HYDAC INTERNATIONAL

Innovative Solutions

Cooling Systems

Air Cooled / Liquid Cooled

HYDAC About HYDAC

HYDAC stands for worldwide presence and accessibility to the customer. HYDAC has over 1000 distributors worldwide and more than 40+ wholly owned branches. Our know-how has evolved primarily from solving customers' problems, combined with the extensive experience of the entire HYDAC group.

HYDAC Products

Our product range extends from air to water oil coolers. HYDAC is capable of integrating products into cooler solutions for both industrial and mobile applications.

HYDAC Quality

HYDAC stands for quality and customer satisfaction. We are certified to ISO 9001 and can supply our products with certification if required. To ensure that our products are as innovative as possible, they are developed, manufactured, and tested by qualified personnel using advanced technology.

HYDAC Customer Service

Our internal staff and worldwide distribution network take care of the important matter of customer service. HYDAC values high standards, professional ethics, and mutual respect in all transactions with customers, vendors, and employees. We invest in our relationships by providing expertise, quality, dependability, and accessibility to foster growth and a sense of partnership. Our customer service representatives are committed to serving the customers' needs.

Energy and Environmental Technology

HYDAC Coolers have played a key role in providing innovative developments in hydroelectric, heating, wind, and waste power plants. HYDAC has vast expertise in solvent and waste water processing technologies.

Offshore Shipbuilding and Marine Technology

Maritime technology places special demands on material functionality and reliability. HYDAC products meet these demands due to our high quality and test standards. HYDAC products have been applied under the toughest conditions from drilling rigs to deep sea applications.

Mobile Market

The aim of our engineers has always been to reduce volume and weight, resulting in increased product performance. HYDAC Coolers are compact with high performance components for the Mobile Market, which can be found in construction, forestry, and agricultural equipment.

Industrial Engineering

Since we began, HYDAC has been involved in many industrial engineering applications. Our knowledge and expertise of many industries provides a comprehensive range of versatile hydraulic components. HYDAC offers custom cooling solutions for machine tools, plastic injection molding machines, test equipment, presses, and welding robots. Other industrial applications include: steel and heavy industry, power transmissions, and paper mills.

Process Technology

The core products of HYDAC process technology are coolers, electronics, filters, and filtration systems for the industrial and environmental processing industries. HYDAC products are found in chemical, petrochemical, and plastics industries. Also, paper and dye production, foundries, steel manufacturing, and power plants.

Table of Contents

HYDAC Coolers Overview

Mobile Coolers

Industrial Coolers

Combi-Coolers

Competitor Crossover

Wind Energy

Advantages

The advantages of an off line cooling system are a stable cooling and filtration performance irrespective of variations in flow and duty cycle of the main hydraulic circuit. This allows the cooler to be sized to fit the heat load and not the maximum return flow of the main circuit. A further advantage is that the off-line cooler is completely isolated from surge pressures in the return line that can potentially damage the cooler. Also, maintenance can be performed on the filters without having to shut down the main system.

Selection Requirements

The following parameters need to be known to correctly size a cooler:

- How much heat needs to be removed from the system?
- What is the desired oil temperature?
- What is the supplied water temperature and ambient air temperature?
- What is the flow required?
- What is the desired oil to water flow ratio?
- What is the viscosity of the oil?

1. Required Flow

As a rule of thumb, the pump should be sized so that it circulates approximately 25 to 30% of the reservoir's capacity.
Note: Before sizing the heat exchanger, the flow rate needs to be known.

2. Heat Removed

The main function of the cooler is to transfer heat from the oil into the water. Heat load is generally described in units of HP, kW, or BTU's/Hr being removed. When designing a new system, a good rule of thumb is a cooler should be sized to remove approximately 25 to 30 % of the input HP or kW.

In an existing system with a heat problem and the heat load is not known, 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.

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

HP = kW x 1.341

See example of heat load calculation below.

3. Oil/Water Temperatures

The inlet oil temperature is the desired temperature of the oil in the reservoir. The inlet water temperature is the water temperature entering the cooler unit.

4. Flow Ratio

Maximum capacity of a cooler is achieved when the oil to water ratio is 1:1. This is desirable where the water supply is plentiful, as this will be the smallest, least expensive cooler. As the ratio increases, the cooling capacity decreases and a larger cooler will be required. This option costs more initially, but will save on water usage.

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)*	=	0.915 Kg/l
V *(Tank Volume)*	=	380 l (100 Gal)
t *(Time in Minutes)*	=	45 min.

$$Pv = \frac{\Delta T \times SHoil \times SGoil \times V}{t \times 60} = kW$$

$$Pv = \frac{34.4 \times 1.88 \times 0.915 \times 380}{45 \times 60} = 8.32 \text{ kW}$$

HP = 8.32 x 1.341 = 11.16

Heat to be removed = 11.16 HP

OK / OKC / ELD / ELH / SC

Technical Data Inquiry Sheet

Internal Use Only	
Project Responsibility	
Date	

Contact Information

Distributor:		Company Name:	
Distributor Contact:		Customer Contact:	
Distributor Phone:		Customer Phone:	
Distributor Fax:		Customer Fax:	
Distributor E-mail:		Customer E-mail:	

The following basic information is needed for the proper sizing and ordering of a cooler unit.

Critical Sizing Data

Heat Load To Be Removed: (HP)

Oil Type: (ISO VG or SAE grade) _____

Oil Flow: (gpm) _____

Desired Oil Temperature: (°F) _____

Ambient Temperature: (°F)

Inlet Water Temperature: (°F) _____

Power Data

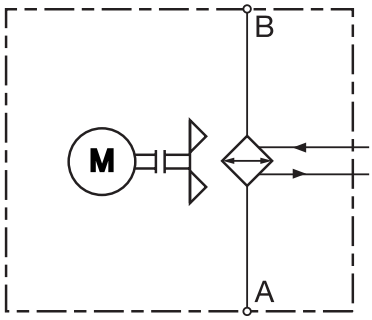
AC		**DC**	
115V1PH	⬭	12V	⬭
230V1PH	⬭	24V	⬭
230V3PH	⬭		
460V3PH	⬭		
575V3PH	⬭		

Hydraulic Flow Rate _____ gpm (l/min)

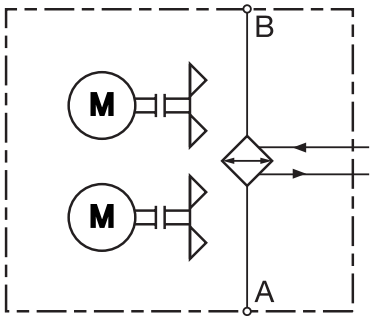
ELD Series
Air Cooled Oil Coolers for Mobile Applications

Hydraulic Symbol

Sizes 1 - 4.5



Sizes 5 - 6



Description

These coolers use a combination of high performance cooling elements combined long life DC electrical powered fans to give long trouble free operation in mobile hydraulic applications. The compact design allows the coolers to fit most equipment and provide the highest cooling performance in heat dissipation while minimizing space required.

Features

- Most coolers are designed with the inlet/outlet ports facing toward the back to help reduce fittings
- Available with internal pressure bypass
- All units feature a built in thermostat port
- 12 and 24 volt DC fans
- Up to 50 HP cooling capacity
- Rated flows up to 45 gpm
- Motor lifetimes up to 8,000 hours

Applications


Agricultural


Automotive


Construction


Commercial Municipal


Railways

Model Code

ELD 1H 3.5 12 S F X

Model
ELD = Air Cooled Oil Cooler with DC Motor Drive

Size
1H
1.5H
2H
3H
4H
4.5H
5H
6H
(see heat dissapation table on page 5)

Modification Number *(latest version always supplied)*

Motor Drive Voltage
12 = 12 volt DC
24 = 24 volt DC

Air Flow Direction
S = Suction *(standard)*
B = Blowing *(consult factory)*

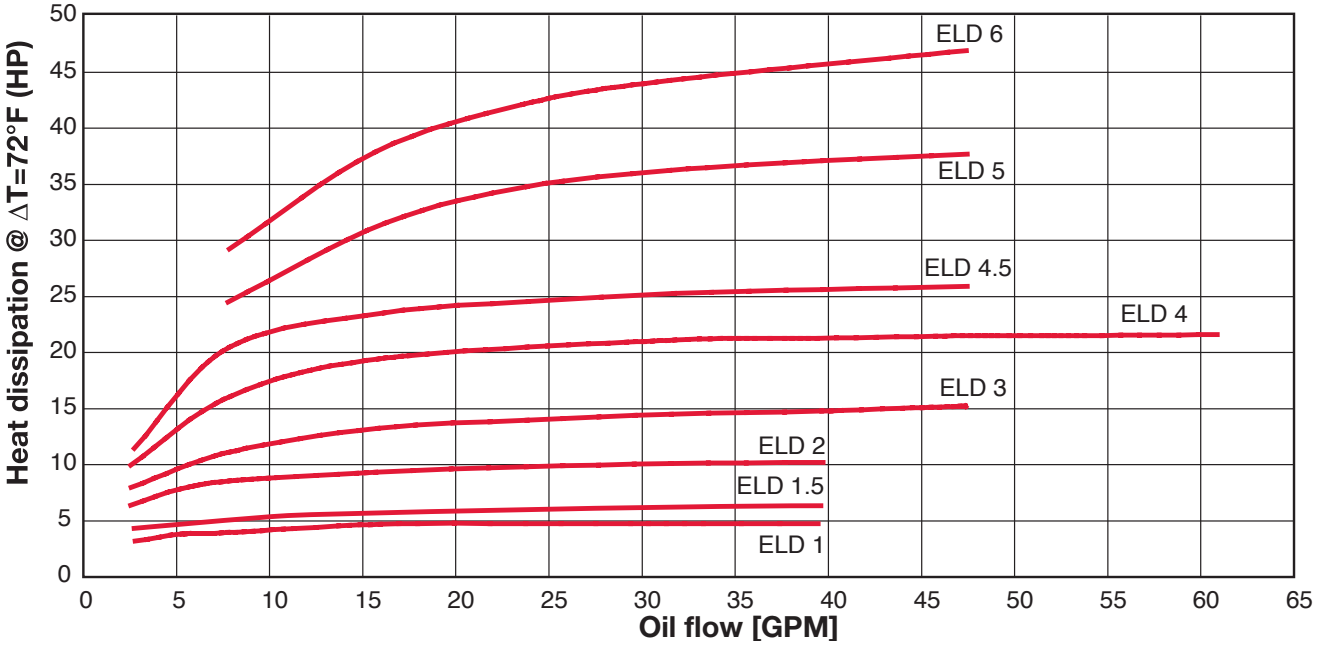
Accessories
TS 140 = 140°F set point *(Additional set points available - consult factory)*
F = Optional Foot Mount
IBP = Inegrated bypass valve

Opening Pressure Drop *(IBP Only)*
2 = 2 bar (29 psi)
3 = 3 bar (45 psi)

ELD Series

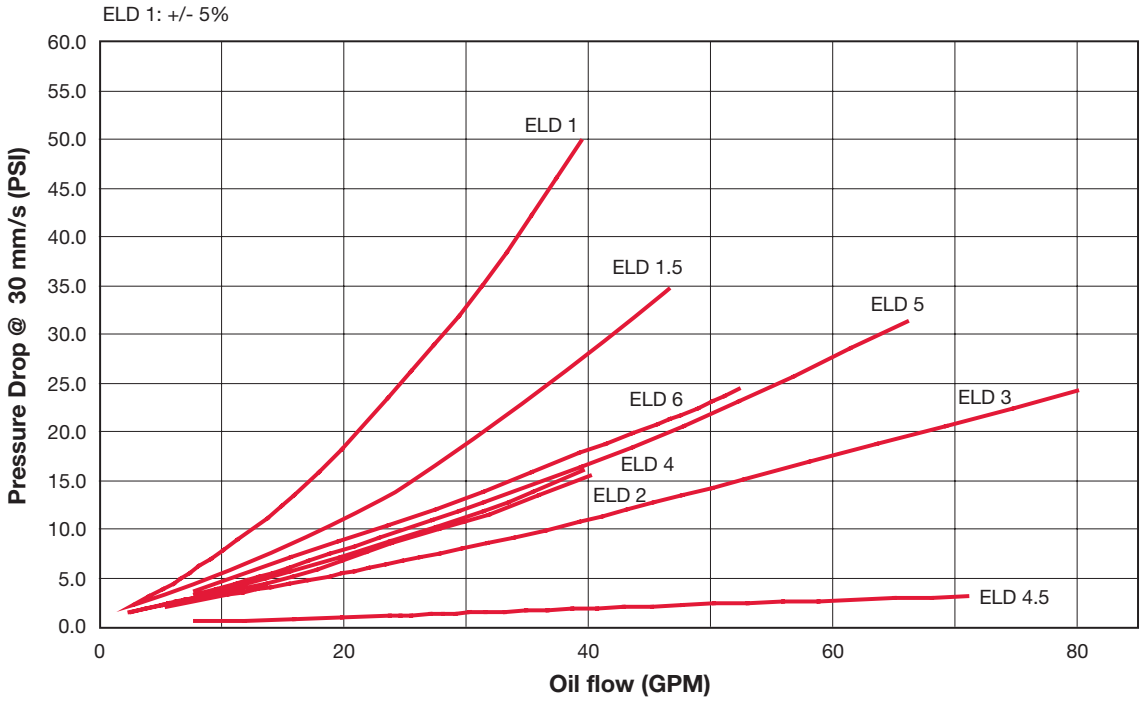
Heat Dissapation

Tolerance: +/- 5%



Pressure Drop

ELD 1: +/- 5%



*Values measured at T = 72°F, may vary at lower dT values

*Pressure Drop Curves above using fluid with a viscosity of 30 mm2/s.
For other viscosities the result must be multiplied by the K Factors below.

Viscosity (SSU)	46	70	102	150	213	250	315	464	695
Viscosity (mm²/s)	10	15	22	32	46	54	68	100	150
K Factor	0.5	0.65	0.77	1	1.3	1.52	1.9	2.8	5.3

Engineering Data

Size	Motor Capacity (kW)	Amp Draw	Recommend-ed Fuse (A)	Protection Class IP	Fan Diameter (mm)	Noise Level dBa* (1 meter)	Weight (lbs.)
ELD 1 12 volt / 24 volt	0.11 / 0.11	8 / 3.2	15 / 7.5	67	190	73	8.8
ELD 1.5 12 volt / 24 volt	0.11 / 0.11	8 / 3.2	15 / 7.5	67	190	73	8.8
ELD 2 12 volt / 24 volt	0.16 / 0.16	9.4 / 5.2	20 / 15	67	255	74	20.688
ELD 3 12 volt / 24 volt	0.26 / 0.26	17.5 / 8.0	25 / 20	67	305	79	24.2
ELD 4 12 volt / 24 volt	0.35 / 0.35	22.5 / 10.5	30 / 20	67	385	76	34.98
ELD 4.5 12 volt / 24 volt	0.35 / 0.35	22.5 / 10.5	30 / 20	67	385	76	48.4
ELD 5 12 volt / 24 volt	0.53 / 0.53	35.0 / 16.0	2x25 / 2x20	67	305	80	66.66
ELD 6 12 volt / 24 volt	0.69 / 0.69	45.0 / 21.0	2x30 / 2x20	67	385	77	80.52

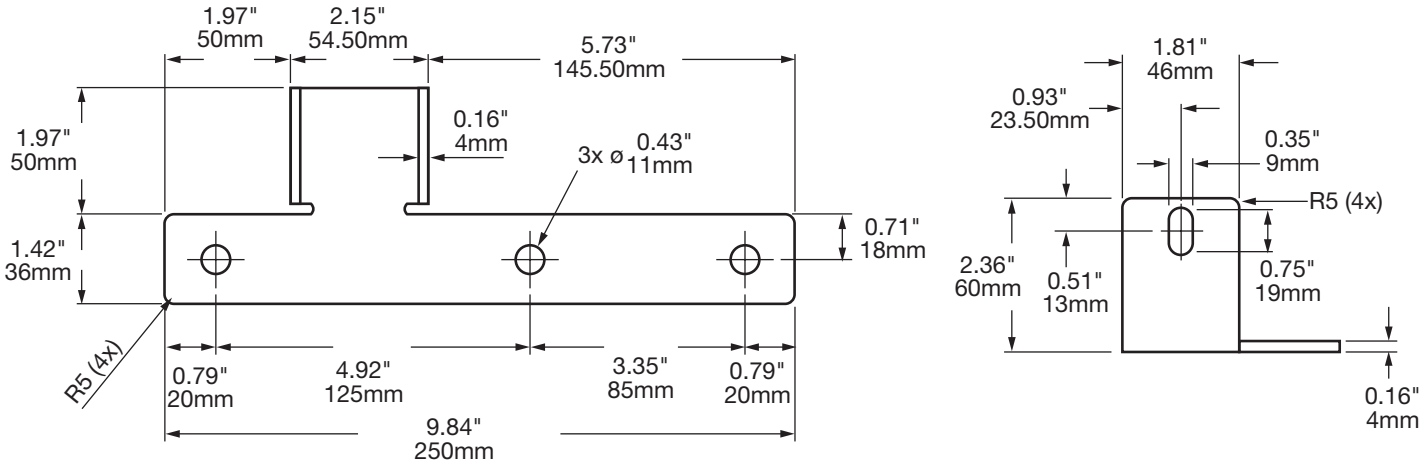
*The noise levels are only a guide as acoustic properties vary and depend on the characteristics of the room, connections, viscosity, and resonance.

Construction

Housing	Welded Steel
Heat Exchanger	Aluminum
Fan	Plastic
Maximum Viscosity	2000 cst.
Maximum Oil Temperature	266°F
Maximum Operating Pressure	230 psi
Mounting Position	All positions
Fan Rotation	See arrow on fan
Fluids	Mineral Oil to Din 51524 Part 1 and 2

Accessories

Foot Bracket - ELD 2-6 & ELH 2-5

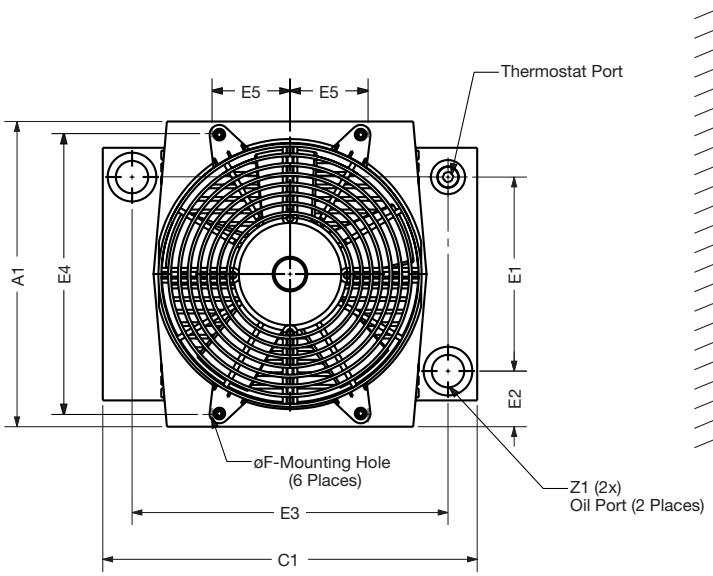


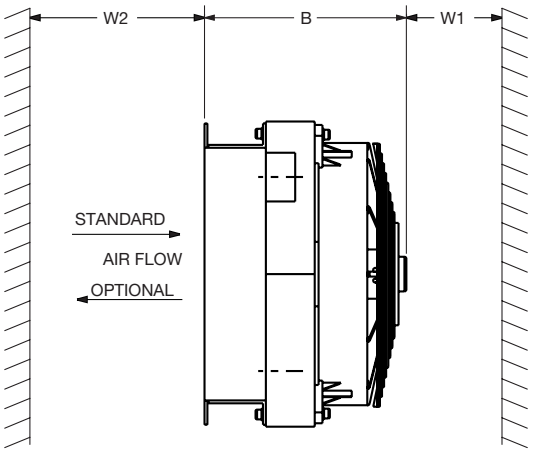
Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.
Dimensions are in inches/(mm).

