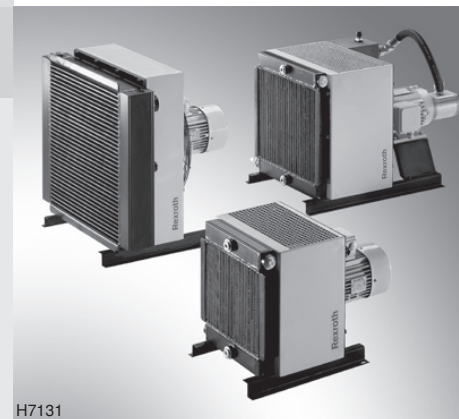


Oil/air cooler

RE 50112/05.13
Replaces: 01.12

1/24

Type KOL and KOLP

Component series 2X
Maximum flow 400 l/min [105 GPM]

H7131

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Features

- Environmentally friendly as no exchange of water with hydraulic fluid possible
- Compact design
- Broad field of application
- Large number of variants
- Ready for connection

Applications

- Machine tools
- Test stands
- Presses
- Plastics processing machines / injection moulding machines

Description


The oil/air cooler is used for heat dissipation.

Pressure drops in lines and devices release energy in the hydraulic system in the form of heat. This heat is dissipated from the hydraulic system into the ambient air by means of the oil/air cooler. In this way, the hydraulic fluid temperature range can be kept in the perfect temperature range for the hydraulic components.

The oil/air cooler basically consists of electric motor, housing, cooler element and fan wheel. In the design with radial fan wheel, the oil/air cooler is also available as complete circulation circuit (attached external gear pump with or without filter).

The installation position is horizontal or vertical. For horizontal installation position of the oil/air coolers, four long holes are integrated in the mounting bars. For the vertical installation position, the long holes for mounting are located at the cooler element. See unit dimensions.

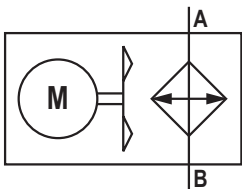
Optionally, filters are available with electric or optical maintenance indicator.

 If the oil/air coolers are used in heavily polluted environment, we recommend using the oil/air cooler with air filter mat.

Symbols

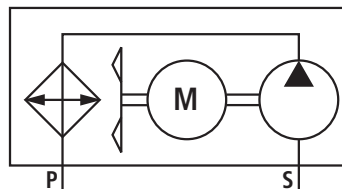
Symbol for oil/air cooler

(Type KOL.../A... and KOL.../R...)



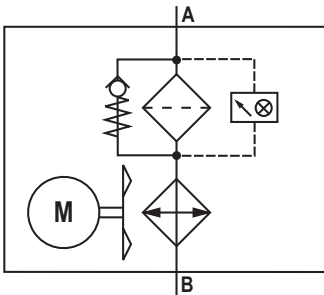
Symbol for oil/air cooler with pump

(Type KOLP.../R...)



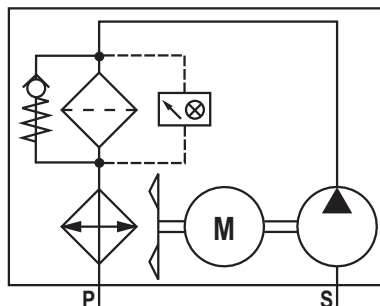
Symbol for oil/air cooler with filter and optical maintenance indicator

(Type KOL.../R-F...-O...)



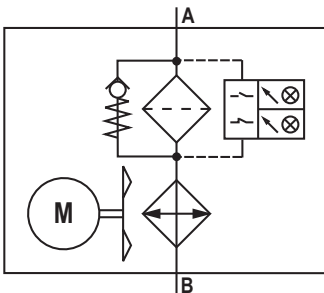
Symbol for oil/air cooler with pump and filter with optical maintenance indicator

(Type KOLP.../R-...F...-O...)



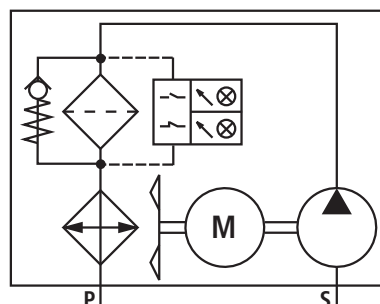
Symbol for oil/air cooler with filter and electric maintenance indicator

(Type KOL.../R-F...-E...)



Symbol for oil/air cooler with pump and filter with electric maintenance indicator

(Type KOLP.../R-...F...-E...)



Ordering code

		-2X/		-		-		/M		*	
Device type											Further details in clear text
Oil/air cooler	= KOL										Seal material ²⁾
Oil/air cooler with circulating pump	= KOLP ¹⁾										NBR seal
Cooling power (with q_{Vmax} ; $\Delta t = 40$ K)											Maintenance indicator ⁶⁾
3 kW	= 3 ¹⁾										E = Electric maintenance indicator
5 kW	= 5 ¹⁾										O = Optical maintenance indicator
8 kW	= 8 ¹⁾										Filter rating ⁶⁾
10 kW	= 10 ¹⁾										3 = Filter rating 3 μ m
15 kW	= 15 ⁷⁾										10 = Filter rating 10 μ m
20 kW	= 20 ⁷⁾										Filter flow ¹⁾
30 kW	= 30 ⁷⁾										No code = Without filter
40 kW	= 40 ⁷⁾										100 = max. 100 l/min [26.4 GPM]
45 kW	= 45 ⁷⁾										160 ⁵⁾ = max. 160 l/min [42.2 GPM]
65 kW	= 65 ⁷⁾										Additional equipment ¹⁾
80 kW	= 80 ⁷⁾										No code = Without additional equipment
120 kW	= 120 ⁷⁾										F = With filter
Supply voltage (3 phases) ²⁾											B5 = With bypass start of opening 55 °C [131 °F]
220/380 V - 50 Hz	= B										B6 = With bypass start of opening 65 °C [149 °F]
230/400 V - 50 Hz (standard)	= N										T5 = With temperature switch switching point 50 °C [122 °F]
240/415 V - 50 Hz	= C										T6 = With temperature switch switching point 60 °C [140 °F]
254/440 V - 60 Hz	= D										L = with air filter ⁹⁾
265/460 V - 60 Hz	= E										Circulating pump flow ¹⁾
275/480 V - 60 Hz	= F										No code = Without circulating pump
Component series 20 to 29	= 2X										6 ³⁾ = Flow 6 l/min [1.6 GPM] ⁸⁾
(20 to 29: Unchanged installation and connection dimensions)											9 ⁴⁾ = Flow 9 l/min [2.4 GPM] ⁸⁾
Design principle											13 ³⁾ = Flow 13 l/min [3.4 GPM] ⁸⁾
Cooler with axial fan wheel	= A										19 ³⁾ = Flow 19 l/min [5.0 GPM] ⁸⁾
Cooler with radial fan wheel	= R										20 ⁴⁾ = Flow 20 l/min [5.3 GPM] ⁸⁾
											30 = Flow 30 l/min [7.9 GPM] ⁸⁾
											45 ⁴⁾ = Flow 45 l/min [12 GPM] ⁸⁾

¹⁾ Only in connection with radial fan wheel

²⁾ Others on request

³⁾ Only in connection with cooling power 3 and 8 kW

⁴⁾ Only in connection with cooling power 5 and 10 kW

⁵⁾ Only in connection with cooling power 8 and 10 kW

⁶⁾ Only in connection with filter

⁷⁾ Only in connection with axial fan wheel

⁸⁾ Indication of the flow with $f = 50$ Hz, with $f = 60$ Hz the flow increases by approx. 20 %.

⁹⁾ The air filter mat (unpolluted) reduces the cooling power by approx. 10 %. With vertical installation position, the oil/air cooler can no longer be put onto the cooler element.

Order example: Type KOL10N-2X/R-B5T5L/M

Oil/air cooler	KOL
Cooling power (with q_{Vmax} ; $\Delta t = 40$ °C [40 °K]), 10 kW	10
Supply voltage, 230/400 V - 50 Hz	N
Design principle, radial fan wheel	R
Additional equipment:	B5T5L
– Bypass start of opening 55 °C [131 °F]	
– Temperature switch switching point 50 °C [122 °F]	
– Air filter	
Seal material NBR	M

Technical data (For applications outside these parameters, please consult us!)**general**

Direction of rotation (fan wheel)	Counterclockwise
Installation position	Horizontal and vertical

hydraulic

Operating pressure max.	bar [psi]	26 [377]
Hydraulic fluid	Mineral oil (HLP) according to DIN 51524, part 2 Please observe our specifications according to data sheet 07075!	
Hydraulic fluid temperature range	°C [°F]	-20 to +80 [-4 to +176]
Maximum admissible degree of contamination of the hydraulic fluid cleanliness class according to ISO 4406 (c)	Class 21/19/16 ^{1, 2)}	
Viscosity range	mm ² /s [SUS]	2000 [9280] ¹⁾

¹⁾ Does not apply to version KOLP.../R... and KOLP.../R-...F... (see below).

²⁾ The cleanliness classes specified for the components must be adhered to in the hydraulic system. Effective filtration prevents faults and at the same time increases the service life of the components.

Air flow

Air flow in m ³ /h [cu yd/h]	Type	50 Hz / 60 Hz
	KOL (P) 3	550 [720] / 660 [870]
	KOL(P) 5	820 [1070] / 980 [1280]
	KOL(P) 8	730 [960] / 930 [1220]
	KOL(P) 10	1520 [1990] / 1820 [2380]
	KOL 15	2180 [2850] / 2610 [3410]
	KOL 20	3220 [4210] / 3860 [5050]
	KOL 30	3600 [4710] / 4320 [5650]
	KOL 40	5330 [6970] / 6400 [8370]
	KOL 45	7000 [9160] / 8400 [10990]
	KOL 65	10000 [13080] / 12000 [15700]
	KOL 80	11720 [15330] / 14060 [18390]
	KOL 120	17170 [22460] / 20520 [26840]

Amending technical data for version KOLP.../R... and KOLP.../R-...F...**general**

