HYDAC INTERNATIONAL

Air Cooled Oil Coolers

SC Series
OK Series

FEATURES

- Plate and Fin type Heat Exchangers
- Externally mounted Heat Exchangers
- Available with HYDAC Filters
- Accessories include: Thermostats (adjustable and fixed), Thermostatic Bypass Valves, and Bypass Valves

SC Series
The SC Series cooler design uses a large blower wheel which spins slowly to draw air through an oversized cooler. This combination offers excellent cooling capacity with low noise.

- Up to 16 HP cooling capacity
- Down to 56 dBa noise level
- Packaged systems with pump flows ranging from 2.4 GPM to 18.5 GPM
- Maximum flows (w/o pump) up to 26 GPM

OK Series
The OK series coolers use a fan blade for moving air across the heat exchanger.

- Up to 100 HP cooling capacity
- Packaged systems with pump flows ranging from 8.45 GPM to 47.5 GPM
- Maximum flows (w/o pump) up to 80 GPM
- 230 V 1ph, and 230/460 V 3ph
- 12 VDC and 24 VDC
- Hydraulic drive

SC

OK

Contents

Model Code / Ordering Information

CONFIGURATION	COOLER SIZE	DESIGN	MOTOR	PUMPS	FILTER TYPE	MICRON RATING	FILTER INDICATOR	ACCESSORIES
		1.0						

CONFIGURATION

Code	Description
SC	Basic cooler
SCF	Cooler with filter
SCA	Cooler w/circulator pump
SCAF	Cooler w/circulator pump and filter

ACCESSORIES

Code	Description
Omit	None
TR1	Reservoir Thermostat, adjustable 0° to 200°F
AITR	Inline Thermostat, adjustable 0° to 200°F
AITF 48	Inline Thermostat, fixed 118° to 108°F
AITF 60	Inline Thermostat, fixed 140° to 122°F
AITF 72	Inline Thermostat, fixed 161° to 153°F
AITB45	Thermostatic bypass valve, 113° F to 131°F
AITB55	Thermostatic bypass valve, 130° F to 150°F
AITB60	Thermostatic bypass valve, 140° F to 158°F

COOLER SIZE

Code	Description
1L	See heat transfer table found on page 3 to determine proper size.
1S	
2L	
2S	
3L	L = 1140 RPM
3S	S = 1725 RPM

FILTER INDICATOR

Code	Series	Description
Omit	No Filter	-
B	MF95 LF/LPF	Visual
C	MF95 LF/LPF	Electrical (DC)
E	MF160	Gauge
G	MF160	Electrical

Other indicators are available upon request. See page 10 for more information.

MOTOR

Code	Description
B	3-Phase

MICRON RATING

Code	Description
Omit	No filter / SC and SCA models
3	3 microns, Absolute
5	5 microns, Absolute
10	10 microns, Absolute
20	20 microns, Absolute

PUMPS

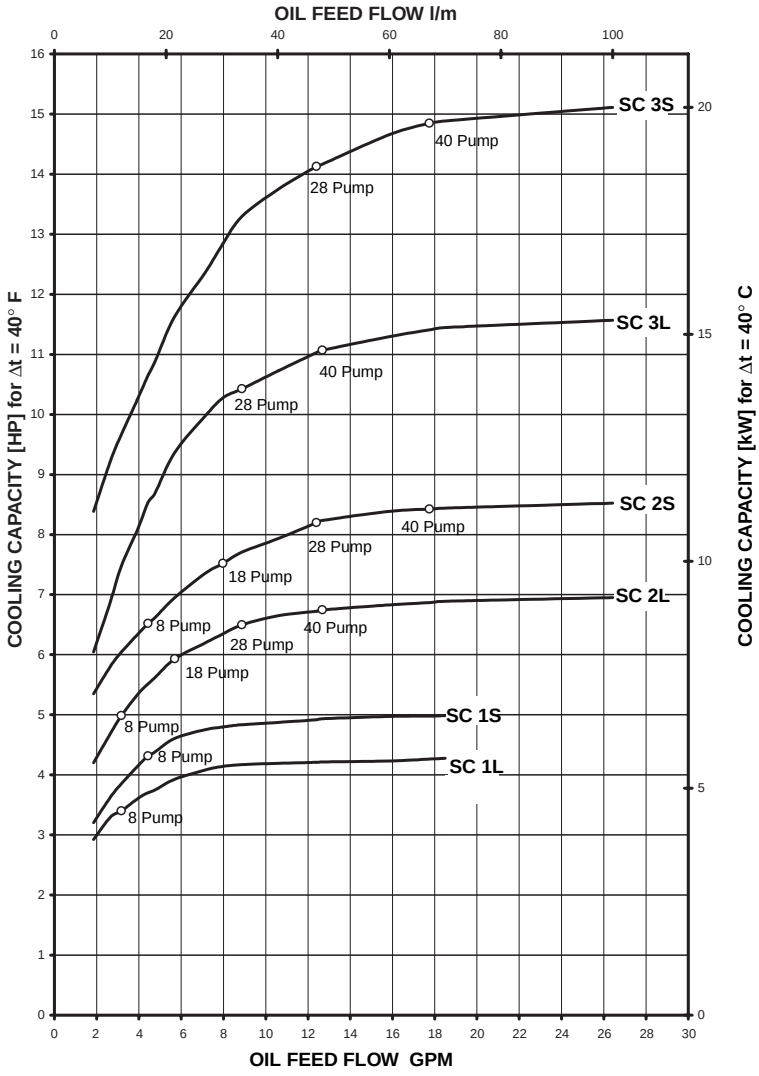
Code	Pump Displacement	GPM (L) 1140 RPM	GPM (S) 1800 RPM	Heat Exchanger Size
Omit	No Pump for SC and SCF models			
8	8 ccm/rev	2.4	3.6	1L, 1S, 2L, 2S
18	18 ccm/rev	5.4	8.2	2L, 2S
28	28 ccm/rev	8.4	12.75	2L, 2S, 3L, 3S
40	40 ccm/rev	12	18.5	

FILTER TYPE

Code	Description	Rated GPM*
Omit	No filter / SC and SCA models	
MF95	Spin-on	25
MF160	Spin-on	30

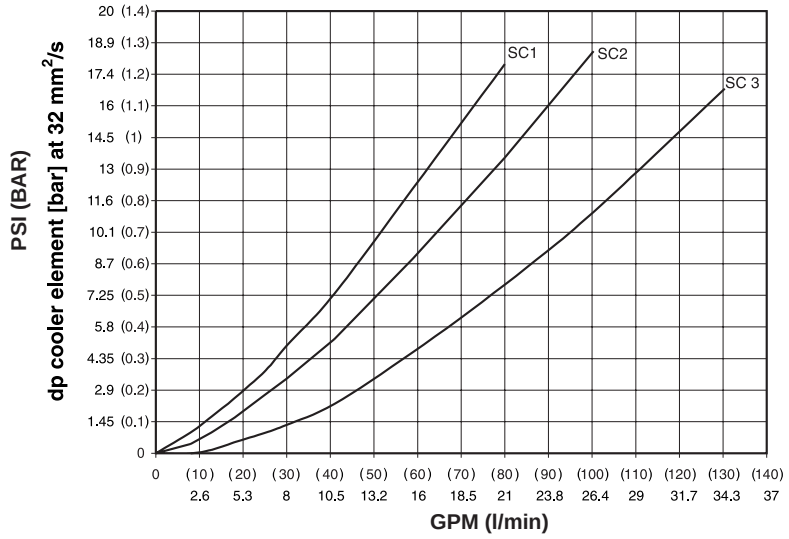
Other return line filters are available upon request. Consult filter brochure for special fluids, or see page 10 for more information on filters.
*Nominal

Cooling Capacity SC COOLERS



SC Pressure Drops

Pressure differential Δp depending on flow rate Q and the viscosity of the oil.
Graph uses oil viscosity of 150 SSU.



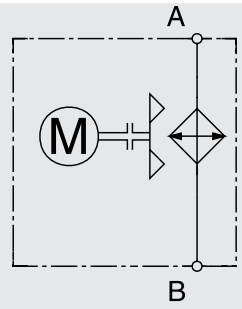
For oil viscosities other than 150 SSU, in the graph above multiply the Δp by the factor k for the corrected pressure drop.

SSU	46	70	102	150	213	250	315	464	695
mm/sec	10	15	22	32	46	54	68	100	150
Factor K	0.5	0.65	0.77	1	1.3	1.52	1.9	2.8	5.3

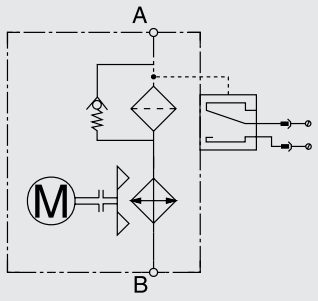
APPLICATIONS

- **Plastic injection molding machines**
- **Gearboxes**
- **Presses**
- **Elevators**
- **Machine centers**
- **Hydraulic Power Units**

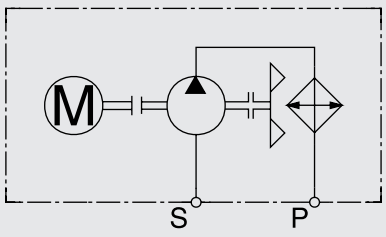
SC



SCF



SCA



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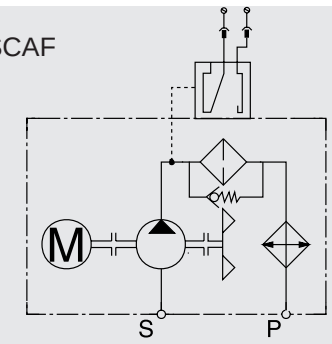