ELD Series

Dimensions

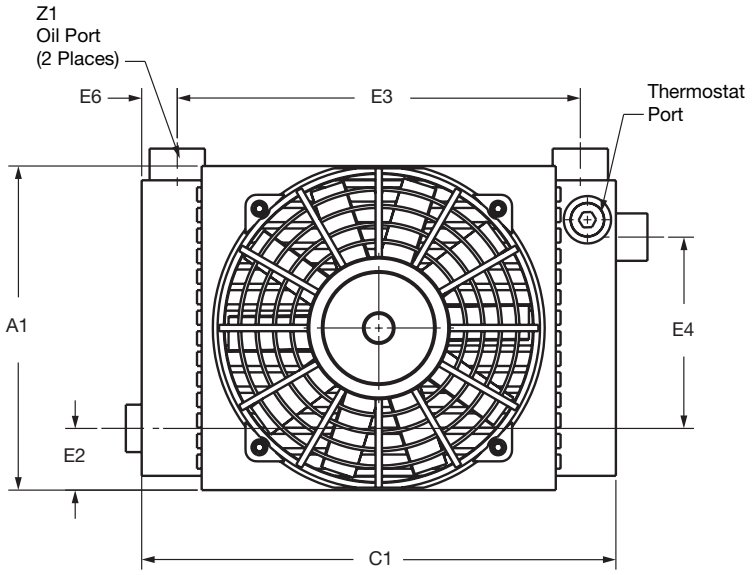
Sizes 1 - 4

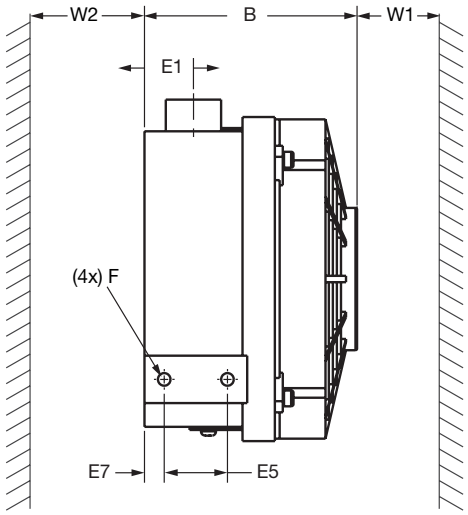




Size	A1	B	C1	E1	E2	E3	E4	E5	F	W1	W2	Z1	Thermostat Port
ELD 1	9.65	4.72	11.81	4.92	2.36	9.84	8.86	3.54	0.35	7.87	3.94	1 1/16”-12 UN	1/2” NPT
ELD 2	12.32	8.27	15.12	7.83	2.24	12.76	11.34	3.15	0.55 x 0.4	9.84	5.91	1 5/16”-12 UN	1/2” NPT
ELD 3	14.02	8.27	16.54	9.06	2.48	14.57	12.95	3.94	0.55 x 0.4	11.81	7.09	1 5/16”-12 UN	1/2” NPT
ELD 4	17.72	7.83	19.69	11.38	3.17	17.72	16.57	5.91	0.63 x 0.4	15.75	7.87	1 5/16”-12 UN	1/2” NPT

Size 1.5





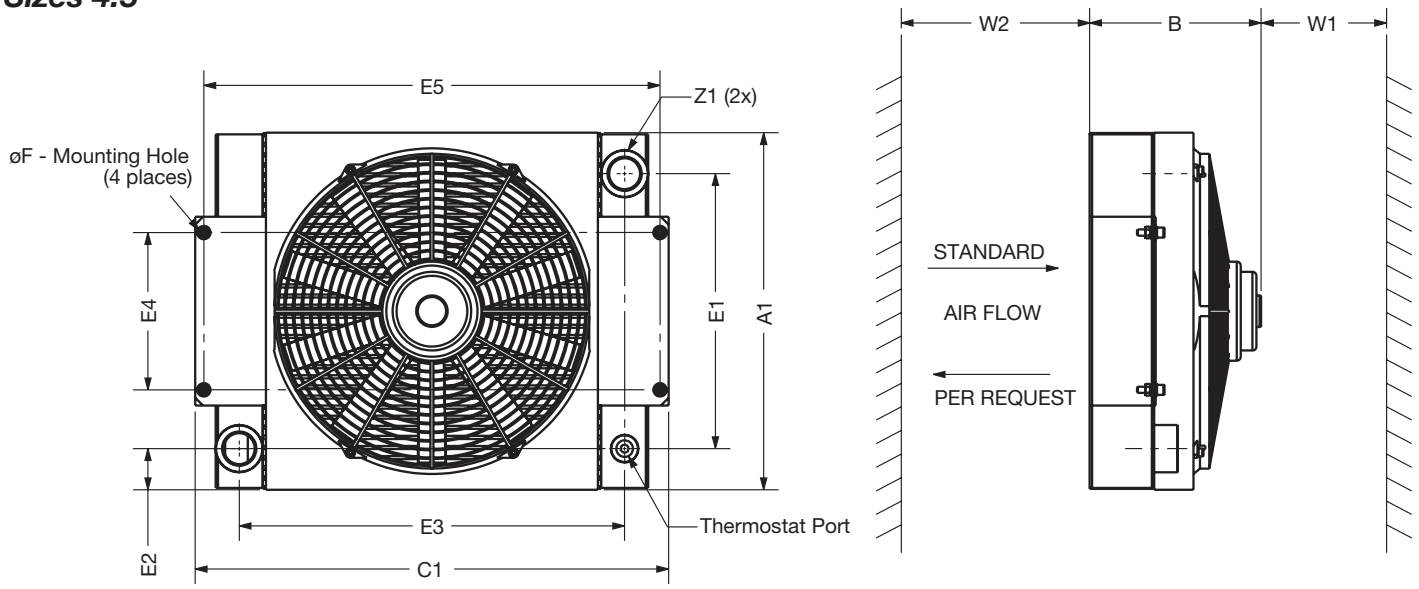
Size	A1	B	C1	E1	E2	E3	E4	E5	E6	E7	F	W1	W2	Z1	Thermostat Port
ELD 1.5	8.07	5.30	11.81	1.22	1.54	10.04	4.76	1.57	0.89	0.49	5/16”-18 UNC	0.31	0.16	1 1/16”-12 UN	1/2” NPT

Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.
Dimensions are in inches.

ELD Series

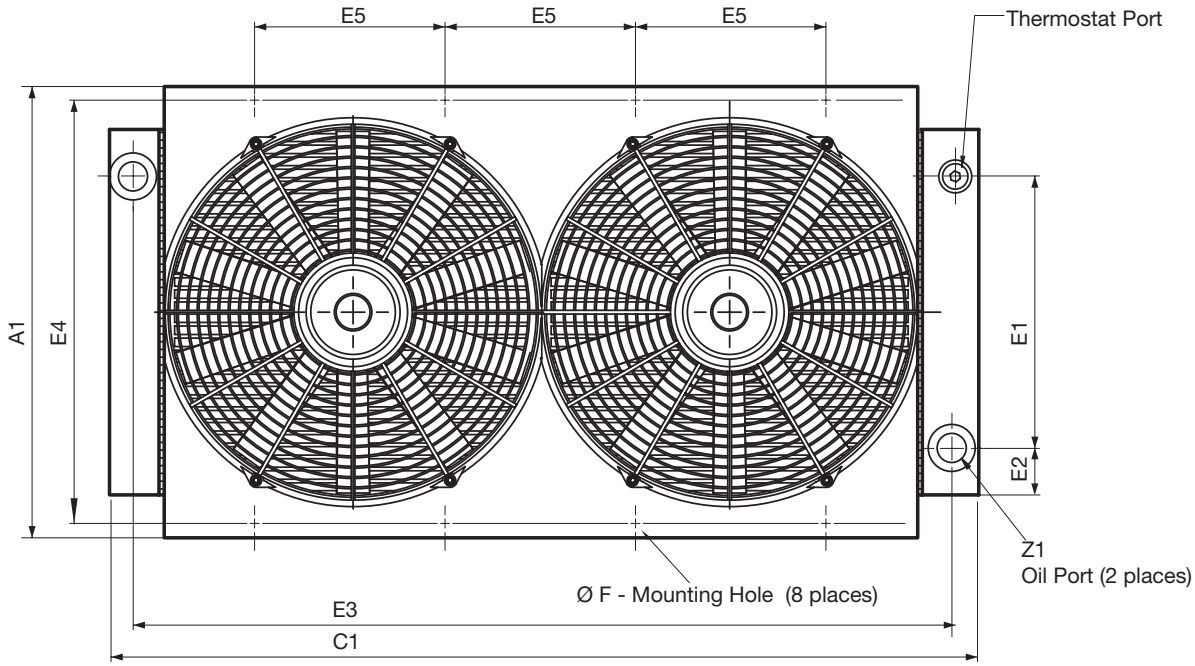
Dimensions

Sizes 4.5



Size	A1	B	C1	E1	E2	E3	E4	E5	F	W1	W2	Z1	Thermostat Port
ELD 4.5	17.87	8.58	23.70	13.78	2.05	19.29	7.87	11.42	0.472	15.75	7.87	1 5/8”-12 UN	1/2” NPT

Sizes 5 - 6

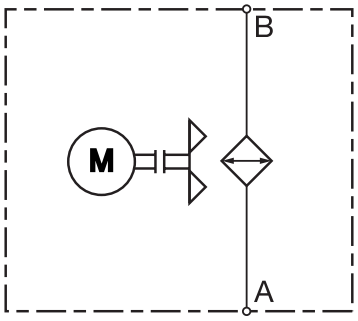


Size	A1	B	C1	E1	E2	E3	E4	E5	F	W1	W2	Z1	Thermostat Port
ELD 5	18.70	9.25	31.89	12.64	3.03	29.53	17.72	6.69	0.63 x 0.35	15.75	7.87	1 5/8”-12 UN	1/2” NPT
ELD 6	20.94	8.86	37.40	14.69	3.11	35.04	19.80	7.87	0.71 x 0.35	19.69	9.84	1 5/8”-12 UN	1/2” NPT

Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.
Dimensions are in inches.

ELH Series
Air Cooled Oil Coolers for Mobile Applications

Hydraulic Symbol



Description
These coolers use a combination of high performance cooling elements combined with high capacity hydraulic drive fan to give long trouble free operation in mobile hydraulic applications. The compact design allows the coolers to fit most equipment and provide the highest cooling performance in heat dissipation while minimizing space required.

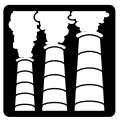
Features
- ELD 2 - 5 coolers are designed with the inlet/outlet ports facing toward the back to help reduce fittings
- Available with internal pressure and temperature bypass
- All units feature a built in thermostat port
- Up to 180 HP cooling capacity
- Rated flows up to 90 gpm
- Hydraulic motor drive offers more cooling in a smaller package
- Optional thermal speed control and pressure relief *(Consult Factory)*

Applications


Agricultural


Automotive


Construction


Industrial


Commercial Municipal


Railways

Model Code

ELH 2 1.5 H6.3 S F XX X

Model
ELH = Air Cooled Oil Cooler with Hydraulic Motor Drive

Size *(See the heat transfer table found on page 11 to determine the proper size.)*
2
3
4
5
6
7
8
9
10
11

Modification Number *(latest version always supplied)*

Hydraulic Motor Drive Displacement
H6.3 = 6.3 ccm/rev
H14 = 14 ccm/rev
H22 = 22 ccm/rev

Air Flow Direction
S = Suction *(standard)*
B = Blowing *(consult factory)*

Accessories
F = Optional Foot Mount *(sizes 2 - 4 only)*
IBT = thermostatic bypass valve
IBP = inegrated bypass valve

Opening Temperature *(IBT only)*

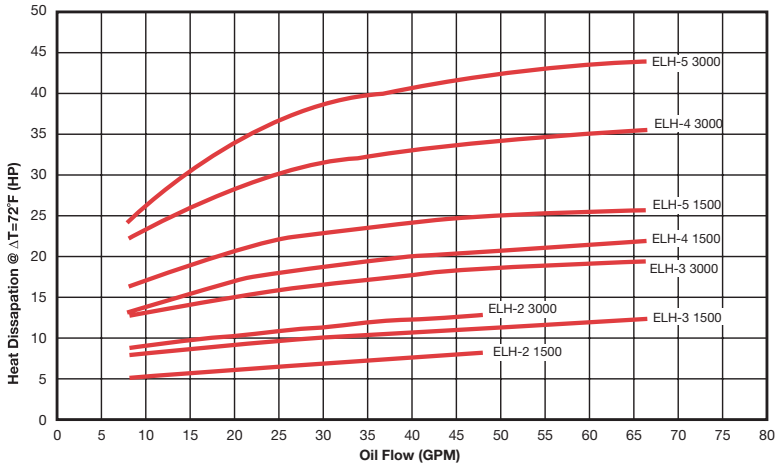
	Opening Temp.	Closing Temp.
45 =	113°F (45°C)	131°F (55°C)
50 =	130°F (55°C)	150°F (65°C)
60 =	140°F (60°C)	158°F (70°C)

Opening Pressure Drop *(IBT & IBP only)*
2 = 2 bar (29 psi)
3 = 3 bar (45 psi)

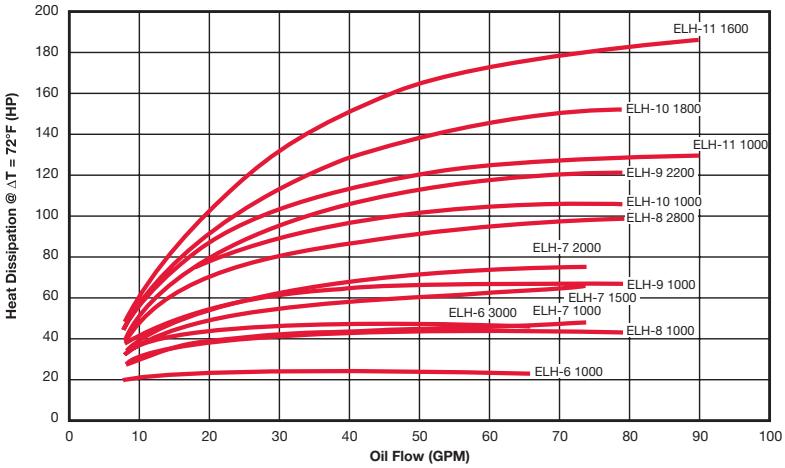
ELH Series

Heat Dissapation

Sizes 2 - 5

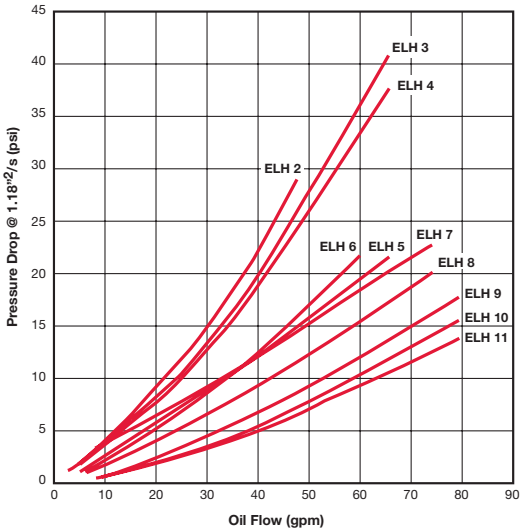


Sizes 6 - 11



Pressure Drops

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



*Pressure Drop Curves above using fluid with a viscosity of 30 mm2/s.
For other viscosities the result must be multiplied by the K Factors below.

Motor Flow Calculation

The motor oil flow Q can be calculated at nominal motor oil operating pressure as follows

$$Q = \frac{Vg \times n}{103 \times nvol} = l/min$$

Vg = motor displacement (cm3/r)

n = fan speed (RPM)

nvol = volumetric efficiency = 90% at motor oil operating pressure of 150 bar (2175 psi)

3.85 liter = 1 gallon

Viscosity (SSU)	46	70	102	150	213	250	315	464	695
Viscosity (mm²/s)	10	15	22	32	46	54	68	100	150
K Factor	0.5	0.65	0.77	1	1.3	1.52	1.9	2.8	5.3

Engineering Data

Model	Motor Displacement (cm3/rev)	Operating Speed Range (rpm)	Δp of motor @ max RPM @ 34 cts (psi)	Motor oil flow @ 1500 rpm (gpm)	Motor Max. Pressure (psi)	Continuous Motor Operating Pressure (psi)	Noise level @ 1000 RPM (dBa) (1 Meter)*	Weight (lbs.)
ELH 2	6.3 / 14 / 22	1000 / 3000	290	2.8 / 6 / 9.7	4350 / 4350 / 2900	3625 / 3625 / 2175	69	24.3
ELH 3	6.3 / 14 / 22	1000 / 3000	290	2.8 / 6 / 9.7	4350 / 4350 / 2900	3625 / 3625 / 2175	69	28.7
ELH 4	6.3 / 14 / 22	1000 / 3000	725 / 435 / 290	2.8 / 6 / 9.7	4350 / 4350 / 2900	3625 / 3625 / 2175	70	40.0
ELH 5	6.3 / 14 / 22	1000 / 3000	1015 / 435 / 290	2.8 / 6 / 9.7	4350 / 4350 / 2900	3625 / 3625 / 2175	70	53.0
ELH 6	6.3 / 14 / 22	1000 / 3000	2175 / 1015 / 725	2.8 / 6 / 9.7	4350 / 4350 / 2900	3625 / 3625 / 2175	70	94.6
ELH 7	14 / 22	1000 / 3000	TBA	6 / 9.7	4350 / 2900	3625 / 2175	77	TBA
ELH 8	6.3 / 14 / 22	1000 / 2800	2900 / 1160 / 870	2.8 / 6 / 9.7	4350 / 4350 / 2900	3625 / 3625 / 2175	76	147.7
ELH 9	14 / 22	1000 / 2200	1885 / 1305	6 / 9.7	4350 / 2900	3625 / 2175	78	187.4
ELH 10	14 / 22	1000 / 1800	3335 / 1885	6 / 9.7	4350 / 2900	3625 / 2175	82	242.5
ELH 11	14 / 22	1000 / 1600	3625 / 2175	6 / 9.7	4350 / 2900	3625 / 2175	83	341.7

*The noise levels are only a guide as acoustic properties vary and depend on the characteristics of the room, connections, viscosity, and resonance.

Construction

Housing	Welded Steel
Heat Exchanger	Aluminum
Fan	Plastic
Motor	Aluminum housing, Steel gears and shaft

Cooler Specifications

Maximum Viscosity	2000 cst.
Maximum Oil Temperature	266 F
Maximum Operating Pressure	230 psi
Mounting Position	All positions
Fluids	Mineral Oil to Din 51524 *(for other fluids please consult factory)*

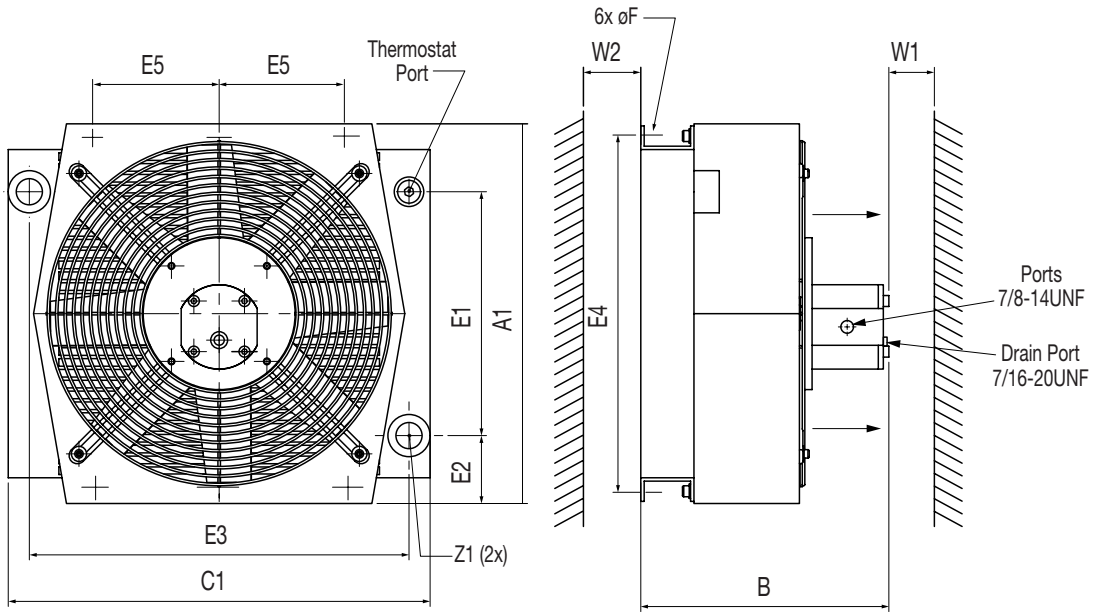
Hydraulic Motor Specifications

Fan Rotation	See arrow on housing
Fluids	Mineral Oil to Din 51524 DIN 51511
Filtration	ISO/DIS 4406 Code 19/16- Filtration grade B25>75
Maximum Outlet Side Pressure	1740 psi
Maximum Drian Pressure	29 psi
Fluid Viscosity Range	10 - 600 cst. (recommended 30 - 45 cst.)
Fluid Temperature Range	Up to 194˚ F

ELH Series

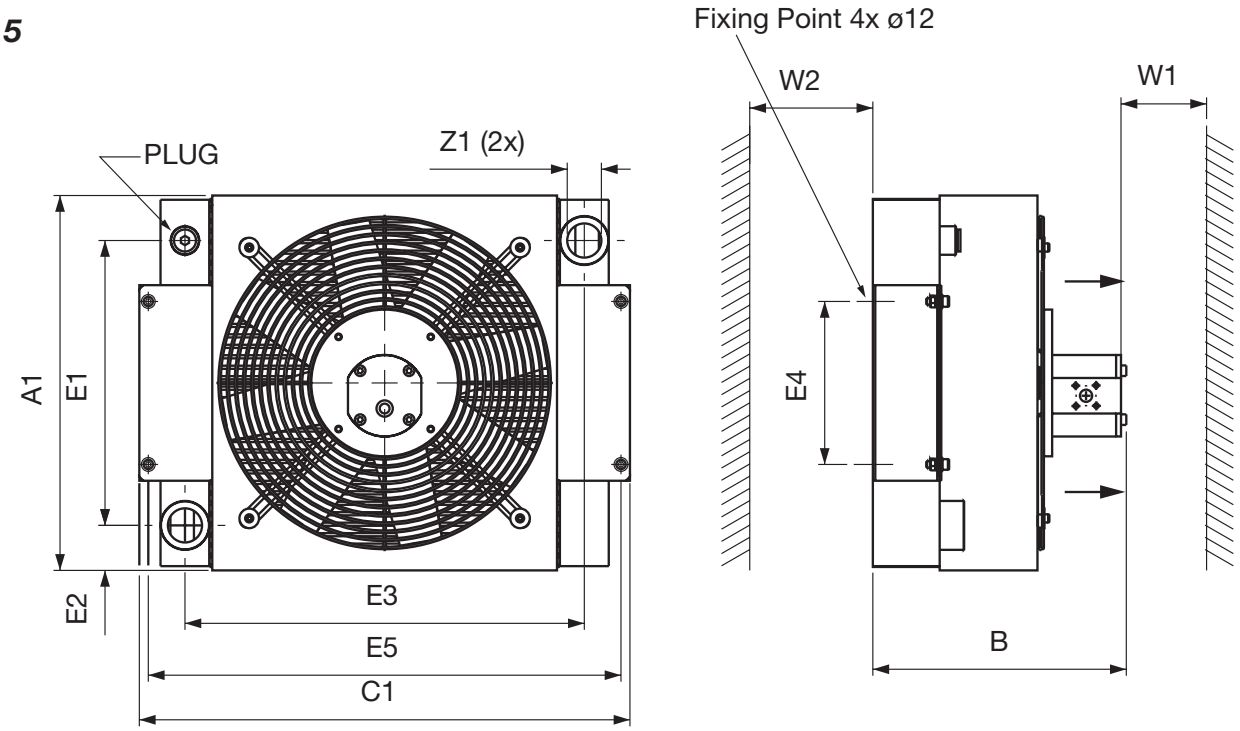
Dimensions

Sizes 2 - 4



Size	A1	B 6.3 cc	B 14 cc	B 22 cc	C1	E1	E2	E3	E4	E5	F	W1	W2	Z1	Thermostat Port
ELH 2	12.32	10.63	11.14	11.70	15.12	7.83	2.20	12.76	11.34	3.15	0.55 x 0.4	7.87	5.91	1-5/16”-12 UN	1/2” NPT
ELH 3	14.02	10.99	11.49	12.05	16.54	9.06	2.48	14.57	12.95	3.94	0.55 x 0.4	9.84	7.09	1-5/16”-12 UN	1/2” NPT
ELH 4	17.72	11.56	12.06	12.62	19.69	11.38	3.17	17.72	16.57	5.91	0.49 x 0.39	13.78	7.87	1-5/16”-12 UN	1/2” NPT

Size 5



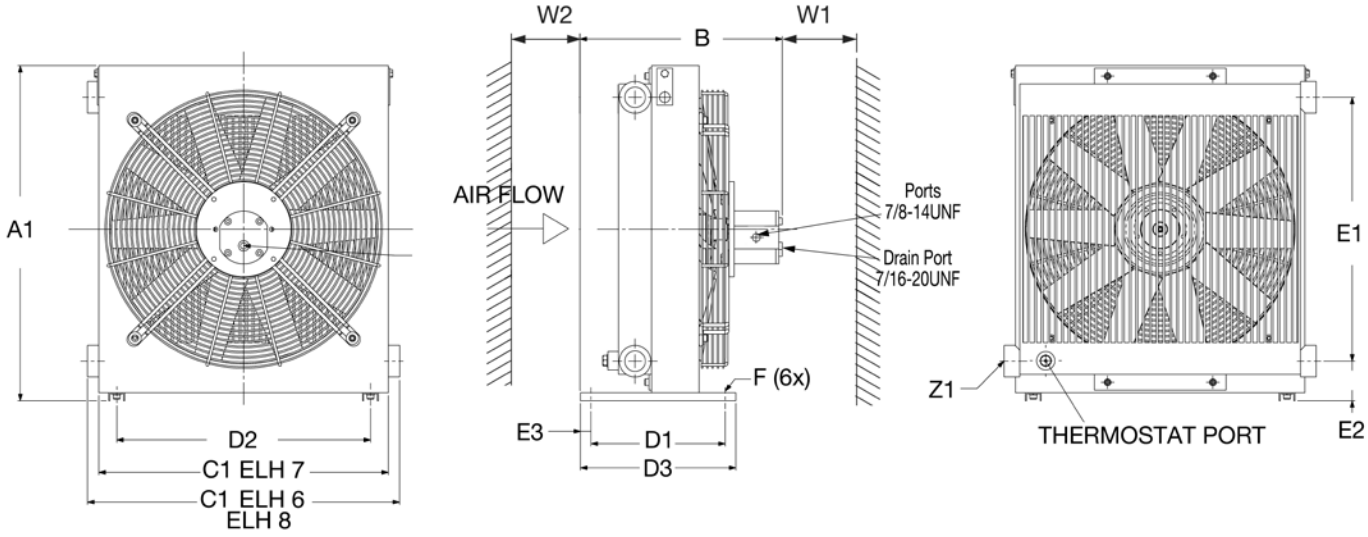
Size	A1	B 6.3 cc	B 14 cc	B 22 cc	C1	E1	E2	E3	E4	E5	F	W1	W2	Z1	Thermostat Port
ELH 5	18.11	12.25	12.73	13.29	23.70	13.78	2.17	19.29	7.87	22.83	0.47	15.75	9.84	1-5/8”-12 UN	1/2” NPT

Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.
Dimensions are in inches.

