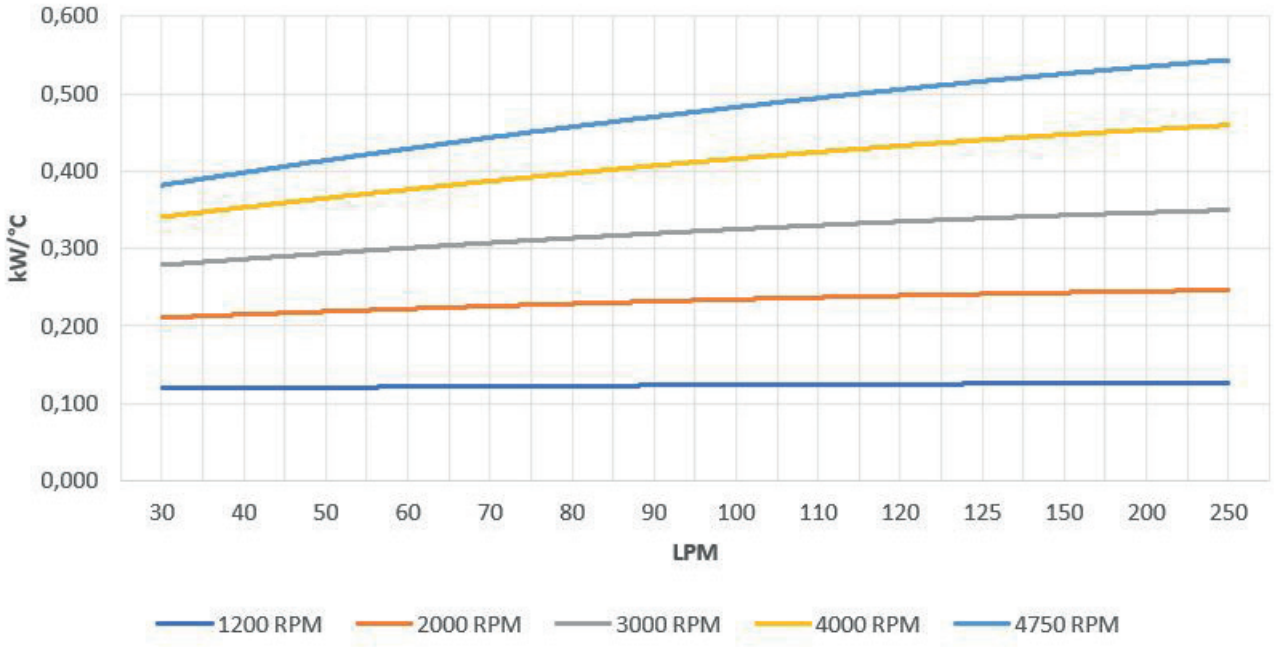
QDC 025 segment 1 cooling capacity (water glycol mix 50% / 50%)



QDC 025 segment 1 pressure drop (mineral oil)



QDC 025 segment 1 cooling capacity (mineral oil)

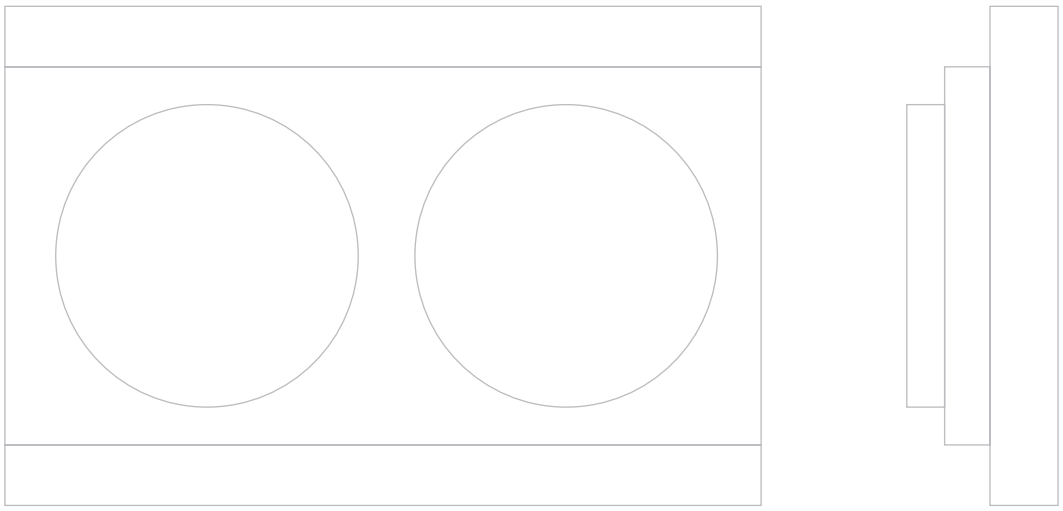


QDC 050

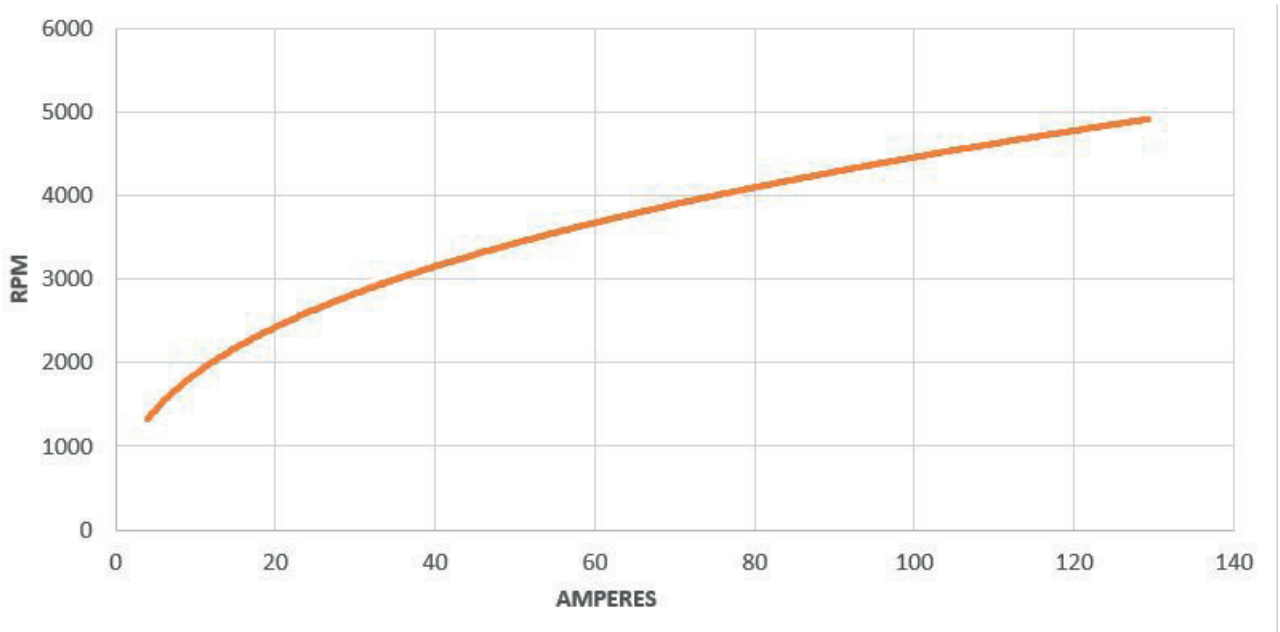
Type	P/N	Total dimension [mm]	Weight [kg]	LpA dB(A)1 m
QDC 050	5847050001	769 x 866 x 239.5	27	50 - 86*

* max. speed 4750 RPM / noise level tolerance ± 3 dB(A). Components in the vicinity can change the sound values significantly.