SC Specifications / Engineering Data

SPECIFICATIONS

COOLER MODELS	COOLER SET UP	FLUID SPECIFICATIONS				
		Maximum Oil Flow Without Pump GPM (LPM)	Order Code 8 Pump Dipl. 8 ccm/rev GPM (LPM)	Order Code 18 Pump Dipl. 18 ccm/rev GPM (LPM)	Order Code 28 Pump Dipl. 28 ccm/rev GPM (LPM)	Order Code 40 Pump Dipl 40 ccm/rev GPM (LPM)
SC-1L, SCF-1L	FAN	21(80)	-	-	-	-
SCA-1L, SCAF-1L	FAN/PUMP	-	2.4 (9.1)	-	-	-
SC-1S, SCF-1S	FAN	21(80)	-	-	-	-
SCA-1S, SCAF1S	FAN/PUMP	-	3.6 (13.8)	-	-	-
SC-2L, SCF-2L	FAN	26 (98)	-	-	-	-
SCA-2L, SCAF-2L	FAN/PUMP	-	2.4 (9.1)	5.4 (20.5)	-	-
SCA-2L, SCAF-2L	FAN/PUMP	-	-	-	8.4 (31.9)	12 (45.6)
SC-2S, SCF-2S	FAN	26 (98)	-	-	-	-
SCA-2S, SCAF-2S	FAN/PUMP	-	3.6 (13.8)	8.2 (31)	-	-
SCA-2S, SCAF-2S	FAN/PUMP	-	-	-	12.75 (48.3)	18.2 (69)
SC-3L, SCF-3L	FAN	34 (114)	-	-	-	-
SCA-3L, SCAF-3L	FAN/PUMP	-	-	-	8.4 (31.9)	12 (45.6
SC-3S, SCF-3S	FAN	34 (114)	-	-	-	-
SCA-3S, SCAF-3S	FAN/PUMP	-	-	-	12.75 (48.3)	18.2 (69)

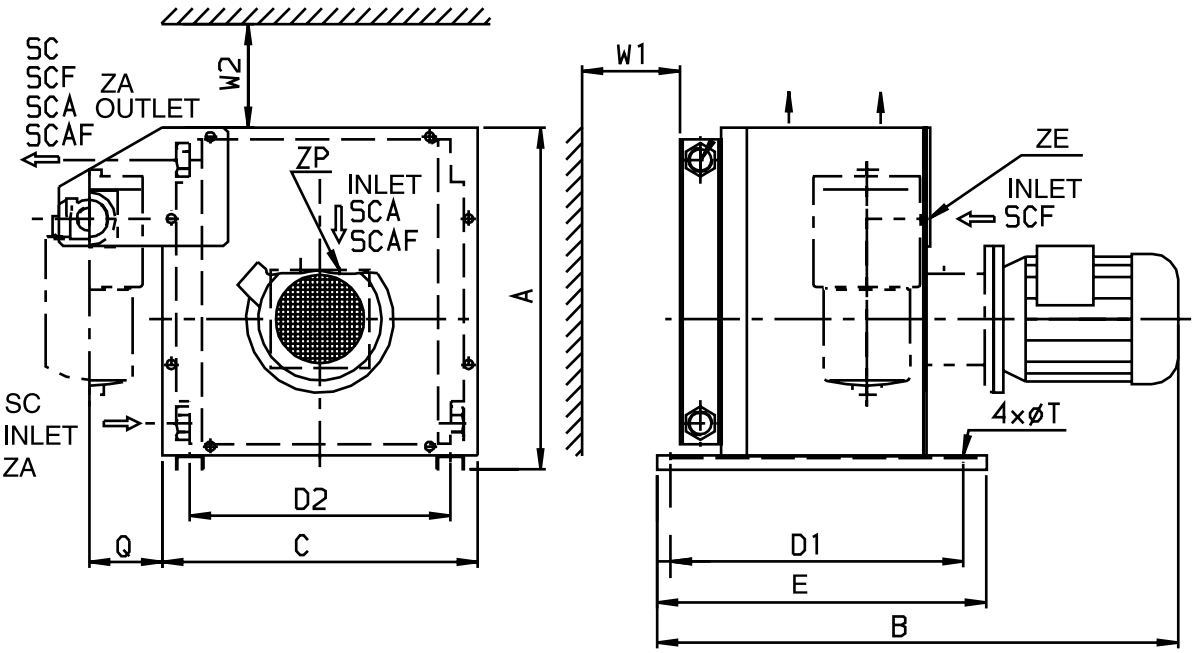
COOLER MODELS	COOLER SET UP	SPECIFICATIONS	AIR FLOW SPECIFICATIONS		MOTOR SPECIFICATIONS		WEIGHT
		Pump Code	Air Flow CFM (m^3h)	Noise dBa	Level HP (Kw)	Motor RPM	Motor LBS.
SC-1L, SCF-1L	FAN	-	290 (492)	56	.4 (.3)	1140	46.3
SCA-1L, SCAF-1L	FAN/PUMP	8	290 (492)	59	.4 (.3)	1140	55.1
SC-1S, SCF-1S	FAN	-	440 (748)	63	.4 (.3)	1725	46.3
SCA-1S, SCAF-1S	FAN/PUMP	18	440 (748)	67	.6 (.45)	1725	55.1
SC-2L, SCF-2L	FAN	-	500 (850)	62	.6 (.45)	1140	70.5
SCA-2L, SCAF-2L	FAN/PUMP	8/18	500 (850)	68	.6 (.45)	1140	79.4
SCA-2L, SCAF-2L	FAN/PUMP	28/40	-	68	1.75 (1.3)	1140	83.8
SC-2S, SCF-2S	FAN	-	810 (1,376)	71	.85 (.63)	1725	70.5
SCA-2S, SCAF-2S	FAN/PUMP	8/18	810 (1,376)	74	.85 (.63)	1725	79.4
SCA-2S, SCAF-2S	FAN/PUMP	28/40	-	76	2.4 (.1.8)	1725	83.8
SC-3L, SCF-3L	FAN	-	1150 (1,954)	68	.85 (.63)	1140	110.2
SCA-3L, SCAF-3L	FAN/PUMP	28/40	1150 (1,954)	70	2.4 (1.75)	1140	125.7
SC-3S, SCF-3S	FAN	-	1700 (2,888)	77	1.22 (.9)	1725	110.2
SCA-3S, SCAF-3S	FAN/PUMP	28/40	1700 (2,888)	78	2.9 (2.16)	1725	125.7

GENERAL SPECIFICATIONS

Construction	Housing	Welded steel housing, steel filter bracket, steel legs, steel blower wheel
	Heat Exchanger	Aluminum
	Motors	TEFC
	Pump	Aluminum housing, steel inner pump ring, steel rotor, and steel vanes
Mounting Position		Horizontal, motor shaft
Maximum Pressure	W/o Pump	230 PSI (16 BAR)
	With Pump	90 PSI (6 BAR)*
Rated Suction Pressure		11.8" Hg (0.4 BAR)
Fluids		Mineral oil to DIN 51524 Part 1 and 2
		Permissable contamination < NAS 12
Ambient Temperature		50° F (10° C) to 104° F (40° C)
Maximum Oil Temperature	W/o Pump	266° F (130° C)
	With Pump	212° F (100° C)
Air Flow Direction		Pulled across heat exchanger

* Note: Systems do not include relief valve. Pressures higher than 90 PSI will result in motor overload conditions.

SC Dimensions



inches

		A	B	C	D1	D2	E	F	L	Q	T	ZA	ZE	ZP	W1min*	W2min**
SC/SCF	1L/S	14.76	19.49	13.58	12.60	11.22	14.17	11.38	1.99	3.15	0.35	1 1/16"-12 JIC (M)	***	-	6	7.87
	2L/S	18.50	22.24	15.16	15.43	11.81	16.93	15.31	1.99	3.15	0.35	1 1/16"-12 JIC (M)	***	-	8	9.84
	3L/S	20.87	27.56	17.72	18.50	14.17	19.69	17.28	2.19	3.15	0.35	1 1/16"-12 JIC (M)	***	-	10	11.81
SCA/SCAF	1L/S/08	14.76	22.64	13.58	12.60	11.22	14.17	11.38	1.99	3.15	0.35	1 1/16"-12 JIC (M)	***	7/8"-14 JIC (M)	6	7.87
	2L/S/08	18.50	26.18	15.16	15.04	11.81	16.93	15.31	1.99	3.15	0.35	1 1/16"-12 JIC (M)	***	7/8"-14 JIC (M)	8	9.84
	2L/S/18	18.50	26.18	15.16	15.04	11.81	16.93	15.31	1.99	3.15	0.35	1 1/16"-12 JIC (M)	***	1 5/16"-12 (JIC) (M)	8	9.84
	2L/S/28-40	18.50	26.18	15.16	15.04	11.81	16.93	15.31	1.99	3.15	0.35	1 1/16"-12 JIC (M)	***	1 5/8"-12 (JIC) (M)	8	9.84
	3L/S/28-40	20.87	31.50	17.72	18.50	14.17	19.69	17.28	2.19	3.15	0.35	1 1/16"-12 JIC (M)	***	1 5/8"-12 (JIC) (M)	10	11.81

mm

		A	B	C	D1	D2	E	F	L	Q	T	ZA	ZE	ZP	W1min*	W2min**
SC/SCF	1L/S	375	495	345	320	285	360	289	50.5	80	9	1 1/16"-12 JIC (M)	***	-	150	200
	2L/S	470	565	385	392	300	430	389	50.5	80	9	1 1/16"-12 JIC (M)	***	-	200	250
	3L/S	530	700	450	470	360	500	439	55.5	80	9	1 1/16"-12 JIC (M)	***	-	250	300
SCA/SCAF	1L/S/08	375	575	345	320	285	360	289	50.5	80	9	1 1/16"-12 JIC (M)	***	7/8"-14 JIC (M)	150	200
	2L/S/08	470	610	385	382	300	430	389	50.5	80	9	1 1/16"-12 JIC (M)	***	7/8"-14 JIC (M)	200	250
	2L/S/18	470	630	385	382	300	430	389	50.5	80	9	1 1/16"-12 JIC (M)	***	1 5/16"-12 (JIC) (M)	200	250
	2L/S/28-40	470	665	385	382	300	430	389	50.5	80	9	1 1/16"-12 JIC (M)	***	1 5/8"-12 (JIC) (M)	200	250
	3L/S/28-40	530	800	450	470	360	500	439	55.5	80	9	1 1/16"-12 JIC (M)	***	1 5/8"-12 (JIC) (M)	250	300

* minimum distance above cooler
** minimum distance from cooler
*** Consult proper HYDAC filter literature for port size and filter dimensions.