ELH Series

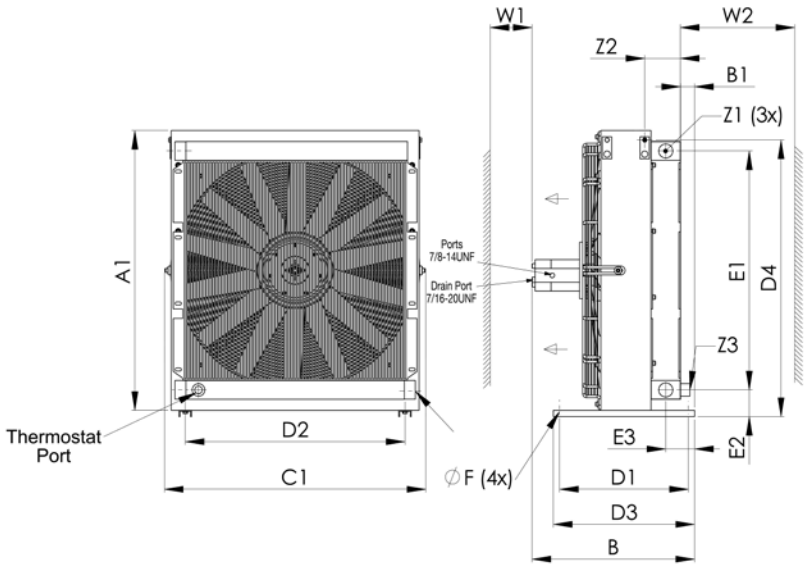
Dimensions

Sizes 6 - 8



Size	A1	B 6.3 cc	B 14 cc	B 22 cc	C1	D1	D2	D3	E1	E2	E3	F	W1	W2	Z1	Thermostat Port
ELH 6	25.12	14.87	15.37	15.93	23.54	10.04	18.98	11.61	19.69	3.07	0.79	0.35	39.37	23.62	1-5/8”-12 UN	1/2” NPT
ELH 7	28.58	-	17.50	18.06	27.80	16.14	22.05	17.72	23.62	2.87	0.79	0.35	42.00	25.00	1-5/8”-12 (F)	1/2” NPT
ELH 8	30.08	15.06	15.57	16.13	27.64	10.04	18.98	11.61	24.74	3.06	0.79	0.35	43.31	27.56	1-5/8”-12 UN	1/2” NPT

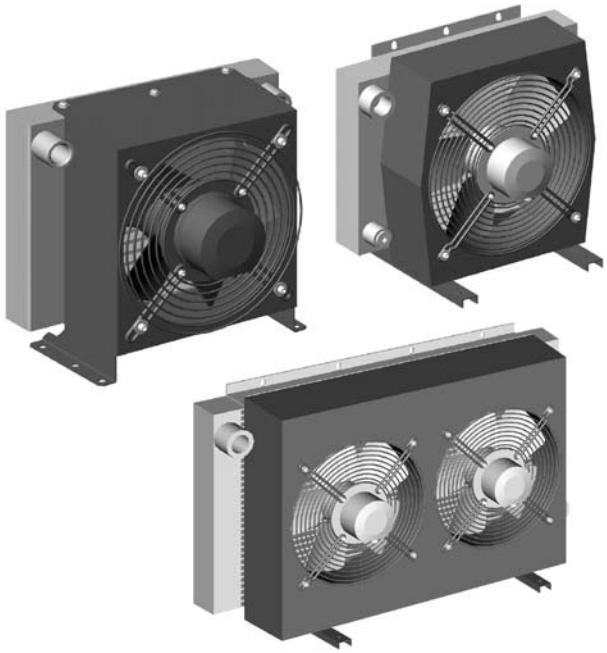
Sizes 9 - 11



Size	A1	B 6.3 cc	B 14 cc	B 22 cc	C1	D1	D2	D3	E1	E2	E3	F	W1	W2	Z1	Thermostat Port
ELH 9	35.83	-	19.88	20.44	32.56	16.14	27.56	17.72	29.92	3.35	3.62	0.35	47.24	35.43	1-7/8”-12 UN	1/2” NPT
ELH 10	41.73	-	20.72	21.28	38.28	18.11	27.56	19.69	35.83	3.54	3.66	0.35	55.12	35.43	1-7/8”-12 UN	1/2” NPT
ELH 11	46.40	-	21.49	22.05	42.91	18.11	27.56	19.69	41.73	2.95	3.66	0.35	62.99	39.37	1-7/8”-12 UN	1/2” NPT

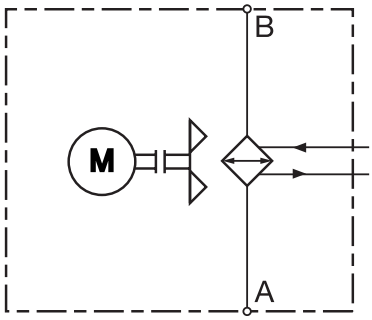
Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.
Dimensions are in inches.

OKC Series
Air Cooled Oil Coolers

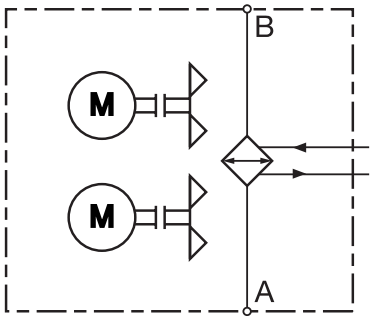


Hydraulic Symbol

Sizes 1 - 5



Sizes 6 - 7



Description

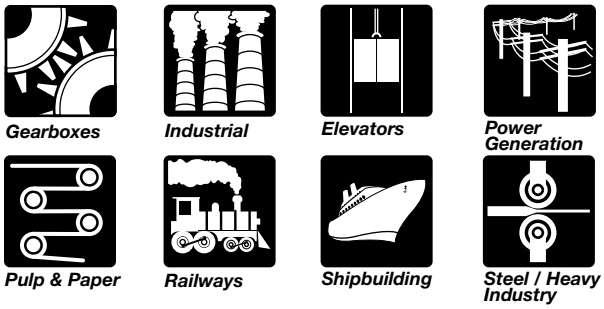
These coolers use a combination of high performance cooling elements and high capacity, compact AC Electric powered fans to give long trouble free operation in hydraulic applications.

The compact design allows the coolers to fit most equipment and provide the highest cooling performance in heat dissipation while minimizing space required.

Features

- Cooling Range: up to 23 HP
- AC Motors in 230/460 Volt 50/60 Hz
- Hydraulic Pressure: 230 psi Dynamic

Applications



Model Code

OKC 1H 1.5 230 / S / TS140

Model
OKC = Air Cooled Oil Cooler

Size
1H
2H
3H
4S
5S
6H
7S

H = High Speed Fan
S = Standard Speed Fan

Modification Number *(latest version always supplied)*

Electric Motor Fan Voltage
110 = 110 Volts 50/60 Hz 1PH *(consult factory)*
230 = 230 Volts 50/60 Hz 1PH
460 = 460 Volts 50/60 Hz 3PH

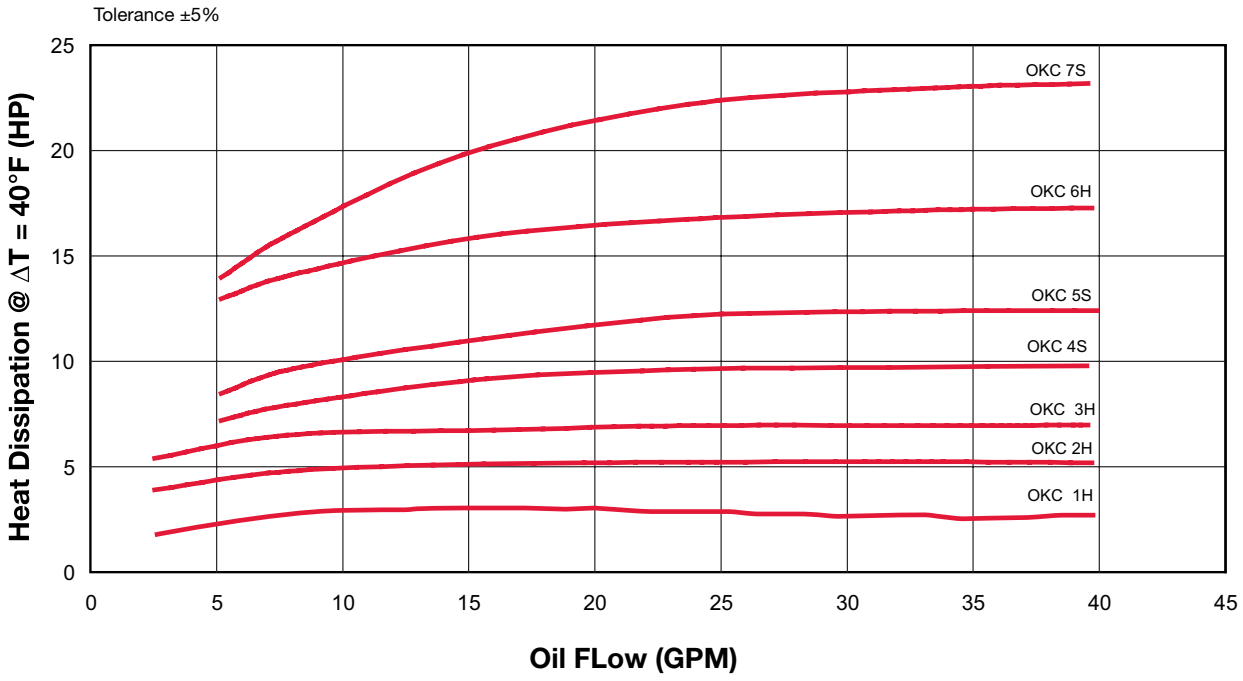
Air Flow Direction
S = Suction

Accessories
TS140 = Thermostat (fixed) 140°F Set Point
Other Temperature Set Points Available *(consult factory)*

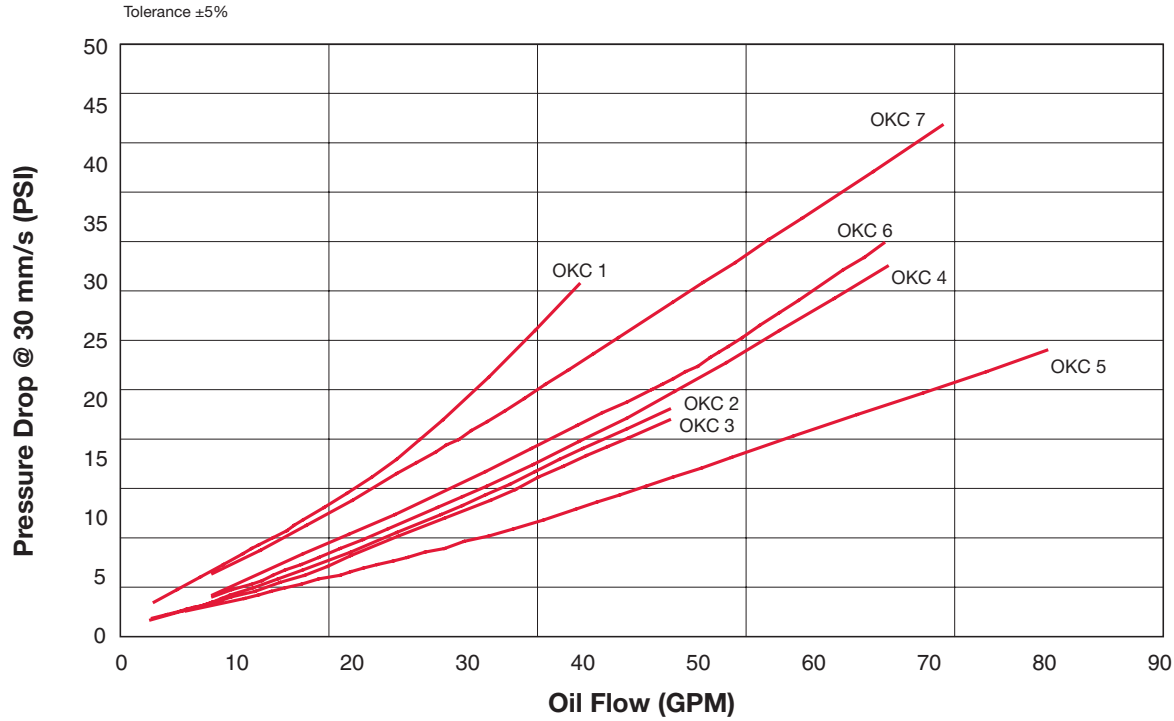
OKC Series

Heat Dissipation

Cooling capacity depending on oil flow and the temperature differential ΔT between the oil inlet and air inlet.
For calculations with low ΔT values (i.e. below 20°F), please contact our technical support.



Pressure Drop



*Pressure Drop Curves above using fluid with a viscosity of 30 mm2/s.
For other viscosities the result must be multiplied by the K Factors below.

Viscosity (mm2/s)	10	15	22	32	46	54	68	100	150
K Factor	0.5	0.65	0.77	1	1.3	1.52	1.9	2.8	5.3

Engineering Data

Size	Voltage (V)	Amp Draw	Speed @ 60 Hz (rpm)	Noise Level dBa* (1 meter)	Max. Operating Pres. (psi)	Max. Oil Temperature (°F)	Max. Viscosity (mm2/s)	Weight (lbs.)
OKC 1H	230 / 460	0.52 / 0.25	3105 / 2990	71	230	266	2000	20
OKC 2H	230 / 460	0.52 / 0.30	2990 / 2875	71	230	266	2000	27
OKC 3H	230 / 460	0.74 / 0.41	2990 / 2875	75	230	266	2000	32
OKC 4S	230 / 460	0.91 / 0.50	1610 / 1887	69	230	266	2000	47
OKC 5S	230 / 460	0.91 / 0.50	1610 / 1887	72	230	266	2000	62
OKC 6H	230 / 460	0.74 / 0.41	2990 / 2875	75	230	266	2000	86
OKC 7S	230 / 460	0.91 / 0.50	1610 / 1887	71	230	266	2000	99

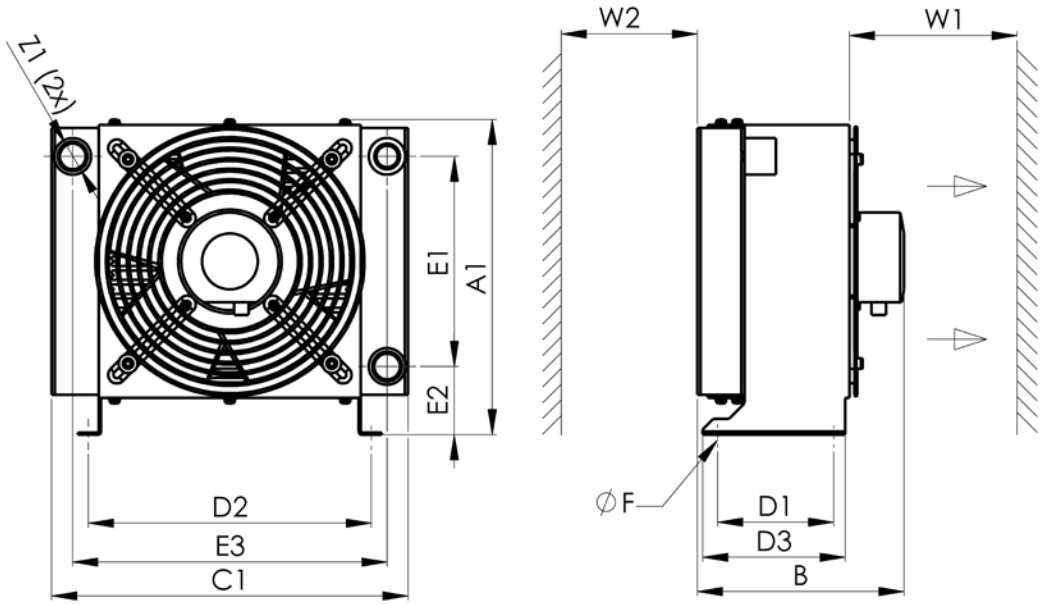
Construction

- Electrical connection box is included
- Capacitor is supplied with the cooler and mounted in the connection box
- All motor with IP55 have protection class F
- All mounting positions possible
- For direction of rotation see arrow on cooler housing
- Cooling Fluid: Mineral oil to DIN 51524

OKC Series

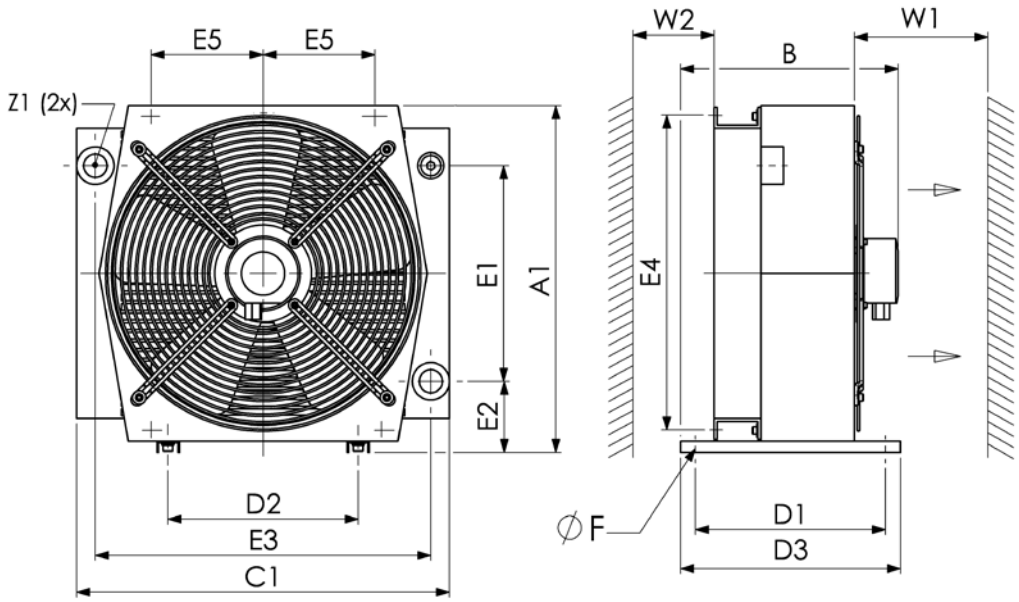
Dimensions

Sizes 1



Size	A1	B	C1	D1	D2	D3	E1	E2	E3	W1	W2	Z1	F (6xø)	Plug
OKC 1	11.81	8.07	13.39	4.33	10.63	5.35	7.94	2.48	11.81	7.87	2.76	1 1/16” -12 UNF	8.33	1/2” NPT (F)

Sizes 2 - 5



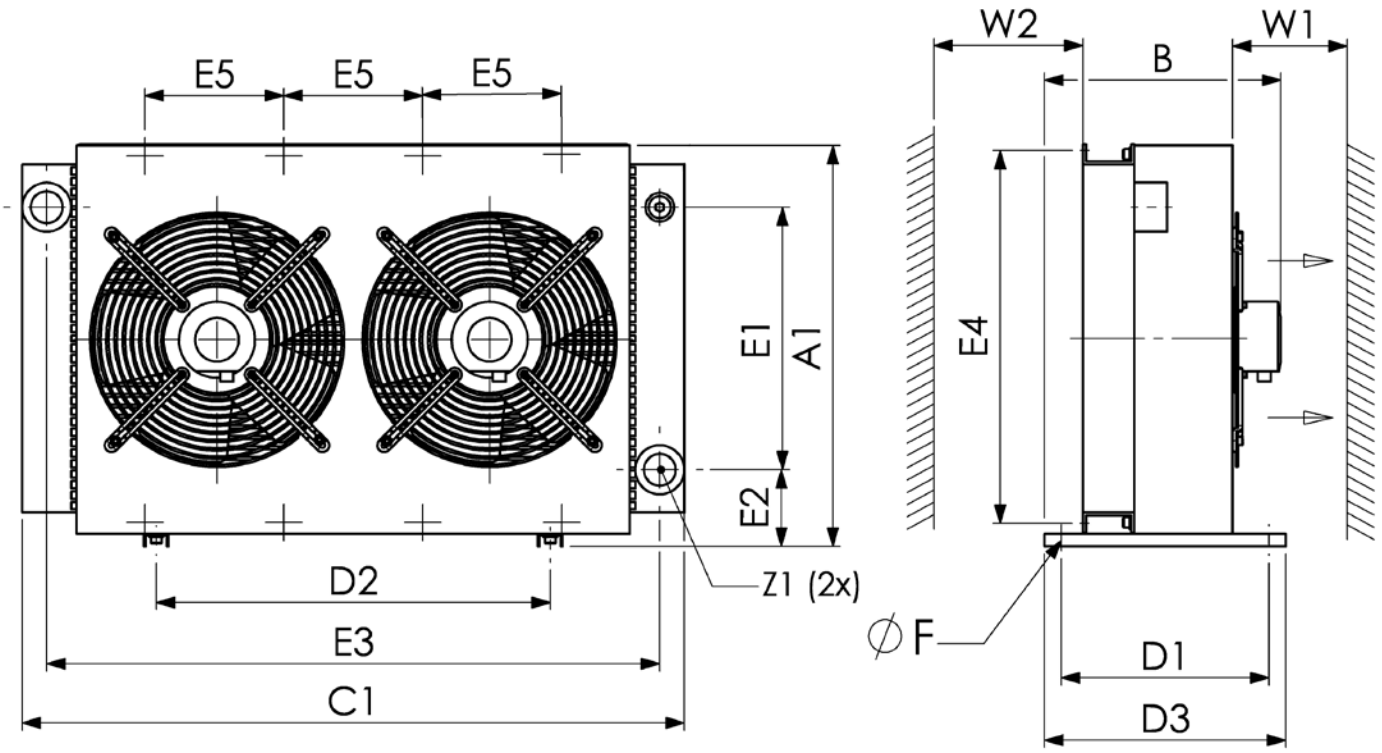
Size	A1	B	C1	D1	D2	D3	E1	E2	E3	E4	E5	W1	W2	Z1	F (4xø)	Plug
OKC 2	12.91	11.42	15.12	10.04	6.30	11.61	7.87	2.80	12.75	11.34	3.15	9.84	5.91	1 5/16” -12 UNF	0.35	1/2” NPT (F)
OKC 3	14.61	11.30	16.54	10.04	9.45	11.61	9.06	3.07	14.57	12.95	3.94	11.81	7.09	1 5/16” -12 UNF	0.35	1/2” NPT (F)
OKC 4	18.31	11.50	19.69	10.04	10.04	11.61	11.38	3.76	17.72	16.57	5.91	15.75	7.87	2 5/16” -12 UNF	0.35	1/2” NPT (F)
OKC 5	18.70	12.05	23.70	10.04	10.04	11.61	13.76	2.75	19.29	7.87	22.83	15.75	9.84	1 5/8” -12 UNF	0.35	1/2” NPT (F)

Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.
Dimensions are in inches.