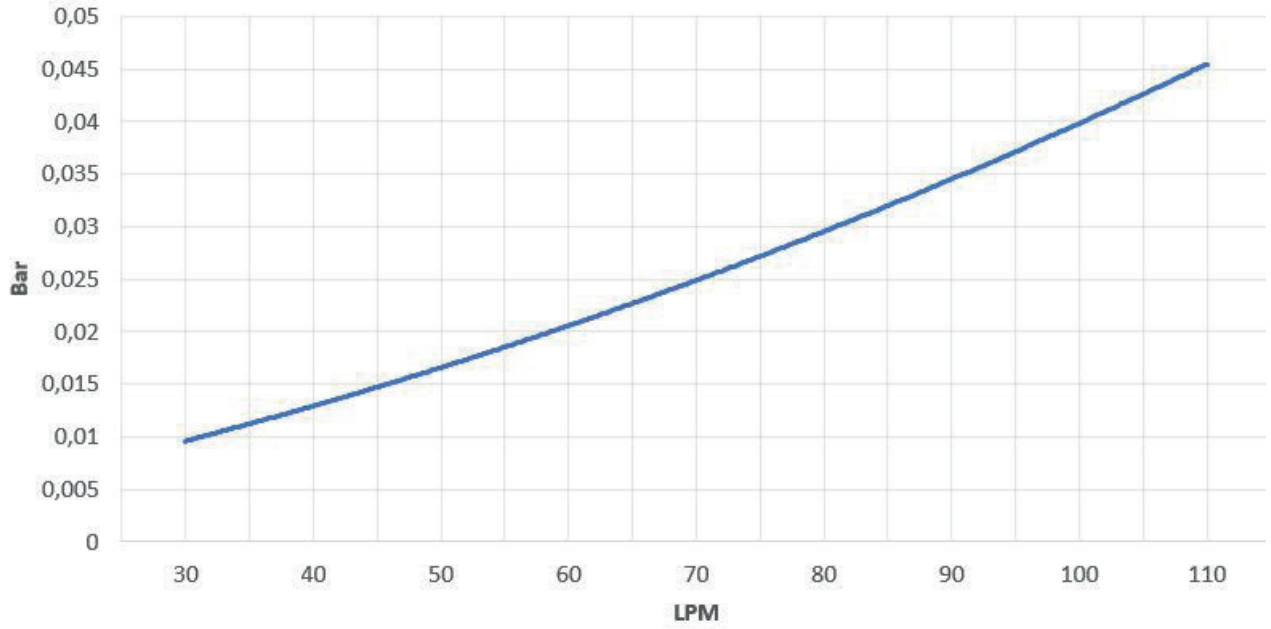
Dimensional draw on request



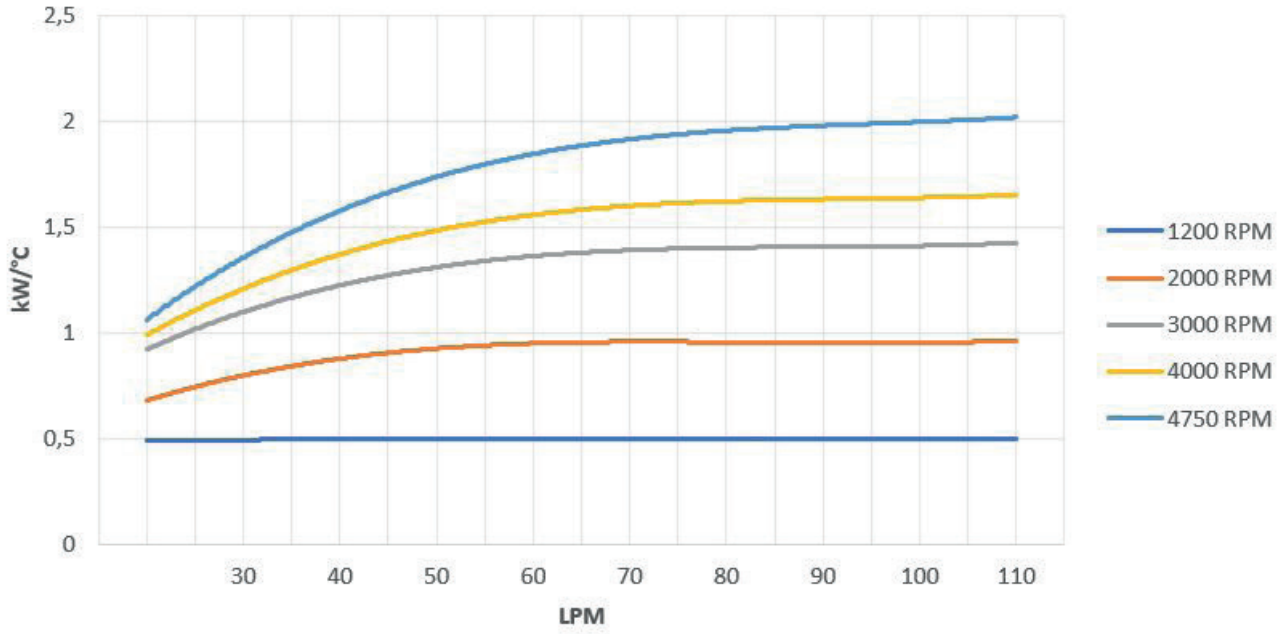
QDC 050 - A/RPM



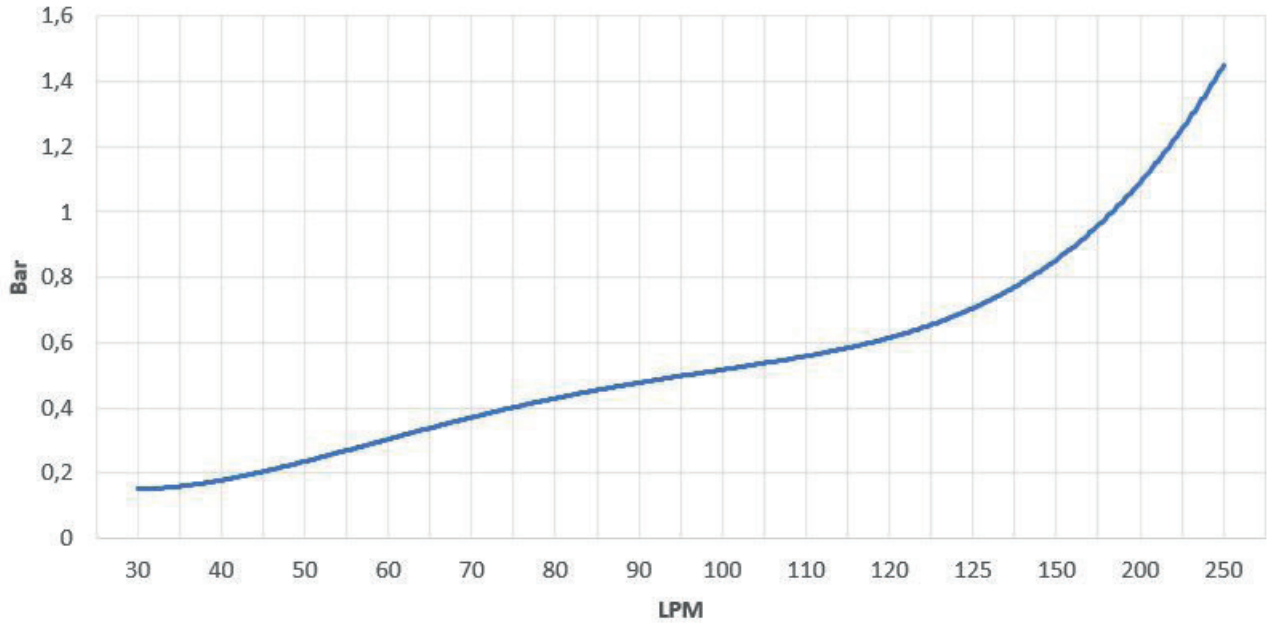
QDC 050 pressure drop (water glycol mix 50% / 50%)



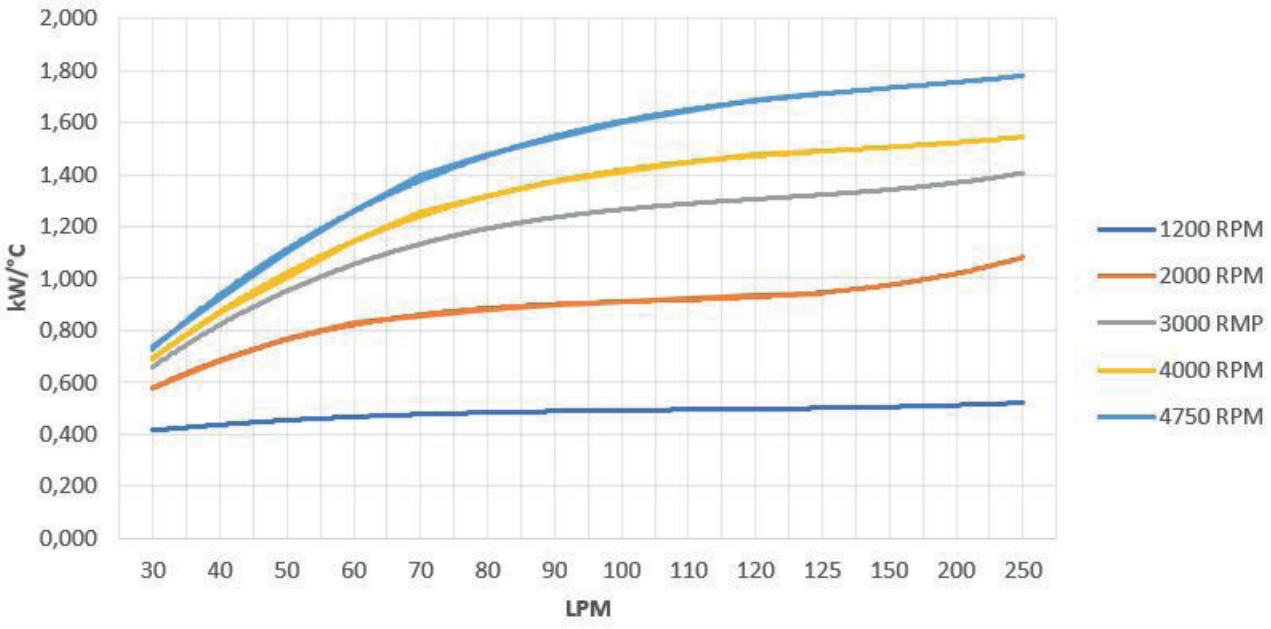
QDC 050 cooling capacity (water glycol mix 50% / 50%)



QDC 050 pressure drop (mineral oil)



QDC 050 cooling capacity (mineral oil)