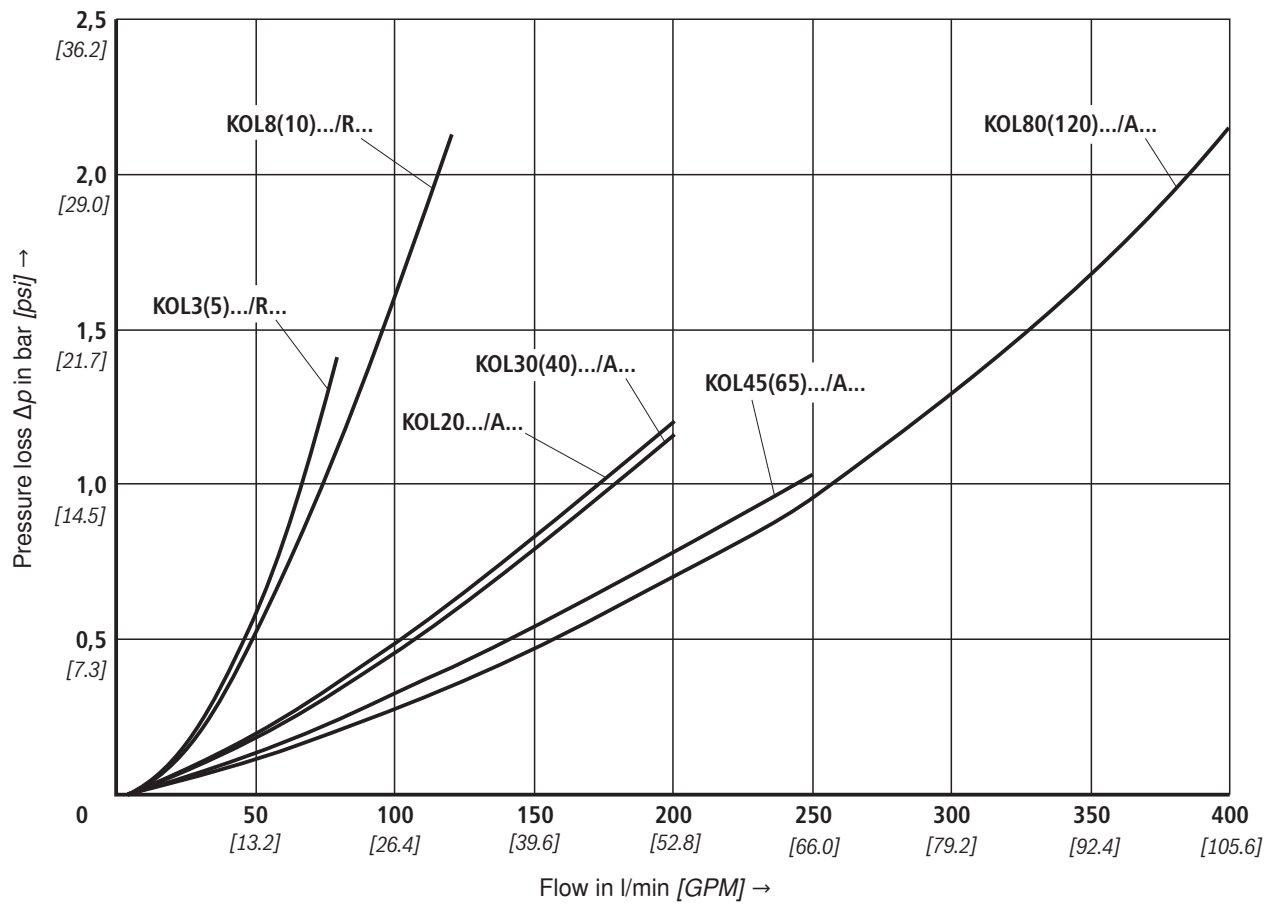
Direction of rotation (pump)	Clockwise	
Suction head max.	m [ft]	0.8 [2.62]

hydraulic

Maximum admissible degree of contamination of the hydraulic fluid cleanliness class according to ISO 4406 (c)	Class 18/16/12 ²⁾	
Viscosity range	mm ² /s [SUS]	12 to 100 [55 to 464]

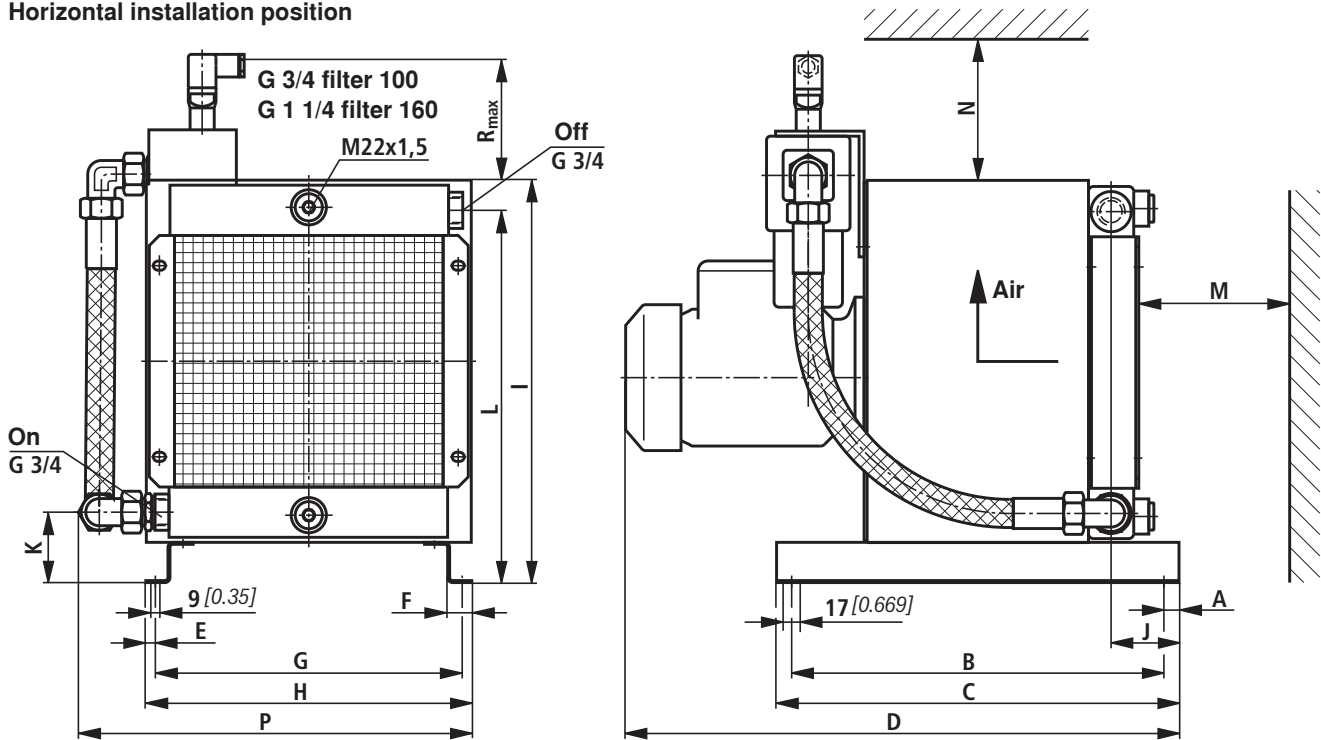
²⁾ The cleanliness classes specified for the components must be adhered to in the hydraulic system. Effective filtration prevents faults and at the same time increases the service life of the components.

Δp - q_v characteristic curves (cooler element, measured with $v = 30 \text{ mm}^2/\text{s}$ [141 SUS] and $\vartheta = 50 \text{ }^\circ\text{C}$ [122 °F])



Unit dimensions: Type KOL.../R-(F)... (dimensions in mm [inch])

Horizontal installation position



Cooler type	A ¹⁾	B ¹⁾	C	D	E	F	G	H	I	J	K
KOL3(5).../R...	15	370	400	538	9.5	24	305	324	400	66	70
KOL3(5).../R-F100...	[0.59]	[14.5]	[15.7]	[21.2]	[0.37]	[0.94]	[12]	[12.7]	[15.7]	[2.59]	[2.75]
KOL8(10).../R...	15	420	450	588	9.5	24	405	424	500	66	70
KOL8(10).../R-F100...	[0.59]	[16.5]	[17.7]	[23.1]	[0.37]	[0.94]	[15.9]	[16.7]	[19.6]	[2.59]	[2.75]
KOL8(10).../R-F160...											

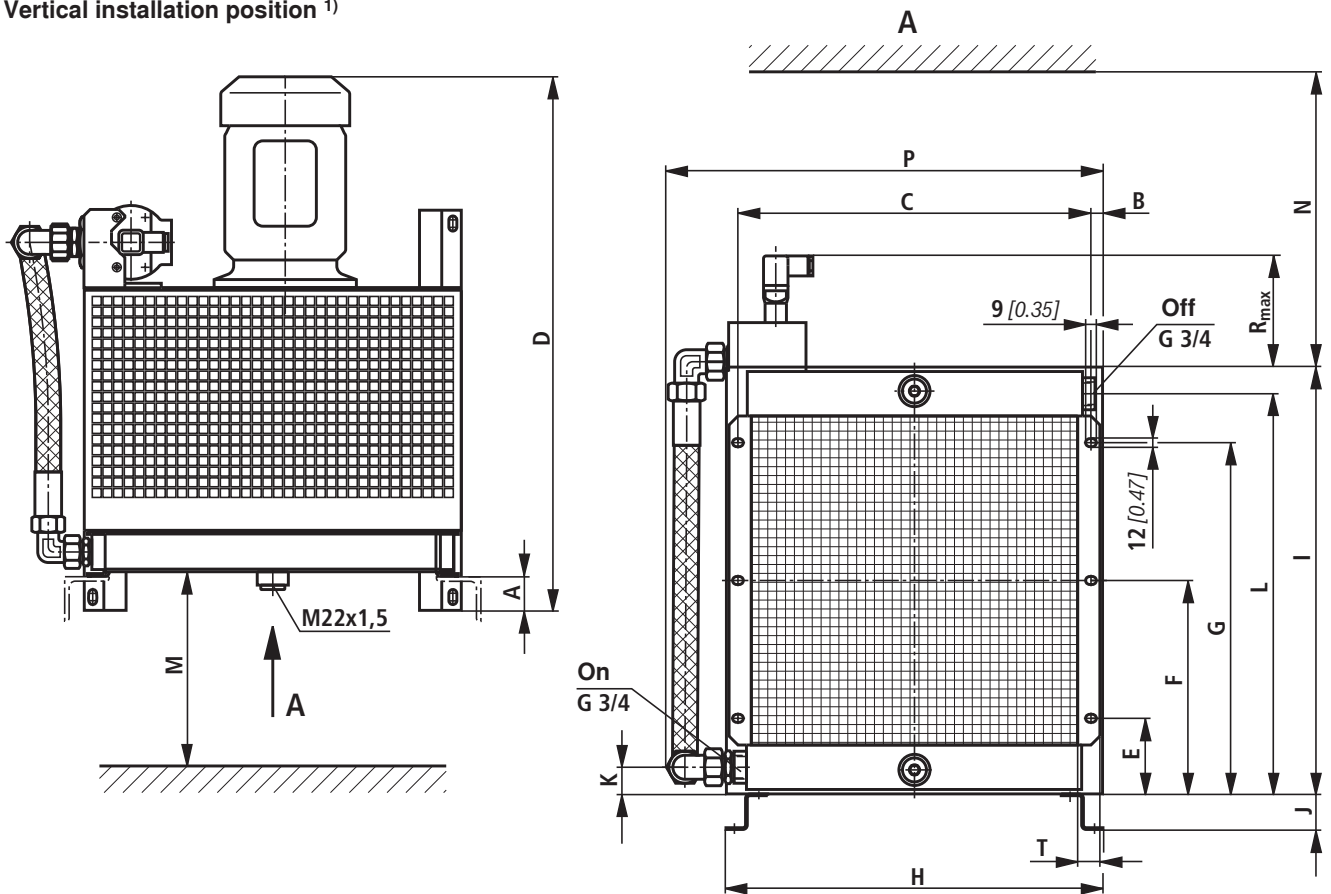
Cooler type	L	M	N	P	R _{max}	Sound pressure level in dB (A) ²⁾		Weight in kg [lbs]	
						f = 50 Hz	f = 60 Hz		
KOL3(5).../R...	370	150	200	420	-	54 (64)	62 (68)	23.0	
KOL3(5).../R-F100...	[14.5]	[5.9]	[7.9]	[16.54]	[16.9]			[5]	[50.6]
KOL8(10).../R...	470	200	250	165	-	65 (68)	67 (74)	32.0	
KOL8(10).../R-F100...	[18.5]	[7.9]	[9.8]	[6.5]	113			[4.44]	[76]
KOL8(10).../R-F160...				[20.9]	78			[3.07]	[80.4]