OKC Series

Dimensions

Sizes 6 - 7



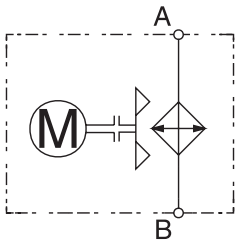
Size	A1	B	C1	D1	D2	D3	E1	E2	E3	E4	E5	W1	W2	Z1	F (4xø)	Plug
OKC 6	19.49	11.38	31.89	10.04	18.98	11.61	12.68	3.70	29.53	17.72	6.69	15.75	7.87	1 5/8” -12 UNF	0.35	1/2” NPT (F)
OKC 7	21.54	11.38	37.40	10.04	18.98	11.61	14.69	3.72	35.04	19.80	7.87	19.80	9.84	1 5/8” -12 UNF	0.35	1/2” NPT (F)

Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.
Dimensions are in inches.

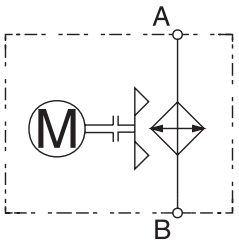
OK Series
Air Cooled Oil Coolers

Hydraulic Symbol

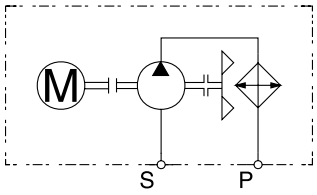
OK 1 -11



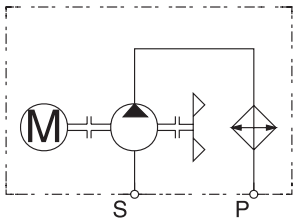
OKF 3 -11



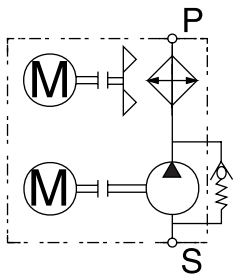
OKA 4 - 6



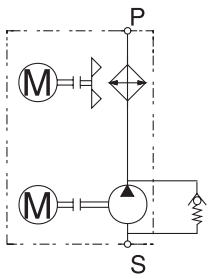
OKAF 4 - 6



OKA 8 - 11



OKAF 8 - 11



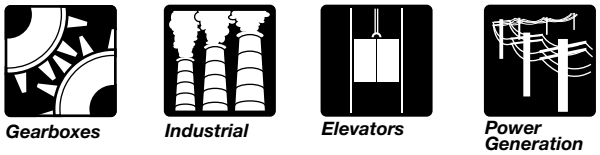
Description

The OK Series cooler design uses a axial fan assembly which draws air through the cooler. This combination offers excellent cooling capacity with low noise.

Features

- High efficient plate and fin style heat exchangers
- Externally mounted heat exchangers for easy maintenance and cleaning
- Modular pump and filter options for a plug and play fluid conditioning system
- Available with HYDAC MF and LPF series filters
- Accessories Include: Thermostats *(adjustable and fixed)*, Integrated Thermostatic Bypass Valves, and Bypass Valves
- 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 90 gpm

Applications



Model Code

OK 1H 3.5 A 28 MF95 3 B TR1 XX X

Model

OK	=	Basic Cooler
OKF	=	Cooler with filter *(sizes 3-11 only)*
OKA	=	Cooler with circulator pump *(sizes 4-11 only)*
OKAF	=	Cooler with circulator pump and filter *(sizes 4-11 only)*

Cooler Size

1H, 2H, 2S, 3H, 3S, 4L, 4S, 5L, 5S
6L, 6S, 7L, 7S, 8L, 8S, 9L, 10L, 11L
Note: L = 1200 RPM, S = 1800 RPM, H = 3600 RPM
(See the heat transfer table found on page 23 to determine the proper size.)

Modification Number *(latest version always supplied)*

Motor

A	=	220 volt-1ph *(size 1H only)*
B	=	230/460 volt-3 ph *(standard) (sizes 2-11 only)*
C		575 volt-3 ph *(optional - contact factory)*

Pump

(omit)	=	No Pump for OK/OKF models
28	=	28 ccm/rev, L = 8.4 gpm, S = 12.75 gpm *(sizes 4L, 4S, 5L, 5S, 6L, 6S only)*
40	=	40 ccm/rev, L = 12 gpm, S = 18.5 gpm *(sizes 4L, 4S, 5L, 5S, 6L, 6S only)*
70	=	70 ccm/rev, L/S = 34.3 gpm *(sizes 7L, 7S, 8L, 8S, 9L, 10L, 11L only)*
100	=	100 ccm/rev, L/S = 47.5 gpm *(sizes 7L, 7S, 8L, 8S, 9L, 10L, 11L only)*

Filter Type

(omit)	=	No filter	
MF95	=	Spin-on	25 rated gpm
MF190	=	Spin-on	30 rated gpm
MF195	=	Spin-on	60 rated gpm
LPF160	=	cartridge filter	43 rated gpm
LPF240	=	cartridge filter	63 rated gpm
LPF280	=	cartridge filter	73 rated gpm

Note: Other return line filters are available upon request. Consult the HYDAC Hydraulic & Lube Oil Filters catalog for special fluids.

Micron Rating

(omit)	=	No filter / OK and OKA models
3	=	3 micron, Absolute
5	=	5 micron, Absolute
10	=	10 micron, Absolute
20	=	20 micron, Absolute

Filter Indicator

(omit)	=	No filter
B	=	Visual
C	=	Electrical *(AC/DC) (LPF filters only)*
D24	=	Visual *(lamp)* and Electrical *(switch)*
D115	=	Visual *(lamp)* and Electrical *(switch)*
D230	=	Visual *(lamp)* and Electrical *(switch)*

numbers indicate supply voltage for light *(LPF filters only)*

Accessories

(omit)	=	None
TR1	=	Reservoir Thermostat, adjustable 32˚ to 200˚F
AITR	=	Inline Thermostat, adjustable 32˚ to 200˚F
TS-120	=	Inline Thermostat, fixed 120˚F
TS-140	=	Inline Thermostat, fixed 140˚F
TS-160	=	Inline Thermostat, fixed 160˚F
IBT	=	Thermostatic bypass valve
IBP	=	Inegrated bypass valve

only available with OK & OKF Units

Opening Temperature *(IBT only)*

		Opening Temp.	Closing Temp
45	=	113°F (45°C)	131°F (55°C)
50	=	130°F (55°C)	150°F (65°C)
60	=	140°F (60°C)	158°F (70°C)

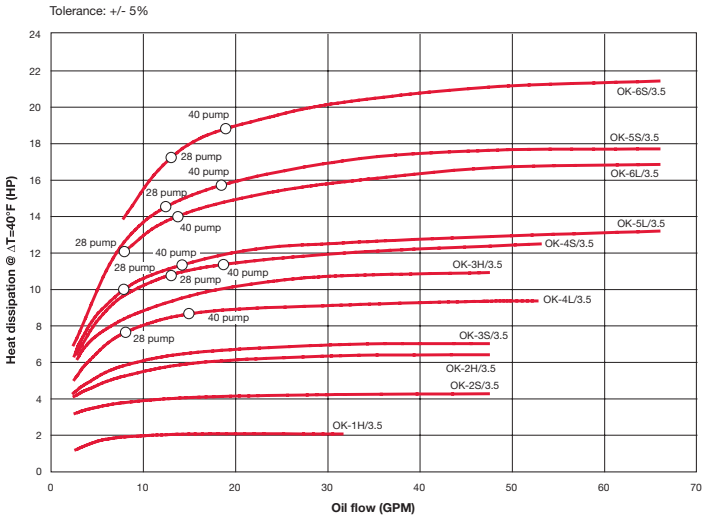
Opening Pressure Drop *(IBT & IBP only)*

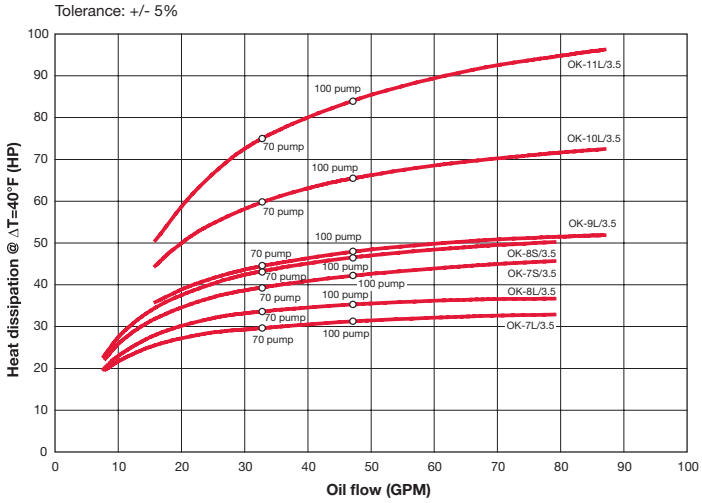
2	=	2 bar (29 psi)
3	=	3 bar (45 psi)

OK Series

Cooling Capacities

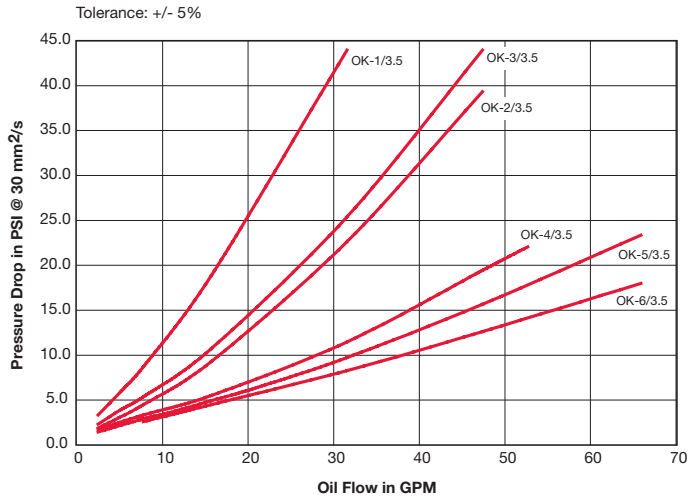
Sizes 1 - 6 Sizes 7 - 11

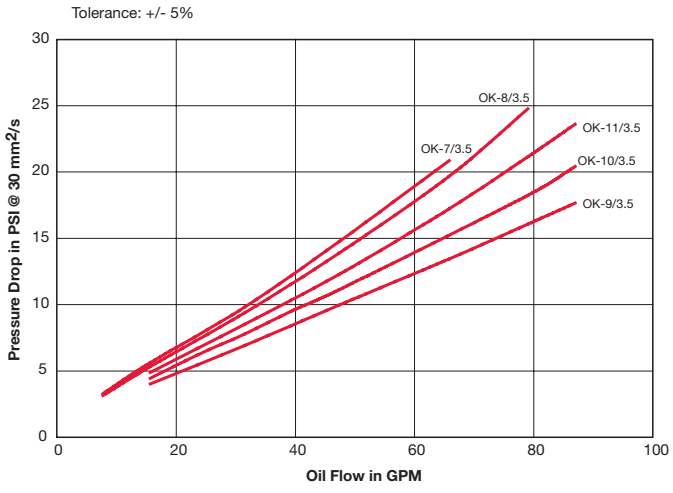




Pressure Drops:

Pressure differential Δp depending on flow rate Q and the viscosity of the oil.
Graph uses oil viscosity of 30mm2/s.





*Pressure Drop Curves above using fluid with a viscosity of 30 mm2/s.
For other viscosities the result must be multiplied by the K Factors below.

Viscosity (SSU)	46	70	102	150	213	250	315	464	695
Viscosity (mm²/s)	10	15	22	32	46	54	68	100	150
K Factor	0.5	0.65	0.77	1	1.3	1.52	1.9	2.8	5.3

Engineering Data
General

Construction	**Housing**	Welded steel housing, steel filter bracket, steel legs, steel blower wheel
	Heat Exchanger	Aluminum
	Motors	TEFC, IEC frame, B5 flange
	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) Dynamic 290 psi (20 bar) Static
	with pump	OKA 4-6: 90 psi (6 bar)*
		OKA 7-11: 145 psi (10 bar)
Pump Rated Suction Pressure		11.8" Hg (-0.4 bar) to 44 psi (3 bar)
Fluids		Mineral oil to DIN 51524 Part 1 and 2 Permissable contamination < NAS 12
Max Viscosity	**w/o pump**	2000 cst
	w/ pump	180cst
Ambient Temperature		50° - 104° F (10° - 40°C)
Maximum Oil Temperature	**w/o pump**	266° F (130°C)
	with pump	176° F (80°C)
Air Flow Direction		Pulled across heat exchanger

*Note: Sizes OKA-4-6 do not include relief valve. Pressures higher than 90 psi *(measured at pump outlet)* will result in motor overload conditions
Sizes OKA-8-11 come with a 145 psi relief valve built into the pump.

Specifications

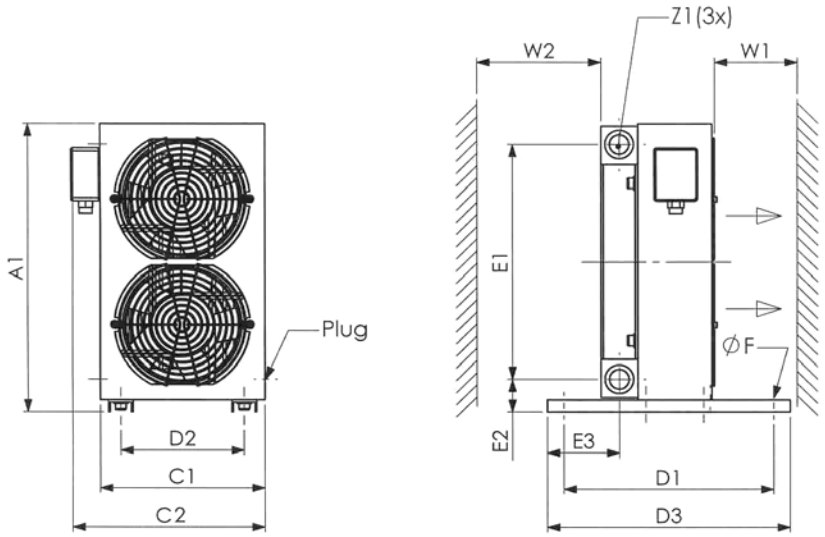
Models	Set Up	Maximum Oil Flow gpm	Pump Displacement Per Pump Code Level gpm		Noise dBa*1	Motor Specifications Kw	Motor Specifications RPM	Weight lbs.
OK 1H	fan	26			60	0.21	3450	15
OK 2S	fan	40			64	0.29	1800	29
OK 2H	fan	40			80	0.21	3450	29
OK 3S, OKF 3S	fan	40			66	0.63	1725	37
OK 3H, OKF 3H	fan	40			85	0.29	3450	37
OK 4L, OKF 4L	fan	40			63	1.27	1160	68
OKA 4L, OKAF 4L	fan / pump	–	Code 28 - 8.45	Code 40 - 12	68	1.30	1160	75
OK 4S, OKF 4S	fan	–			72	0.43	1725	68
OKA 4S, OKAF 4S	fan / pump	–	Code 28 - 12.75	Code 40 - 18.5	75	2.07	1725	91
OK 5L, OKF 5L	fan	60			72	0.43	1160	99
OKA 5L, OKAF 5L	fan / pump		Code 28 - 8.45	Code 40 - 12	75	1.27	1160	106
OK 5S, OKF 5S fan	60				79	1.27	1725	99
OKA 5S, OKAF 5S	fan / pump		Code 28 - 12.75	Code 40 - 18.5	81	2.07	1725	106
OK 6L, OKF 6L	fan	60			72	0.43	1160	110
OKA 6L, OKAF 6L	fan / pump		Code 28 - 8.45	Code 40 - 12	77	1.27	1160	126
OK 6S, OKF 6S	fan	60			79	1.27	1725	119
OKA 6S, OKAF 6S	fan / pump	–	Code 28 - 12.75	Code 40 - 18.5	82	2.07	1725	126
OK 7L, OKF 7L	fan	74			80	1.27	1160	134
OKA 7L, OKAF 7L	pump fan	–	Code 70 - 34.3*	Code 100 - 47.5	84	4.60	1725	197
						1.30	1160	
OK 7S, OKF 7S	fan	74			85	3.45	1725	153
OKA 7S, OKAF 7S	pump fan	–	Code 70 - 34.3*	Code 100 - 47.5	87	4.60	1725	197
						3.45	1725	
OK 8L, OKF 8L	fan	74			80	1.27	1160	150
OKA 8L, OKAF 8L	pump fan	–	Code 70 - 34.3*	Code 100 - 47.5	84	4.60	1725	197
						1.27	1160	
OK-8S, OKF-8S	fan	74			85	3.45	1725	153
OKA-8S, OKAF-8S	pump fan	–	Code 70 - 34.3*	Code 100 - 47.5	87	4.60	1725	197
						3.45		
OK 9L, OKF 9L	fan	79	Code 70 - 34.3*	Code 100 - 47.5	80	1.27	1160	275
OKA 9L, OKAF 9L	pump fan	–	Code 70 - 34.3*	Code 100 - 47.5	86	4.60	1725	330
						1.27	1160	
OK 10L, OKF 10L	fan	79			82	2.50	1160	315
OKA 10L, OKAF 10L	pump fan	–	Code 70 - 34.3*	Code 100 - 47.5	86	4.60	1725	370
						2.50	1160	
OK 11L, OKF 11L	fan	79			83	3.45	1160	375
OKA 11L, OKAF 11L	pump fan	–	Code 70 - 34.3*	Code 100 - 47.5	86	4.60	1725	435
						3.45	1160	

*The noise levels are only a guide as acoustic properties depend on the characteristics of the room, connections, viscosity and resonance.
1) 3 Phase Motor

OK Series

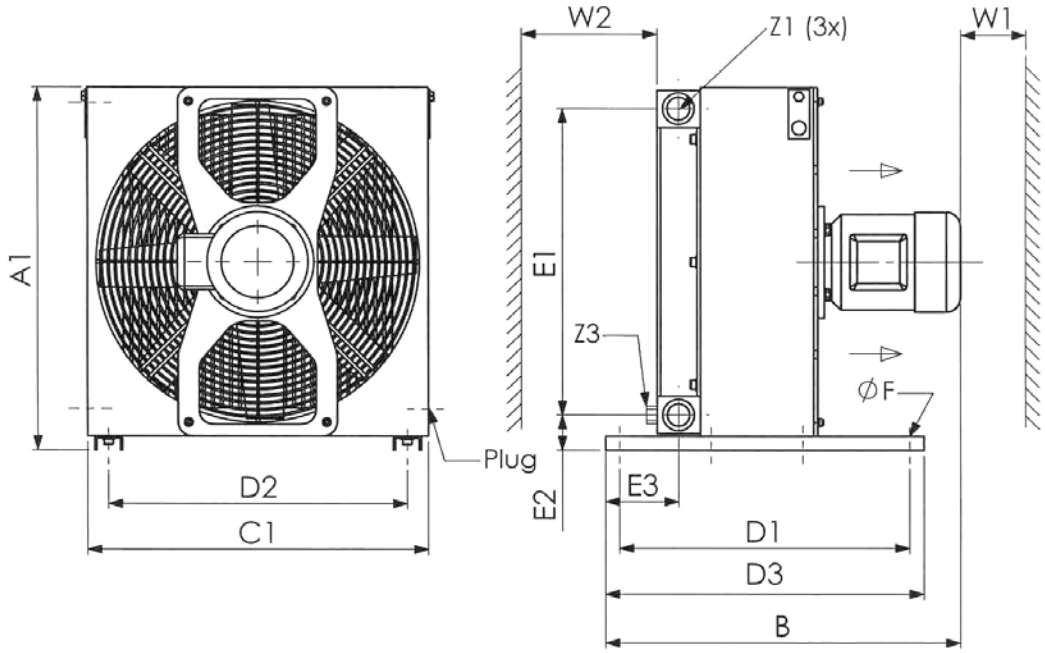
Dimensions

Size 1



Size	A1	C1	C2	D	D2	D3	E1	E2	E3	F	W1	W2	Z1	Z3
OK 1H	13.98	7.87	9.29	10.04	5.91	11.61	11.38	1.59	3.44	0.35	5.91	3.94	1 1/16”-12 (F)	-