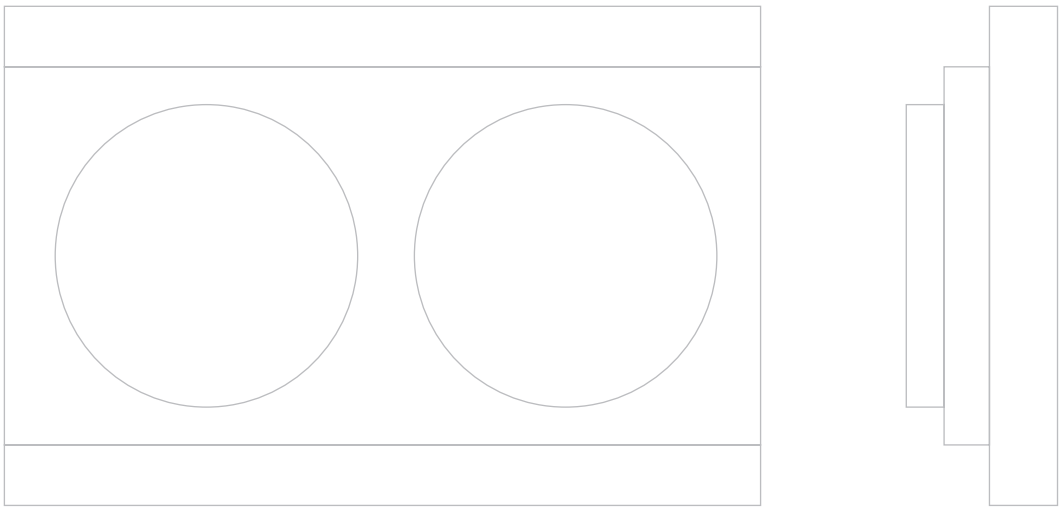


QDC 075

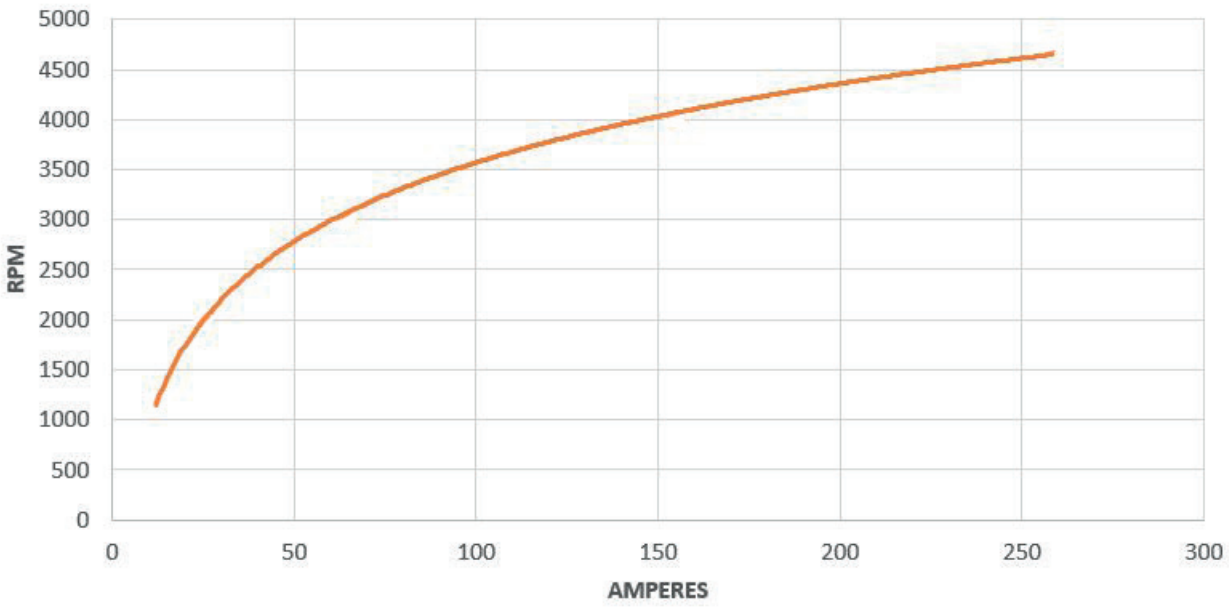
Type	P/N	Total dimension [mm]	Weight [kg]	LpA dB(A)1 m
QDC 075	5847075001	1124 x 866 x 239.5	41	50 - 86*

* max. speed 4750 RPM / noise level tolerance ± 3 dB(A). Components in the vicinity can change the sound values significantly.

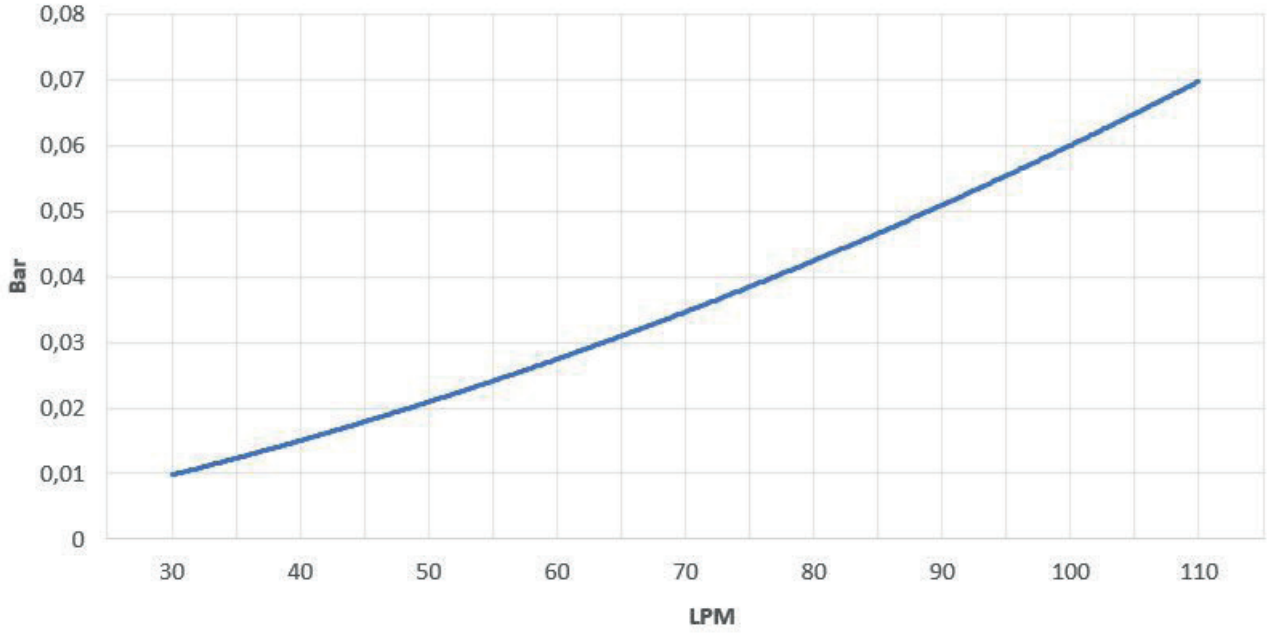
Dimensional draw on request



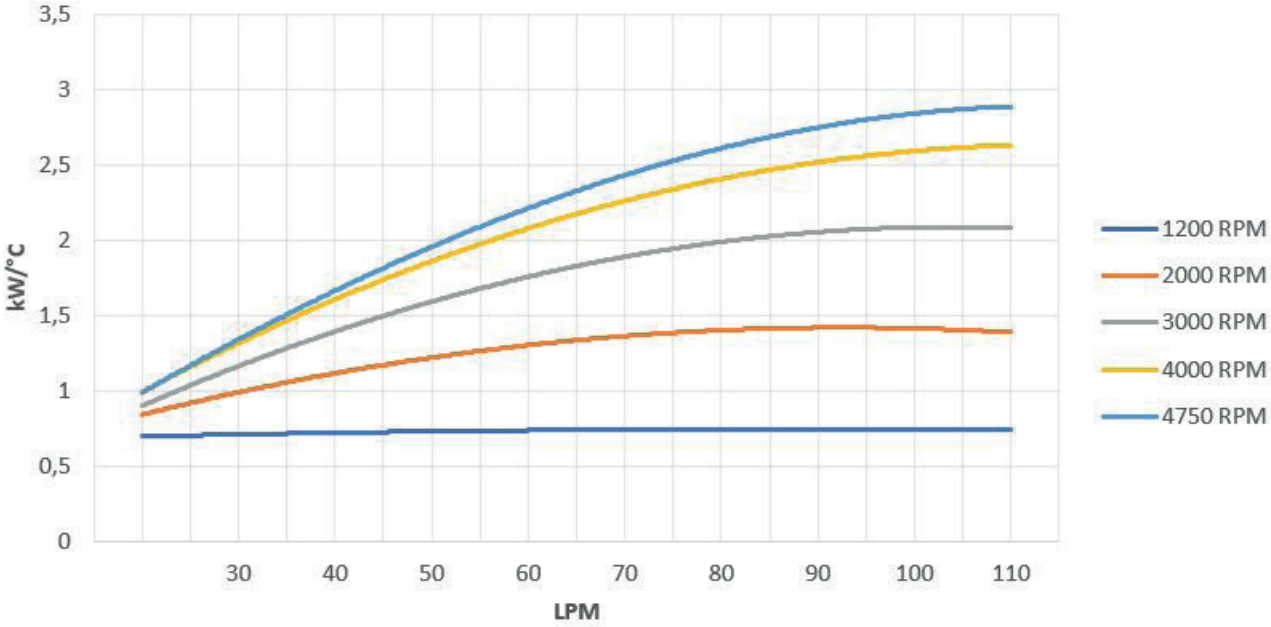
QDC 075 - A/RPM



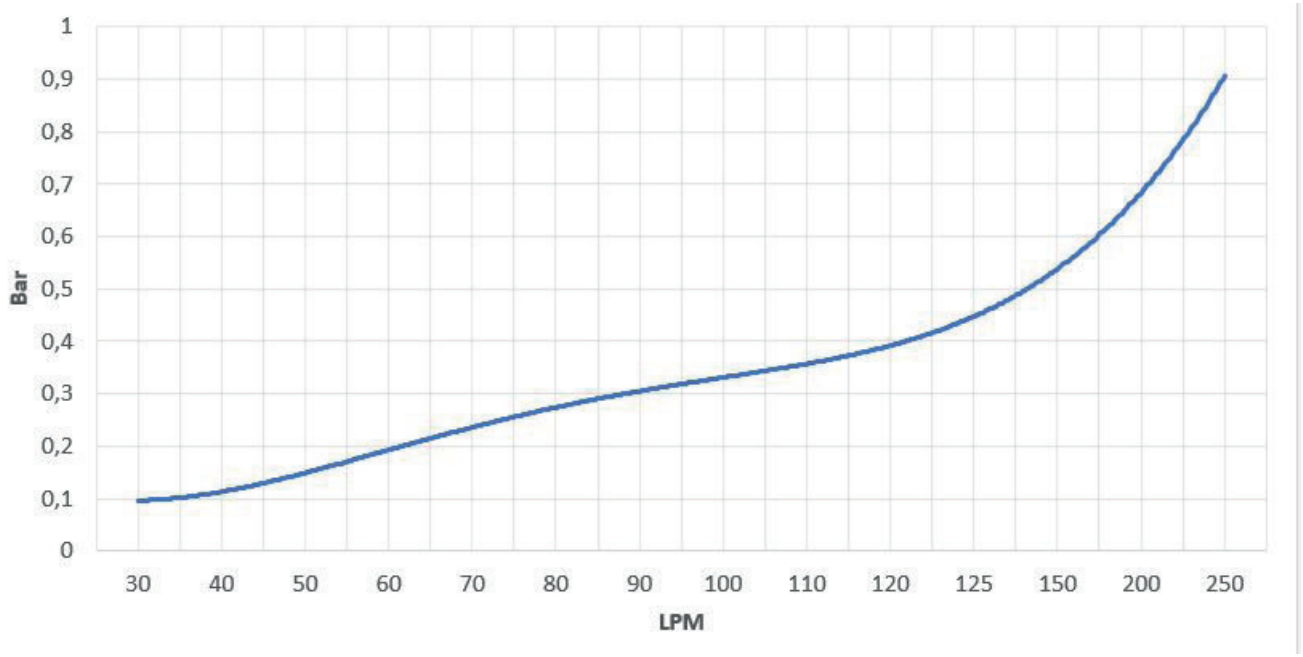
QDC 075 pressure drop (water glycol mix 50% / 50%)