Model Code / Ordering Information

CONFIGURATION	COOLER SIZE	DESIGN	MOTORS	PUMPS	FILTER TYPE	MICRON RATING	FILTER INDICATOR	ACCESSORIES
		2.0						

CONFIGURATION

Code	Description	Sizes
OK	Basic cooler	ALL #
OKF	Cooler with filter	3 - 11 #
OKA	Cooler w/circulator pump	4 - 11
OKAF	Cooler w/circulator pump and filter	4 - 11

Models for hydraulic motors

COOLER SIZE

Codes		Description
1H*	6L	See heat transfer table found on page 7 to determine proper size.
2H*	6S	
3S	8**	
3H	8H*	
4**	8L	
4H*	8S	L = 1140 RPM
4L	9**	S = 1725 RPM
4S	9L	H = 3450 RPM
5**	10**	
5L	10L	* Used with DC units
5S	11**	
6**	11L	** Used with hydraulic drive units
6H*		

MOTORS

Code	Description	Cooler Size
A	220 - 1ph	1H, 2H
B	208-230/460 3ph	ALL
C	12 VDC	1H, 2H, 3H, 4H, 6H, 8H
D	24 VDC	
H-6.1*	6.1 cm^3/rev Hyd. Motor	4, 5, 6
H-14*	14 cm^3/rev Hyd. Motor	5, 6, 8, 9, 10
H-20.8*	20.8 cm^3/rev Hyd. Motor	8, 9, 10,11

*Available on OK and OKF units only

PUMPS

Code	Pump Displacement	GPM (L) 1140 RPM	GPM (S) 1800 RPM	Heat Exchanger Size
Omit	No Pump - OK/OKF models and DC/Hydraulic Drive			
28	28 ccm/rev	8.4	12.75	4L, 4S, 5L, 5S, 6L, 6S
40	40 ccm/rev	12	18.5	
70	70 ccm/rev	-	34.3	8L, 8S, 9L, 10L, 11L
100	100 ccm/rev	-	47.5	

ACCESSORIES

Code	Description
Omit	None
TR1	Reservoir Thermostat, adjustable 0° to 200°F
AITR	Inline Thermostat, adjustable 0° to 200°F
AITF 48	Inline Thermostat, fixed 118° to 108°F
AITF 60	Inline Thermostat, fixed 140° to 122°F
AITF 72	Inline Thermostat, fixed 161° to 153°F
AITB45	Thermostatic bypass valve, 113° F to 131°F
AITB55	Thermostatic bypass valve, 130° F to 150°F
AITB60	Thermostatic bypass valve, 140° F to 158°F
AIB	Bypass valve

FILTER INDICATOR

Code	Filter Type	Description
Omit	No filter	-
B	MF95	Visual
C	MF95	Electrical (DC)
G	MF160/180	Electrical (AC/DC)
E	MF160/180	Gauge

Other indicators available upon request. See page 10 for more information.

MICRON RATING

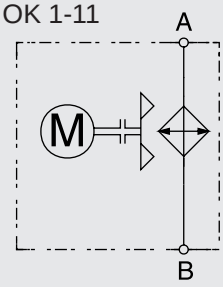
Code	Description
Omit	No filter / OK and OKA models
3	3 microns, Absolute
5	5 microns, Absolute
10	10 microns, Absolute
20	20 microns, Absolute

FILTER TYPE

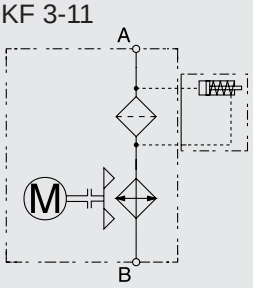
Code	Description	Rated GPM*
Omit	No filter / OK & OKA models	-
MF95	Spin-on	25
MF160		30
MF180		60
MFD180	Dual Spin-on	120

Other return line filters available upon request. Consult filter brochure for special fluids, or see page 10 for more information on filters.
* Nominal

Type: OK 1-11



Type: OKF 3-11



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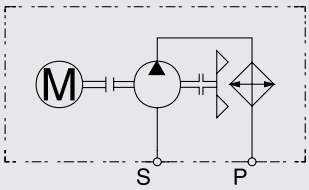

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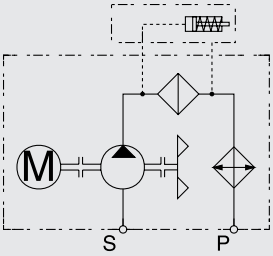

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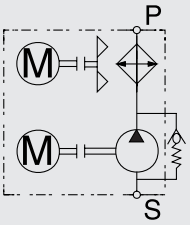

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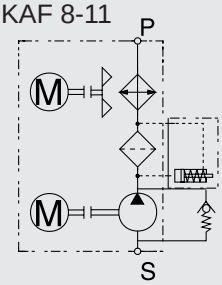
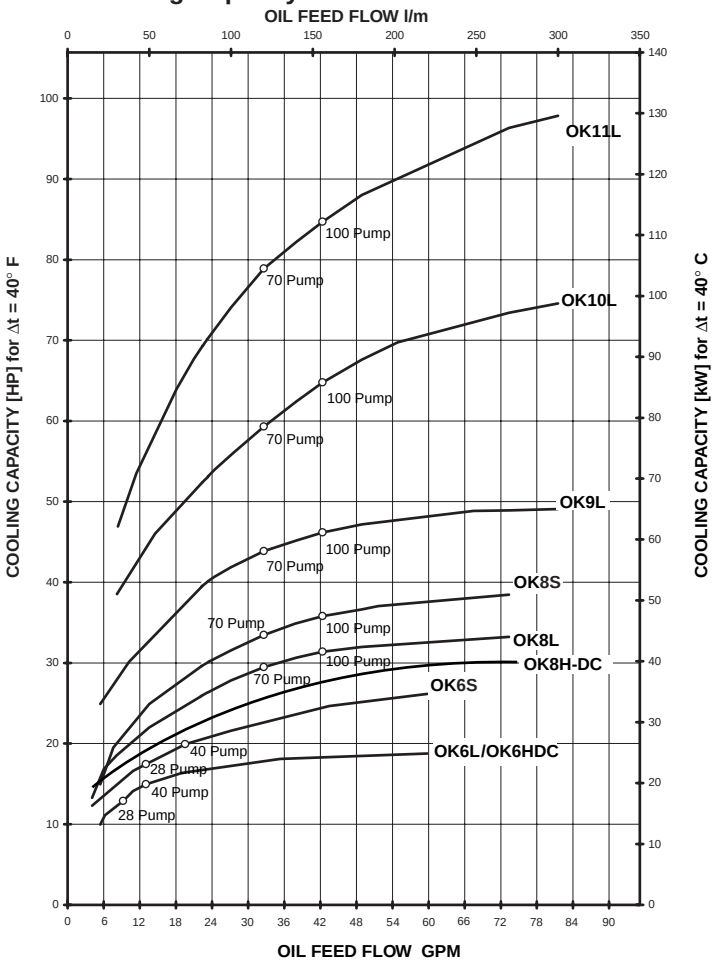
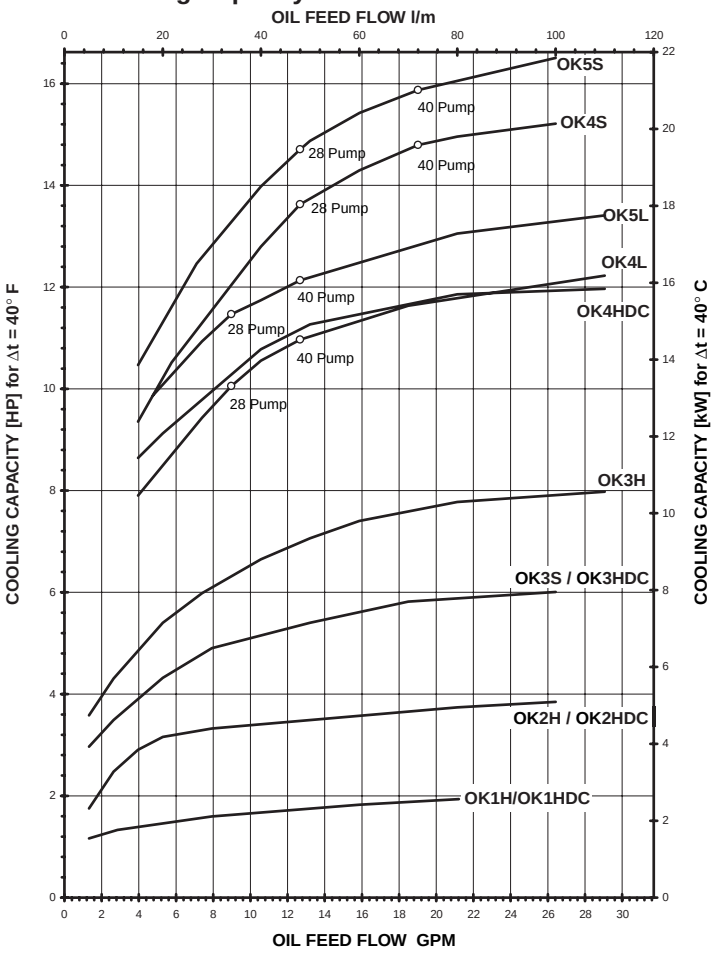