Sizes 2 - 6



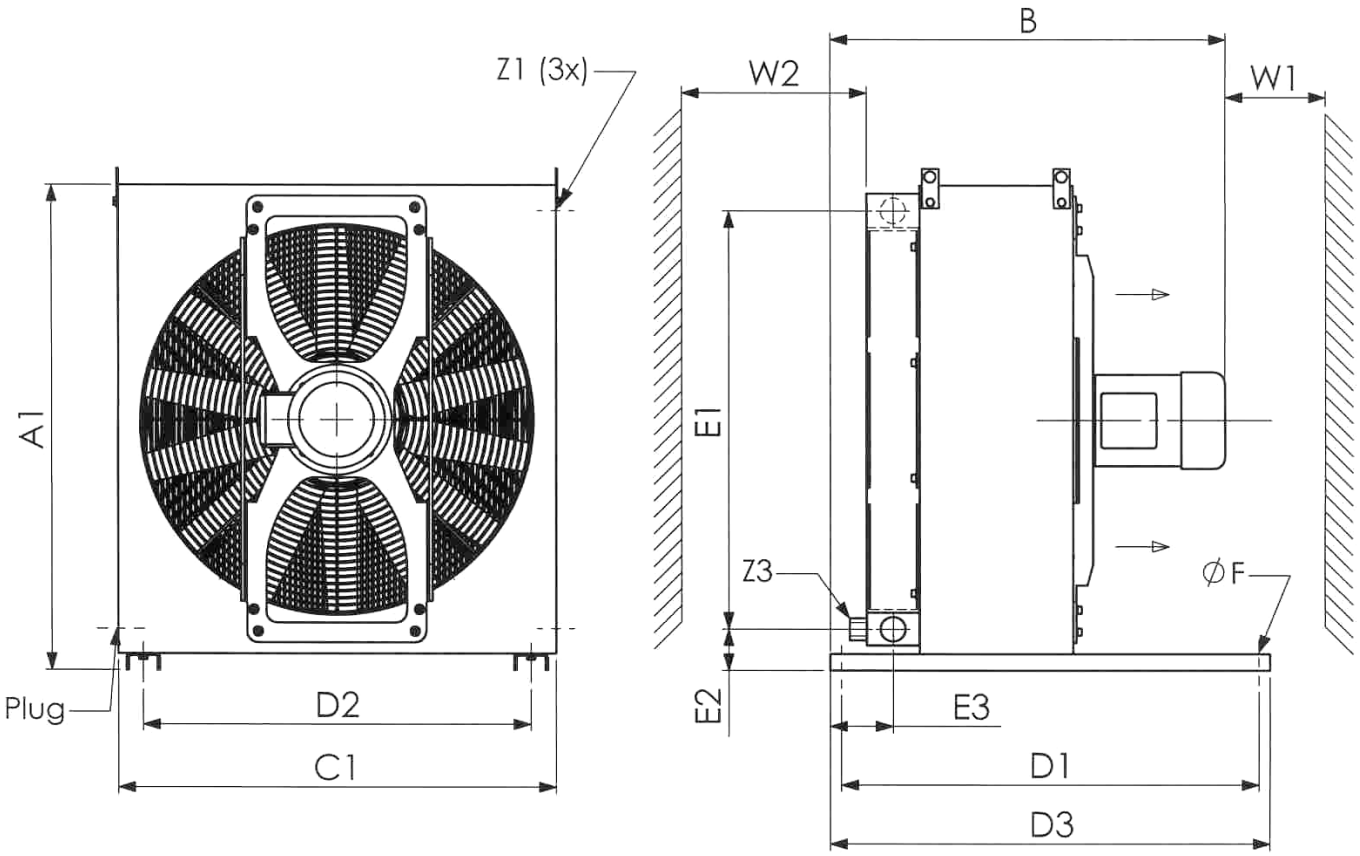
Size	A1	B	C1	D	D2	D3	E1	E2	E3	F	W1	W2	Z1	Z3
OK 2S, H	13.98	15.79	12.99	10.04	6.30	11.61	11.38	1.59	2.28	0.35	19.69	7.87	1 1/16”-12 (F)	-
OK 3S, H	17.91	16.50	14.96	10.04	11.42	11.61	15.31	1.61	2.28	0.35	31.50	11.81	1 1/16”-12 (F)	-
OK 4L, S	20.47	20.75	19.09	16.14	16.73	17.72	17.28	1.99	4.07	0.35	47.24	15.75	1 5/16”-12 (F)	-
OK 5L, S	22.13	22.83	21.34	16.14	18.98	17.72	17.28	2.81	3.70	0.35	59.06	19.69	1 5/16”-12 (F)	-
OK6 L, S	25.20	23.90	23.35	16.14	18.98	17.72	19.69	3.15	2.91	0.35	70.87	23.62	1 5/8”-12 (F)	1/2” NPT

Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.
Dimensions are in inches.

OK Series

Dimensions

Sizes 7 - 11



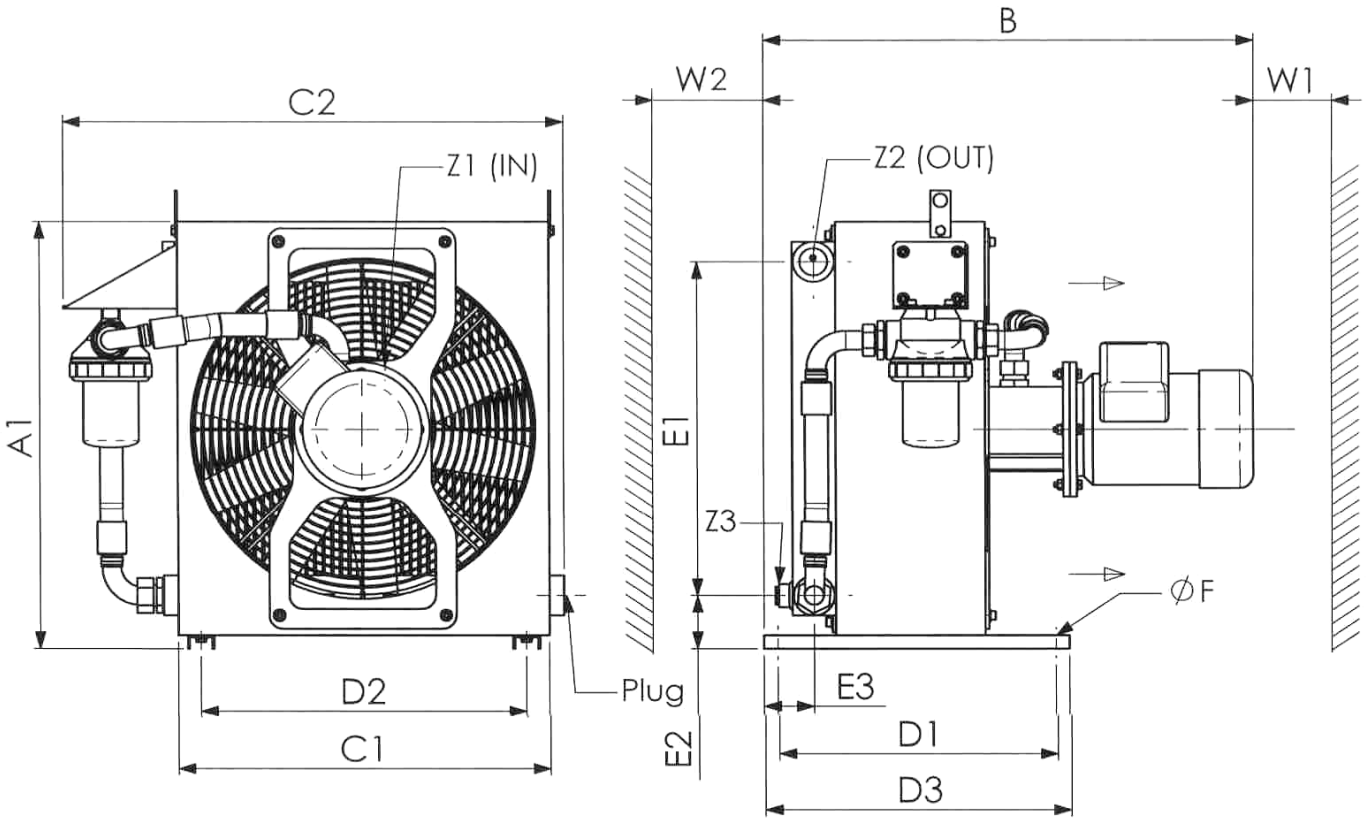
Size	A1	B	C1	D1	D2	D3	E1	E2	E3	F	W1	W2	Z1	Z3
OK 7L, S	28.58	24.10	27.80	16.14	22.00	17.72	23.62	2.87	2.89	0.35	47.24	23.62	1 5/8”-12 (F)	1/2” NPT
OK 8L, S	28.54	24.10	27.76	16.14	22.05	17.72	24.80	2.30	2.89	0.35	47.24	23.62	1 5/8”-12 (F)	1/2” NPT
OK 9LS, H	34.65	27.91	31.10	29.53	27.56	31.10	29.92	2.95	4.65	0.47	98.43	35.43	1 7/8”-12 (F)	1/2” NPT
OK 10L	40.55	29.88	36.61	29.53	27.56	31.10	35.83	2.95	4.59	0.47	110.24	35.43	1 7/8”-12 (F)	1/2” NPT
OK 11L	46.46	31.65	41.34	29.53	27.56	31.10	41.73	2.95	4.59	0.47	118.11	39.37	1 7/8”-12 (F)	1/2” NPT

Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.
Dimensions are in inches.

OKA / OKAF Series

Dimensions

Sizes 4 - 6



Size	A1	B	C1	C2	D1	D2	D3	E1	E2	E3	F	W1	W2	Z1	Z2	Z3
OKA 4L, S	20.47	27.17	19.09	19.09	16.14	16.73	17.72	17.28	1.99	4.09	0.35	47.24	15.75	1 5/8”-12 JIC-20(M)	1 5/16”-12 (F)	-
OKAF 4L, S	20.47	27.17	19.09	24.21	16.14	16.73	17.72	17.28	1.99	4.09	0.35	47.24	15.75	1 5/8”-12 JIC-20(M)	1 5/16”-12 (F)	-
OKA 5L, S	22.13	27.56	21.34	21.34	16.14	18.98	17.72	17.28	2.81	3.70	0.35	59.06	19.69	1 5/8”-12 JIC-20(M)	1 5/16”-12 (F)	-
OKAF 5L, S	22.13	27.56	21.34	21.46	16.14	18.98	17.72	17.28	2.81	3.70	0.35	59.06	19.69	1 5/8”-12 JIC-20(M)	1 5/16”-12 (F)	-
OKA 6L, S	25.20	28.35	22.99	27.99	16.14	18.98	17.72	19.69	3.15	2.89	0.35	70.87	23.62	1 5/8”-12 JIC-20(M)	1 5/8”-12 (F)	1/2” NPT
OKAF 6L, S	25.20	28.35	22.99	28.11	16.14	18.98	17.72	19.69	3.15	2.89	0.35	70.87	23.62	1 5/8”-12 JIC-20(M)	1 5/8”-12 (F)	1/2” NPT

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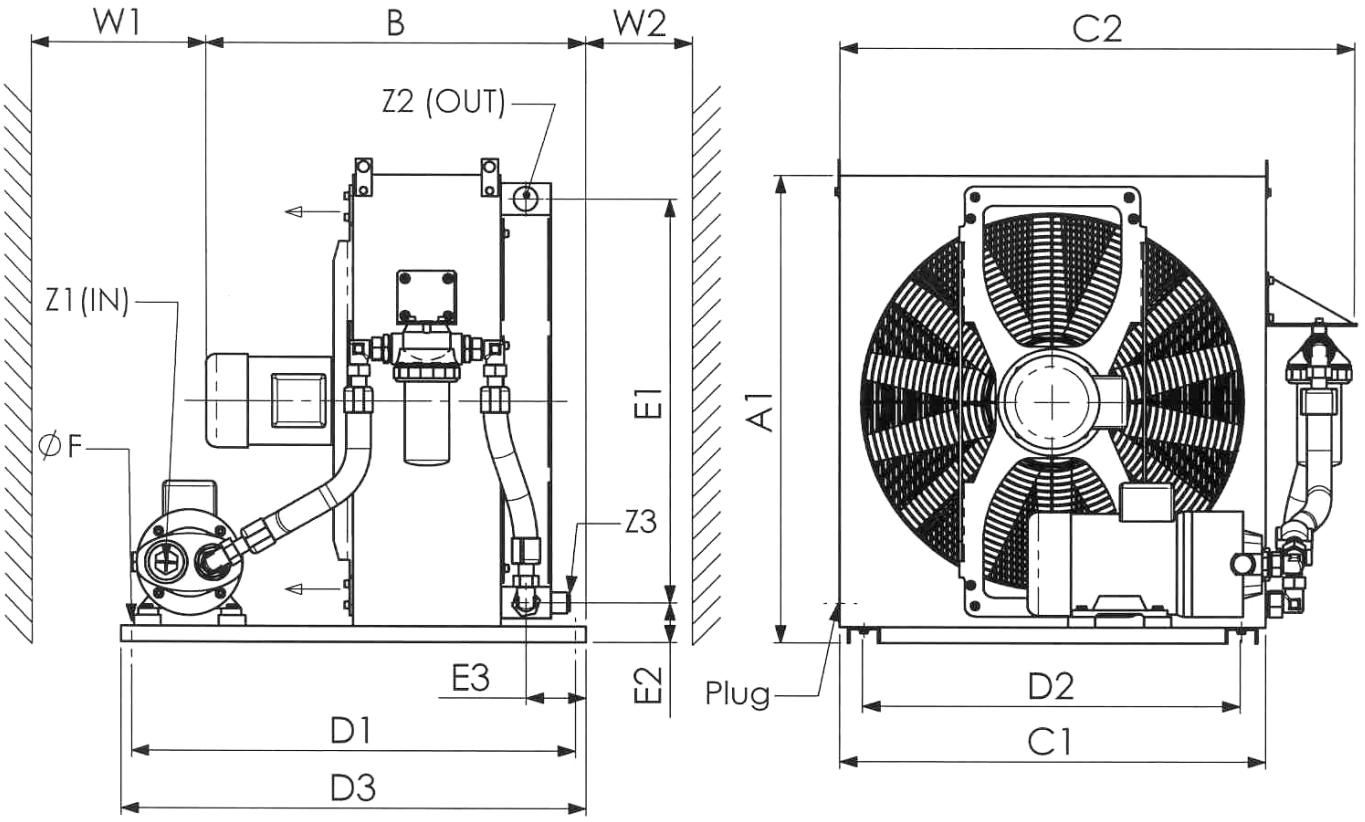
Dimensions are in inches.

OKA / OKAF Series

Dimensions

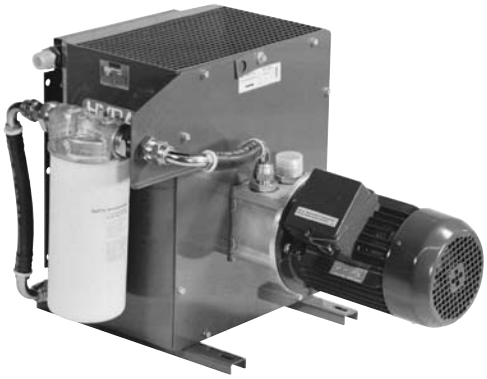
Sizes 7 - 11



Size	A1	B	C1	C2	D1	D2	D3	E1	E2	E3	F	W1	W2	Z1	Z2	Z3
OKA 7L, S	28.98	23.62	27.80	27.80	22.05	22.05	23.62	23.62	3.27	2.89	0.35	47.24	23.62	2 1/2”-12 JIC-20(M)	1 5/8”-12 (F)	1/2” NPT
OKAF 7L, S	28.98	23.62	27.80	32.09	22.05	22.05	23.60	23.62	3.27	2.89	0.35	47.24	23.62	2 1/2”-12 JIC-20(M)	1 5/8”-12 (F)	1/2” NPT
OKA 8L, S	28.94	23.62	27.76	27.76	22.05	22.05	23.62	24.76	2.66	2.89	0.35	47.24	23.62	2 1/2-12 JIC-32(M)	1 5/8”-12 (F)	1/2” NPT
OKAF 8L, S	28.94	23.62	27.76	34.45	22.05	22.05	23.62	24.76	2.66	2.89	0.35	47.24	23.62	2 1/2-12 JIC-32(M)	1 5/8”-12 (F)	1/2” NPT
OKA 9L	34.65	27.91	31.10	31.10	32.68	27.56	34.25	29.92	2.95	4.65	0.47	47.24	35.43	2 1/2-12 JIC-32(M)	1 7/8”-12 (F)	1/2” NPT
OKAF 9L	34.65	27.91	31.10	36.85	32.68	27.56	34.25	29.92	2.95	4.65	0.47	98.43	35.43	2 1/2-12 JIC-32(M)	1 7/8”-12 (F)	1/2” NPT
OKA 10L	40.55	29.86	36.61	36.61	32.68	27.56	34.25	35.83	2.95	4.59	0.47	110.24	35.43	2 1/2-12 JIC-32(M)	1 7/8”-12 (F)	1/2” NPT
OKAF 10L	40.55	29.86	36.61	41.73	32.68	27.56	34.25	35.83	2.95	4.59	0.47	110.24	35.43	2 1/2-12 JIC-32(M)	1 7/8”-12 (F)	1/2” NPT
OKA 11L	46.46	31.63	41.34	41.34	32.68	27.56	34.25	41.73	2.95	4.59	0.47	118.11	39.37	2 1/2-12 JIC-32(M)	1 7/8”-12 (F)	1/2” NPT
OKAF 11L	46.46	31.63	41.34	46.46	32.68	27.56	34.25	41.73	2.95	4.59	0.47	118.11	39.37	2 1/2-12 JIC-32(M)	1 7/8”-12 (F)	1/2” NPT

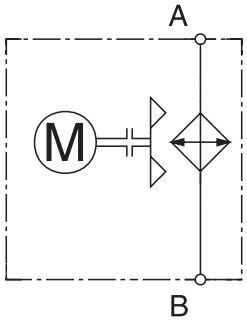
Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.
Dimensions are in inches.

SC Series
Air Cooled Oil Coolers

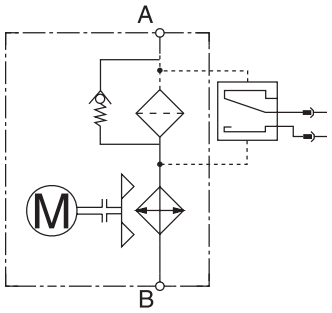


Hydraulic Symbol

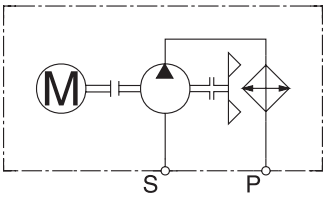
SC



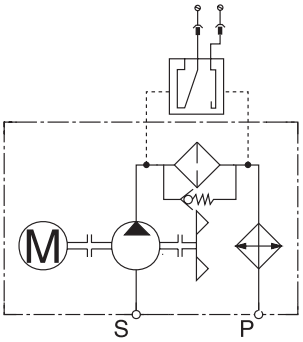
SCF



SCA



SCAF



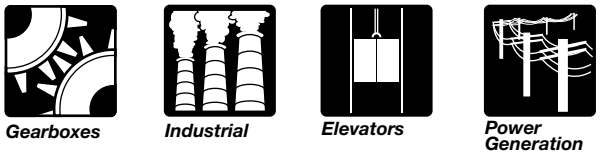
Description

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

Features

- High efficient plate and fin style heat exchangers
- Externally mounted heat exchangers for easy maintenance and cleaning
- Modular pump and filter options for a plug and play fluid conditioning system
- Available with HYDAC MF and LPF series filters
- Accessories Include: Thermostats *(adjustable and fixed)*, Integrated Thermostatic Bypass Valves, and Bypass Valves
- Down to 64 dBa noise level
- Up to 16 HP cooling capacity
- Warm air is directed up and away from work area
- Packaged systems with pump flows ranging from 3.1 gpm to 18.5 gpm
- Maximum flows *(w/o pump)*
- up to 42 gpm

Applications



Model Code

SC 1L 1.5 A 10 MF95 3 B TR1 XX X

Model
- SC = Basic Cooler
- SCF = Cooler with filter
- SCA = Cooler with circulator pump
- SCAF = Cooler with circulator pump and filter

Size *(See the heat transfer table found on page 29 to determine the proper size.)*
0S, 1L, 1S, 2L, 2S, 3L, 3S, 4L, 4S
Note: L = 1200 RPM, S = 1800 RPM

Modification Number *(latest version always supplied)*

Motor
- A = 1 phase 115/230 volt *(only available on SC/SCA-0 and 1 models)*
- B = 3 phase 230/460 volt
- C = 3 phase 575 volt

Pumps
- *(omit)* = No Pump for SC and SCF Models
- 10 = 10 ccm/rev, L = 3.1 gpm, S = 4.75gpm *(sizes OS, 1L, 1S only)*
- 28 = 28 ccm/rev, L = 8.4, S = 12.75 *(sizes 2L, 2S, 3L, 3S, 4L, 4S only)*
- 40 = 40 ccm/rev, L = 12 *(sizes 2L, 3L, 4L only)*

Filter Type *(not applicable for SC and SCA models)*
- *(omit)* = No filter / SC and SCA models
- MF95 = Spin-on / 25 gpm
- MF190 = Spin-on / 30 gpm
- MF195 = Spin-on / 60 gpm
- LPF160 = Cartridge / 42 gpm
- LPF240 = Cartridge / 63 gpm

Micron Rating
- *(omit)* = No filter / SC and SCA models
- 3 = 3 microns, Absolute
- 5 = 5 microns, Absolute
- 10 = 10 microns, Absolute
- 20 = 20 microns, Absolute

Filter Indicator
- *(omit)* = No filter
- B = Visual
- C = Electrical *(AC/DC) (LPF filters only)*
- D24 = Visual *(lamp)* and Electrical *(switch)*
- D115 = Visual *(lamp)* and Electrical *(switch)*
- D230 = Visual *(lamp)* and Electrical *(switch)*

numbers indicate supply voltage for light *(LPF filters only)*

Accessories
- *(omit)* = None
- TR1 = Reservoir Thermostat, adjustable 32° to 200˚F
- AITR = Inline Thermostat, adjustable 32˚ to 200˚F
- TS-120 = Inline Thermostat, fixed 120˚F
- TS-140 = Inline Thermostat, fixed 140˚F
- TS-160 = Inline Thermostat, fixed 160°F
- IBT = Thermostatic bypass valve
- IBP = Inegrated bypass valve

only available with SC & SCF Units

Opening Temperature *(IBT only)*

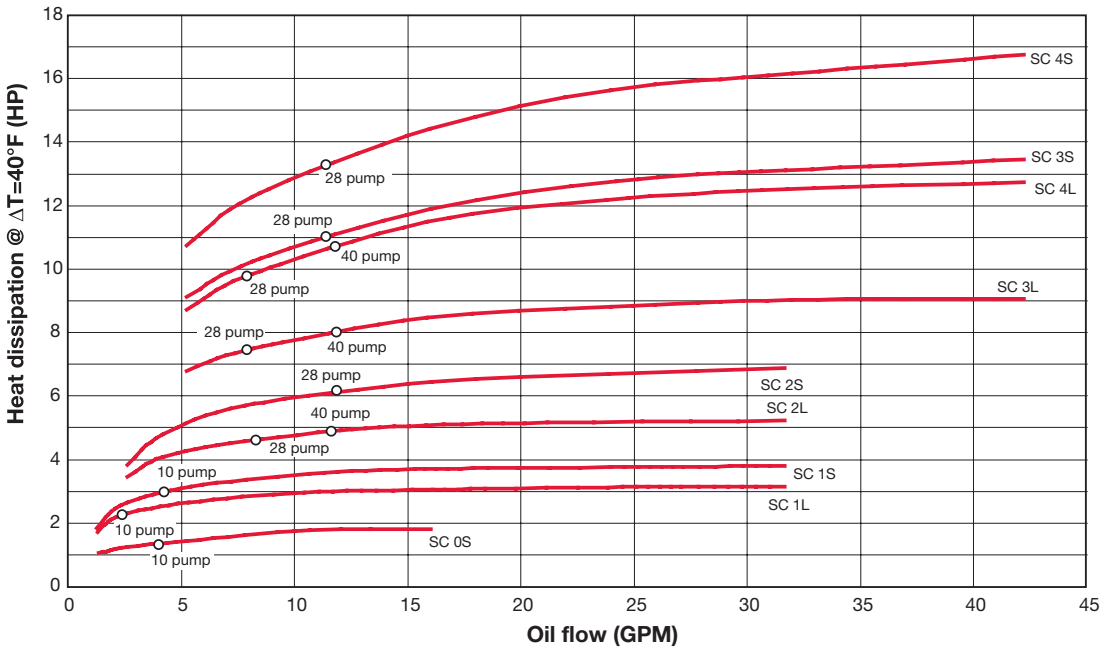
	Opening Temp.	Closing Temp.
45	113°F (45°C)	131°F (55°C)
50	130°F (55°C)	150°F (65°C)
60	140°F (60°C)	158°F (70°C)