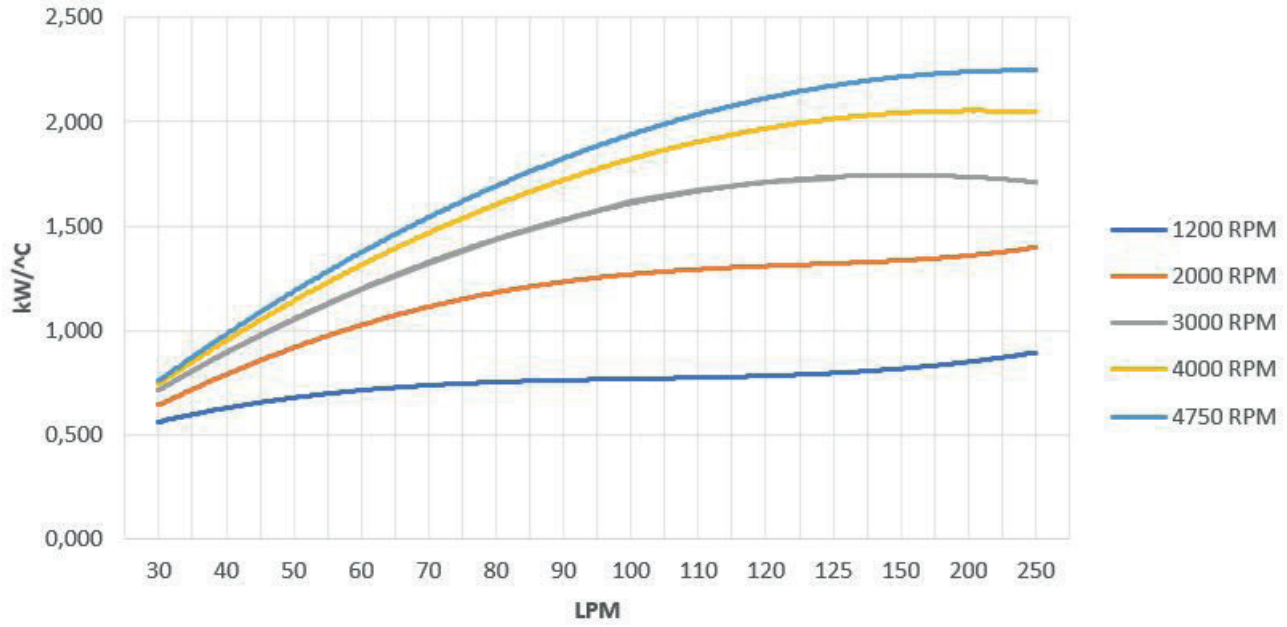
QDC 075 cooling capacity (water glycol mix 50% / 50%)



QDC 075 pressure drop (mineral oil)



QDC 075 cooling capacity (mineral oil)

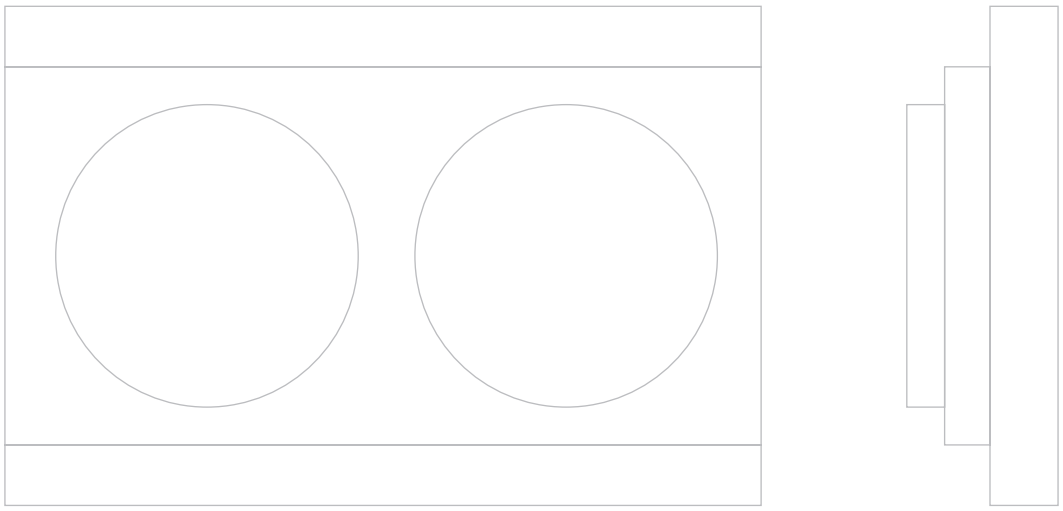


QDC 100

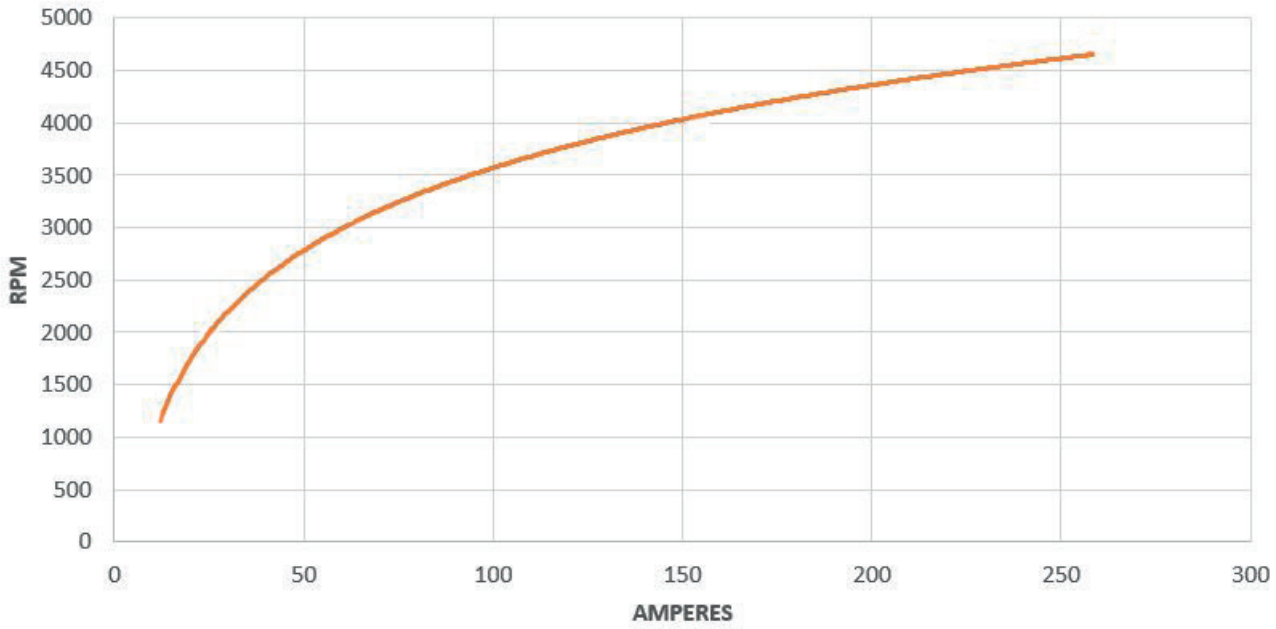
Type	P/N	Total dimension [mm]	Weight [kg]	LpA dB(A)1 m
QDC 100	5847100001	1478 x 866 x 239.5	54	50 - 86*

* max. speed 4750 RPM / noise level tolerance ± 3 dB(A). Components in the vicinity can change the sound values significantly.