Cooling Capacity OK COOLERS Size 6 to 11



Cooling Capacity OK COOLERS Size 1 to 5

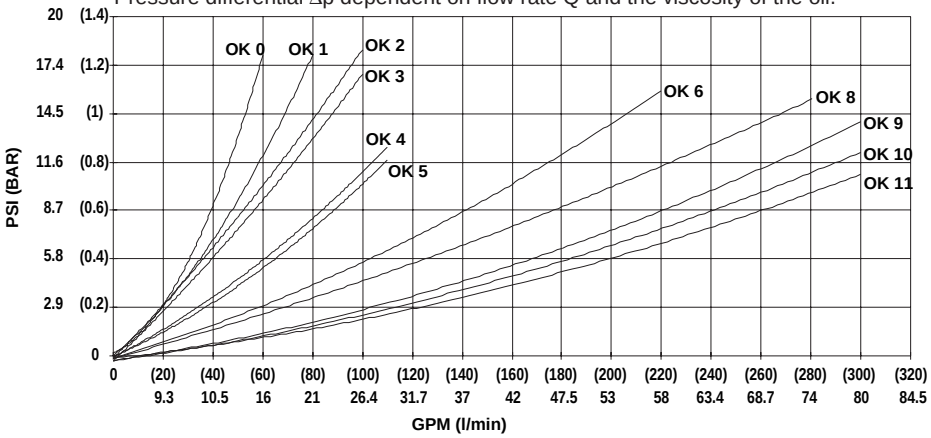


OK SPECIFICATIONS

COOLER MODELS	COOLER SET UP	FLUID SPECIFICATIONS				
		Maximum Oil Flow Without Pump GPM (LPM)	Order Code 28 Pump Dipl. 28 ccm/rev GPM (LPM)	Order Code 40 Pump Dipl. 40 ccm/rev GPM (LPM)	Order Code 70 Pump Dipl. 70 ccm/rev GPM (LPM)	Order Code 100 Pump Dipl. 100 ccm/rev GPM (LPM)
OK-1H	Fan	21 (80)	-	-	-	-
OK-1H-DC	Fan	21 (80)	-	-	-	-
OK-2H	Fan	26 (100)	-	-	-	-
OK-2H-DC	Fan	26 (100)	-	-	-	-
OK-3S, OKF-3S	Fan	26 (100)	-	-	-	-
OK-3H,OKF-3H	Fan	26 (100)	-	-	-	-
OK-3H-DC, OKF-3-DC	Fan	26 (100)	-	-	-	-
OK-4L, OKF-4L	Fan	29 (100)	-	-	-	-
OKA-4L, OKAF-4L	Fan/Pump	-	8.45 (31.92)	12 (45.6)	-	-
OK-4S, OKF-4S	Fan	29 (110)	-	-	-	-
OKA-4S, OKAF-4S	Fan/Pump		12.75 (48.3)	18.5 (70)		
OK-4H-DC, OKF-4H-DC	Fan	29 (110)		-	-	-
OK-5L, OKF-5L	Fan/Pump	29 (110)	-	-	-	-
OKA-5L, OKAF-5L	Fan/Pump	-	8.45 (31.92)	12 (45.6)	-	-
OK-5S, OKF-5S	Fan	29 (110)	-	-	-	-
OKA-5S, OKAF-5S	Fan/Pump	-	12.75 (48.3)	18.5 (70)	-	-
OK-6L, OKF-6L	Fan	60 (227)	-	-	-	-
OKA-6L, OKAF-6l	Fan/Pump	-	8.45 (31.92)	12 (45.6)	-	-
OK-6S, OKF-6S	Fan	60 (227)	-	-	-	-
OKA-6S, OKAF-6S	Fan/Pump	-	12.75 (48.3)	18.5 (70)	-	-
OK-6H-DC, OKF-6-DC	Fan	60 (227)	-	-	-	-
OK-8L, OKF-8L	Fan	74 (280)	-	-	-	-
OK-8S, OKF-8S	Fan	74 (280)	-	-	-	-
OKA-8L, OKAF-8L	Pump	-	-	-	34.3 (130)	-
and	Pump	-	-	-	-	47.5 (180)
OKA-8S, OKAF-8S	Fan	-	-	-	-	-
OK-8H-DC	Fan	74 (280)	-	-	-	-
OK-9L, OKF-9L	Fan	79 (300)	-	-	-	-
	Pump	-	-	-	34.3 (130)	-
OKA-9L, OKAF-9L	Pump	-	-	-	-	47.5 (180)
	Fan	-	-	-	-	-
OK-10L, OKF-10L	Fan	79 (300)	-	-	-	-
	Pump	-	-	-	34.3 (130)	-
OKA-10L, OKAF-10L	Pump	-	-	-	-	47.5 (180)
	Fan	-	-	-	-	-
OK-11L, OKF-11L	Fan	79 (300)	-	-	-	-
	Pump	-	-	-	34.3 (130)	-
OKA-11L, OKAF-11L	Pump	-	-	-	-	47.5 (180)
	Fan	-	-	-	-	-

OK Series Pressure Drops

Pressure differential Δp dependent on flow rate Q and the viscosity of the oil.



SSU	46	70	102	150	213	250	315	464	695
mm/sec	10	15	22	32	46	54	68	100	150
Factor K	0.5	0.65	0.77	1	1.3	1.52	1.9	2.8	5.3

For oil viscosities other than 150 SSU, in the graph above multiply the Δp by the factor k for the corrected pressure drop.

OK SPECIFICATIONS

COOLER MODELS	COOLER SET UP	PUMP CODE	AIR FLOW SPECIFICATIONS		MOTOR SPECIFICATIONS		WEIGHT
			Air Flow CFM (m^3h)	Noise Level dBa	Motor HP (kW)	Motor RPM	lbs.
OK-1H	Fan	-	130 (220)	58	.06 (.04)	3450	7.7
OK-1H-DC Fan	-		130 (220)	58	.07 (.05)	3450	7.7
OK-2H	Fan	-	270 (460)	74	.10 (.06)	3450	12.1
OK-2H-DC Fan	-		250 (425)	75	.08 (.05)	3450	11
OK-3S, OKF-3S	Fan	-	540 (917)	73	.3 (.25)	1725	28.7
OK-3H, OKF-3H	Fan	-	1220 (2070)	82	.4 (.37)	3450	28.7
OK-3H-DC, OKF-3-DC	Fan	-	580 (965)	76	.2 (.18)	3450	19.8
OK-4L, OKF-4L	Fan	-	550 (934)	72	.4 (.37)	1160	59.5
OKA-4L, OKAF-4L	Fan/Pump	28/40	550 (934)	75	1.7 (1.5)	1160	86
OK-4S, OKF-4S	Fan	-	1150 (1953)	79	.6 (.55)	1725	59.5
OKA-4S, OKAF-4S	Fan/Pump	28/40	1150 (1953)	80	2.4 (1.79)	1725	90.4
OK-4H-DC, OKF-4H-DC	Fan	-	1120 (1900)	76	1.3 (.25)	3450	55.1
OK-5L, OKF-5L	Fan	-	1010 (1716)	71	.6 (.55)	1160	83.8
OKA-5L, OKAF-5L	Fan/Pump	28/40	1010 (1716)	73	1.7 (1.5)	1160	110.2
OK-5S, OKF-5S	Fan	-	1410 (2395)	77	1.7 (1.5)	1725	83.8
OKA-5S, OKAF-5S	Fan/Pump	28/40	1410 (2395)	77	2.8 (2.4)	1725	110.2
OK-6L, OKF-6L	Fan	-	1390 (2361)	70	.6 (.55)	1160	101.4
OKA-6L, OKAF-6L	Fan/Pump	28/40	1390 (2361)	75	1.7 (1.5)	1160	116.8
OK-6S, OKF-6S	Fan	-	2370 (4026)	77	1.7 (1.5)	1725	101.4
OKA-6S, OKAF-6S	Fan/Pump	28/40	2370 (4026)	80	2.8 (2.4)	1725	116.8
OK-6H-DC, OKF-6-DC	Fan	-	1970 (3347)	78	1.5 (.37)	3450	72.8
OK-8L, OKF-8L	Fan	-	2980 (5063)	78	1.7 (1.5)	1160	149.9
OKA-8L, OKAF-8L	Pump	70	-	-	3.5 (2.6)	1725	196.2
	Pump	100	-	-	4.8 (3.5)	1725	196.2
	Fan	-	2980 (5063)	82	1.7 (1.5)	1160	196.2
OK-8S, OKF-8S	Fan	-	4400 (7475)	83	2.4 (1.8)	1725	152.1
OKA-8S, OKAF-8S	Fan	70	-	-	3.5 (2.6)	1725	196.2
	Pump	100		-	4.8 (3.5)	1725	196.2
	Pump	-	4400 (7475)	83	1.7 (1.5)	1725	196.2
OK-8H-DC Fan	-		4720 (7254)	82	.8 (.6)	3450	132.3
OK-9L, OKF-9L	Fan	-	6430 (10925)	80	1.7 (1.5)	1160	273.4
OKA-9L, OKAF-9L	Pump	70	-	-	3.5 (2.6)	1725	326.3
	Pump	100	-	-	4.8 (3.5)	1725	326.3
	Fan	-	6430 (10925)	84	1.7 (1.5)	1160	326.3
OK-10L, OKF-10L	Fan	-	8790 (14935)	80	2.4 (1.8)	1160	313.1
OKA-10L, OKAF-10L	Pump	70	-	-	3.5 (2.6)	1725	368.2
	Pump	100	-	-	4.8 (3.5)	1725	368.2
	Fan	-	8790 (14935)	84	3 (2.4)	1160	368.2
OK-11L, OKF-11L	Fan	-	12170 (20677)	81	3.5 (2.6)	1160	374.8
OKA-11L, OKAF-11L	Pump	70	-	-	3.5 (2.6)	1725	432.1
	Pump	100	-	-	4.8 (3.5)	1725	432.1
	Fan	-	12170 (20677)	84	3.5 (2.6)	1160	432.1

GENERAL SPECIFICATIONS

Construction	Housing	Welded steel housing, steel filter bracket, steel legs, steel blower wheel
	Heat Exchanger	Aluminum
	Motors	TEFC
	Pump	Aluminum housing, steel inner pump ring, steel rotor, and steel vanes
Mounting Position		Horizontal, motor shaft
Maximum Pressure	W/o Pump	230 PSI (16 BAR)
	With Pump	90 PSI (6 BAR)*
Rated Suction Pressure		11.8" Hg (-0.4 BAR)
Fluids		Mineral oil to DIN 51524 Part 1 and 2
		Permissable contamination < NAS 12
Ambient Temperature		50° F (10° C) to 104° F (40° C)
Maximum Oil Temperature	W/o Pump	266° F (130° C)
	With Pump	212° F (100° C)
Air Flow Direction		Pulled across heat exchanger

* Note: Sizes OKA-4-6 do not include relief valve. Pressures higher than 90 PSI will result in motor overload conditions. Sizes OKA-8-11 come with a 90 PSI relief valve built into the pump.