¹⁾ Dimension to the center of the long hole

²⁾ According to DIN 45635

Unit dimensions: Type KOL.../R-(F)... (dimensions in mm [inch])

Vertical installation position ¹⁾



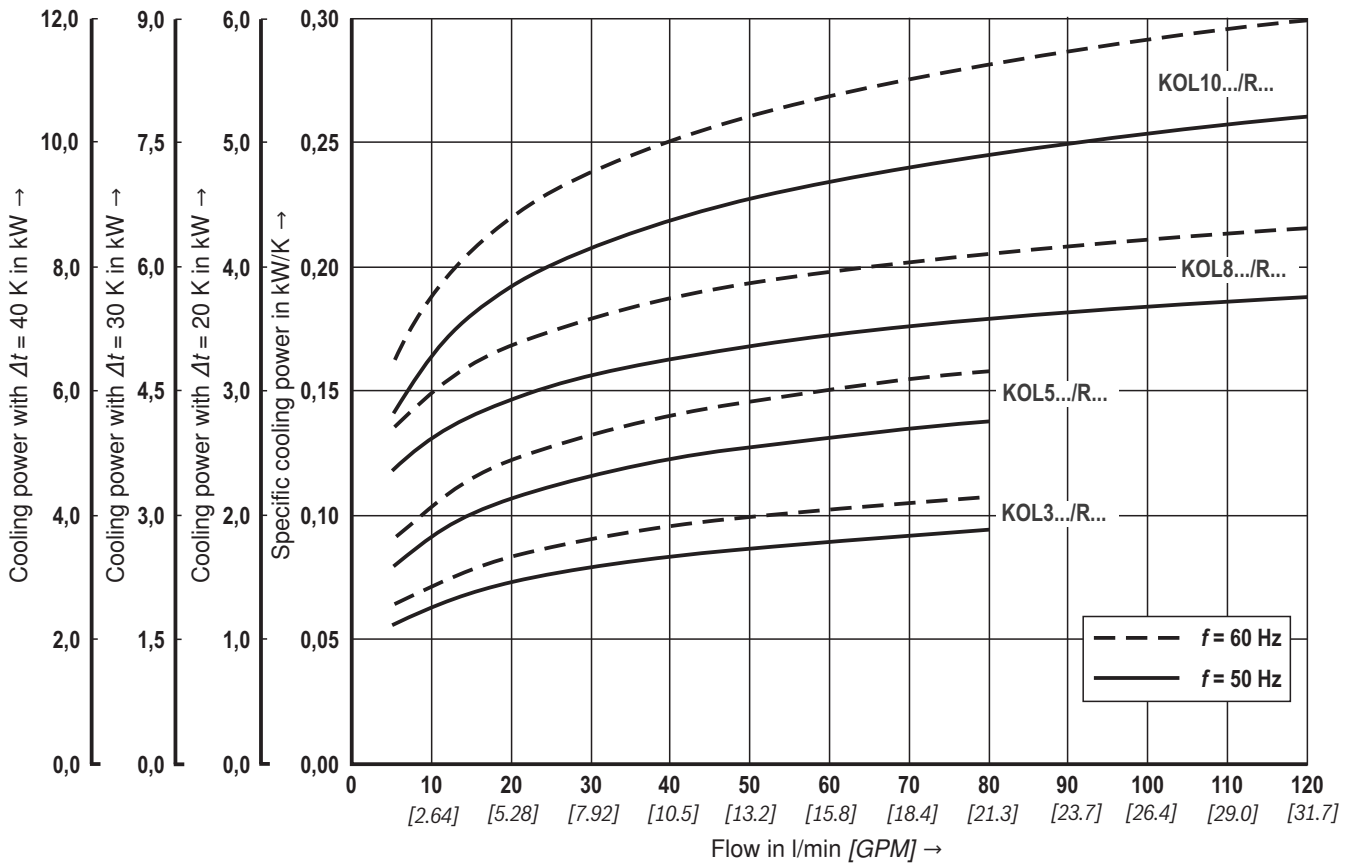
Cooler type	A	B	C	D	E	F	G	H	I	J	K
KOL3(5).../R...	38.5	13	297	538	85	275	-	324	360	40	30
KOL3(5).../R-F100...	[1.51]	[0.51]	[11.7]	[21.2]	[3.34]	[10.8]	-	[12.7]	[14.2]	[1.57]	[1.18]
KOL8(10).../R...	38.5	13.5	397	588	75	230	385	424	460	40	30
KOL8(10).../R-F100...	[1.51]	[0.53]	[15.6]	[23.1]	[2.95]	[9.05]	[15.1]	[16.7]	[18.1]	[1.57]	[1.18]
KOL8(10).../R-F160...											

Cooler type	L	M	N	P	R _{max}	T	Sound pressure level in dB (A) ²⁾		Weight in kg [lbs]
							f = 50 Hz	f = 60 Hz	
KOL3(5).../R...	330	150	200	-	-	25 [0.98]	54 (64)	62 (68)	23.0 [50.6]
KOL3(5).../R-F100...	[12.9]	[5.9]	[7.9]	430 [16.9]	127 [5]				25.5 [56.2]
KOL8(10).../R...	430	200	250	-	-	25 [0.98]	65 (68)	67 (74)	32.0 [70.5]
KOL8(10).../R-F100...	[16.9]	[7.9]	[9.8]	530 [20.9]	113 [4.44]				34.5 [76]
KOL8(10).../R-F160...				78 [3.07]					36.5 [80.4]

¹⁾ In case of additional equipment with air filter, the oil/air cooler cannot be put down onto the cooler element!

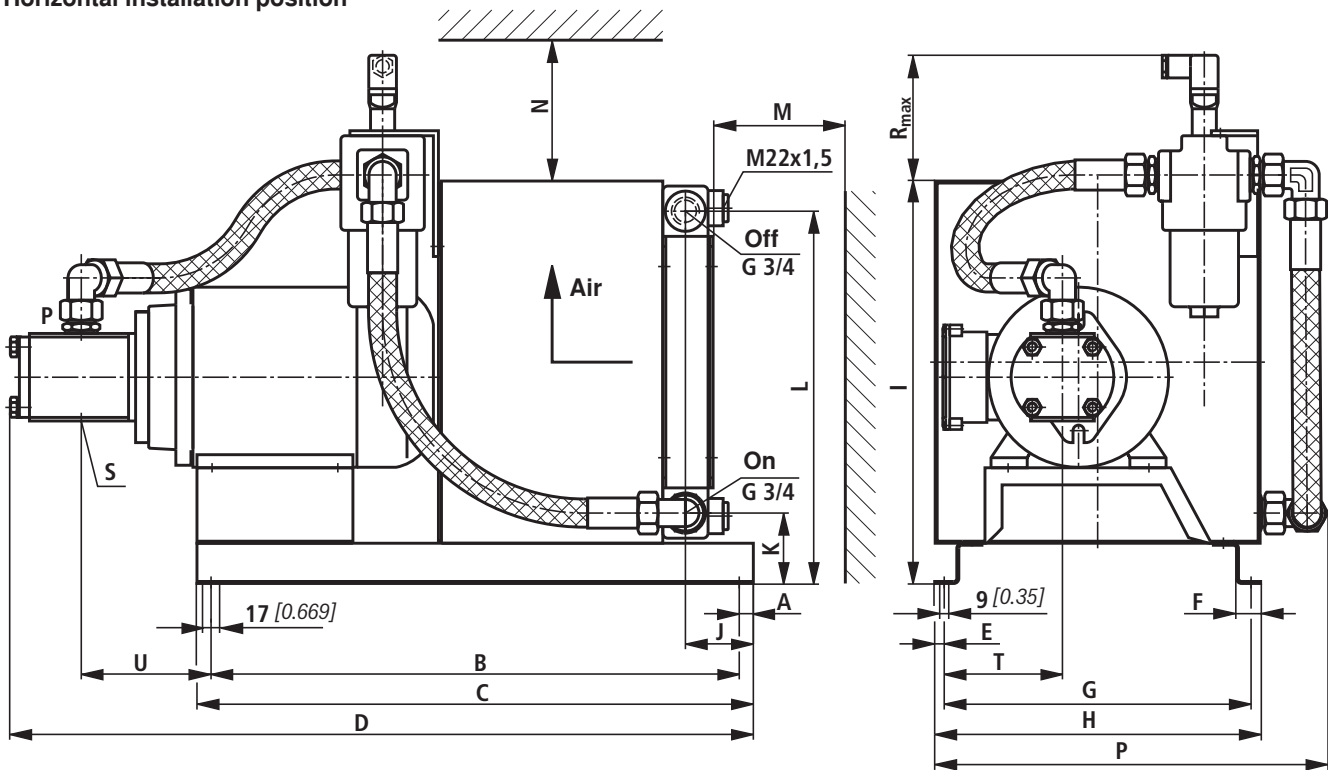
²⁾ According to DIN 45635

Cooling power according to DIN EN 1048: type KOL.../R...



Unit dimensions: Type KOLP.../R...(F)... (dimensions in mm [inch])

Horizontal installation position



Unit dimensions: Type KOLP.../R...(F)... (dimensions in mm [inch])

Horizontal installation position

Cooler type	A ¹⁾	B ¹⁾	C	D	E	F	G	H	I	J	K	L
KOLP3.../R-6...	15 [0.59]	525 [20.6]	555 [21.8]	700.5 [27.5]	9.5 [0.37]	24 [0.94]	305 [12]	324 [16.6]	400 [15.7]	68 [2.59]	70 [2.75]	370 [14.5]
KOLP5.../R-9...				712.5 [28]								
KOLP3.../R-13...				722.5 [28.4]								
KOLP5.../R-20...				740.5 [29.1]								
KOLP3.../R-19...				–								
KOLP5.../R-30...				–								
KOLP3.../R-30...				–								
KOLP5.../R-45...				–								
KOLP3(5).../R...F100...	15 [0.59]	575 [22.6]	605 [23.8]	750.5 [29.5]	9.5 [0.37]	24 [0.94]	405 [15.9]	424 [16.6]	500 [19.6]	68 [2.59]	70 [2.75]	470 [18.5]
KOLP8.../R-6...				762.5 [30]								
KOLP10.../R-9...				772.5 [30.4]								
KOLP8.../R-13...				790.5 [31]								
KOLP10.../R-20...				–								
KOLP8.../R-19...				–								
KOLP10.../R-30...				–								
KOLP8.../R-30...				–								
KOLP10.../R-45...	–											
KOLP8(10).../R...F100...	–	–	–	–	–	–	–	–	–	–	–	–
KOLP8(10).../R...F160...	–	–	–	–	–	–	–	–	–	–	–	–