Opening Pressure Drop *(IBT & IBP only)*
- 2 = 2 bar (29 psi)
- 3 = 3 bar (45 psi)

SC Series

Cooling Capacities

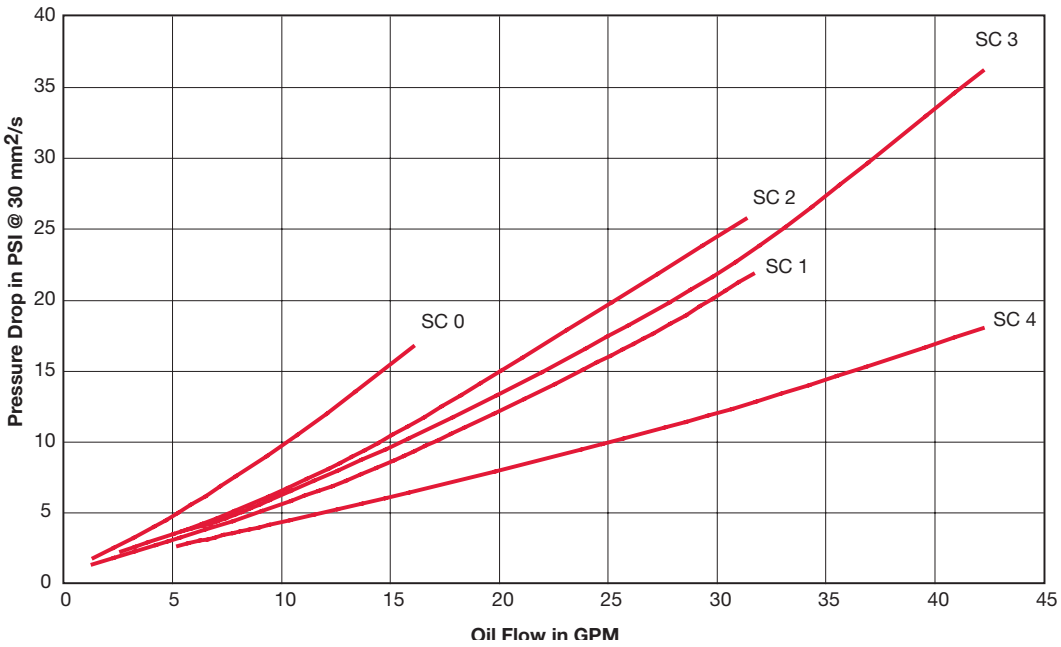
Tolerance: +/- 5%



Pressure Drops

Pressure differential Δp depending on flow rate Q and the viscosity of the oil.
Graph uses oil viscosity of 30mm²/s.

Tolerance: +/- 5%



*Pressure Drop Curves above using fluid with a viscosity of 30 mm2/s.
For other viscosities the result must be multiplied by the K Factors below.

Viscosity (SSU)	46	70	102	150	213	250	315	464	695
Viscosity (mm²/s)	10	15	22	32	46	54	68	100	150
K Factor	0.5	0.65	0.77	1	1.3	1.52	1.9	2.8	5.3

Engineering Data

Construction	**Housing**	Welded steel housing, steel filter bracket,steel legs, steel blower wheel
	Heat Exchanger	Aluminum
	Motors	TEFC, IEC Frame B5 Flange
	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) Dynamic 290 psi (20 BAR) Static
	With Pump	90 psi (6 BAR)*
Rated Suction Pressure		11.8" Hg (-.4 BAR) to 44 psi (3 BAR)
Fluids		Mineral oil to DIN 51524 Part 1 and 2
Contamination Limit		Permissible contamination < NAS 12
Max Viscosity	**W/o Pump**	2000 cst
	With Pump	180 cst
Ambient Temperature		50˚F (10˚C) to 104˚F (40˚C)
Maximum Oil Temperature	**W/o Pump**	266˚F (130˚C)
	With Pump	175˚F (80˚C)
Air Flow Direction		Pulled across Heat Exchanger

*Note: SCA/SCAF units do not include relief valve. Pressure higher than 90 psi *(measured at pump outlet)* will result in motor overload conditions.

Specifications

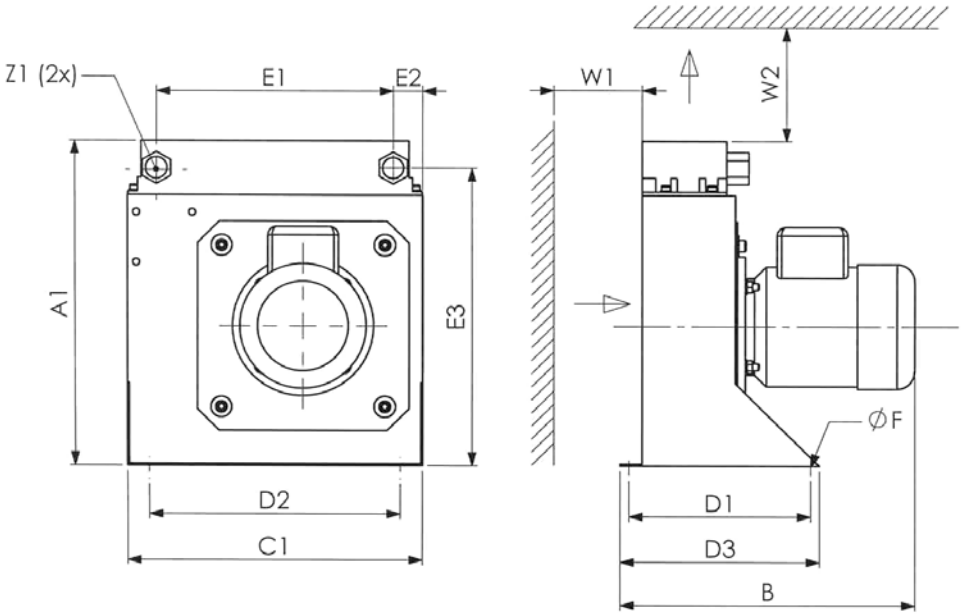
Model	Description	Fluid Specifications			Motor Specifications			
		Max. Oil Flow Without Pump gpm	Pump Displacement. Per Pump Code gpm		Noise Level dBa*1	kW	RPM	Weight lbs.
SC 0, SCF 0	Fan	16	-	-	68	0.21	1800	31
SCA 0,SCAF 0	Fan/Pump	-	Code 10 - 4.75	-	70	0.43	1800	51
SC 1L, SCF 1L	Fan	32	-	-	64	0.30	1200	47
SCA 1L, SCAF 1L	Fan/Pump	-	Code 10 - 3.1	-	68	0.43	1200	69
SC 1S, SCF 1S	Fan	32	-	-	69	0.30	1800	47
SCA 1S, SCAF 1S	Fan/Pump	-	Code 10 - 4.75	-	71	0.43	1800	69
SC 2L, SCF 2L	Fan	32	-	-	66	0.43	1200	71
SCA 2L, SCAF 2L	Fan/Pump	-	Code 28 - 8.45	Code 40 -12	68	1.30	1200	99
SC 2S, SCF 2S	Fan	32	-	-	76	0.70	1800	71
SCA 2S, SCAF 2S	Fan/Pump	-	Code 28 - 12.75	-	77	1.80	1800	99
SC 3L, SCF 3L	Fan	42	-	-	73	0.70	1200	104
SCA 3L, SCAF 3L	Fan/Pump	-	Code 28 - 8.45	Code 40 - 12	73	1.30	1200	148
SC 3S, SCF 3S	Fan	42	-	-	82	0.91	1800	104
SCA 3S, SCAF 3S	Fan/Pump	-	Code 28 - 12.75	-	84	2.20	1800	148
SC 4L, SCF 4L	Fan	42	-	-	73	0.70	1200	108
SCA 4L, SCAF 4L	Fan/Pump	-	Code 28 - 8.45	Code 40 - 12	73	1.30	1200	152
SC 4S, SCF 4S	Fan	42	-	-	82	0.91	1800	108
SCA 4S, SCAF 4S	Fan/Pump	-	Code 28 - 12.75	-	84	2.20	1800	152

*The noise levels are only a guide as acoustic properties depend on the characteristics of the room, connections, viscosity and resonance.
1) 3 Phase Motor

SC Series

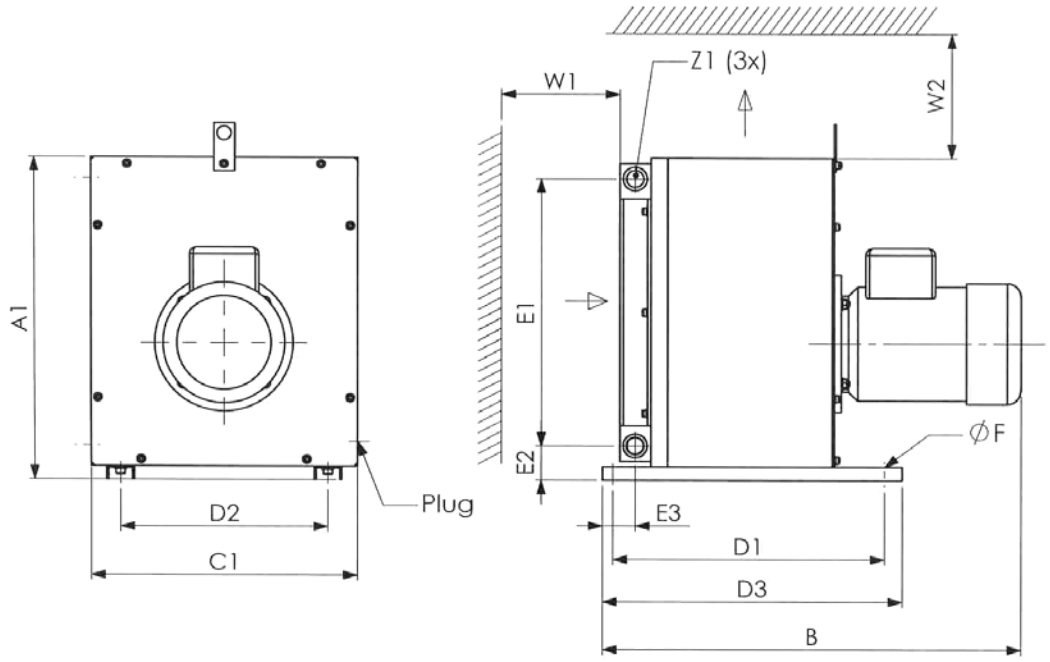
Dimensions

Size 0 S



Model	A1	B	C1	D1	D2	D3	E1	E2	E3	F	W1	W2	Z1
SC 0S	14.65	12.89	13.19	8.07	11.22	8.86	10.59	1.30	13.43	0.35	31.50	7.87	1 1/16”-12 UNF

Sizes 1 - 4 L, S



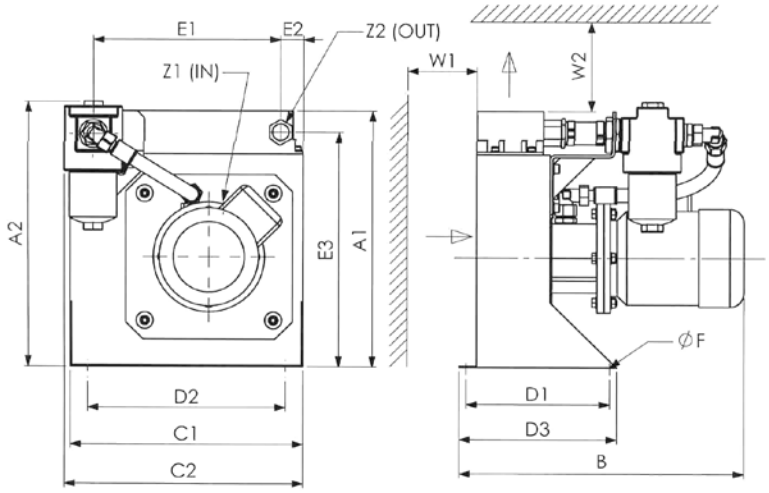
Model	A1	B	C1	D1	D2	D3	E1	E2	E3	F	W1	W2	Z1
SC 1L, S	14.76	20.47	13.58	12.60	11.22	14.17	11.38	1.99	1.87	0.35	39.37	11.81	1 1/16”-12 UNF
SC 2L, S	18.50	23.70	15.16	15.35	11.81	16.93	15.31	1.99	1.87	0.35	59.06	15.75	1 1/16”-12 UNF
SC 3L, S	20.87	27.68	17.72	18.50	14.17	19.69	17.28	2.19	2.46	0.35	78.74	19.69	1 1/16”-12 UNF
SC 4L, S	20.87	27.68	17.72	18.50	14.17	19.69	17.28	2.19	2.11	0.35	78.74	19.69	15/16”-12 UNF

Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.
Dimensions are in inches.

SCA / SCAF Series

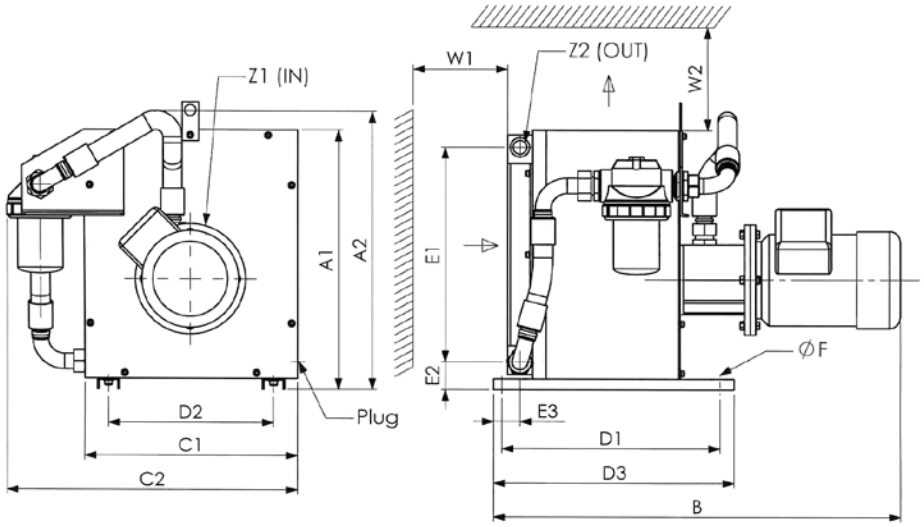
Dimensions

Sizes 0 S



Model	A1	A2	B	C1	C2	D1	D2	D3	E1	E2	E3	F	W1	W2	Z1	Z2
SCA 0S	14.65	0.00	17.05	13.19	0.00	8.07	11.22	8.86	9.53	1.67	13.27	0.35	7.87	31.50	3/4”-12 JIC-8(M)	1 1/16”-12 UNF
SCAF 0S	14.65	15.20	16.06	13.19	13.54	8.07	11.22	8.86	9.53	1.67	13.27	0.35	7.87	31.50	3/4”-12 JIC-8(M)	1 1/16”-12 UNF

Sizes 1 - 4 L, S

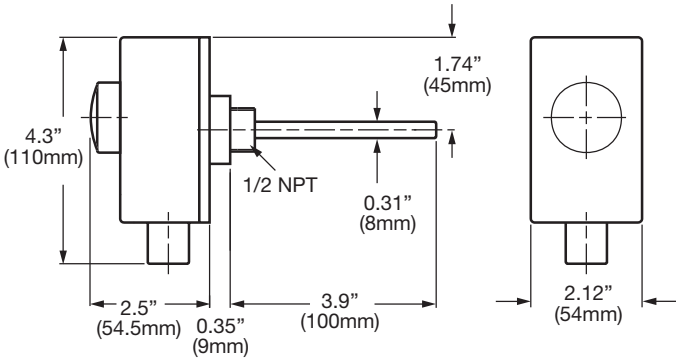


Model	A1	A2	B	C1	C2	D1	D2	D3	E1	E2	E3	F	W1	W2	Z1	Z2
SCA 1L, S	14.76	-	23.64	13.58	-	12.60	11.22	14.17	11.38	1.99	1.99	0.35	11.81	39.37	1 1/16”-12 JIC-12(M)	1 1/16”-12 UNF
SCAF 1L, S	14.76	15.35	23.64	13.58	19.13	12.60	11.22	14.17	11.38	1.99	1.99	0.35	11.81	39.37	1 1/16”-12 JIC-12(M)	1 1/16”-12 UNF
SCA 2L, S	18.50	-	28.66	15.16	-	15.35	11.81	16.93	15.31	1.99	1.99	0.35	15.75	59.06	1 5/16”-12 JIC-16(M)	1 1/16”-12 UNF
SCAF 2L, S	18.50	19.69	28.66	15.16	20.71	15.35	11.81	16.93	15.31	1.99	1.99	0.35	15.75	59.06	1 5/16”-12 JIC-16(M)	1 1/16”-12 UNF
SCA 3L, S	20.87	-	32.64	17.72	-	18.50	14.17	19.69	17.28	2.19	1.99	0.35	19.69	78.74	1 5/8”-12 JIC-20(M)	1 1/16”-12 UNF
SCAF 3L, S	20.87	22.05	32.64	17.72	22.93	18.50	14.17	19.69	17.28	2.19	1.99	0.35	19.69	78.74	1 5/8”-12 JIC-20(M)	1 1/16”-12 UNF
SCA 4L, S	20.87	-	32.64	17.72	-	18.50	14.17	19.69	17.28	2.19	1.99	0.35	19.69	78.74	1 5/8”-12 JIC-20(M)	1 5/16”-12 UNF
SCAF 4L, S	20.87	22.05	32.64	17.72	22.93	18.50	14.17	19.69	17.28	2.19	1.99	0.35	19.69	78.74	1 5/8”-12 JIC-20(M)	1 5/16”-12 UNF

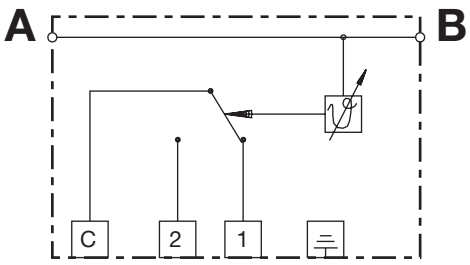
Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.
Dimensions are in inches.

TR1 Series

Adjustable Temperature Switch Tank Mounted



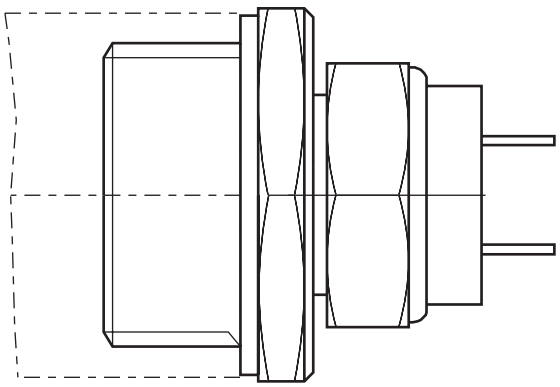
Hydraulic Symbol



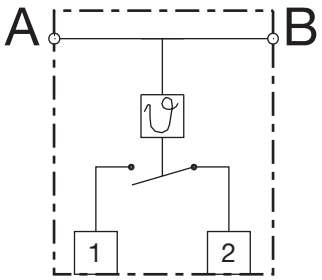
TR1/AITR Adjustable Thermostat

Temperature Range	0 to 200˚ F
	(0 to 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

TS Series



Hydraulic Symbol



TS Technical Data

Voltage	12/24 VDC
	220/440V
Amps	6A / 120V, 4A / 240V, 4A / 12VDC, 2A / 24VDC
Accuracy	±3%

Filters

The SC and OK series coolers offer MF Spin-ons and LPF series filters, which feature Betamicron media. For more detailed information on filters see HYDAC Hydraulic & Lube Oil Filters catalog #02081318. Other filters are available upon request.

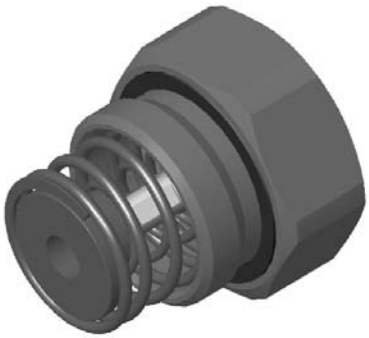
Note: It is important that the pressure drop across the filter element does not get too high. Oils with a viscosity of ISO VG46 or lower will have a ΔP lower than 10 psi. It is best to check the pressure drops of high viscosity fluids. Pressure drop across a clean filter assembly should not exceed more than 10 psi.

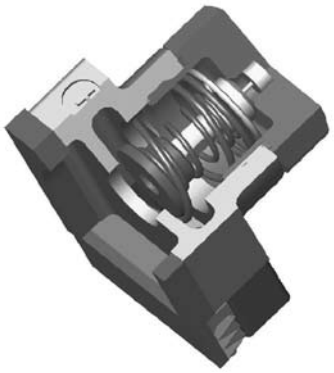
Filter selection is determined by:

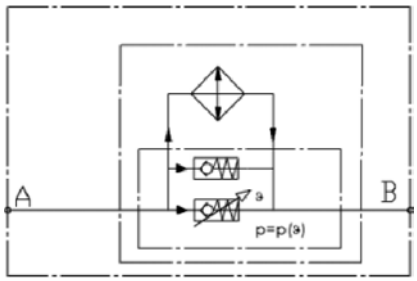
1. Selecting desired series filter, MF or LPF
2. What is the allowable contamination level of the system? From this determine the micron rating of your filter.
3. Determine the size of the filter by the flow rate going through the cooler system. Refer to HYDAC Hydraulic & Lube Oil Filters catalog #02081318 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.