LF

LPF

MF

Code B

Code D

Code E

Code G

FILTERS

The SC and OK coolers use either a Spin-on MF series filter, or LF/LPF series filters. All styles feature elements with Betamicron® media and are offered in various absolute micron ratings.

Filter selection is determined by:

1. Selecting desired series filter, MF, LF, or LPF
2. What is allowable contamination level of the system? From this determine the micron rating of your filter.
3. Determine the size of the filter by the flow rate going through the cooler system. Refer to HYDAC filter literature for flow rate and pressure drop information on particular filters. Keep in mind the physical size of the cooler versus the size of the element.

Note: It is important that the pressure drop across the filter element does not get too high. Pressure drop across a clean filter assembly should not exceed more than 10 PSI.

CLOGGING INDICATORS

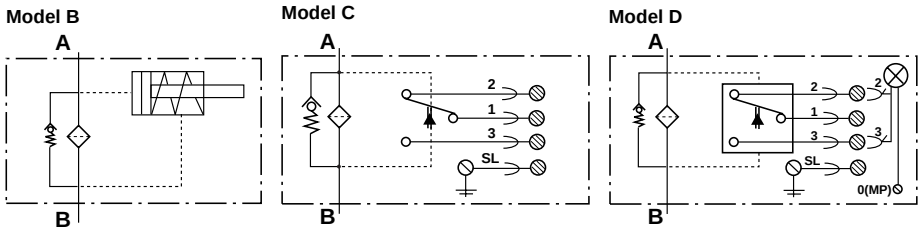
LF/LPF SERIES and MF95 FILTERS

The LF/LPF and MF95 filters use a differential pressure style indicator. These indicators are magnetically actuated and have no external dynamic seals. These features produce high reliability while reducing leak points.

Code B Visual Clogging Indicator - A red marker extends to signal that the filter element is clogged.

Code C Electrical Clogging Indicator – An electric switch is activated when clogging of the filter element occurs. The switch can be connected for normally open or normally closed circuits. Rated for 12 VDC to 230 VAC.

Code D Electrical Clogging Indicator with Visual Lamp - An electric switch and light activate when clogging of the filter element occurs. The switch can be connected for normally open or normally closed circuits. The Lamp can be activated either on closing or opening of the contact. Code D indicator is available in 24 VDC, 115 VAC, or 230 VAC.



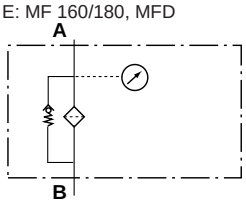
MF SERIES FILTERS

Code E Gauge - The gauge indicates the static pressure upstream of the filter element and thus the degree of contamination of the filter element. The dial face has a 3-colored scale for easy reference.

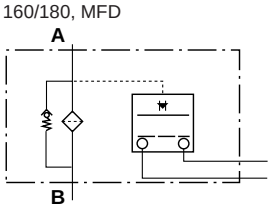
Code G Pressure Switch - The pressure switch monitors the upstream pressure of the filter causing a normally open contact to close when 29 PSI is reached.

Electrical Ratings:
8 amps - 12 VDC
4 amps - 24 VDC
1 amp - 120 VAC
.5 amps - 240VAC

Code E: MF 160/180, MFD



Code G: MF 160/180, MFD



Note: For more detailed information on clogging indicators, see HYDAC Clogging Indicators Mechanical, Electrical, Electronic catalog, number A 7.050.3/12.86.

HYDRAULIC DRIVE

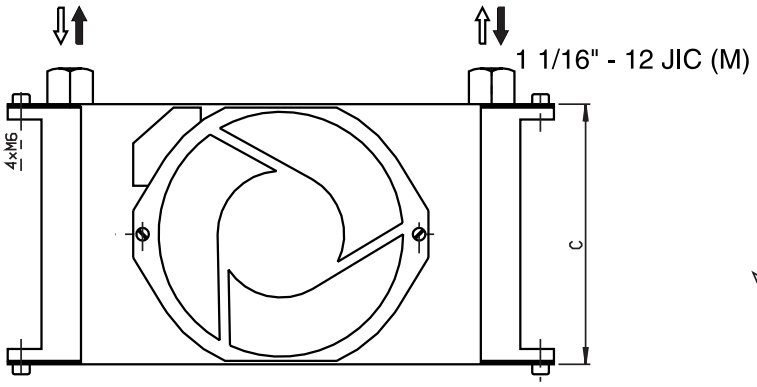
Special Features of Hydraulic Motor:
- high efficiency
- low noise, low pulsation
- oil filtration 30 µm min.
- equipped with 1/4" NPT drain connection

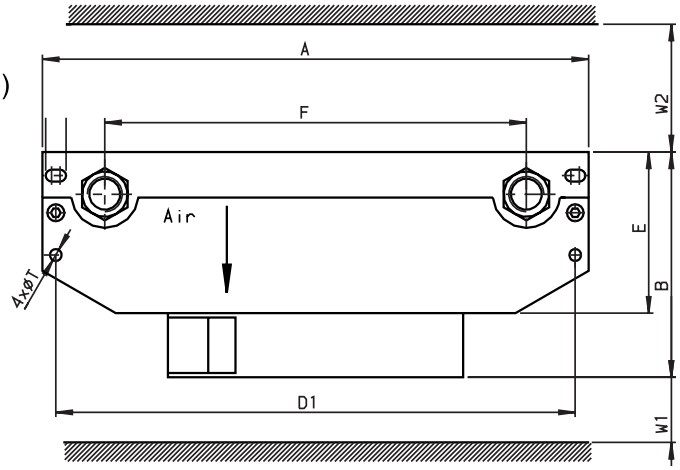
Connections: SAE

OK	4	5	6	8	9	10	11
cu/in rev	0.37	0.37 / 0.85	0.37 / 0.85	0.85 / 1.27	0.85 / 1.27	0.85 / 1.27	1.27
Maximum RPM	1800	1800	1800	1800	1400	1400	1000
GPM	2.9	2.9 / 6.6	2.9 / 6.6	6.6 / 9.9	5.2 / 7.7	5.2 / 7.7	5.5
Required PSI	400	750 / 350	1000 / 500	550 / 350	850 / 550	1000 / 650	550
Input HP	0.8	1.5	2	2.4	3	3.35	3

Note: Unit is shown with AITB Thermostatic Bypass Valve.

OK Size 1 Dimensions





inches

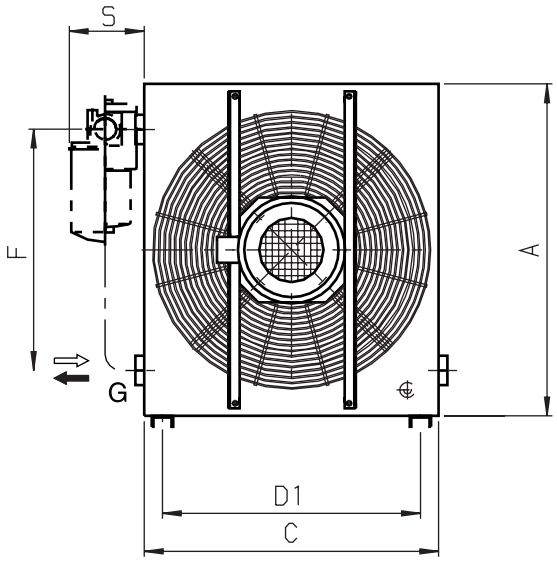
OK	A	B 12/24DC	B 220V 1ph	B 3ph	C	D1	T	E	F	W1min*	W2min**
Size 1	12.76	8.50	5.16	12.20	6.06	12.13	0.28	3.94	9.53	4	6

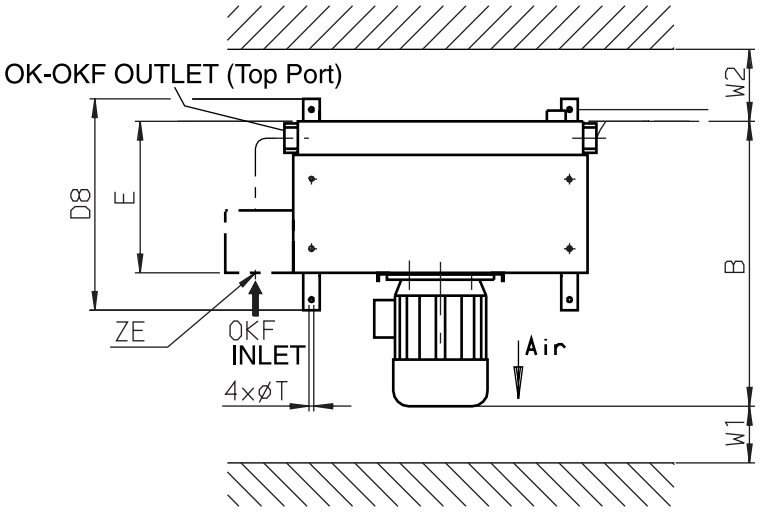
mm

OK	A	B 12/24DC	B 220V 1ph	B 3ph	C	D1	T	E	F	W1min*	W2min**
Size 1	324	216	131	310	154	308	7	100	242	100	150