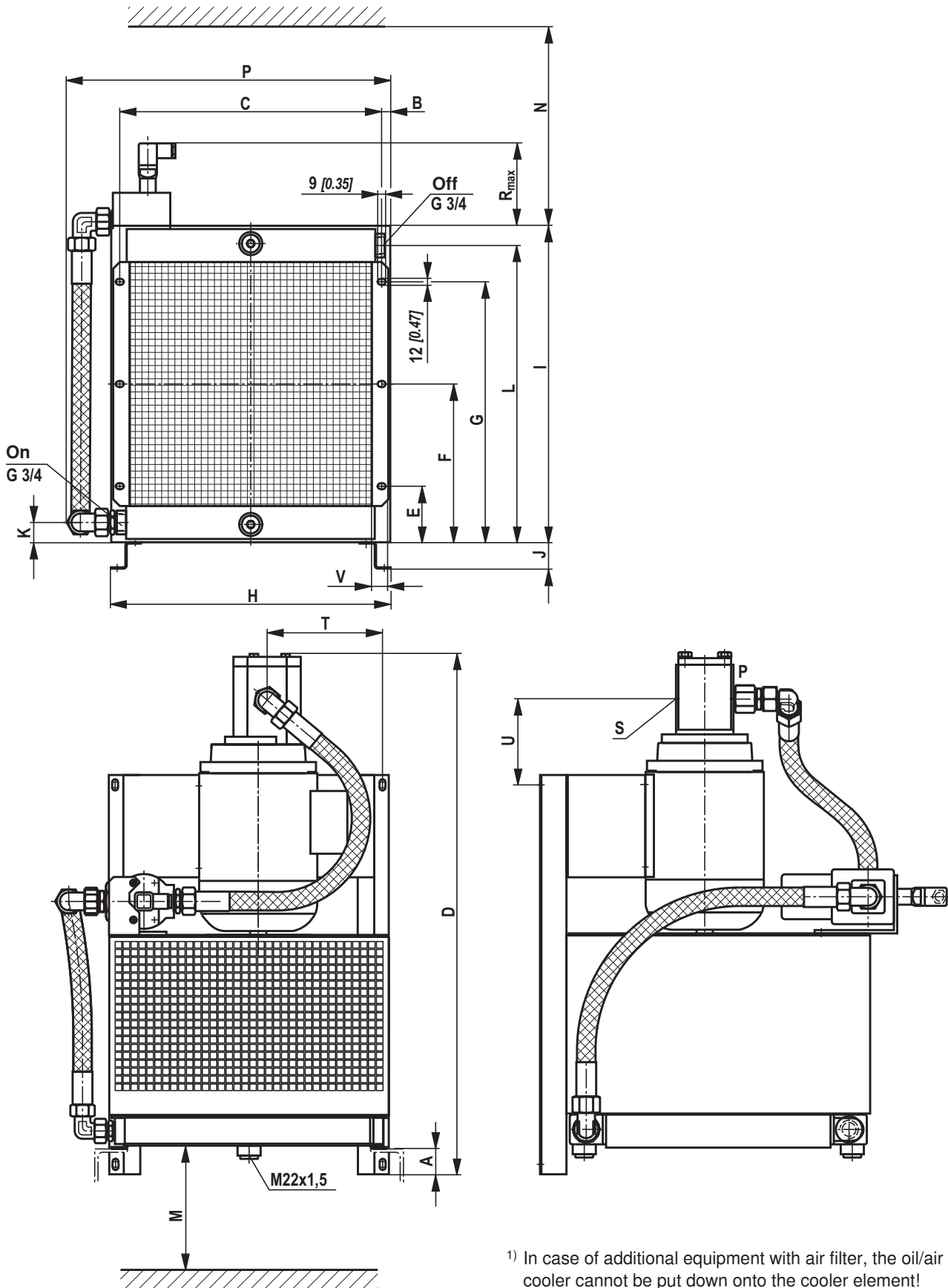
Cooler type	M	N	P	R _{max}	S	T	U	Sound pressure level in dB (A) ²⁾		Weight in kg [lbs]				
								f = 50 Hz	f = 60 Hz					
KOLP3.../R-6...	150 [5.9]	200 [7.87]	430 [16.9]	–	G 1/2	117.5 [4.62]	110 [4.3]	63	69	34.4 [75.8]				
KOLP5.../R-9...								65	70	38.0 [83.7]				
KOLP3.../R-13...								116 [4.5]	63	69	34.7 [76.4]			
KOLP5.../R-20...									71	74	38.3 [84.4]			
KOLP3.../R-19...					121 [4.7]		73	76	G 3/4	117.5 [4.62]	117.5 [4.62]	65	72	35.0 [77.1]
KOLP5.../R-30...												73	76	38.6 [85.0]
KOLP3.../R-30...												130	75	35.4 [78.0]
KOLP5.../R-45...												78	83	39.0 [85.9]
KOLP3(5).../R...F100...	–	–	–	–	–	–	–	–	–	37.9 [83.5] (41.5 [91.4])				
KOLP8.../R-6...	200 [7.87]	250 [9.84]	530 [20.9]	–	G 1/2	172.5 [6.79]	110 [4.3]	65	67	42.9 [94.5]				
KOLP10.../R-9...								69	74	46.5 [102.4]				
KOLP8.../R-13...								116 [4.5]	65	68	43.2 [95.2]			
KOLP10.../R-20...									69	74	46.8 [103.1]			
KOLP8.../R-19...					121 [4.7]		72	76	G 3/4	172.5 [6.79]	172.5 [6.79]	68	70	43.5 [95.8]
KOLP10.../R-30...												72	76	47.1 [103.8]
KOLP8.../R-30...												130	72	43.9 [96.7]
KOLP10.../R-45...												78	83	47.5 [104.7]
KOLP8(10).../R...F100...	–	–	–	–	–	–	–	–	–	46.4 [102.2] (50.0 [110])				
KOLP8(10).../R...F160...	–	–	–	–	–	–	–	–	–	48.4 [106.6] (52.0 [114.6])				

¹⁾ Dimension to the center of the long hole

²⁾ According to DIN 45635

Unit dimensions: Type KOLP.../R...(F)... (dimensions in mm [inch])

Vertical installation position ¹⁾



¹⁾ In case of additional equipment with air filter, the oil/air cooler cannot be put down onto the cooler element!

Unit dimensions: Type KOLP.../R...(F)... (dimensions in mm [inch])

Vertical installation position

Cooler type	A	B	C	D	E	F	G	H	I	J	K	L
KOLP3.../R-6...	40.5 [1.59]	13 [0.51]	297 [11.7]	700.5	85 [3.34]	275 [10.8]	-	324 [12.7]	360 [14]	40 [1.57]	30 [1.18]	330 [12.9]
KOLP5.../R-9...				[27.5]								
KOLP3.../R-13...				712.5								
KOLP5.../R-20...				[28]								
KOLP3.../R-19...				722.5								
KOLP5.../R-30...				[28.4]								
KOLP3.../R-30...				740.5								
KOLP5.../R-45...				[29.1]								
KOLP3(5).../R...F100...				-								
KOLP8.../R-6...	40.5 [1.59]	13.5 [0.53]	397 [15.6]	750.5	75 [2.9]	230 [9]	385 [15]	424 [16.6]	460 [18.1]	40 [1.57]	30 [1.18]	430 [16.9]
KOLP10.../R-9...				[29.5]								
KOLP8.../R-13...				762.5								
KOLP10.../R-20...				[30]								
KOLP8.../R-19...				772.5								
KOLP10.../R-30...				[30.4]								
KOLP8.../R-30...				790.5								
KOLP10.../R-45...				[31]								
KOLP8(10).../R...F100...				-								
KOLP8(10).../R...F160...												

Cooler type	M	N	P	R _{max}	S	T	U	V	Sound pressure level in dB (A) ¹⁾		Weight in kg [lbs]		
									f = 50 Hz	f = 60 Hz			
KOLP3.../R-6...	150 [5.9]	200 [7.87]	430 [16.9]	-	G 1/2	117.5 [4.62]	110 [4.3]	25 [0.9]	63	69	34.4 [75.8]		
KOLP5.../R-9...									65	70	38.0 [83.7]		
KOLP3.../R-13...									63	69	34.7 [76.4]		
KOLP5.../R-20...									71	74	38.3 [84.4]		
KOLP3.../R-19...					G 3/4				121 [4.7]	65	72	35.0 [77.1]	
KOLP5.../R-30...										73	76	38.6 [85.0]	
KOLP3.../R-30...										130 [5.1]	71	75	35.4 [78.0]
KOLP5.../R-45...										78	83	39.0 [85.9]	
KOLP3(5).../R...F100...				127 [5]	-				-	-	37.9 [83.5] (41.5 [91.4])		
KOLP8.../R-6...	200 [7.87]	250 [9.84]	530 [20.9]	-	G 1/2	172.5 [6.79]	110 [4.3]	25 [0.9]	65	67	42.9 [94.5]		
KOLP10.../R-9...									69	74	46.5 [102.4]		
KOLP8.../R-13...									116 [4.5]	65	68	43.2 [95.2]	
KOLP10.../R-20...									69	74	46.8 [103.1]		
KOLP8.../R-19...					G 3/4				121 [4.7]	68	70	43.5 [95.8]	
KOLP10.../R-30...										72	76	47.1 [103.8]	
KOLP8.../R-30...										130 [5.1]	70	72	43.9 [96.7]
KOLP10.../R-45...										78	83	47.5 [104.7]	
KOLP8(10).../R...F100...				113 [4.44]	-				-	-	46.4 [102.2] (50.0 [110])		
KOLP8(10).../R...F160...				78 [3]	-				-	-	48.4 [106.6] (52.0 [114.6])		

¹⁾ According to DIN 45635

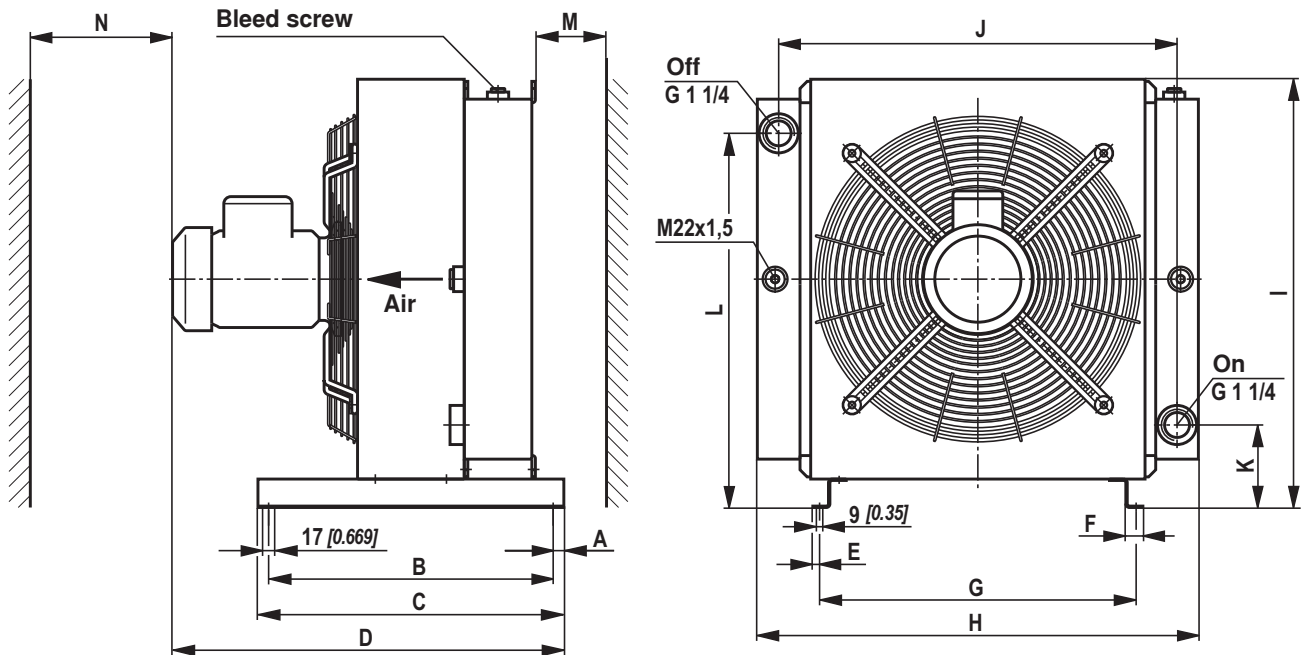
Cooling power: Type KOLP.../R...(F)...