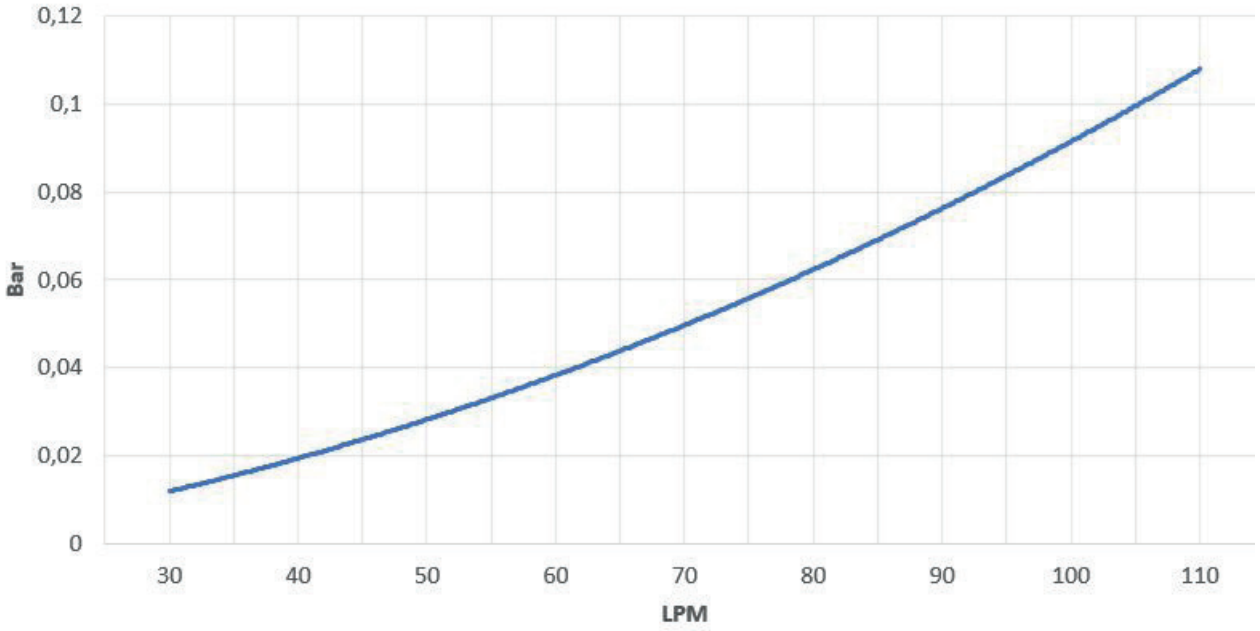
Dimensional draw on request



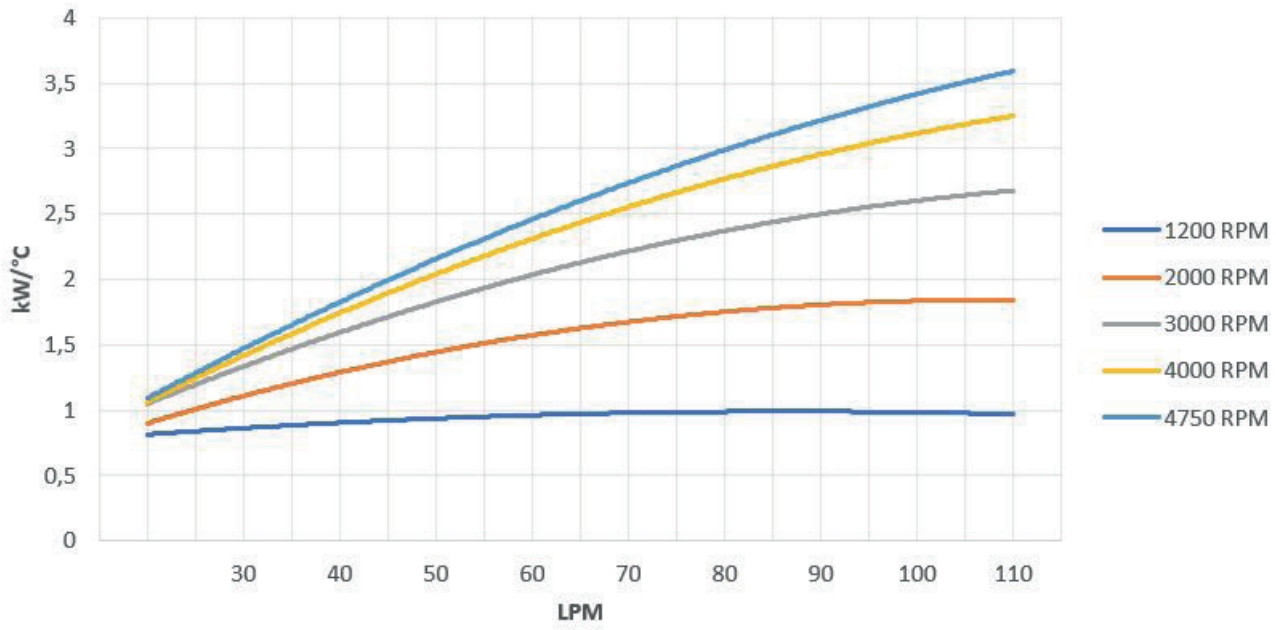
QDC 100 - A/RPM



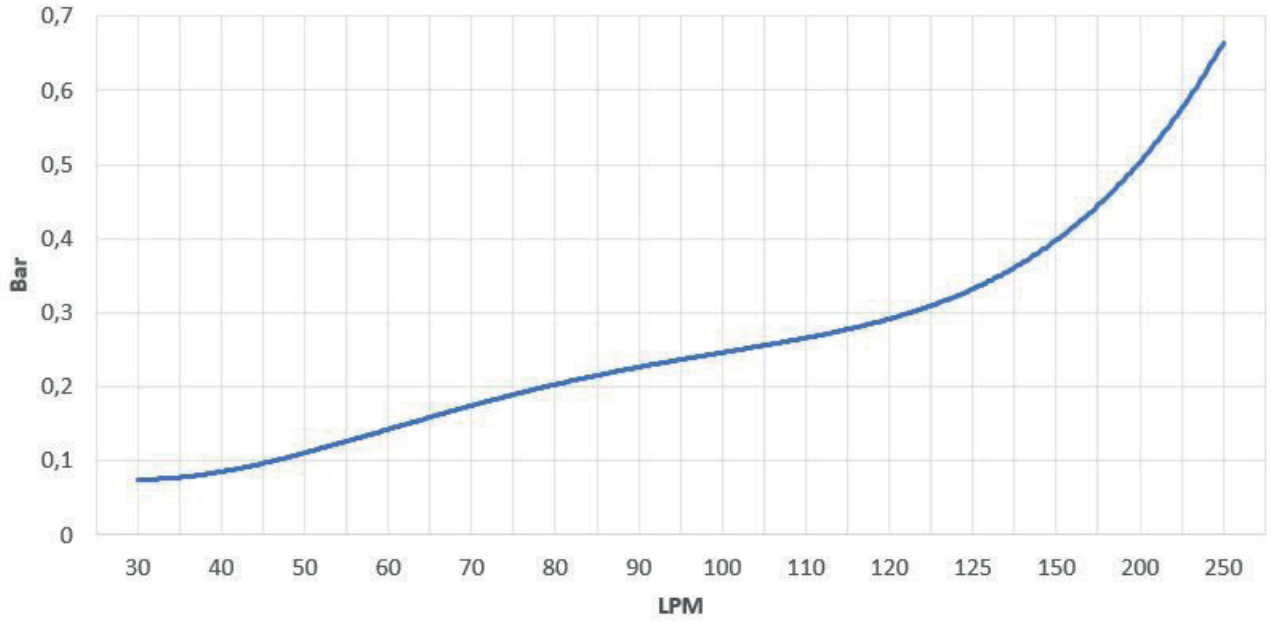
QDC 100 pressure drop (water glycol mix 50% / 50%)



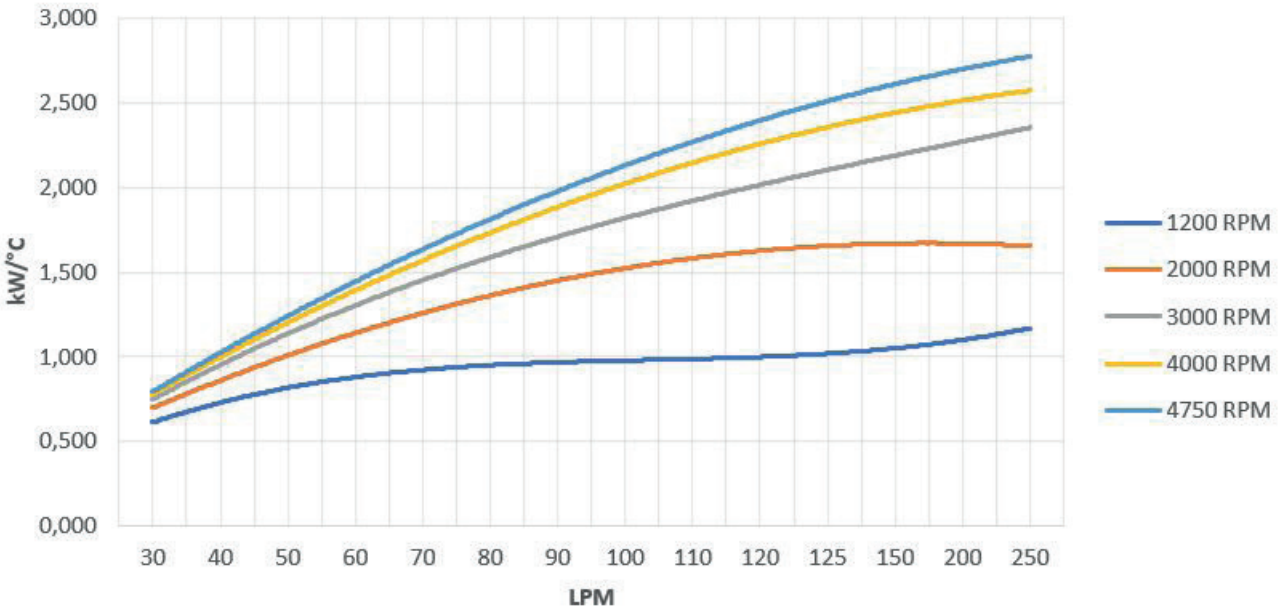
QDC 100 cooling capacity (water glycol mix 50% / 50%)



QDC 100 pressure drop (mineral oil)

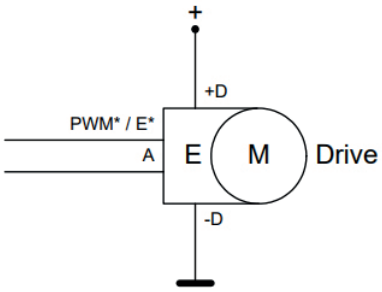


QDC 100 cooling capacity (mineral oil)



Fan data

E stands for integrated electronics. M stands for motor. Drive stands for motor with axial integrated electronics.

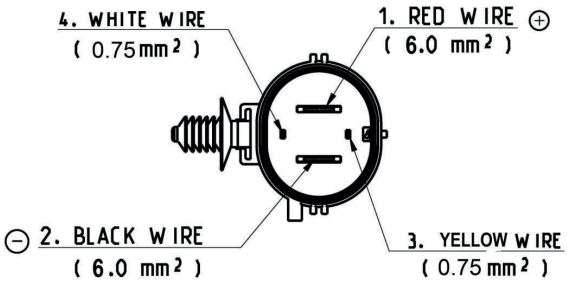


Technical data

Operating supply voltage range	[V]	16.0 ... 32.0 at the drive connector
Supply voltage to reach max. speed	[V]	26.0 ... 32.0 at the drive connector
Operating ambient temperature	[°C]	-40 to +110
Max. operating ambient temperature at max. fan speed	[°C]	+85*
Time from 0 RPM to max. speed	[s]	10
Load dump protection (pulse 5b)	[V]	65 - pulse peak voltage (U_s) - ISO16750-2:2010
Reverse polarity protection		ISO16750-1 functional status class C - device fully functional after correcting the polarity

* Few minutes ambient temperature transients do not engage the derating owing to the thermal inertia of the system. Overloads may anticipate derating.