* minimum distance above cooler
** minimum distance from cooler

OK/OKF Size 2 - 6 Dimensions





inches

OK/OKF	A	B				C	D1	D8	E	F	S	ZE	G	SW	T	W1min*	W2min*
		12/24 DC	220 V 1ph	3ph	HYD. MOT.												
Size 2	13.19	6.50	8.86	11.81	-	9.06	6.30	11.61	5.91	9.65	-	***	1 1/16"-12 JIC (M)	1.30	0.35	4	4
Size 3	13.78	10.83	-	16.14	-	14.17	11.42	11.61	7.87	9.65	-	***	1 1/16"-12 JIC (M)	1.30	0.35	4	4
Size 4	20.47	12.99	-	18.11	13.78	21.34	18.98	17.72	9.65	17.32	6.7	***	1 5/16"-12 JIC (M)	1.61	0.35	6	8
Size 5	21.34	-	-	19.69	14.17	21.34	18.98	17.72	9.65	17.32	6.7	***	1 5/16"-12 JIC (M)	1.61	0.35	6	8
Size 6	24.41	14.37	-	21.26	16.54	21.65	18.98	17.72	11.22	19.69	6.7	***	1 5/8"-12 JIC (M)	2.17	0.35	6	8

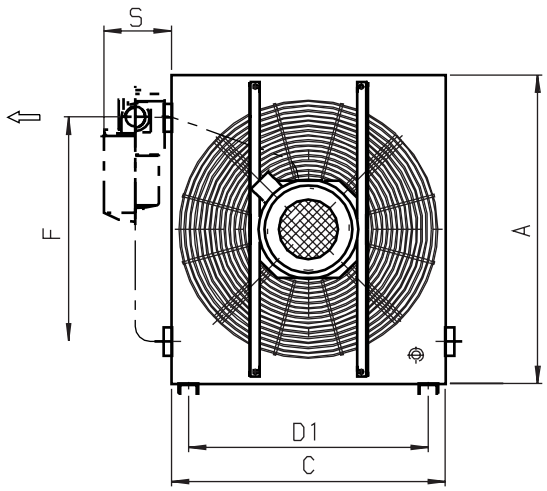
mm

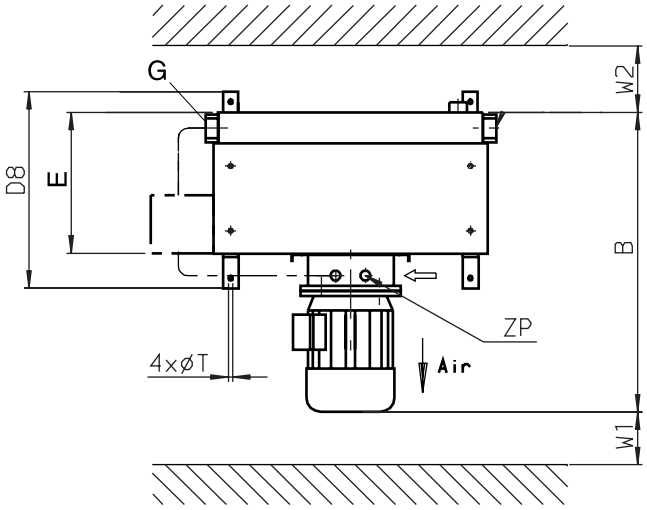
OK/OKF	A	B				C	D1	D8	E	F	S	ZE	G	SW	T	W1min*	W2min*
		12/24 DC	220 V 1ph	3ph	HYD. MOT.												
Size 2	335	165	225	300	-	230	160	295	5.91	245	-	***	1 1/16"-12 JIC (M)	33	9	100	100
Size 3	350	275	-	410	-	360	290	295	7.87	245	-	***	1 1/16"-12 JIC (M)	33	9	100	100
Size 4	520	330	-	460	350	542	482	450	9.65	440	170	***	1 5/16"-12 JIC (M)	41	9	150	200
Size 5	542	-	-	500	360	542	482	450	9.65	440	170	***	1 5/16"-12 JIC (M)	41	9	150	200
Size 6	620	365	-	540	420	550	482	450	11.22	500	170	***	1 5/8"-12 JIC (M)	55	9	150	200

* minimum distance from cooler

*** Consult proper HYDAC filter literature for port size and filter dimensions.

OKA/OKAF Size 4 - 6 Dimensions





inches

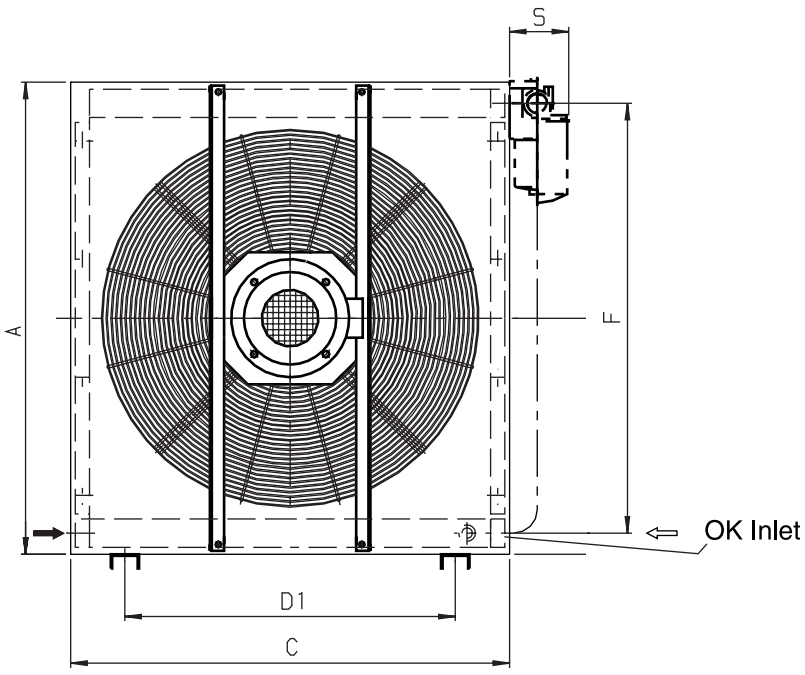
OKA/OKAF	A	B	C	D1	D8	E	F	G	S	SW	T	ZP	W1min*	W2min*
Size 4	20.47	22.83	21.34	18.98	17.72	9.65	17.32	1 5/16"-12 JIC (M)	6.7	1.61	0.35	1 5/8"-12 JIC (M)	6	8
Size 5	21.34	24.41	21.34	18.98	17.72	9.65	17.32	1 5/16"-12 JIC (M)	6.7	1.61	0.35	1 5/8"-12 JIC (M)	6	8
Size 6	24.41	25.98	25.98	18.98	17.72	11.22	19.69	1 5/8"-12 JIC (M)	6.7	2.17	0.35	1 5/8"-12 JIC (M)	6	8

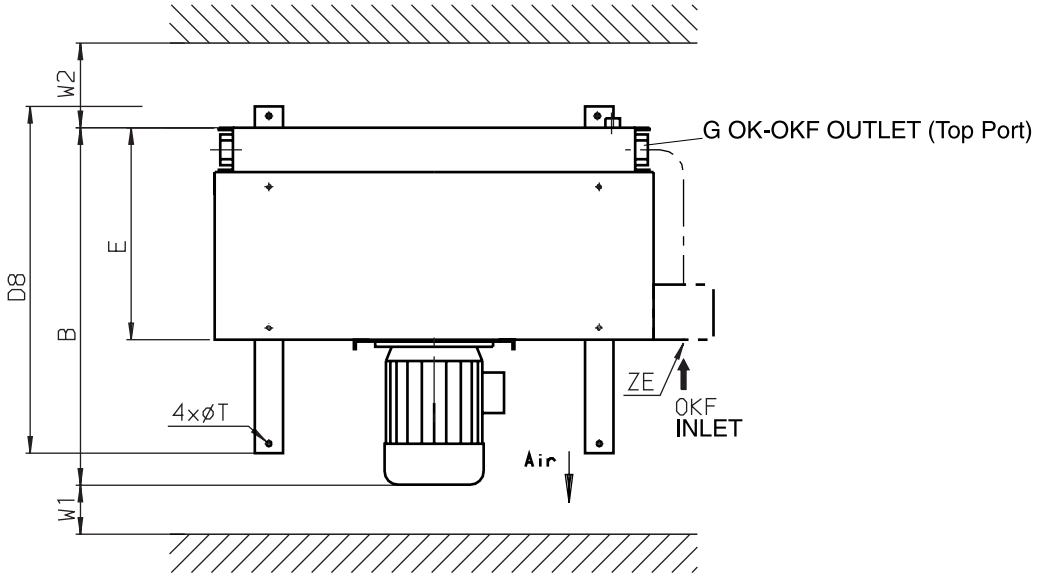
mm

OKA/OKAF	A	B	C	D1	D8	E	F	G	S	SW	T	ZP	W1min*	W2min*
Size 4	520	580	542	482	450	245	440	1 5/16"-12 JIC (M)	170	41	0.35	1 5/8"-12 JIC (M)	50	200
Size 5	542	620	542	482	450	245	440	1 5/16"-12 JIC (M)	170	41	0.35	1 5/8"-12 JIC (M)	150	200
Size 6	620	660	550	482	450	285	500	1 5/8"-12 JIC (M)	170	41	0.35	1 5/8"-12 JIC (M)	150	200