Cooler type	Specific cooling power in kW/K		Cooling power with $\Delta t = 20\text{ °C}$ in kW ¹⁾		Cooling power with $\Delta t = 30\text{ °C}$ in kW ¹⁾		Cooling power with $\Delta t = 40\text{ °C}$ in kW ¹⁾	
	$f = 50\text{ Hz}$	$f = 60\text{ Hz}$	$f = 50\text{ Hz}$	$f = 60\text{ Hz}$	$f = 50\text{ Hz}$	$f = 60\text{ Hz}$	$f = 50\text{ Hz}$	$f = 60\text{ Hz}$
KOLP3.../R-6...	0.056	0.065	1.1	1.3	1.7	2.0	2.2	2.6
KOLP5.../R-9...	0.088	0.101	1.8	2.0	2.6	3.0	3.5	4.0
KOLP3.../R-13...	0.066	0.076	1.3	1.5	2.0	2.3	2.6	3.0
KOLP5.../R-20...	0.106	0.121	2.1	2.4	3.2	3.6	4.2	4.8
KOLP3.../R-19...	0.073	0.084	1.5	1.7	2.2	2.5	2.9	3.4
KOLP5.../R-30...	0.115	0.132	2.3	2.6	3.5	4.0	4.6	5.2
KOLP3.../R-30...	0.078	0.089	1.6	1.8	2.3	2.6	3.1	3.6
KOLP5.../R-45...	0.125	0.143	2.5	2.9	3.8	4.3	5.0	5.7
KOLP3(5).../R-...F100...	-	-	-	-	-	-	-	-
KOLP8.../R-6...	0.120	0.138	2.4	2.8	3.6	4.1	4.8	5.5
KOLP10.../R-9...	0.160	0.184	3.2	3.7	4.8	5.5	6.4	7.4
KOLP8.../R-13...	0.135	0.155	2.7	3.1	4.1	4.7	5.4	6.2
KOLP10.../R-20...	0.190	0.218	3.8	4.4	5.7	6.5	7.6	8.7
KOLP8.../R-19...	0.145	0.166	2.9	3.3	4.4	5.0	5.8	6.6
KOLP10.../R-30...	0.207	0.238	4.1	4.7	6.2	7.1	8.3	9.5
KOLP8.../R-30...	0.156	0.179	3.1	3.6	4.7	5.4	6.2	7.1
KOLP10.../R-45...	0.221	0.254	4.4	5.0	6.6	7.6	8.8	10.1
KOLP8(10).../R-...F100...	-	-	-	-	-	-	-	-
KOLP8(10).../R-...F160...	-	-	-	-	-	-	-	-

¹⁾ Values rounded

Unit dimensions: Type KOL15-40.../A... (dimensions in mm [inch])

Horizontal installation position



Cooler type	A ¹⁾	B ¹⁾	C	D	E	F	G	H	I	J	K	L
KOL15.../A...	15	400	430	558	9.5	24	445	620	602	560	114.5	527.5
KOL20.../A...	[0.59]	[15.7]	[16.9]	[21.9]	[0.37]	[0.94]	[17.5]	[24.4]	[23.7]	[22]	[4.5]	[20.7]
KOL30.../A...	15	400	430	603	9.5	24	595	770	749	710	109.5	679.5
KOL40.../A...	[0.59]	[15.7]	[16.9]	[23.7]	[0.37]	[0.94]	[23.4]	[30.3]	[29.4]	[27.9]	[4.31]	[26.7]

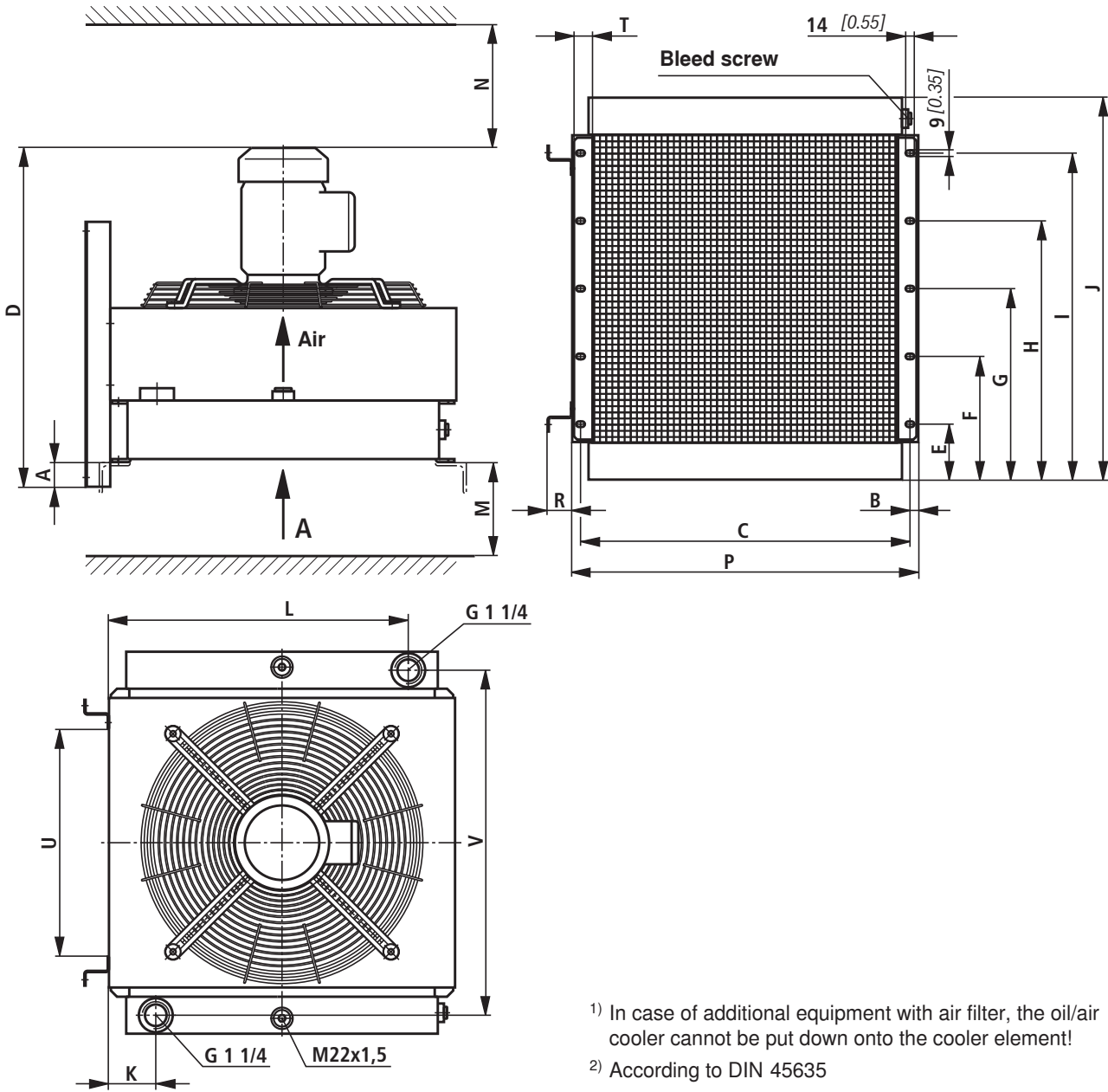
Cooler type	M	N	Sound pressure level in dB (A) ²⁾		Weight in kg [lbs]
			f = 50 Hz	f = 60 Hz	
KOL15.../A...	500 [19.7]	800 [31.5]	68	74	49.0 [107.9]
KOL20.../A...			79	84	
KOL30.../A...	800 [31.49]	2100 [82.6]	77	82	68.5 [150.9]
KOL40.../A...			88	92	

¹⁾ Dimension to the center of the long hole

²⁾ According to DIN 45635

Unit dimensions: Type KOL15-40.../A... (dimensions in mm [inch])

Vertical installation position ¹⁾



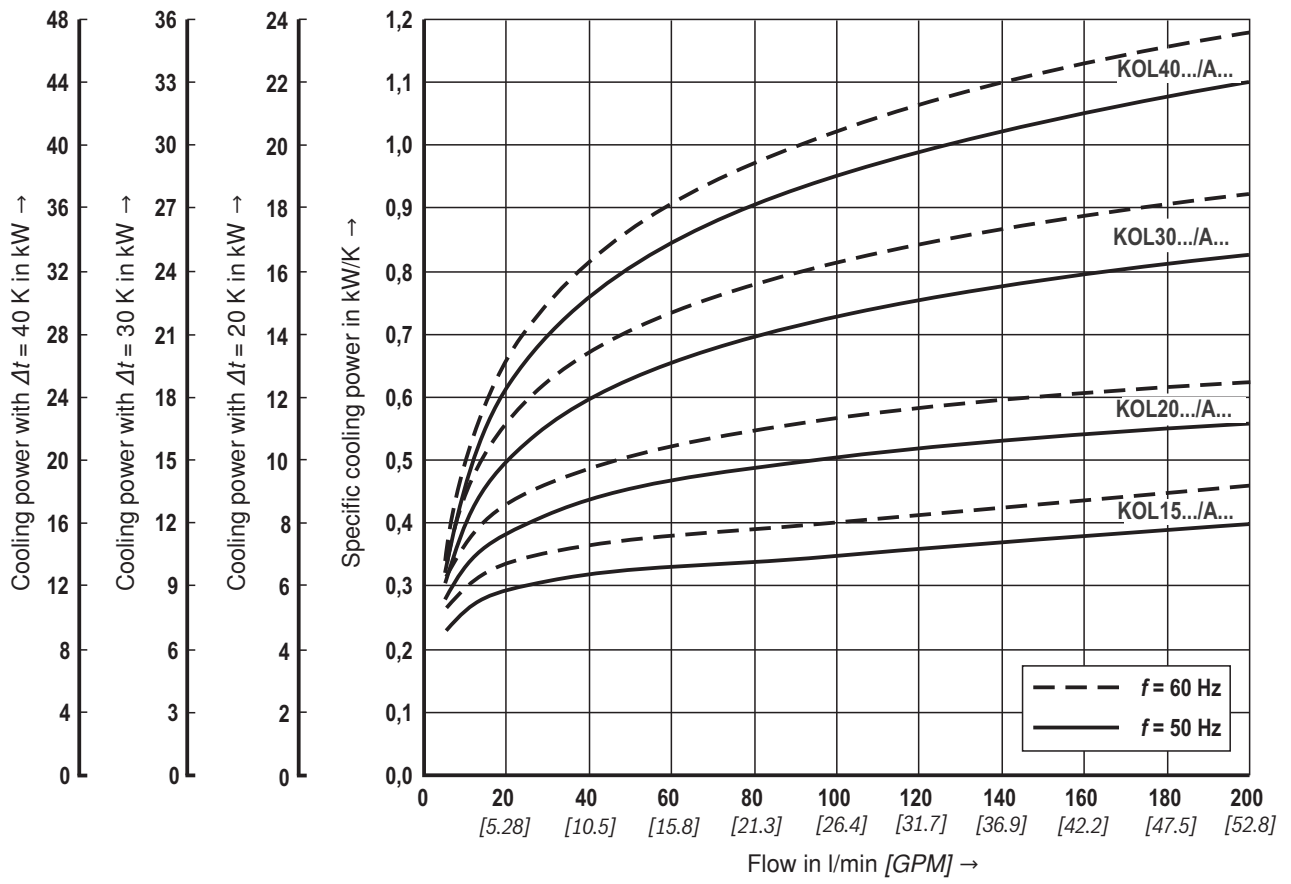
1) In case of additional equipment with air filter, the oil/air cooler cannot be put down onto the cooler element!