Connector and wires



Identification (*)	+D	-D	A	PWM* / E*
Pin number	1	2	3	4
Wire colour	Red	Black	Yellow	White
Section (mm^2)	6.0	6.0	0.75	0.75

Connector	**YAZAKI HYBRID (USCAR-2 compliant)**

Counter part connector in the rubric accessories >> **Link**

Further features

Compliance		ECE reg. 10-04 and updates - automotive EMC directive
		2002/95/EC RoHS - hazardous substances
		2000/53/EC and updates - end-of-life vehicle
Ingress protection		IP 68 and IP6K9K design
Allowed power supply max. ripple	[ms]	1 % - contact Parker for special needs
Fuse protection		An automotive fuse according ISO8820 must be chosen and used by the customer in the application wire harness. Each drive must be protected by the unique proper fuse (e.g. in case of double fan modules, two fuses are needed)

Measurement conditions

The below conditions are assumed:

T_{AMB} = 20°C +/- 5°C

Supply voltage **UB** = 26.0V at the **drive** connector - unless otherwise specified.

Drive pin functions

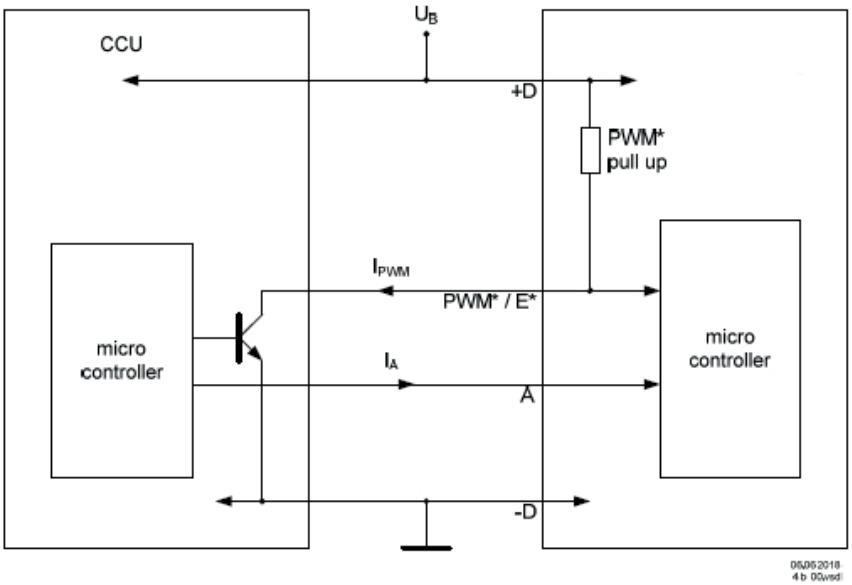
The electrical drive interface consists of 4 pins.

Power pins:
- supply voltage plus: +D
- supply voltage minus: -D

Signal pins:
- Input: digital PWM input / active low: PWM* / E*
- Input: analogue input: A

The signal pin PWM* / E* is used to control the drive mode, it is not the control input.
The signal pin A can be used to control the speed of the drive.

Drive interface



The drive interface, i.e. the connections between the CCU (custom control unit) and the drive, is depicted in the picture above.

The CCU electronics and the drive electronics are connected via two unidirectional lines. The PWM signal for the input PWM* / E* comes from the CCU electronics and uses a pull up resistor (PWM* / E* pull up) located in the drive electronics to determine the recessive level.
This pull up resistor is connected to the supply voltage plus: +D / UB. The dominant level on the input PWM* / E* is low level, provided by the switching to ground stage depicted in above figure. as a bipolar npn transistor in the CCU.

Interface hardware for digital control: pin PWM* / E*

The input PWM* / E* is used to wake up the drive from quiescent current mode. Any PWM duty cycle that guarantees a pulse going to the dominant level for more than T_{wakeup} will wake up the drive electronics.

Parameters	Min	Typical	Max	Unit	Denomination
PWM* / E* frequency range	50	100	500	Hz	f_{PWM} [1]
PWM* / E* duty cycle range	0	—	100	%	dc_{min} ...dc_{max}
PWM* / E* high level voltage	U_B *0.65	—	—	V	U_{PWMH}
PWM* / E* low level voltage	—	—	U_B *0.45	V	U_{PWMl}
PWM* / E* resolution	—	1	—	%	dc_{resol}
PWM* / E* accuracy	—	1	—	%	dca_{ccu}
PWM* / E* current	-10%	5.5	+10%	mA	I_{PWM*}
PWM* / E* leakage current	—	—	200	µA	I_{PWM*}
PWM* / E* wage up voltage	U_B - 2V	—	—	V	U_{PWMWU}
PWM* / E* wake up pulse	150	—	—	µs	T_{wakeup}
PWM* pull up	—	4.7	—	kΩ	—

[1] For production line internal reasons there is a test mode implemented which is activated at a PWM frequency range from 1400 Hz to 1600 Hz with dedicated duty cycles for various test modes. The application must not use this frequency range!

Interface hardware for analogue control: PIN A

Parameters	Min	Typical	Max	Unit	Denomination
A voltage range	0	—	10	V	U_A
Absolute maximum A voltage	-32	—	35	V	U_{Amax}
A current range	0	—	0.32	mA	I_A
A maximum current	-1.8	—	1.8	mA	I_{Amax}

Software functions

The drive has different working modes related mainly to the drive current consumption:

1. Quiescent current mode
2. Electronics active mode
3. Run mode
4. Failure mode

The drive mode changes accordingly to the control input duty cycle on pin PWM* / E* and the voltage level on analogue input A.

No.	Drive mode	Current consumption	Drive speed
1	Quiescent current mode	< 100 µA	0
2	Electronics active mode	< 40 µA	0
3	Run mode	depending on the requested speed and on the load	depending on the PWM duty cycle or the analogue input voltage level
4	Failure mode	< 40 µA	depending on the failure

The quiescent current mode is entered when the pin PWM* / E* is on 100 % duty cycle (recessive level). The time to go into quiescent current mode depends on the actual PWM base frequency and the number of samples for the plausibility check. Additionally 2 seconds are waited after the detection of the absence of the PWM signal before finally going into quiescent current mode.

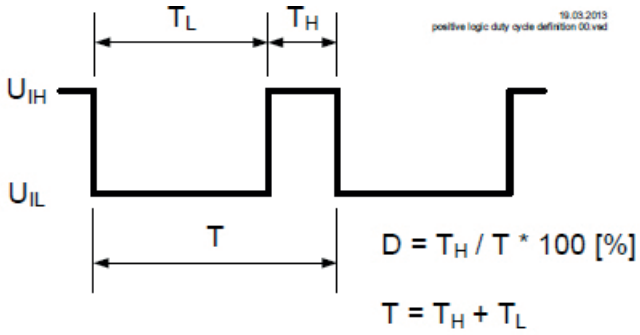
The electronics active mode is entered with any PWM duty cycle value between 0 % and < 100 % if the condition is fulfilled (T_{wakeup}). The run mode is entered in the following cases:

- if the PWM duty cycle on pin PWM* / E* has a value where the drive is asked to run
- if the analogue signal on pin analogue input A has a value where the drive is asked to run

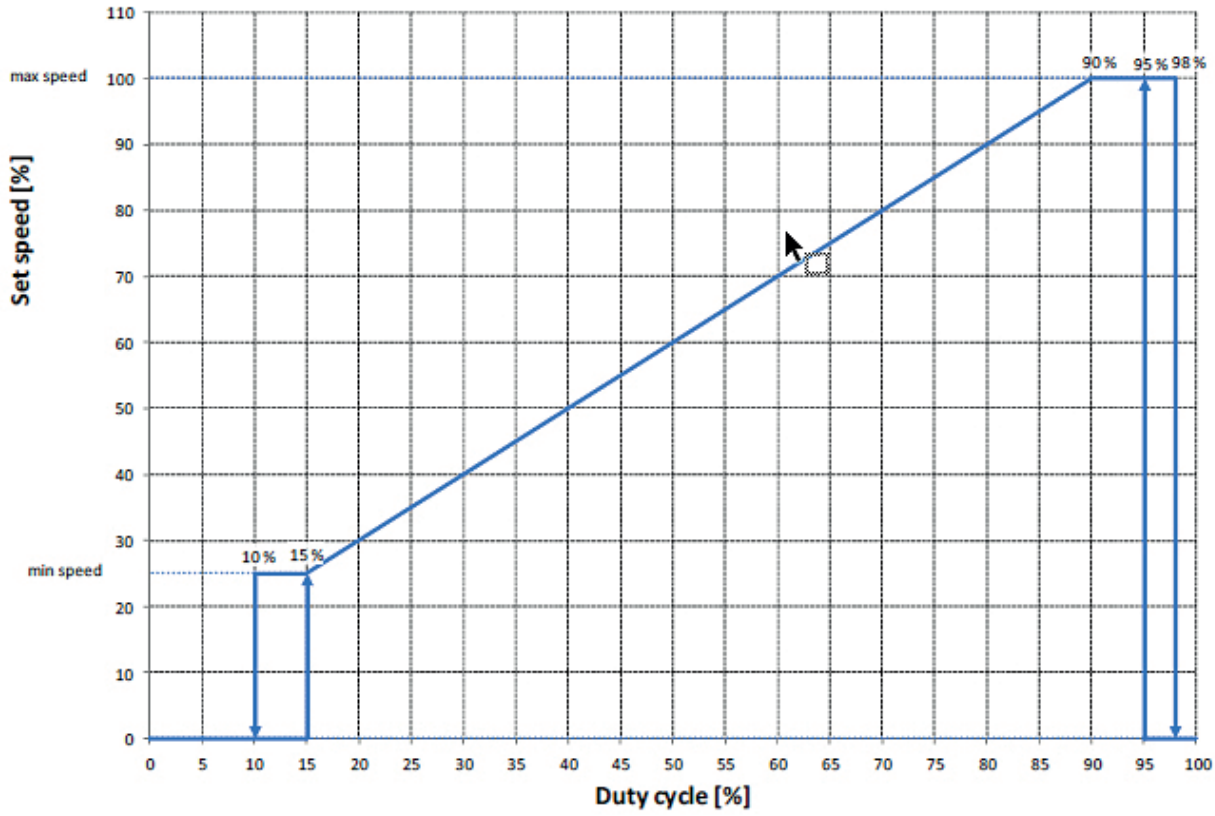
The failure mode is entered in case of failures of the drive

Digital control: transfer function PWM input

The transfer function PWM input is the relation between the drive speed and the duty cycle on the pin digital PWM input / active low: PWM* / E*.