* minimum distance from cooler

OK/OKF Size 8 - 11 Dimensions





inches

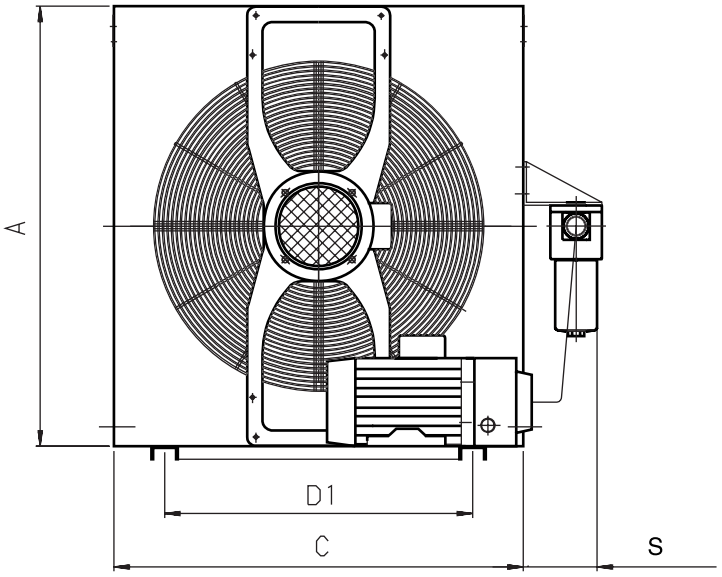
OK/OKF	A	B			C	D1	D8	E	F	S	ZE	G	T	W1min*	W2min*
		12/24 DC	3ph	HYD. MOT.											
Size 8	29.37	* ***	23.62	17.72	25.35	18.98	19.69	12.01	24.80	6.7	***	1 5/8"-12 JIC (M)	0.35	6	8
Size 9	33.46	-	27.56	21.26	31.10	27.58	31.10	15.75	29.92	6.7	***	1 7/8"-12 JIC (M)	0.43	8	12
Size 10	39.37	-	33.07	24.80	36.61	27.56	31.10	17.72	35.83	6.7	***	1 7/8"-12 JIC (M)	0.35	8	16
Size 11	45.28	-	33.07	26.38	41.34	27.56	31.10	19.69	41.73	6.7	***	1 7/8"-12 JIC (M)	0.43	8	20

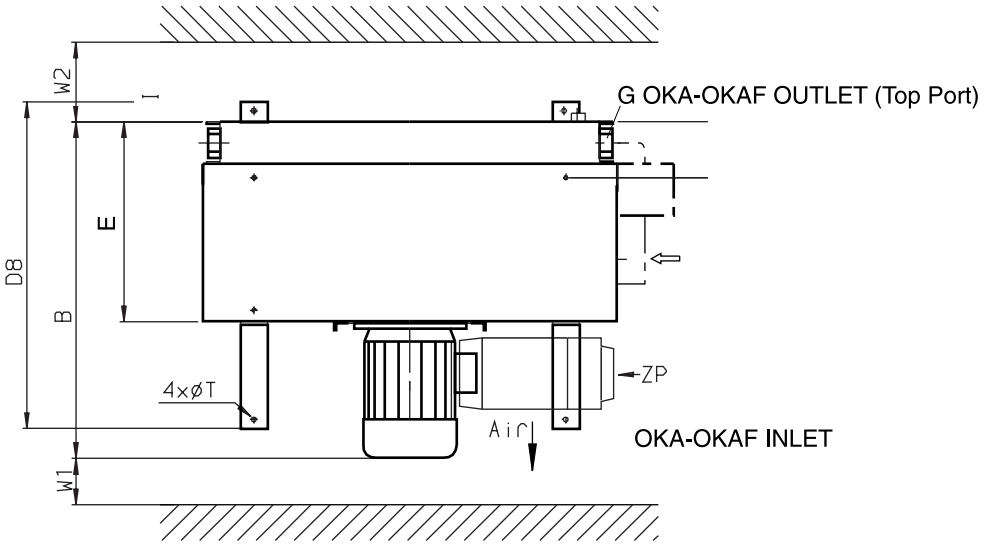
mm

OK/OKF	A	B			C	D1	D8	E	F	S	ZE	G	T	W1min*	W2min*
		12/24 DC	3ph	HYD. MOT.											
Size 8	746	****	600	450	644	482	500	305	630	170	***	1 5/8"-12 JIC (M)	9	150	373
Size 9	850	-	700	540	790	700	790	400	760	170	***	1 7/8"-12 JIC (M)	11	200	425
Size 10	1000	-	840	630	930	700	790	450	910	170	***	1 7/8"-12 JIC (M)	9	200	400
Size 11	1150	-	840	670	1050	700	790	500	1060	170	***	1 7/8"-12 JIC (M)	11	200	500

* minimum distance from cooler
*** Consult proper HYDAC filter literature for port size and filter dimensions.
**** available upon request

OKA/OKAF Size 8 - 11 Dimensions





inches

OK/OKF	A	B		C	D1	D8	E	F	G	S	T	ZP	W1min*	W2min*
		3ph	HYD. MOT.											
Size 8	29.37	23.62	17.72	25.35	18.98	19.69	12.01	24.80	1 5/8"-12 JIC (M)	6.7	0.35	2" NPT	6	8
Size 9	33.46	27.56	21.26	31.10	27.58	31.10	15.75	29.92	1 7/8"-12 JIC (M)	6.7	0.43	2" NPT	8	12
Size 10	39.37	33.07	24.80	36.61	27.56	31.10	17.72	35.83	1 7/8"-12 JIC (M)	6.7	0.35	2" NPT	8	12
Size 11	45.28	33.07	26.38	41.34	27.56	31.10	19.69	41.73	1 7/8"-12 JIC (M)	6.7	0.43	2" NPT	8	12

mm

OK/OKF	A	B		C	D1	D8	E	F	G	S	T	ZP	W1min*	W2min*
		3ph	HYD. MOT.											
Size 8	746	600	450	644	482	700	305	630	1 5/8"-12 JIC (M)	170	9	2" NPT	150	200
Size 9	850	700	640	790	700	870	400	760	1 7/8"-12 JIC (M)	170	11	2" NPT	150	200
Size 10	1000	840	630	930	700	870	450	910	1 7/8"-12 JIC (M)	170	9	2" NPT	200	400
Size 11	1150	840	670	1050	700	870	500	1060	1 7/8"-12 JIC (M)	170	11	2" NPT	200	500

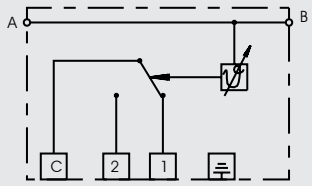
* minimum distance from cooler

ACCESSORIES

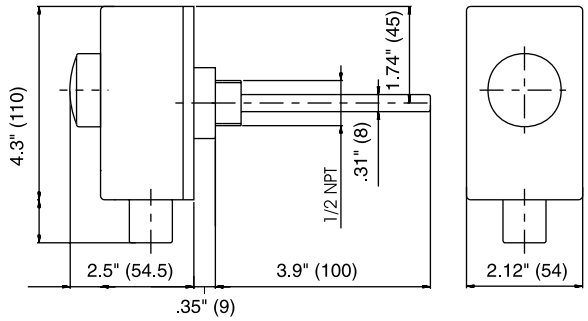
TEMPERATURE SWITCHES, ADJUSTABLE

TR1/ AITR Adjustable Thermostat

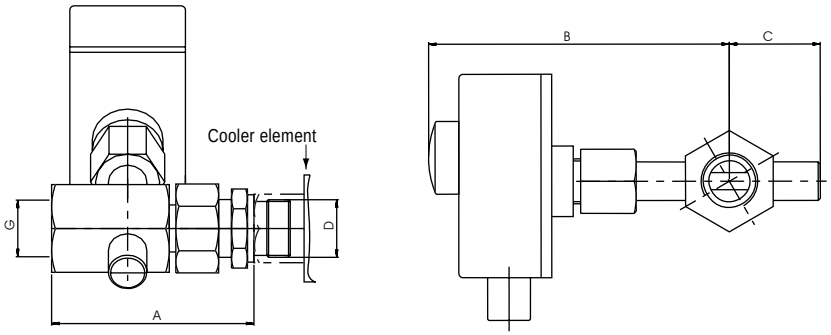
Temperature Range	0-200° F (0-95° C)
Switching Differential	5° F (2.5° C)
Voltage	220V/440V
Amps	10A/220V 5A/440V
Enclosure	IP50
Conduit Connector	1/2"
Max. PSI	150



Tank-mounted - Order Code: TR1



Inline - Order Code: AITR
Sizes SC 1 - 3, OK 1 - 3



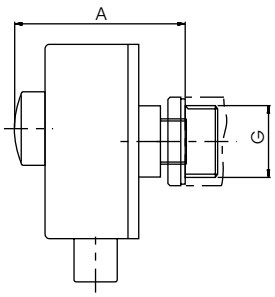
inches

	A	B	C	D	G
SC 1-3 and OK 1-3	3.66	5.63	1.57	3/4" BPSS	3/4" BPSS

mm

	A	B	C	D	G
SC 1-3 and OK 1-3	93	143	40	3/4" BSPP	3/4" BPSS

Cooler Mounted - Order Code: AITR
Sizes OK 4 - 11



inches

	A	G
OK 4, 5	3.11	1" BPSS
OK 6, 8	3.78	M 22 X 1.5
OK 9, 10, 11	3.31	3/4" BPSS

mm

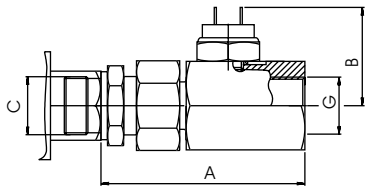
	A	G
OK 4, 5	79	1" BPSS
OK 6, 8	96	M 22 X 1.5
OK 9, 10, 11	84	3/4" BPSS

TEMPERATURE SWITCHES, FIXED

AITF Technical Data

Voltage	12/24 VDC 220/440V
Amps	15A
Cycle Life	100,000
Accuracy	+/-3%
Max. PSI	435 PSI
Spade Connection	6.35 mm X .8mm

Inline - Order Code: AITF
Sizes: SC 1 - 3, OK 1 - 3



inches

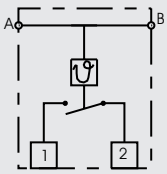
	A	B	C	G
SC 1-3 and OK 1-3	3.62	2.36	3/4" BSPP	3/4" NPT

mm

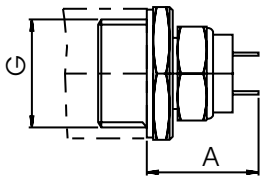
	A	B	C	G
SC 1-3 and OK 1-3	92	60	3/4" BSPP	3/4" NPT