2) According to DIN 45635

Cooler type	A	B	C	D	E	F	G	H	I	J	K	L
KOL15.../A...	38.5	13.5	535	542	90	235	385	530	-	620	74.5	487.5
KOL20.../A...	[1.51]	[0.531]	[16.9]	[21.3]	[3.54]	[9.25]	[15.1]	[20.8]	-	[24.4]	[2.93]	[19.1]
KOL30.../A...	38.5	14.5	680	587	95	240	385	530	675	770	69.5	639.5
KOL40.../A...	[1.51]	[0.57]	[16.9]	[23.1]	[3.74]	[9.44]	[15.1]	[20.8]	[26.5]	[30.3]	[2.73]	[25.1]

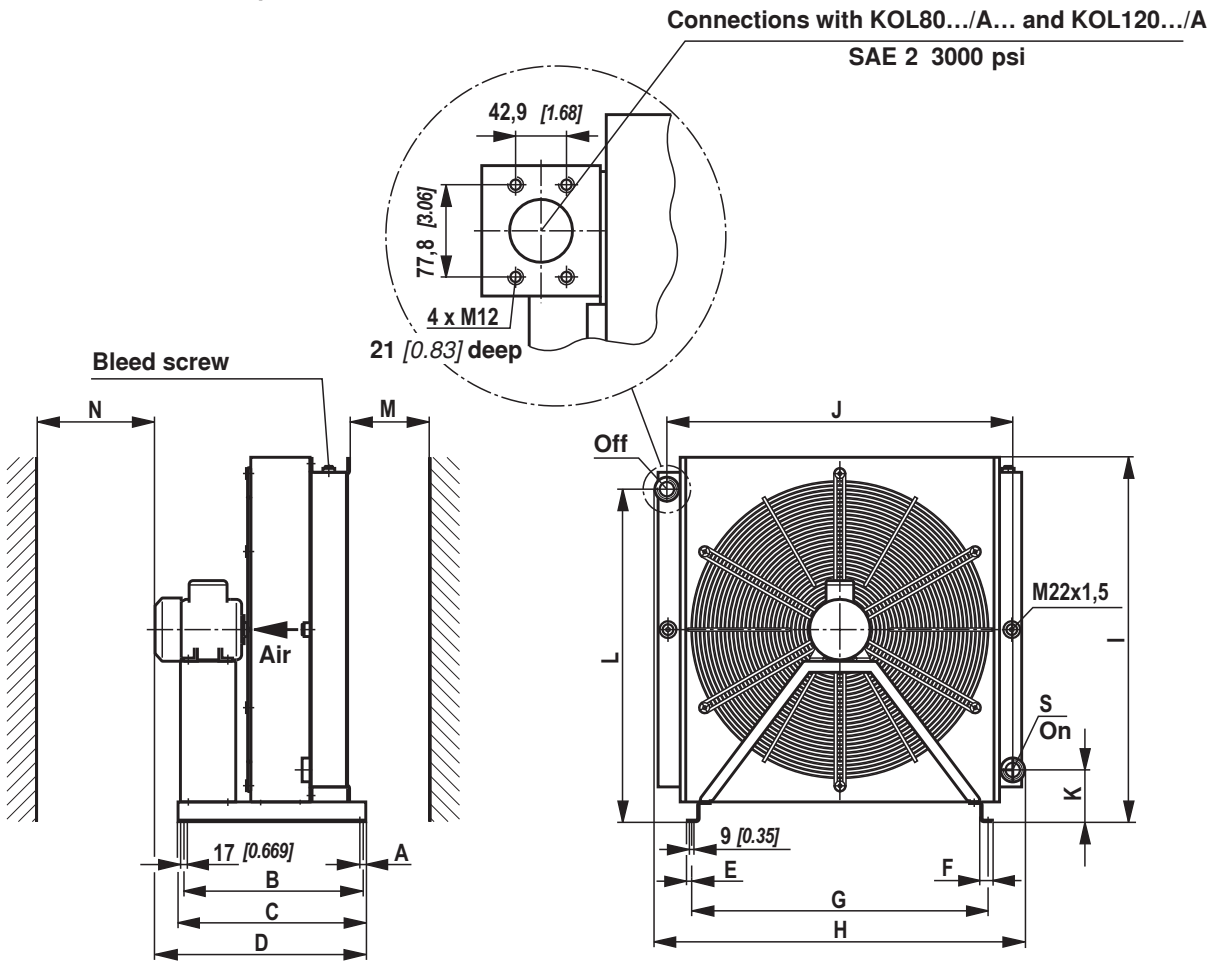
Cooler type	M	N	P	R	T	U	V	Sound pressure level in dB (A) ²⁾		Weight in kg [lbs]
								f = 50 Hz	f = 60 Hz	
KOL15.../A...	500	800	562	40	30	370	560	68	74	49.0
KOL20.../A...	[19.7]	[31.5]	[22.1]	[1.57]	[1.18]	[14.5]	[22]	79	84	[107.9]
KOL30.../A...	800	2100	709	40	30	520	710	77	82	66.5
KOL40.../A...	[31.49]	[82.6]	[27.9]	[1.57]	[1.18]	[20.4]	[27.9]	88	92	[146.5]

Cooling power according to DIN EN 1048: Type KOL15-40.../A...



Unit dimensions: Type KOL45-120.../A... (dimensions in mm [inch])

Horizontal installation position



Cooler type	A ¹⁾	B ¹⁾	C	D	E	F	G	H	I	J	K	L
KOL45.../A...	15	470	500	573	11	30	750	935	922	875	131	841
KOL65.../A...	[0.59]	[18.5]	[19.6]	[22.5]	[0.43]	[1.18]	[29.5]	[36.8]	[36.2]	[34.4]	[5.15]	[33.1]
KOL80.../A...	15	520	550	642	11	30	960	1200	1147	1100	148	1048
KOL120.../A...	[0.59]	[20.4]	[21.6]	[25.3]	[0.43]	[1.18]	[37.7]	[47.2]	[45.1]	[43.3]	[5.82]	[41.2]

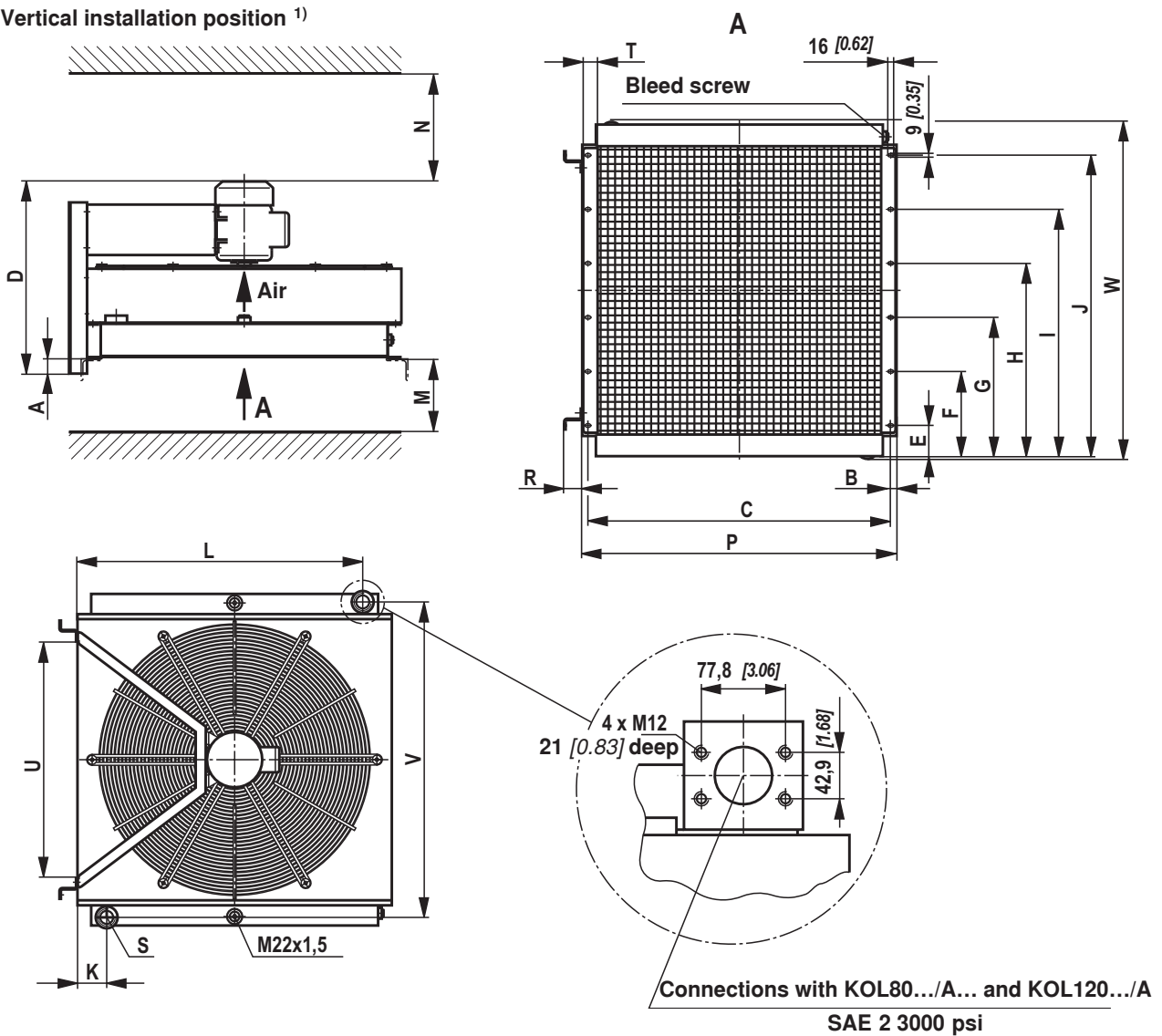
Cooler type	M	N	S	Sound pressure level in dB (A) ²⁾		Weight in kg [lbs]
				f = 50 Hz	f = 60 Hz	
KOL45.../A...	900 [35.4]	2500 [98.4]	G 1 1/2	81	88	94.5 [208]
KOL65.../A...				91	97	
KOL80.../A...	1000 [39.3]	3000 [118]	SAE 2	84	90	154 [339]
KOL120.../A...				92	98	

¹⁾ Dimension to the center of the long hole

²⁾ According to DIN 45635

Unit dimensions: Type KOL45-120.../A... (dimensions in mm [inch])