Bypass

IBT Thermostatic Bypass Hydraulic Symbol

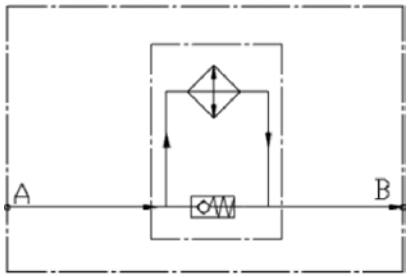






IBP Integrated Bypass

Hydraulic Symbol



Features

- 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

Model Code

OK-4 IBT XX / X

Model

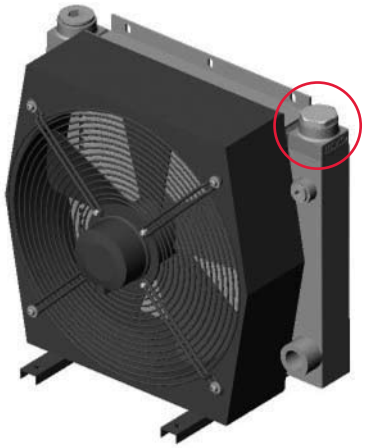
IBT	=	thermostatic bypass valve
IBP	=	inegrated bypass valve

Opening Temperature *(IBT only)*

		Opening Temp.	Closing Temp.
45	=	113°F (45°C)	131°F (55°C)
50	=	130°F (55°C)	150°F (65°C)
60	=	140°F (60°C)	158°F (70°C)

Opening Pressure Drop

2	=	2 bar (29 psi)
3	=	3 bar (45 psi)

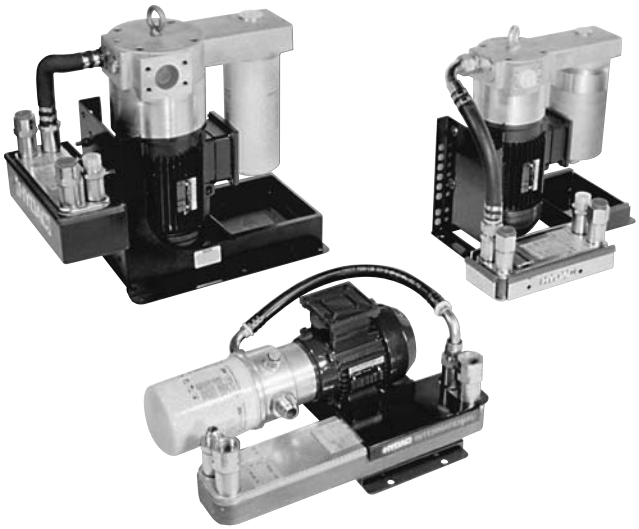


Warning:

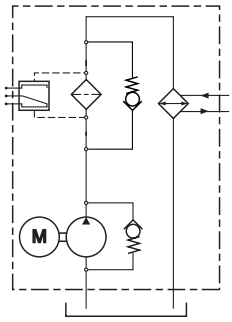
These valves are added to a cooling element in conjunction with a flow channel that is braised into the original construction.

(They need one special cooling element which maintains the same dimensions and points of fixing)

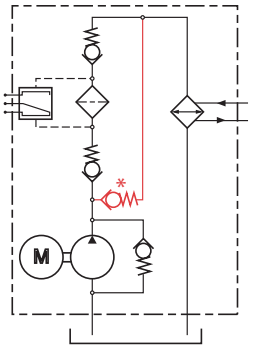
PFC Series
Pump / Filter / Cooler Units



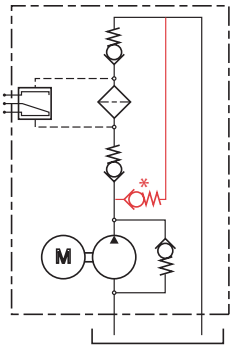
Hydraulic Symbol
PFC 1



PFC 2/3



PF 2/3



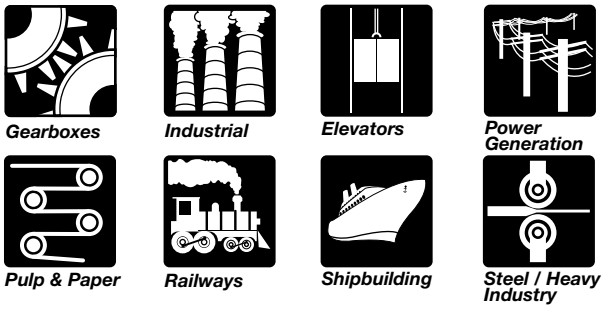
* Filtration bypass optional on PF/PFC-3.

Description
The PFC pump/filter/cooler unit is a compact, easy-to-install unit for off-line filtration/cooling circuits. Installation is simply a matter of hooking up the hydraulic and water lines and connecting the electrical power.

Features
- Plate type heat exchangers
- Rotary vane pump
- MF, Dimicron or LF series HYDAC filters
- Built in filter Clogging indicators
- Clean and easy replacement of filter element due to isolating check valves located up and down stream of the filter (PFC 2/3)
- Removable drip pan under filter (PFC 2/3)
- Reduced installation costs
- Simple compact design
- Heavy duty construction

Ratings:
- Cooling Capacities:
  PFC-1: over 15 HP
  PFC-2: over 40 HP
  PFC-3: over 100 HP
- Pump Flow Rates:
  PFC-1: 1.6 to 4.75 gpm
  PFC-2: 4.75 to 18.5 gpm
  PFC-3: 6.3 to 47.5 gpm
- Oil Viscosities:
  up to 22,000 SSU

Applications



Model Code

PFC-1 0.0 3.5 0.43-4-1 410-10 MF160 10 D 24 - 2

Model

PFC-1	=	Pump/Filter/Cooler
PF-2	=	Pump/Filter
PF-3	=	Pump/Filter
PFC-2	=	Pump/Filter/Cooler
PFC-3	=	Pump/Filter/Cooler

Design Code

0.0	=	PF-2/3 only
1.0	=	610
2.0	=	615
X.1	=	Filter Bypass *(standard on PFC-1) (optional on PF-2 & PF-3)*
X.2	=	Filter Bypass/Filter Shutoff *(PF & PFC-3 only)*

Pump

3.5	=	3.5 ccm/rev (1.6 gpm @ 1800 rpm)	PFC-1 only
7	=	7 ccm/rev (3.3 gpm @ 1800 rpm)	
10	=	10 ccm/rev (4.75 gpm @ 1800 rpm)	
15	=	15 ccm/rev (4.75 gpm @ 1200 rpm) (7 gpm @ 1800 rpm)	PFC-2 only
20	=	20 ccm/rev (6.3 gpm @ 1200 rpm) (9.5 gpm @ 1800 rpm)	
30	=	30 ccm/rev (9.5 gpm @ 1200 rpm) (14.5 gpm @ 1800 rpm)	
40	=	40 ccm/rev (n/a gpm @ 1200 rpm) (18.5 gpm @ 1800 rpm)	
20	=	20 ccm/rev (6.3 gpm @ 1200 rpm) (9.5 gpm @ 1800 rpm)	PFC-3 only
30	=	30 ccm/rev (9.5 gpm @ 1200 rpm) (14.5 gpm @ 1800 rpm)	
40	=	40 ccm/rev (12.5 gpm @ 1200 rpm) (18.5 gpm @ 1800 rpm)	
50	=	50 ccm/rev (15.5 gpm @ 1200 rpm) (23.5 gpm @ 1800 rpm)	
70	=	70 ccm/rev (21 gpm @ 1200 rpm) (34 gpm @ 1800 rpm)	
100	=	100 ccm/rev (32 gpm @ 1200 rpm) (47.5 gpm @ 1800 rpm)	

Motor HP

0.43 - 4-1	=	115/230 Volt - 1800 rpm	PFC-1 only
0.63 - 4-3	=	230/460 Volt - 1800 rpm	
1.3 - 6-3	=	1.3 kW - 1200 rpm *(pumps 15, 20 only)*	PFC-2 only
1.7 - 4-3	=	2 kW - 1800 rpm	
4.6 - 4-3	=	4.6 kW - 1800 rpm	PFC-3 only
4.6 - 6-3	=	4.6 kW - 1200 rpm	
575 Volt	=	Consult Factory	

Heat Exchanger *(see page 47 for details)*

PFC-1			PFC-2		PFC-3		PF-2 & PF-3
610-10	615-10	610-20	615-20		610-30	615-30	*(omit)*
610-20	615-20	610-30	615-30		610-40	615-40	
			610-40	615-40	610-50	615-60	
					610-60	615-80	
					610-70		
					610-100	AIB	*(Bypass used with Code 50, 70, & 100 pumps in high viscosity applications, consult factory)*
					610-120		

Filter

MF160	=	Spin-on Filter	PFC-1 only
N5DM	=	Cartridge Filter *(only available in 2 & 20 micron)*	
MF180	=	Spin-on Filter	PFC-2 only
LF330	=	Cartridge Filter	
MF180	=	Spin-on Filter	PFC-3 only
LF500	=	Cartridge Filter	

Filter Rating

2	=	2 µm *(only available on N5DM filters used on PFC-1)*
3	=	3 µm
5	=	5 µm
10	=	10 µm
20	=	20 µm

Filter Clogging Indicator

BM	=	Visual indicator with manual reset
C	=	Electrical switch indicator *(12-24 VDC / 110-220VAC)*
D	=	Combination visual *(light)* / electrical *(switch)*

Lamp Voltages *(for D clogging indicators)*

(omit)	=	B & C type indicators do not use lamps
24	=	24VDC
115	=	115VAC
230	=	230VAC

Trip Pressure

2	=	29 psi (2 bar) *(must be used on PFC-1 and PFC-2 Units)*
5	=	72 psi (5 bar)

Engineering Data

Model		PFC-1	PFC-2 / PFC-3
Mounting Position		Horizontal/Vertical	Vertical
Operating Pressures	**Oil side**	110 psi (7.5 bar) Relief Valve Setting	PFC-2: 90 psi (6 bar) PFC-3: 140 psi (9.5 bar)
	Water side	435 psi (30 bar)	435 psi (30 bar)
	Filter Bypass	44 psi (3 bar)	44 psi optional *(PF/PFC-3 only)*
Rated Suction Pressure		11.8" Hg (-0.4 bar) to 44 psi (3 bar)	11.8" Hg (-0.4 bar) to 44 psi (3 bar)
Pressure Drops	**Housing**	7.5 psi (0.5 bar)	7.5 psi (0.5 bar)
	Check Valves	n/a	7.5 psi (1 bar) each
Fluid Temperatures	**Oil side**	50˚F (10˚C) to 176˚F (80˚C)	50˚ F (10˚C) to 176˚F (80˚C)
	Water side	40˚F (5˚C) to 140˚F (60˚C)	40˚ F (5˚C) to 140˚F (60˚C)
Ambient Temperature		50˚F (10˚C) to 104˚F (40˚C)	50˚ F (10˚C) to 104˚F (40˚C)
Fluids		Mineral oil to DIN 51524 Part 1 and 2	Mineral oil to DIN 51524 Part 1 and 2
		Water Glycol *(HFC Based)*	Water Glycol *(HFC Based)*
Volumetric Efficiency		>90% *(When viscosity = 180 SUS)*	>90% *(When viscosity = 180 SUS)*

Construction

	PFC-1	PFC-2	PFC-3
Frame	Steel	Steel	Steel
Cooler Bracket	Steel	Steel/Aluminum	Steel
Drip Pan	n/a	Plastic	Plastic
Heat Exchanger Box	n/a	Aluminum	Steel
Pump Housing	Aluminum	Aluminum	Aluminum
Stator Ring	Steel	Steel	Steel
Pump Motor	Steel	Steel	Steel
Vanes	Steel	Steel	Steel
Pump/Filter Head	Aluminum	Aluminum	Aluminum
Check Valves	n/a	Steel	Steel
Relief Valves	Steel	Steel	Steel
Bypass Valve	Steel	n/a	Steel *(PFC-3 only)*
Relief/Bypass Springs	Steel	n/a	Steel *(PFC-3 only)*
Heat Exchanger	Stainless Steel/Cooper Brazed	Stainless Steel/Cooper Brazed	Stainless Steel/Cooper Brazed
Hose	Buna-N (Nitrile)	Buna-N (Nitrile)	Buna-N (Nitrile)
Seals	Buna-N (Nitrile), Viton Shaft Seal Optional	Buna-N (Nitrile), Viton Shaft Seal Optional	Buna-N (Nitrile), Viton Shaft Seal Optional
Fittings	Stainless Steel/Cooper Brazed	Stainless Steel/Cooper Brazed	Stainless Steel/Cooper Brazed

Sound Data

PFC-1
64 dBa

PFC-2		
Pump	14.5 psi (1 bar)	87 psi (6 bar)
15	61 dBa	62 dBa
20	62 dBa	62 dBa
30	62 dBa	63 dBa
40	63 dBa	64 dBa

Measured @ 1 meter using ISO VG46 oil @ 40˚C

PFC-3		
Pump	14.5 psi (1 bar)	87 psi (6 bar)
20	69 dBa	69 dBa
30	69 dBa	70 dBa
40	71 dBa	72 dBa
50	71 dBa	72 dBa
70	73 dBa	74 dBa
100	74 dBa	75 dBa

Measured @ 1 meter using ISO VG46 oil @ 40˚C

Weights

PFC-1
PFC-1 + Heat Exchanger

PFC-1	
27 lbs.	
Heat Exchanger	
610-10	3 lbs.
610-20	9 lbs.
615-10	10 lbs.
615-20	15 lbs.

PFC-2
PF-2 + Filter + Heat Exchanger

PF-2	
0.9 kW	35.2 lbs.
1.8 kW	44 lbs.
Filter	
MF180	4.5 lbs.
LF 330	8.8 lbs.
LF500	16 lbs.
Heat Exchanger	
610-20	9 lbs.
610-30	30 lbs.
610-40	31 lbs.
615-20	15 lbs
615-30	37 lbs.
615-40	40 lbs.

PFC-3
PF-3 + Filter + Heat Exchanger

PF-3	
2.5 kW	120 lbs.
4.6 kW	140 lbs.
Filter	
MF180	4.5 lbs.
LF500	16 lbs.
Heat Exchanger	
610-30	30 lbs.
610-40	31 lbs.
610-50	34 lbs.
610-60	36 lbs.
610-70	38 lbs.
610-100	49 lbs.
610-120	55 lbs.
615-30	37 lbs.
615-40	40 lbs.
615-50	47 lbs.
615-60	53 lbs.
615-80	66 lbs.

Pumps

The pump used in the PFC series is a rotary vane type pump. Depending on the fluid being pumped either a 1,800-rpm motor or 1,200 rpm motor can be used to drive the pump. For standard hydraulic fluids, such as ISO VG 22, 32, and 46 oils the 1,800 rpm motor is used. For higher viscosity fluids, it is recommended that the 1,200-rpm motor be used. The ordering data chart can be used as a guide to match up the proper motor and pump.

For other fluid types outside these ranges please consult the factory. The PFC-1/2 are rated for 90 psi (6 bar). The PFC-3 is rated for a max pressure of 140 psi (9.5 bar). All systems include a built in system relief valve.

PFC-1

Available in 3 flow ranges. The code 3.5 and code 7 pumps, 0.63 kW are used motor for high viscosity applications.

PFC-2

Available in 6 flow ranges. The code 15 and code 20 pumps with 1.3 kW, 1,200 rpm motor are used for high viscosity applications.

PFC-3

Available in 8 flow ranges. The code 30, 40, 50, 70, and 100 pumps with 1,200 rpm motors are used for high viscosity applications.

Motors

PFC-1

Order Code	0.43-4-1	0.63-4-3
H.P.	0.6	0.84
kW	0.43	0.63
Amps	6.4/3.2	3.4/1.7
RPM	1800	1800
Frame Size	71/IMB34	71/IMB34
Voltages	115/230	230/460
Hertz	50/60	
Rotation	CW looking @ motor fan	
Enclosure	TEFC/IP55	

PFC-2

Order Code	1.3-6-3	1.7-4-3
H.P.	1.75	2.25
kW	1.3	1.7
Amps	5.1/3	6.6/3.8
RPM	1200	1800
Frame Size	90/IMB34	
Voltages	230/460	
Hertz	50/60	
Rotation	CW looking @ motor fan	
Enclosure	TEFC/IP55	

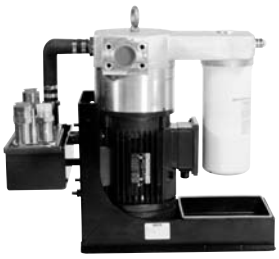
PFC-3

Order Code	4.6-4-3	4.6-6-3
H.P.	5.4	
kW	4.6	4.6
Amps	15.6/9	17.7/10.3
RPM	1800	1200
Frame Size	100/IMB34	112/IMB34
Voltages	230/460	
Hertz	50/60	
Rotation	CW looking @ motor fan	
Enclosure	TEFC/IP55	

PFC Series

Filters

Spin-On

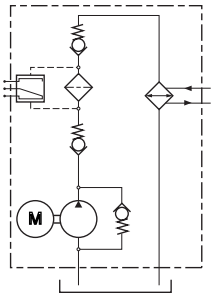


MF 180

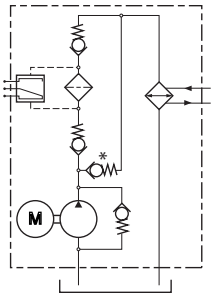
Cartridge

LF500 and Dimicron®

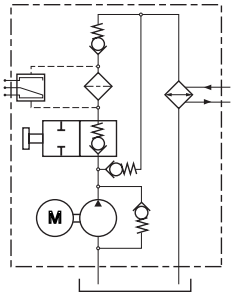
Code X.0



Code X.1



Code X.2



PFC-1 Filter Options

MF160 Spin-on
MF160 spin-on elements are an inexpensive high quality element with high dirt holding capacity.

Dimicron® Technology Filter *(2 or 20 micron)*
Dimicron® technology, which incorporates membrane filtration, sets the PFC-1 apart from conventional filters by providing it with exceptional dirt holding capacity and separation efficiency. Membrane filtration provides the PFC-1 with a separation efficiency over 99.5% for particles 2 micron and larger ($ß_2$> 200) even in a single pass.

The PFC-1 comes standard with a built in 44-psi (3 bar) filter bypass and 29 psi (2 bar) clogging indicator.

PFC-2 & PFC-3 Filter Options

MF180 Filter Element
MF180 Spin-on elements are an inexpensive high quality element with high dirt holding capacity.

PFC-2: LF 330 Cartridge Element
PFC-3: LF 500 Cartridge Element
LF filter elements are contained in a bowl. Nitrile O-ring seals provide a positive reliable seal between the bowl and the PFC head. Suitable for water glycol applications *(HFC Based Fluids)*.

The PFC-2 & PFC-3 units include built in removable drip pan.

Pump/Filter Head Configurations (PF/PFC-3 only)

Order Design Code X.0
Standard
This head configuration includes the built in system relief set at 90 psi (6 bar) on PF-2 and 140 psi (9.5 bar) on PF-3 and includes isolating check valves on either side of the filter. These check valves close when the unit is shut off and is located below fluid level eliminating the need for external ball valves. The standard head can be used with either the MF180 or LF500 filters. Depending on system pressure requirements either the 29 psi (2 bar) or the 72 psi (5 bar) clogging indicators can be used.

Order Design Code X.1
Head with Filter Bypass
This head includes the same features as the standard head, but also includes a 44 psi (3 bar) bypass around the filter. This head configuration can be used with either the MF180 or LF500 filters. Can only be used with 29 psi (2 bar) clogging indicator.

Order Design Code X.2 (PF & PFC-3 only)

Head with Filter Bypass and Filter Isolation Valve
This head includes the same features as the two heads listed above, but also includes and manual shut off on the upstream check valve. When this valve is manually shutoff, it causes the flow to pass over the bypass valve. The increased back pressure on the downstream check valve causes it to close isolating the filter. Now the filter can be changed while the unit is still pumping and cooling. This option is used in place of a duplex filter set up with minimal additional cost and no added space requirements.

Note: This option can only be used with the LF500 filter and 29 psi (2 bar) clogging indicator.

Initial Pressure Drop

$$\Delta p \text{ Element} = \text{Flow} \times \text{K Factor} \times \frac{\text{Actual Viscosity}}{141} \times \frac{\text{Actual Specific Gravity}}{0.86}$$

Size	Dirt Holding Capacities					K Factors				
	2 micron	3 micron	5 micron	10 micron	20 micron	2 micron	3 micron	5 micron	10 micron	20 micron
MF160	n/a	47.5 g	52.1 g	49.5 g	49.1 g	n/a	0.220	0.169	0.157	0.087
MF180	n/a	95.9 g	105.5 g	100.1 g	99.5 g	n/a	0.114	0.087	0.082	0.045
LF330	n/a	60.7 g	64.8 g	72.9 g	81 g	n/a	0.266	0.204	0.190	0.105
LF500	n/a	60.7 g	64.8 g	72.9 g	81 g	n/a	0.162	0.124	0.115	0.064
N5DM	200 g	n/a	200 g	200 g	200 g	n/a	n/a	n/a	n/a	n/a

Clogging Indicators

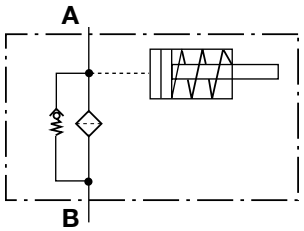
The PFC is available with three different styles of differential pressure type indicators All indicators are magnetically actuated and have no external dynamic seals. High reliability is achieved and magnetic actuation eliminates a leak point.

The clogging indicators are available with two different trip pressures of 29 psi (2 bar) or 72 psi (5 bar). The 29 psi (2 bar) is recommended when high viscosity fluids are being used because or high pressure drops across the PFC. The 72 psi (5 bar) indicator can be used for most applications and will extend times between filter changes.

Note: For more detailed information about clogging indicators, see HYDAC Hydraulic & Lube Oil Filters Catalog.

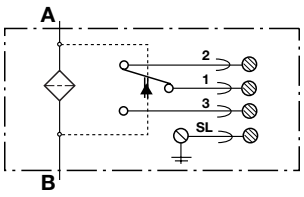
Model BM -Visual Indicator with manual reset

A red marker extends to signal that the filter element is clogged.
The marker must be manually pushed in to reset.



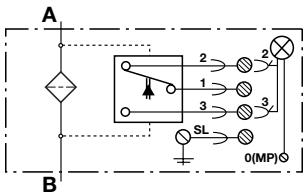
Model C - Electrical Clogging Indicator

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.