AITF Temperature Ranges

Ordering Code	Closing Temperature	Opening Temperature
AITF 48	118° F (48° C)	108° F (42° C)
AITF 60	140° F (60° C)	122° F (50° C)
AITF 72	161° F (72° C)	153° F (67° C)



Cooler Mounted - Order Code: AITF
Sizes: OK 4 - 11



inches

	A	G
OK 4, 5	1.85	1" BPSS
OK 6, 8	1.73	M 22 X 1.5
OK 9, 10, 11	1.77	3/4" BPSS

mm

	A	G
OK 4, 5	47	1" BPSS
OK 6, 8	44	M 22 X 1.5
OK 9, 10, 11	45	3/4" BPSS

ACCESSORIES

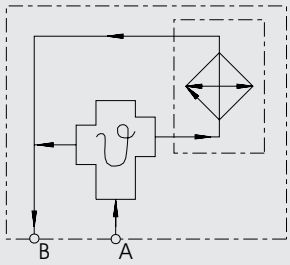
Thermostatic Bypass - Order Code: AITB

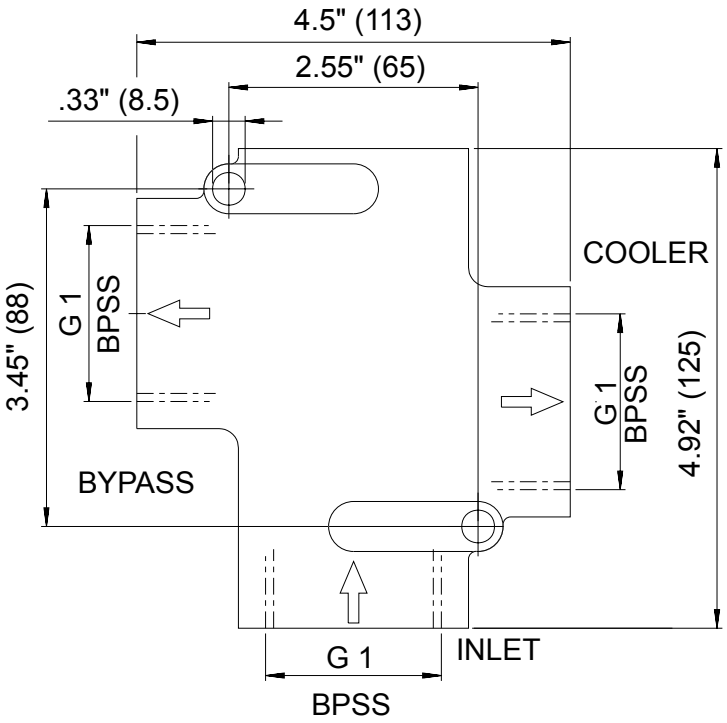
Technical Data

- fixed setting temperature valve
- precise temperature control
- low pressure drop
- shock resistant
- can function in any position
- maximum pressure 230 PSI (16 BAR)
- maintenance-free
- 42 GPM (160 l/min)

AITB Temperature Ranges

Ordering Code	Opening Temperature	Closing Temperature
AITB45	113° F (45° C)	131° F (55° C)
AITB55	130° F (55° C)	150° F (65° C)
AITB60	140° F (60° C)	158° F (70° C)

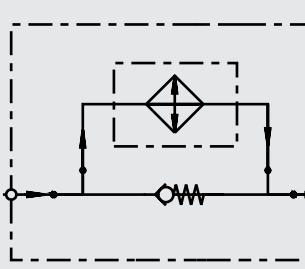


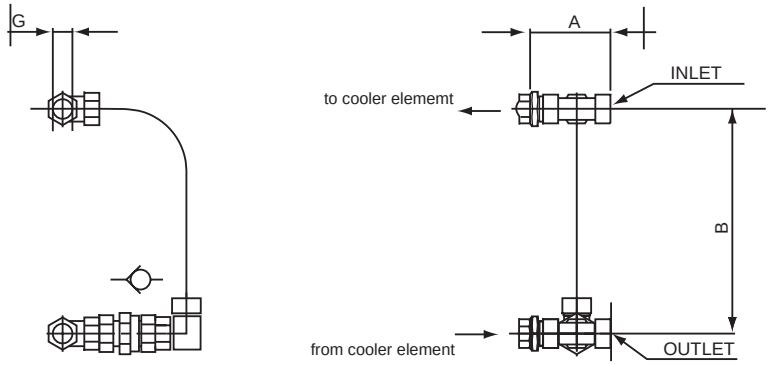


BYPASS VALVE - Order Code: AIB

Technical Data

- 66 PSI (4.5 BAR) cracking pressure
- different cracking pressure on request





inches

	SC 1,2	SC 3	OK 1,2,3	OK 4-5	OK 6	OK 8	OK 9	OK 10	OK 11
A	3.94	3.94	3.94	4.33	5.00	5.00	6.10	6.10	6.10
B	15.31	17.28	9.84	17.28	19.69	24.80	29.92	35.83	41.73
G	D 0.87	D 0.87	D 0.87	D 1.10	D 1.38	D 1.38	D 1.65	D 1.65	D 1.65

mm

	SC 1,2	SC 3	OK 1,2,3	OK 4-5	OK 6	OK 8	OK 9	OK 10	OK 11
A	100	100	100	110	127	127	155	155	155
B	389	439	250	439	500	630	760	910	1060
G	D 22	D 22	D 22	D 28	D 35	D 35	D 42	D 42	D 42

CONVERSION TABLES

Heat to be removed - Heat load is measured generally in three different forms, which are HP, kW, or BTUs/Hr being removed. When designing a new system, a good rule of thumb is that a cooler should be sized to remove approximately 25 - 30% of the input HP or kW.

In an existing system with a heat problem where the heat load is unknown, then a heat load test needs to be performed. The test is performed by measuring the temperature rise of the oil over a certain period of time. Take this temperature rise and time in minutes and use it in the following formula to determine the kW heat load.

$$\text{Heat Load } P_V = \frac{\Delta\text{Temperature X Specific Heat (1.88 KJ/Kgk) °C (oil) X Density of oil (0.951 Kg/l) X Volume (l)}}{\text{Operating time (Minutes) X 60}}$$

Heat Load Calculation Example:

Pv (Heat Load) = kW
ΔT (Temperature Rise) = 34.4˚C (93.9˚F)
SH (Specific Heat of oil) = 1.88 KJ/Kgk
SG (Specific Gravity of oil) = .915 Kg/l
V (Tank Volume) = 380 l (100 Gal)
t (Time in Minutes) = 45 min.

$$Pv = \frac{\Delta T \text{ X } SH_{oil} \text{ X } SG_{oil} \text{ X } V}{t \text{ X } 60} = \text{kW}$$

$$Pv = \frac{34.4 \text{ X } 1.88 \text{ X } 0.915 \text{ X } 380}{45 \text{ X } 60} = 12.49 \text{ kW}$$

HP = 12.49 X 1.341 = 16.75

Heat to be removed = 16.75 HP

Conversion Factors and Formulas

STEP 1: To convert to the desired unit of measurement, go to the appropriate table.
STEP 2: Go to the column of known units down to the cell with a one (1).
STEP 3: Go across to the column of the desired units.
STEP 4: Multiply known units by this factor to obtain the number with the desired units.

STEP 4: 15 x (3413) = 51195 BTU/Hr

Example: Convert energy of 15 kW to BTU/Hr

STEP 1 **STEP 2**

ENERGY

BTU/Hr	HP	Ft-Lbf/Sec	Kilowatt (kW)
1	3.929×10^{-4}	0.2161	2.930×10^{-4}
2545	1	550	0.7457
4.6272	1.818×10^{-3}	1	1.356×10^{-3}
3413	1.341	737.6	1

STEP 3

ENERGY

BTU/Hr	HP	Ft-Lbf/Sec	Kilowatt (kW)
1	3.929×10^{-4}	0.2161	2.930×10^{-4}
2545	1	550	0.7457
4.6272	1.818×10^{-3}	1	1.356×10^{-3}
3413	1.341	737.6	1

FLOW

Gallons/Min(GPM)	$Feet^3$/Min(CPM)	$Inches^3$/Sec(CIS)	Liters/Min
1	0.134	3.85	3.785
7.48	1	28.8	28.31
0.260	3.472×10^{-2}	1	0.988
0.2642	3.531×10^{-2}	1.017	1

$$HP = \frac{\text{Flow (GPM) X Pressure (PSI)}}{1714}$$

$$GPM = \frac{\text{Displacement } (Inches^3/Rev) \text{ x RPM}}{231}$$

VISCOSITY

SSU	$Feet^2$/Sec	$IMeter^2$/Sec	Centistoke
1	4.987×10^{-5}	4.635×10^{-6}	4.635
201×10^4	1		9.29×10^4
2.16×10^5	10.76	1	1×10^6
0.216	1.076×10^{-5}	1×10^6	1

VOLUME

GALLONS	$Feet^3$	$Inches^3$	Liters
1	0.134	231	3.785
7.48	1	1728	28.31
4.33×10^{-3}	5.787×10^{-4}	1	1.64×10^{-2}
0.2642	3.531×10^{-2}	61.02	1

PRESSURE

PSI	Inches H_2O	cm Hg	kPo ($kN/Meter^2$)
1	27.68	5.171	6.895
3.613×10^2	1	0.1868	0.249
0.1934	5.353	1	1.333
0.145	4.015	0.750	1

LENGTH

Inches (in)	Feet (ft)	Centimeters (cm)	Meters (m)
1	8.333×10^{-2}	2.540	2.540×10^{-2}
12	1	30.48	0.3045
0.3937	3.281×10^{-2}	1	1×10^{-2}
39.37	3.281	100	1

TEMPERATURE

Fahrenheit (°F)	Celcius (°C)
1	5/9 (°F - 32)
(°C X 9/5) + 32	1

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