Vertical installation position ¹⁾



Connections with KOL80.../A... and KOL120.../A
SAE 2 3000 psi

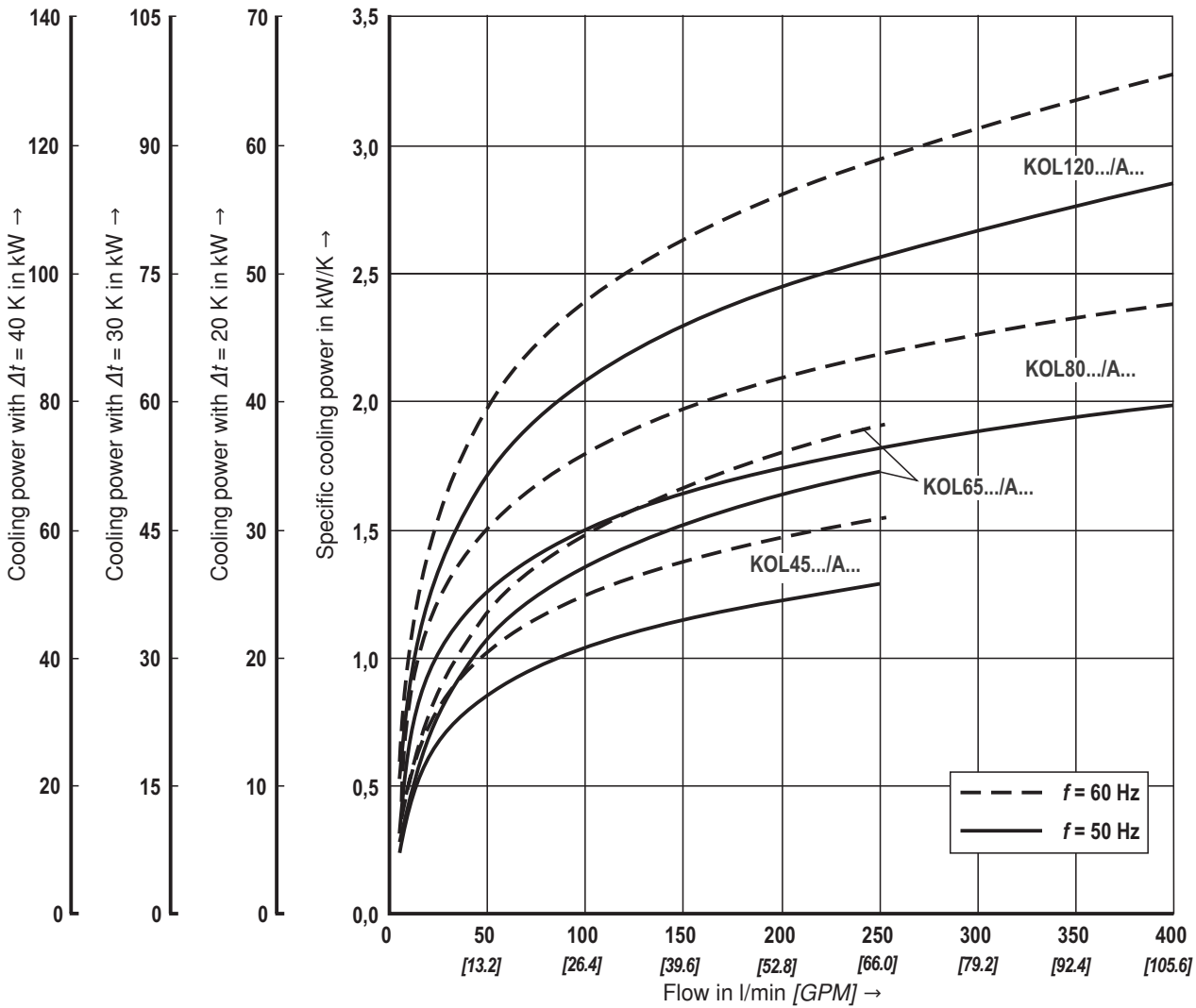
Cooler type	A	B	C	D	E	F	G	H	I	J	K	L
KOL45.../A...	32.5	16	840	573	85	235	385	535	685	835	81	791
KOL65.../A...	[1.27]	[0.62]	[33]	[22.5]	[3.34]	[9.25]	[15.1]	[21]	[26.9]	[32.8]	[3.1]	[31]
KOL80.../A...	36.0	21	1055	642	85	275	465	655	845	1035	98	998
KOL120.../A...	[1.41]	[0.82]	[41.5]	[25.3]	[3.34]	[10.8]	[18]	[25.7]	[33.2]	[40.7]	[3.85]	[39.2]

Cooler type	M	N	P	R	S	T	U	V	W	Sound pressure level in dB (A) ²⁾		Weight in kg [lbs]
										f = 50 Hz	f = 60 Hz	
KOL45.../A...	900	2500	872	50	G1 1/2	40	656	875	935	81	88	94.5 [208]
KOL65.../A...	[35.4]	[98.4]	[34.3]	[1.96]		[1.57]	[25.8]	[34.4]	[36.8]	91	97	
KOL80.../A...	1000	3000	1097	50	SAE 2	45	866	1100	1200	84	90	154 [339]
KOL120.../A...	[39.3]	[118]	[43]	[1.96]		[1.77]	[34]	[43.3]	[47.2]	92	98	

¹⁾ In case of additional equipment with air filter, the oil/air cooler cannot be put down onto the cooler element!

²⁾ According to DIN 45635

Cooling power according to DIN EN 1048: Type KOL45-120.../A...



Replacement filter mat

Denomination	For type	Material no.
FILTERMATTE 316X260MM FL220-G4 KOL3/5	KOL 3/5	R901072973
FILTERMATTE 417X360MM FL220-G4 KOL8/10	KOL 8/10	R901072926
FILTERMATTE 555X500MM FL220-G4 KOL15/20	KOL 15/20	R901072979
FILTERMATTE 700X645MM FL220-G4 KOL30/40	KOL 30/40	R901072981
FILTERMATTE 860X795MM FL220-G4 KOL45/65	KOL 45/65	R901072983
FILTERMATTE 1075X1010MM FL220G4 KOL80/120	KOL 80/120	R901072985

Replacement filter elements ¹⁾

Denomination	For type	Material no.
Filter element ABZFE-N0100-10-1X/M-DIN	KOL(P).../R-F100-10...	R901025362
Filter element ABZFE-N0100-03-1X/M-DIN	KOL(P).../R-F100-3...	R901025356
Filter element ABZFE-N0160-10-1X/M-DIN	KOL(P).../R-F160-10...	R901025363
Filter element ABZFE-N0160-03-1X/M-DIN	KOL(P).../R-F160-3...	R901025358

¹⁾ Filter element according to DIN 24550

Electric motor

Design of the electric motors corresponds to the standard IEC 60034-30:2008. At their nominal voltage, nominal power and nominal frequency, the electric motors covered by the standard correspond to the efficiency level IE2.

The electric motor is designed for the mode of operation according to VDE 0530 part 1 (DIN EN 60034) for continuous

operation S1 within the rated power range. The electric motor complies with insulation class F and protection class IP 55.

The electric motor is to be connected so that the fan wheel rotates in the direction of the arrow. (counterclockwise direction of rotation)

Technical data (For applications outside these parameters, please consult us!)

Supply voltage (other voltages on request)	U	V	220/380 50 Hz 240/415 50 Hz 265/460 60 Hz 230/400 50 Hz 254/440 60 Hz 275/480 60 Hz
Frequency	f	Hz	50 / 60
Mode of operation	S1 continuous operation		
Insulation class	F (winding)		
Protection class according to VDE 0530 / DIN 60034	IP 55		
Number of poles	4 / 6		

Frequency $f = 50$ Hz

Cooler type	Power kW	Speed min^{-1}	Nominal current in A with		
			Δ 220 V / Y 380 V	Δ 230 V / Y 400 V	Δ 240 V / Y 415 V
KOL3(8).../R...	0.25	900	1.59 / 0.92	1.51 / 0.87	1.46 / 0.84
KOL5(10).../R...	0.37	1370	2.03 / 1.17	1.93 / 1.11	1.85 / 1.07
KOL15.../A...	0.37	900	2.24 / 1.30	2.13 / 1.23	2.06 / 1.19
KOL20.../A...	0.55	1370	2.87 / 1.66	2.73 / 1.57	2.63 / 1.52
KOL30.../A...	0.75	935	4.78 / 2.77	4.57 / 2.63	4.37 / 2.53
KOL40.../A...	1.10	1425	6.06 / 3.51	5.81 / 3.34	5.57 / 3.22
KOL45.../A...	1.10	935	5.45 / 3.15	5.18 / 2.99	4.99 / 2.88
KOL65.../A...	1.50	1420	6.71 / 3.87	6.38 / 3.68	6.14 / 3.54
KOL80.../A...	1.50	940	6.78 / 3.91	6.44 / 3.72	6.20 / 3.58
KOL120.../A...	3.00	1430	11.95 / 6.90	11.35 / 6.55	10.94 / 6.32
KOLP3(8).../R...	1.10	910	5.60 / 3.30	5.40 / 3.10	5.20 / 3.00
KOLP5(10).../R...	1.50	1410	6.90 / 4.00	6.60 / 3.80	6.30 / 3.70

Frequency $f = 60$ Hz

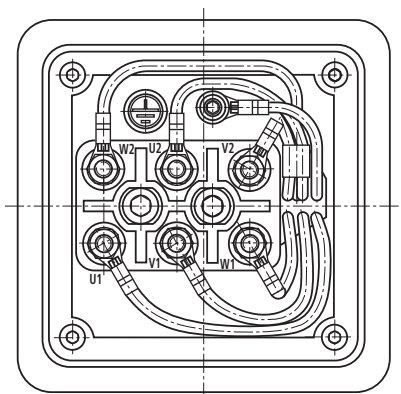
Cooler type	Power kW	Speed min^{-1}	Nominal current in A with		
			Δ 254 V / Y 440 V	Δ 265 V / Y 460 V	Δ 275 V / Y 480 V
KOL3(8).../R...	0.30	1080	1.45 / 0.84	1.39 / 0.80	1.33 / 0.77
KOL5(10).../R...	0.44	1645	1.70 / 0.98	1.63 / 0.94	1.56 / 0.90
KOL15.../A...	0.44	1080	2.24 / 1.30	2.13 / 1.23	2.06 / 1.19
KOL20.../A...	0.66	1645	2.87 / 1.66	2.73 / 1.57	2.63 / 1.52
KOL30.../A...	0.90	1125	4.78 / 2.77	4.57 / 2.63	4.37 / 2.53
KOL40.../A...	1.32	1705	6.06 / 3.51	5.81 / 3.34	5.57 / 3.22
KOL45.../A...	1.32	1125	5.29 / 3.05	5.40 / 3.92	5.18 / 2.99
KOL65.../A...	1.80	1705	6.69 / 3.86	6.40 / 3.68	6.14 / 3.54
KOL80.../A...	1.80	1130	7.01 / 4.05	6.71 / 3.87	6.43 / 3.71
KOL120.../A...	3.60	1715	12.05 / 6.96	11.50 / 6.65	11.03 / 6.37
KOLP3(8).../R...	1.32	1080	4.90 / 2.80	4.70 / 2.70	4.50 / 2.60
KOLP5(10).../R...	1.80	1692	6.00 / 3.40	5.70 / 3.30	5.50 / 3.20

The specified values apply to an environmental temperature of 40 °C and an installation height up to 1000 m above sea level.