It is called ”positive logic duty cycle definition”. Considering this definition, continuous low voltage is 0 % duty cycle (dominant level) and continuous high voltage is 100 % duty cycle (recessive level). Based on this duty cycle definition the transfer function PWM input is shown in the following figure.



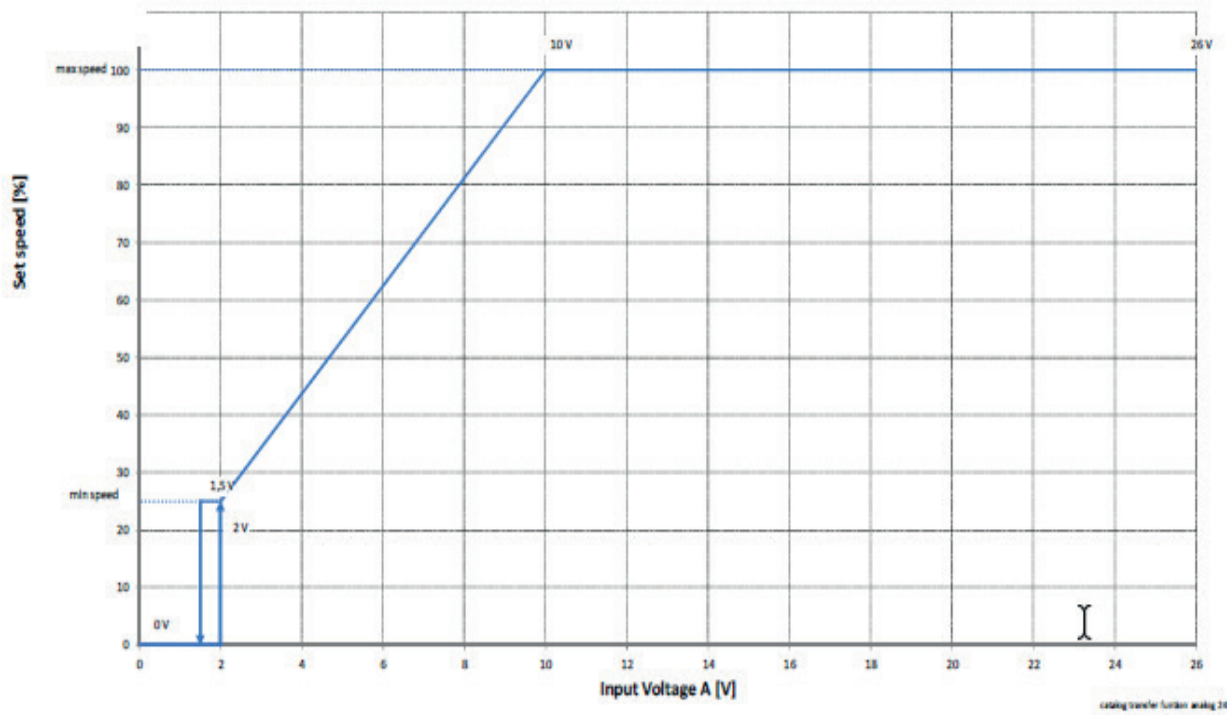
Drive speed set point with digital control

The PWM signal on the control input PWM* / E* is measured by the drive electronics. For improving noise to signal ratio the PWM signal becomes only valid and is only used to set the speed of the drive when a sufficient number of consecutive duty cycle measurements are equal.

This plausibility test slightly delays the response to the change of the duty cycle PWM value. This delay is in the range of 0.2 seconds or less.

Analogue control: transfer function analogue input

The transfer function analogue input is the relation between the drive speed and the duty cycle on the pin analogue input A (see following figure).



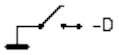
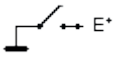
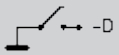
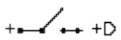
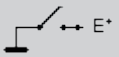
Drive mode - failure modes

Failure mode	Handling of failure	Notification
Drive blocked	In case of detection of a rotor locked the following strategy is used: a delay of 5 s till the next start attempt is introduced. If this start attempt fails again a delay increased by further 5 s till the next start attempt is introduced. This delay increase is repeated till the delay between the attempts is 25 s. Then this delay is kept for ever as long a valid PWM duty cycle is detected which asks the drive to run	Notification is not available as no feedback is provided to the CCU.
Drive overloaded	Fan speed is reduced in case of overload detection by means of current draw measurement.	
Over current	The drive will stop if the over current safety threshold is reached.	
Drive overheated	Fan speed is reduced in case of overheating detection (derating). Over the max operating temperature, the drive will stop.	
Under / over voltage	If the supply voltage is outside the specified range the drive will stop.	
Internal drive failure	The drive will stop if a failure is detected during the startup self check procedure.	

In all cases the drive tries to recover from failures when a valid PWM signal is detected which asks the drive to run.

Operating modes

The drive interface (the connection between the drive and the user system) can be done in 8 ways depending if and how the two signal inputs PWM* / E* and A are used. See the following table:

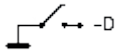
Mode description	Mode	+D	-D	PWM*/E*	A	Pins to connect
On / off to minus	1	+		-	+	4
On / off to plus	2		-	-	+	4
On / off with enable low	3	+	-		+	4
Analogue control 1	4	+		-	analogue	4
Analogue control 2	5		-	-	analogue	4
Analogue control with enable low	6	+	-		analogue	4
Digital control	7	+	-	PWM	n.c.	3
Mixed analogue / digital control	8	+	-	PWM	analogue	4

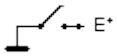
analogue : analogue voltage signal (input)

PWM : PWM signal (input)

n.c. : not connected

 : switch of the drive positive supply to plus

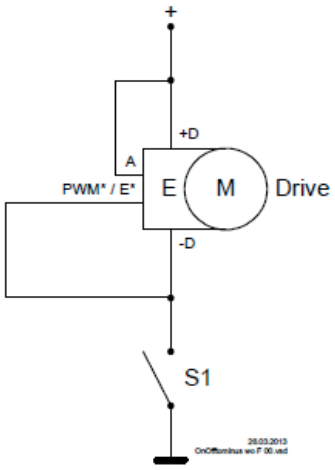
 : switch of the drive negative supply to minus / GND

 : switch active low enable input to minus / GND

Interface mode 1: on / off to minus

When the switch S1 is switched on the drive goes after the initialization of the electronics to full speed. This mode can be used if the CCU which controls the drive has limited capabilities or does not even exist.

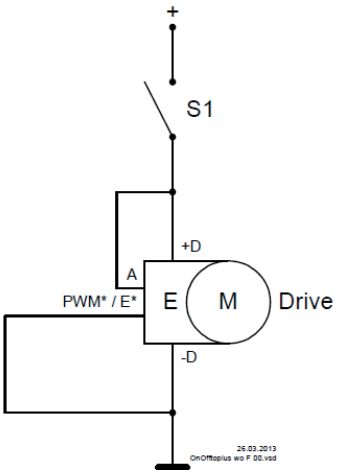
The drive is just switched on and off via any power switch like a relay, MOS FET, or even just a switch. The appropriate current rating for this “switch” has to be dimensioned according to the current consumption of the drive.



Interface mode 2: on / off to plus

When the switch S1 is switched on the drive goes after the initialization of the electronics to full speed. This mode can be used if the CCU which controls the drive has limited capabilities or does not even exist.

The drive is just switched on and off via any power switch like a relay, MOS FET, or even just a switch. The appropriate current rating for this “switch” has to be dimensioned according to the current consumption of the drive.

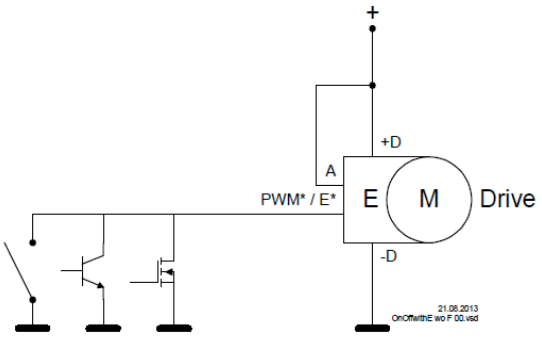


Interface mode 3: on / off with enable low

The drive can stay always on supply voltage and is controlled by a low current enable input which can be driven by simple low cost low side signal driver in the CCU.

When the enable input PWM* / E* goes to high, the drive goes after a short time into the quiescent current mode. When the enable pin PWM* / E* is driven low, the drive goes to full speed after the initialization of the electronics.

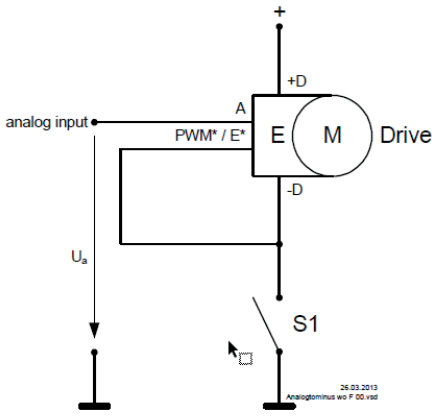
This mode can be used if the CCU which controls the drive has limited capabilities or does not even exist. The appropriate sink current rating of the driver for the enable pin PWM* / E* has to be dimensioned according to the current consumption of the pin PWM* / E*. The circuit structure to drive the pin PWM* / E* can be any active low “open collector”.



Interface mode 4: analogue control 1

When the switch S1 is switched on the drive goes after the initialization of the electronics to the speed requested by the analogue input A.