Terminal assignment

Terminal assignment in the terminal box at the oil/air cooler:

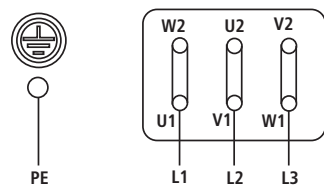
Factory side:



Customer side: Δ triangle

$U = 220 \sim 240 \text{ V}$ with $f = 50 \text{ Hz}$

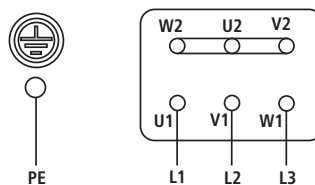
$U = 254 \sim 275 \text{ V}$ with $f = 60 \text{ Hz}$



Customer side: Y star

$U = 380 \sim 415 \text{ V}$ with $f = 50 \text{ Hz}$

$U = 440 \sim 480 \text{ V}$ with $f = 60 \text{ Hz}$



Electric maintenance indicator

Technical data for type KOL.../R-F100(F160)-...- E... and KOLP.../R-...F100(F160)-...-E...

Electrical connection	Round plug-in connection M12 x 1, 4-pole
Contact load, direct voltage	Max. 1 A
Voltage range	10 - 30 V DC
Max. switching power with resistive load	20 VA; 20 W
Switching type	Normally closed contact at 75 % of the response pressure, normally open contact at 100 % of the response pressure
Signal suppression	Signal interconnection to 30 °C [86 °F], return switching at 20 °C [68 °F]
Display by means of LEDs in the electric upper part	Stand-by (LED green) 75 % switching point (LED yellow) 100 % switching point (LED red)
Protection class according to DIN EN 60529	IP 65

Temperature switch

By means of the temperature switch, the oil/air cooler is switched on if the desired oil temperature is exceeded. The temperature switch has a fixedly set switching point switching at a fluid temperature of 50 °C [122 °F] and/or 60 °C [140 °F].

Electrical function

Temperature < 50 °C [122 °F] and/or 60 °C [140 °F] 

Temperature ≥ 50 °C [122 °F] and/or 60 °C [140 °F] 

The switch-back hysteresis is approx. 15 K

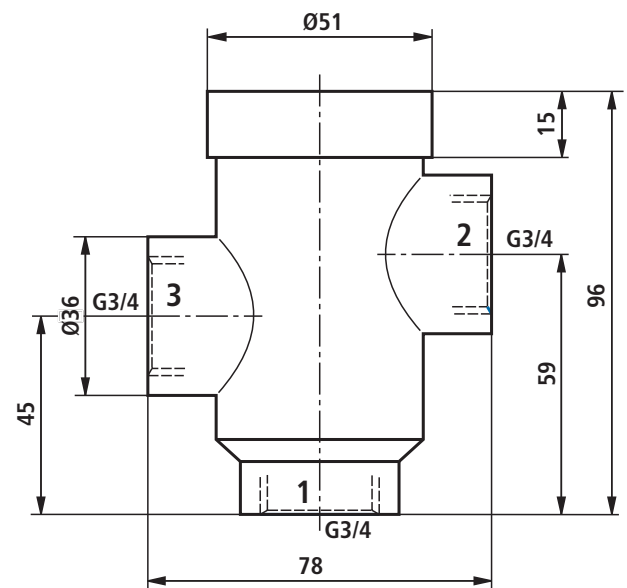
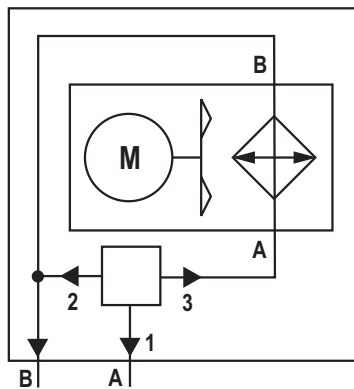
Technical data

Maximum voltage	V	DC 30 V, +10 %/-15 %	AC 230 V, +10 %/-15 %
Maximum current	A	5	10
Protection class		IP 65	
Contact type		Normally closed contact	

Bypass (temperature-controlled)

If the desired fluid temperature is exceeded, the bypass starts opening the line to the oil/air cooler. The fluid now flows through the oil/air cooler and is cooled. If the fluid temperature is undershot, the bypass closes the line to the oil/air cooler. Depending on the design, the fixedly set start of opening is 55 °C [131 °F] or 65 °C [149 °F].

Bypass control in the cooling circuit



Technical data

Q_{max}	l/min	65
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Calculation example / cooler selection

a) Cooling power calculation by temperature measurement

By measuring the temperature increase in the tank within a sufficiently large time interval, the necessary cooling power can be calculated as follows:

Characteristics to be measured:

ϑ_1 = Hydraulic fluid temperature at the beginning of the measurement in °C

ϑ_2 = Hydraulic fluid temperature at the end of the measurement in °C

ϑ_u = Ambient temperature of the air in °C

t = Time interval in min

Apart from that, the following data is necessary:

V = Tank capacity in l

ρ = Hydraulic fluid density in kg/l
(for mineral oil $\rho = 0.915$ kg/l)

c = Specific heat capacity in $\frac{\text{kJ}}{\text{kg K}}$
(for mineral oil $c = 1.88$ $\frac{\text{kJ}}{\text{kg K}}$)

The power loss incurring as heat is calculated as follows:

P_V = Power loss in kW

$$P_V = \frac{V \cdot \rho \cdot c \cdot (\vartheta_2 - \vartheta_1)}{t \cdot 60} \text{ in kW}$$

E.g.: $V = 230$ l; $\vartheta_1 = 25$ °C; $\vartheta_2 = 66$ °C; $t = 90$ min

$$P_V = \frac{230 \text{ l} \cdot 0.915 \frac{\text{kg}}{\text{L}} \cdot 1.88 \frac{\text{kJ}}{\text{kg K}} \cdot (66 \text{ °C} - 25 \text{ °C})}{90 \text{ min} \cdot 60 \text{ s/min}} = 3.0 \text{ kW}$$

With the calculated power loss, you can calculate the specific cooling power that is necessary for the cooler selection:

P_{01} = Specific cooling power in kW/K

ϑ_{BT} = Perfect operating temperature of the hydraulic fluid in °C

E.g.: $P_V = 3.0$ kW; $\vartheta_{BT} = 50$ °C; $\vartheta_u = 25$ °C

$$P_{01} = \frac{P_V}{\vartheta_{BT} - \vartheta_u} = \frac{3.0 \text{ kW}}{50 \text{ °C} - 25 \text{ °C}} = 0.12 \frac{\text{kW}}{\text{K}}$$

With the flow to be considered (e.g. 40 l/min), you can use the diagram (page 8) to select the suitable cooler. With the sample data, type KOL5.../R... is selected.

b) Cooling power calculation by approximate calculation

An approximate value for the power loss can be calculated as follows:

P_M = Motor drive power in kW

P_V = Power loss in kW

η = Pump efficiency ($\eta = 0.7$ to 0.8)

$$P_V = P_M \cdot (1 - \eta) \text{ in kW}$$

E.g.:

$$P_M = 10.0 \text{ kW}; \eta = 0.7$$

$$P_V = 10.0 \text{ kW} \cdot (1 - 0.7)$$

$$P_V = 3.0 \text{ kW}$$

With the calculated power loss, you can calculate the specific cooling power that is necessary for the cooler selection.

P_{01} = Specific cooling power in kW/K

ϑ_{BT} = Perfect operating temperature of the hydraulic fluid in °C

E.g.: $P_V = 3.0$ kW; $\vartheta_{BT} = 50$ °C; $\vartheta_u = 25$ °C

$$P_{01} = \frac{P_V}{\vartheta_{BT} - \vartheta_u} = \frac{3.0 \text{ kW}}{50 \text{ °C} - 25 \text{ °C}}$$

$$P_{01} = 0.12 \frac{\text{kW}}{\text{K}}$$

With the flow to be considered (e.g. 40 l/min), you can use the diagram (page 8) to select the suitable cooler. With the sample data, type KOL5.../R... is selected.

Correction factor for installation height

The cooling power of the oil/air coolers is reduced due to the air density which decreases with increasing height. It can, however, be adjusted using the correction factors listed below.

E.g. installation height 1000 m above sea level:

$$P_{01(1000 \text{ m})} = P_{01} \cdot 0.95$$

Height above sea level in m	Correction factor
0	1.00
500	~ 0.98
1000	~ 0.95
2000	~ 0.91
3000	~ 0.86
4000	~ 0.82

Commissioning information

- Check whether the oil/air cooler has been professionally connected to the machine to be operated (hydraulically and electrically).
- For the electrical connections of the electric motor, the washers and connection bridges that are included in the scope of delivery must be used.
- Check the direction of rotation (counterclockwise) of the fan wheel by switching the electric motor on for a short time (also see arrow for direction of rotation at the housing).
- The electric motor must be protected by means of equipment with an overload relay. The latter must be set to the nominal current that is specified on the name / rating plate.
- In the installation of the oil/air cooler with external gear pump (type KOLP.../R... and KOLP.../R-...F...), the direction of rotation of the motor must imperatively be observed, see arrow for direction of rotation.
- With oil/air coolers (type KOLP.../R... and KOLP.../R-...F...), never operate the pump without hydraulic fluid. Apart from that, sufficient lubrication of the pump has to be ensured.
- In order to achieve perfect cooling power, the oil/air cooler must be bled before the commissioning. In addition, bubble-free operation has to be ensured.
- The oil/air cooler may only be operated with the admissible data. It may moreover only be operated if it is in an unobjectionable condition.
- During all works at the oil/air cooler the system must be depressurized and de-energized. It must moreover be ensured that the fan wheel has stopped rotating.
- Unauthorized modifications or changes which affect the safety and function are not permitted.
- Existing protective devices must not be removed.
- Keep the oil-air cooler clean and do not cover it; exchange polluted filter mats as otherwise, the hydraulic fluid will overheat.
- The generally valid safety and accident prevention regulations must be observed and complied with.

Notes in terms of the EC Machinery Directive 98/37/EC, annex II, section B:

The assemblies are produced in compliance with the harmonized standards EN 982, EN 983, DIN EN ISO 12100 and DIN EN 60204-1.

Commissioning is prohibited until it was confirmed that the machine into which the assembly is to be integrated complies with the regulations laid down in the EC Directives.

Attention!

The oil/air cooler may heat up during operation
→ **Risk of injury!**

Settings, maintenance and service works at the oil/air cooler may only be carried out by authorized, trained and instructed personnel.

In repair works, only original Bosch Rexroth spare parts may be used!

Caution!

If Bosch Rexroth hydraulic products are positioned close to sources of ignition or heat radiators, screening has to be applied so that hydraulic fluid that might leak cannot be ignited and the hose lines are protected against early aging. Hydraulic oil on mineral oil basis is water-endangering and inflammable. It may only be used if the corresponding safety data sheet of the manufacturer is available and all measures prescribed therein have been realized. If leakage at the hydraulic

product can lead to water or soil contamination, the hydraulic product must be put into a suitable collecting pan. In Germany, hydraulic systems are "Systems for handling water-polluting substances in the sense of the Water Resources Act (WHG)". In this connection, please observe in particular §1 and §19 WHG (§19g, §19i, §19l).

Notes

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