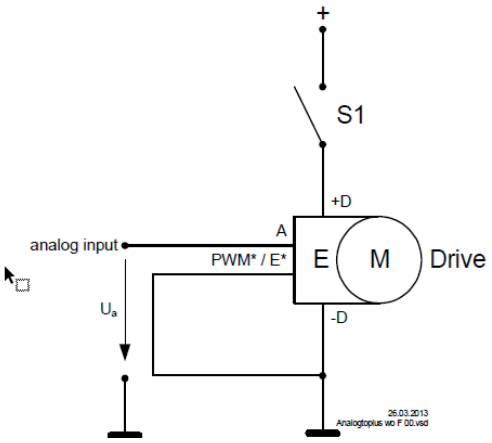
The appropriate current rating for this “switch” has to be dimensioned according to the current consumption of the drive.



Interface mode 5: analogue control 2

When the switch S1 is switched on the drive goes after the initialization of the electronics to the speed requested by the analogue input A.

The appropriate current rating for this “switch” has to be dimensioned according to the current consumption of the drive.



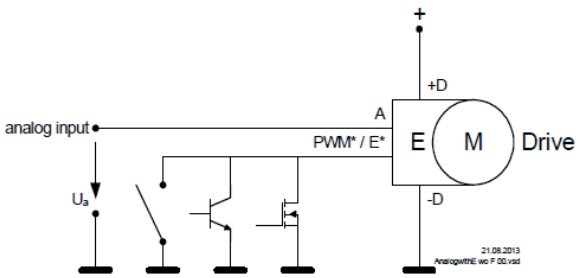
Interface mode 6: analogue control with enable low

In mode 6 the drive can stay always on supply voltage and is controlled by a low current enable input which can be driven by simple low cost low side signal driver in the CCU.

When the enable input PWM* / E* goes to high, the drive goes after a short time into the quiescent current mode. When the enable pin PWM* / E* is driven low, the drive goes to the speed requested by the analogue input A after the initialization of the electronics.

The appropriate sink current rating of the driver for the enable pin PWM* / E* has to be dimensioned according to the current consumption of the pin PWM* / E*. The circuit structure to drive the pin PWM* / E* can be any active low “open collector”.

In this operating mode the supply voltage plus is usually connected permanently. To run the drive first the pin PWM* / E* has to be connected to supply voltage minus and afterwards the drive speed can be then controlled with an analogue voltage on the pin A.



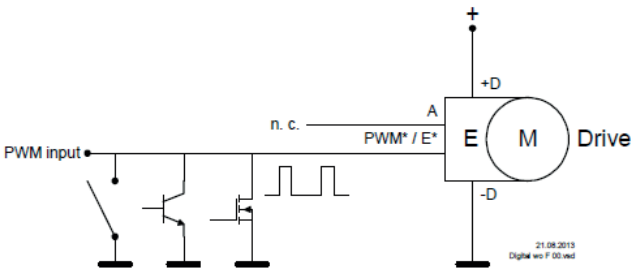
Interface mode 7: digital control

In mode 7 the drive can stay always on supply voltage and is controlled by a low current PWM and enable PWM* / E* input which can be driven by simple low cost low side signal driver in the CCU.

When the enable input PWM* / E* goes to high, the drive goes after a short time into the quiescent current mode. When the enable pin PWM* / E* is driven with PWM, the drive goes to the speed requested by the duty cycle after the initialization of the electronics.

The appropriate sink current rating of the driver for the enable pin PWM* / E* has to be dimensioned according to the current consumption of the pin PWM* / E*. The circuit structure to drive the pin PWM* / E* can be any active low “open collector”.

In this operating mode the supply voltage plus is usually connected permanently. To run the drive on the pin PWM* / E* a PWM signal has to be applied and with the duty cycle of the PWM signal the drive speed can be then controlled.



Interface mode 8: mixed analogue / digital control

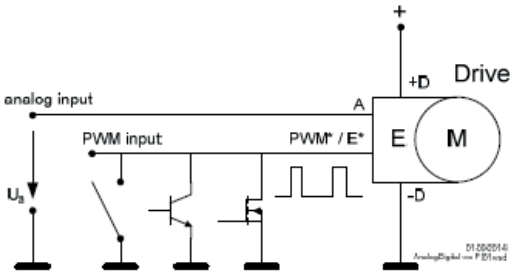
In mode 8 the drive can stay always on supply voltage and is controlled by a low current PWM and enable PWM* / E* input which can be driven by simple low cost low side signal driver in the CCU.

When the enable input PWM* / E* goes to high, the drive goes after a short time into the quiescent current mode. When the enable pin PWM* / E* is driven low (switched to supply voltage minus), the drive goes to the speed requested by the analogue input A after the initialization of the electronics (if the electronics is not already activated).

When the enable pin PWM* / E* is driven with PWM, the drive goes to the speed requested by the duty cycle after the initialization of the electronics (if the electronics is not already activated).

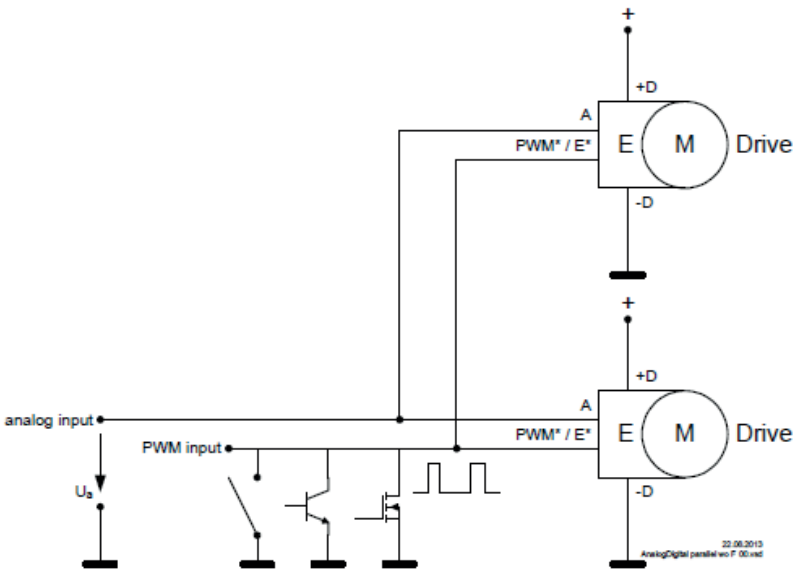
The appropriate sink current rating of the driver for the enable pin PWM* / E* has to be dimensioned according to the current consumption of the pin PWM* / E*. The circuit structure to drive the pin PWM* / E* can be any active low “open collector”.

In this operating mode the supply voltage plus is usually connected permanently. To run the drive on the pin PWM* / E* a PWM signal has to be applied and with the duty cycle of the PWM signal the drive speed can be then controlled. If the pin PWM* / E* is switched to supply voltage minus the drive speed can be then controlled with an analogue voltage on the pin A. So a mixed control with either digital or analogue input is possible. The priority has the digital PWM signal.



Interface parallel configuration

The drives can be used in a parallel configuration in the PWM driven modes as well as in analogue driven modes and also in the combines analogue / PWM mode in such a way that the control lines are connected in parallel as shown in below for the example of two drives.



There is no limitation from the drive‘s point of view in paralleling them. Nevertheless from the CCU’s point of view it has to be considered that all of the drives needs a certain current each on the signal lines PWM* / E* and A. This has to be taken into account for dimensioning the driver stage which controls digitally via the PWM* / E* inputs of the drives or which controls analogue via the A inputs of the drives. The output driver stage of the CCU needs to be capable of driving minimum the input currents of PWM* / E* and / or A times the number of the drives.

Units and acronyms

Unit		Physical quantity
%	percent	Proportionality
Ω	Ohm	Electrical resistance
°C	degree Celsius	Temperature
A	Ampere	Current
h	hours	Time
dBA	deciBel (A-weighting)	Sound pressure level
Hz	Hertz	Frequency
min	minute	Time
Pa	Pascal	Pressure
RPM	Revolutions per minute	Rotation frequency
s	second	Time
V	Volt	Voltage
W	Watt	Power

Prefix	Dimension	
M	10^{6}	mega
k	10^{3}	kilo
m	10^{-3}	milli
ų	10^{-6}	micro
n	10^{-9}	nano
p	10^{-12}	pico

Key word	Description
AMPL_IN	Amplitude PWM input signal
CCU	Custom control unit
Drive	Motor with axially integrated electronics
IGN	Ignition (KL15)
PWM	Pulse width modulation
R_i	Input resistance
SBL	Sealed brushless
T	Temperature
T_{AMB}	Ambient temperature
U_B	Supply voltage
U_N	Nominal supply voltage
rms	Root mean square

Yazaki connector counterpart

Complete electro connector counterpart kit for QDC 24V DC part number:

30130628

The kit includes corresponding Yazaki:

Part no.	Description	Qty.
7283-8497-90	Male connector	1
7158-3032-60	Seal gasket 1.5 mm	1
7116-3251	Female fast-on terminal	2
7157-3582-90	Seal gasket Ø 2.5-3.5 mm for cables	2
7116-3250	Female fast-on terminal	2
7158-3035	Seal gasket Ø 4-5 mm for cables	2
7157-3581-80	Seal gasket Ø 4.75-5.65 mm for cables	2
7116-3285-02	Female fast-on terminal	2
7158-3036-70	Seal gasket Ø 5.5-6.5 mm for cables	2
7116-4103-02	Female fast-on terminal	2
7158-3031-90	Seal gasket Ø 1.6-2.2 mm for cables	2
7116-4102-02	Female fast-on terminal	2
7158-3030-50	Seal gasket Ø 1.2-1.7 mm for cables	2
7147-8925-30	Connector fixing hook	1

IQAN-MC41

Weight	0.5 kg
Temperature range	-40 °C to +85 °C
Protection	Outdoorf chassis
Voltage supply	9 - 32 V DC
Current consumption (idle)	180 mA (24 V) 250 mA (12 V)

Part number:

20085111

www.parker.com

European Headquarters
La Tuilière 6, 1163 Etoy, Switzerland
Tel: +41 21 821 85 00

© 2022 Parker Hannifin Corporation. All rights reserved. Catalogue MSG10-6100/UK 09/2022