Model D - Electrical Clogging Indicator with Visual Lamp

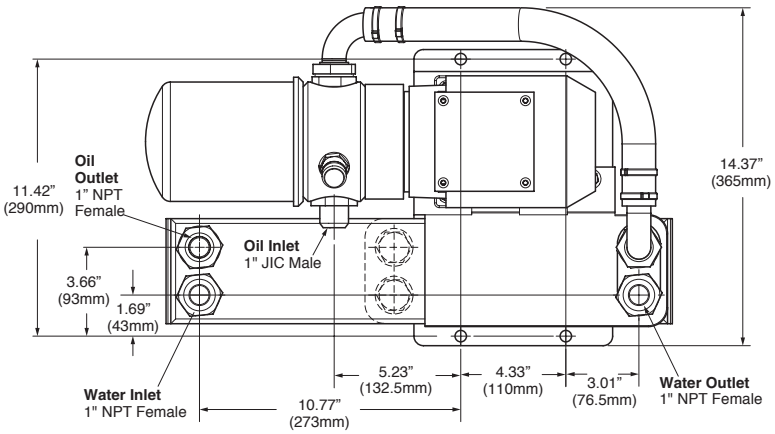
An electric switch and light activate when clogging of the filter element occurs. The switch can be connected for normally open or normally closed circuits. The Lamp can be activated either on closing or opening of the contact. Model D indicator is available in 24 VDC, 115 VAC, or 230 VAC.

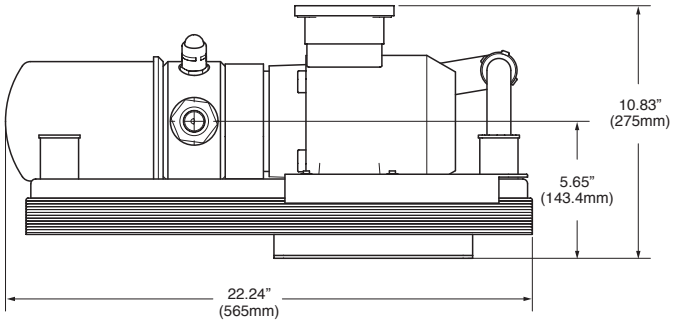


PFC Series

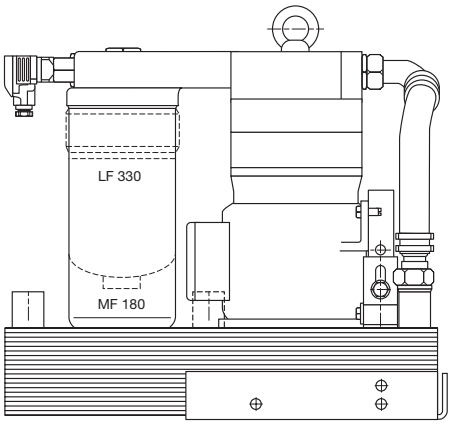
Dimensions

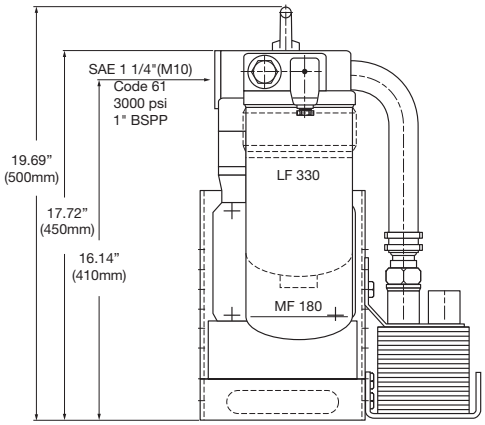
Size 1

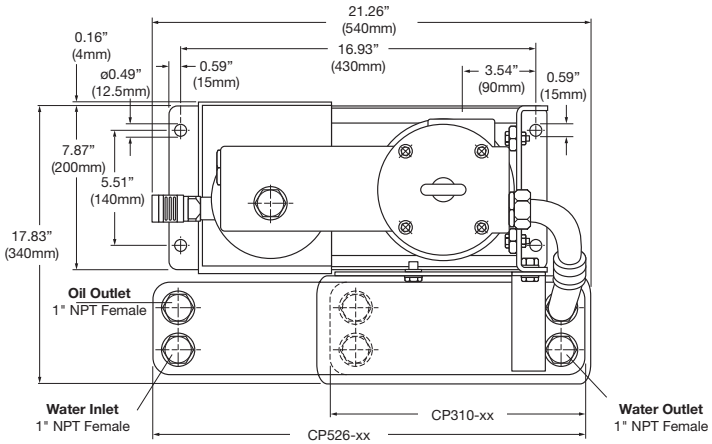




Size 2





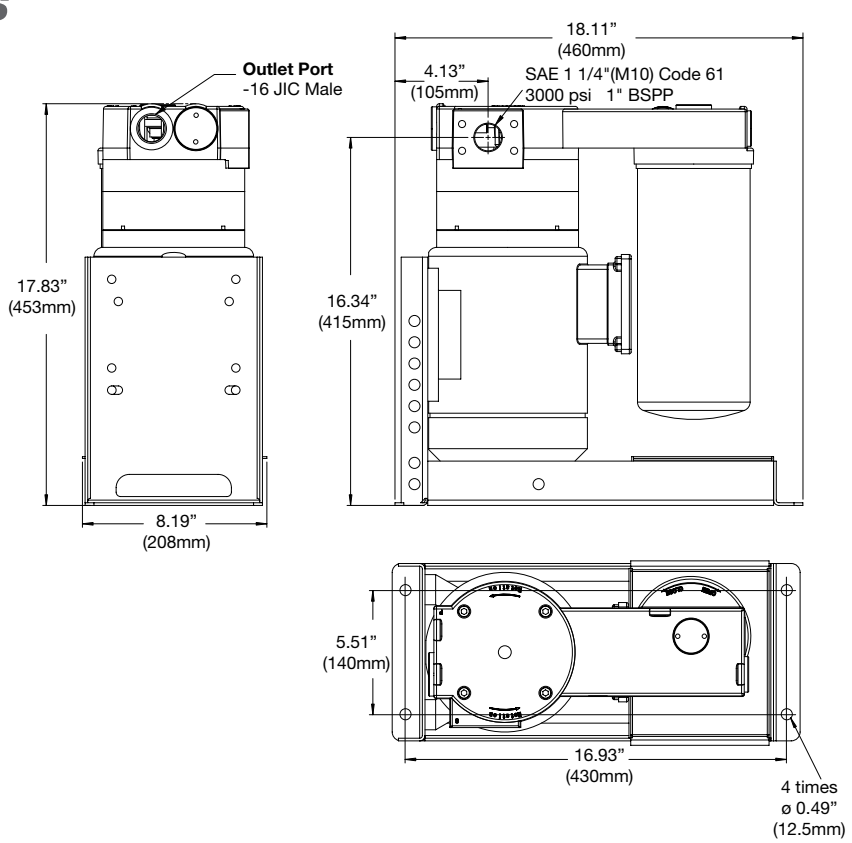


Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.
Dimensions are in inches.

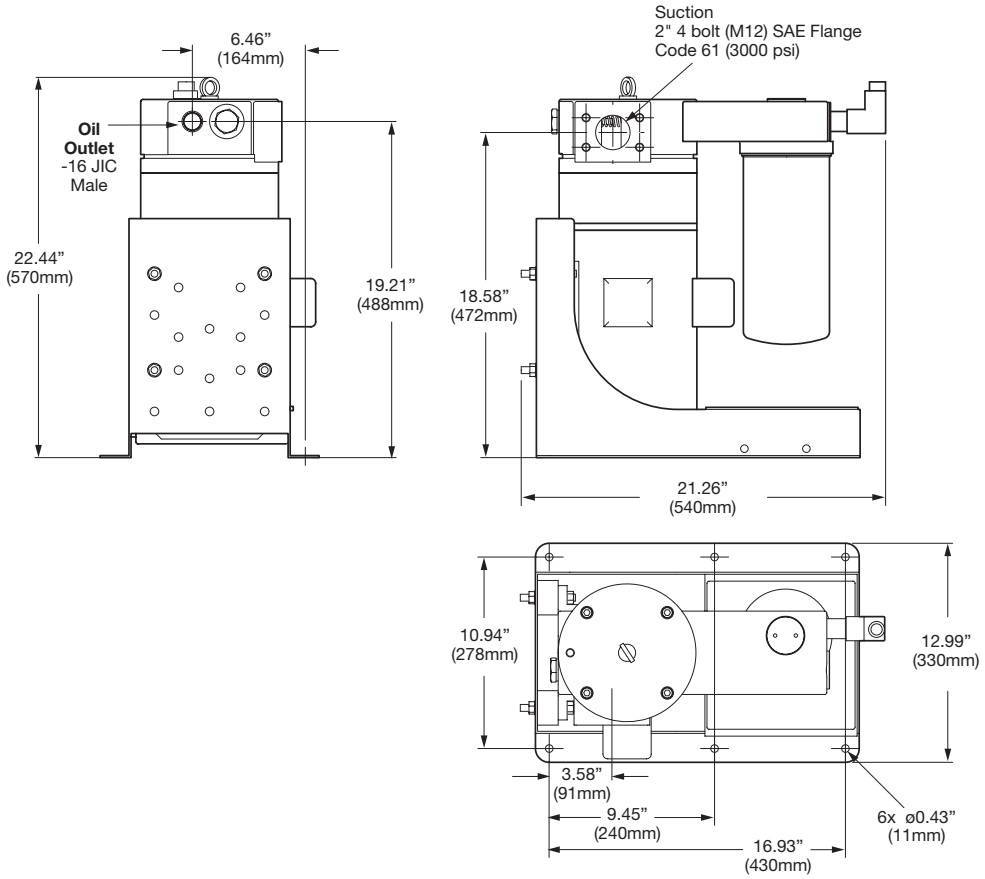
PFC Series

Dimensions

Size 2 Base



Size 3 0.0

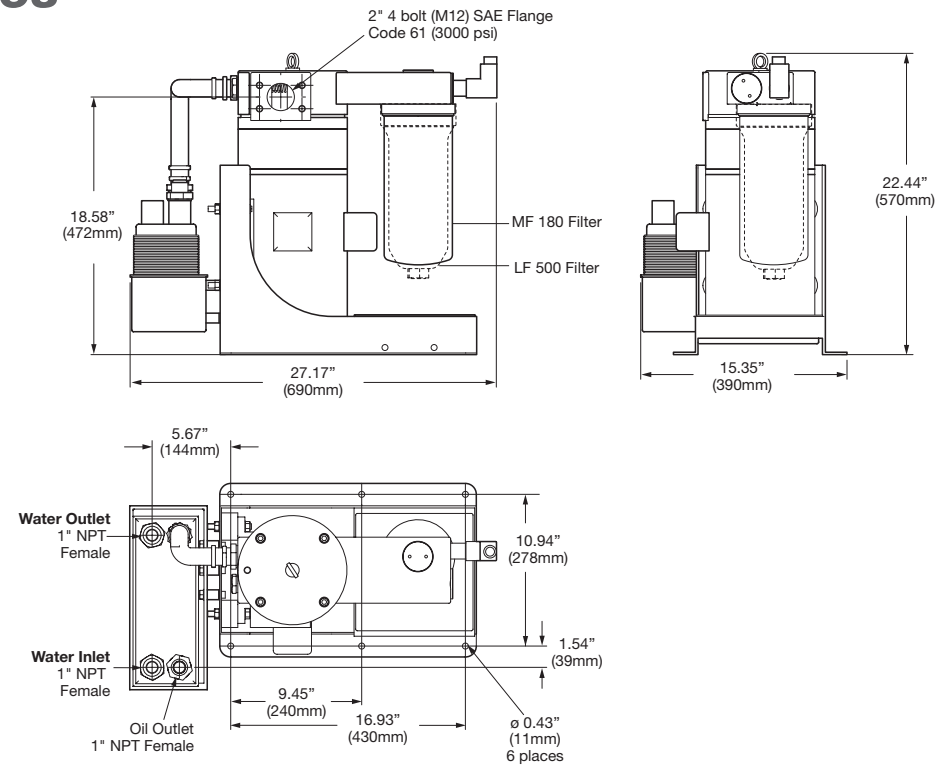


Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.
Dimensions are in inches.

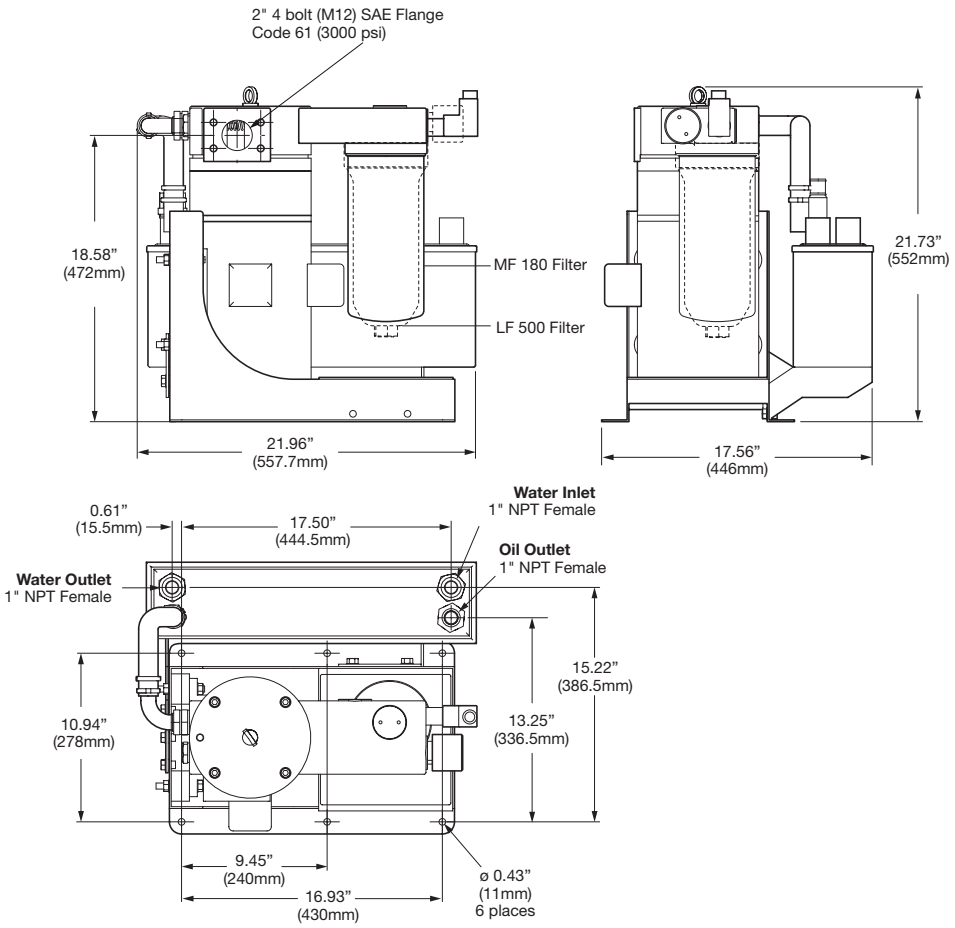
PFC Series

Dimensions

Size 3 1.0



Size 3 2.0



Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.
Dimensions are in inches.

PFC / Plate Heat Exchangers

Technical Data Inquiry Sheet

Internal Use Only	
Project Responsibility	
Date	

Contact Information

Distributor:		Company Name:	
Distributor Contact:		Customer Contact:	
Distributor Phone:		Customer Phone:	
Distributor Fax:		Customer Fax:	
Distributor E-mail:		Customer E-mail:	

The following basic information is needed for the proper sizing and ordering of a PFC cooler unit.

Critical Sizing Data

Heat Load To Be Removed: (BTU/hr) _____

Note: B.T.U. = HP X 2545

Oil Type: (ISO VG or SAE grade) _____

Oil Flow: (gpm or PFC pump) _____

Desired Oil Temperature: (°F) _____

Water Flow: (gpm) _____

Note: Water flow is generally based upon a 4:1 ratio of oil:water to start with.

Inlet Water Temperature: (°F) _____

Filter Data

Filter Type:	**Spin-on**	**Cartridge**
PFC-1:	MF 160 ⬭	Dimicron® ⬭
PFC-2:	MF 180 ⬭	LF 330 ⬭
PFC-3:	MF 180 ⬭	LF 500 ⬭

Micron Rating:

2 ⬭ 3 ⬭ 5 ⬭ 10 ⬭ 20 ⬭
(PFC-1 only)

Filter Clogging Indicator: *(Trip Pressure indicated in psi, PFC-1 MUST use 29 psi)*

Visual with Manual Reset		**Electrical Switch**		**Visual Electrical Switch** *(numbers designate lamp voltage)*					
BM	⬭ (29 psi) ⬭ (72 psi)	C	⬭ (29 psi) ⬭ (72 psi)	D24	⬭ (29 psi) ⬭ (72 psi)	D115	⬭ (29 psi) ⬭ (72 psi)	D230	⬭ (29 psi) ⬭ (72 psi)

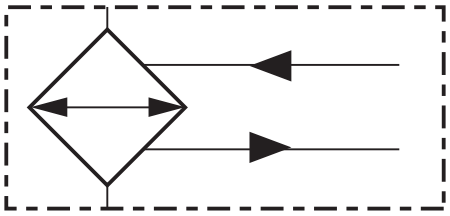
Note: For more detailed information about clogging indicators, see HYDAC Hydraulic & Lube Oil Filiters catalog.

This form can be filled out online at www.HYDACusa.com

Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.
Dimensions are in inches.

HEX Series
Plate Heat Exchangers

Hydraulic Symbol



AIB cooler element bypass option
for high viscosity applications.

Description
Heat exchangers are used to exchange heat between two fluids. Plate heat exchangers are high performance components and provide a high level of efficiency combined with compact dimensions and low weight. Their efficiency reduces the amount of cooling water required for heat transfer which results in low operating costs.

Features
Plates and connections are manufactured from stainless steel to AISI 316, 1.4401, vacuum–brazed with copper. The special moulding of the plates produces the turbulent flow necessary for effective heat transfer and provides the plate heat exchanger with a high level of mechanical strength.

Operating Details
Medium:

- Water glycol *(coolants)*
- HFC operating fluids
- Water
- Oil

Contamination:

The quantity of particles in suspension should be less than 10 mg/l. Particle size < 0.6 mm *(spherical)*.

Thread–like particles cause a rapid rise in pressure drops.

Temperature Range:

- 50° to 437°F (10° to 225°C)
  (freezing point and boiling point must be taken into consideration!)

Pressure:

- max. 49 psi (3 bar) *(static)* up to 257°F (125°C)
- max. 435 psi (30bar) *(static)* up to 437° (225°C)
- Test pressure: 650 psi

Corrosion:

The following limits refer to a pH value of 7

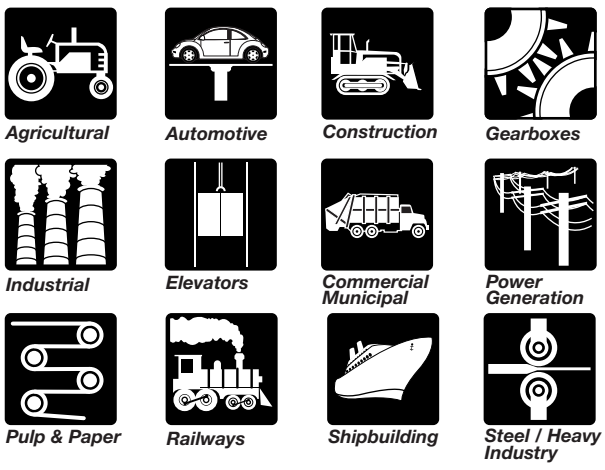
- free chlorine, CL2 < 0.5 ppm
- chloride ions CL
  < 700 ppm at 20 °C
  < 200 ppm at 50 °C

Other Limits:

- ph 7 – 10
- sulphate SO4 2– <100 ppm
- [H CO3 –] / [SO4 2–] >1
- ammonia, NH3 <10 ppm
- free CO < 10 ppm

The following ions are not corrosive under normal conditions: phophate, nitrate, nitrite, iron, manganese, sodium and potassium

Applications



Model Code

HEX 610 – 10 C 27

Series

HEX 610
HEX 615
HEX 422

Number of Plates

	10	20	30	40	50	60	70	80	100	120
610	x	x	x	x	x	x	x		x	x
615	x	x	x	x	x	x		x		
422		x	x	x	x	x		x	x	

Connections

CB 27	=	1” NPT Female X 4	*(size 610 only)*
C 71	=	1” BSPP Female X 4	
CB 52	=	1” NPT Female X 4	*(size 615 only)*
C 71	=	1” BSPP Female X 4	
CB 76	=	1 1/2” NPT Female X 4	*(size 422 only)*
C 72	=	1 1/2” BSPP Female X 4	

Pipes must be connected so that the connections are stress free.

Linear expansion and vibrations from the pipes to the heat exchanger must be avoided.

Pressure drop across heat exchanger

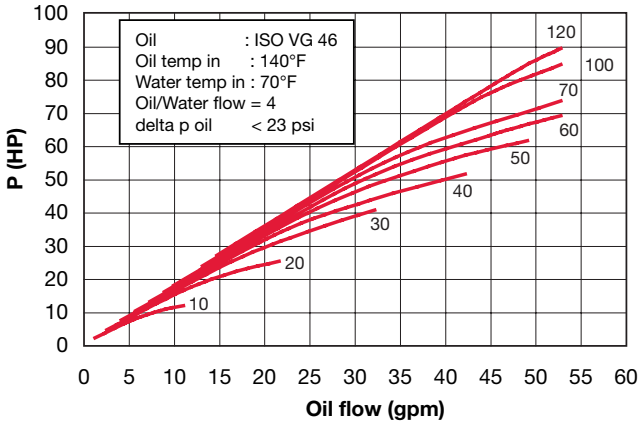
This table is based on an ISO VG45 oil at 130˚F and shows the pump flows with the 1,800 RPM motors. If other grades of oil are to be used, consult the sizing software. When using the 72 psi clogging indicator the pressure drop should not exceed 15 psi max across the heat exchanger. When using the 29 psi clogging indicator the pressure drop should not exceed 30 psi max across the heat exchanger.

Heat Exchanger Size	Pump 3.5 1.6 gpm (6.3 l/min)	Pump 7 3.3 gpm (12.6 l/min)	Pump 10 4.75 gpm (18 l/min)	Pump 15 7 gpm (18 l/min)	Pump 20 9.5 gpm (18 l/min)	Pump 30 14.5 gpm (55 l/min)	Pump 40 18.5 gpm (70 l/min)	Pump 50 23.5 gpm (90 l/min)	Pump 70 34 gpm (130 l/min)	Pump 100 47.5 gpm (180 l/min)
610-10	3	5	8	-	-	-	-	-	-	
610-20	1	2	3	5	7	13.66	-	-	-	-
610-40	-	-	-	2	3	7.35	9.85	13.4	-	-
610-50	-	-	-	-	-	5.64	7.54	10.27	16.19	-
610-70	-	-	-	-	-	4.1	5.2	7	11.1	16.8
610-100	-	-	-	-	-	3	3.8	4.9	7.6	11.66
610-120	-	-	-	-	-	2.55	3.25	4.2	6.35	9.8
615-10	4	9	15	-	-	-	-	-	-	-
615-20	2	3.3	5	9	13	-	-	-	-	-
615-40	-	-	-	4	5	13.25	17.8	-	-	-
615-60	-	-	-	-	-	8.15	10.8	14.75	-	-
615-80	-	-	-	-	-	5.95	7.75	10.5	16.6	-

HEX Series

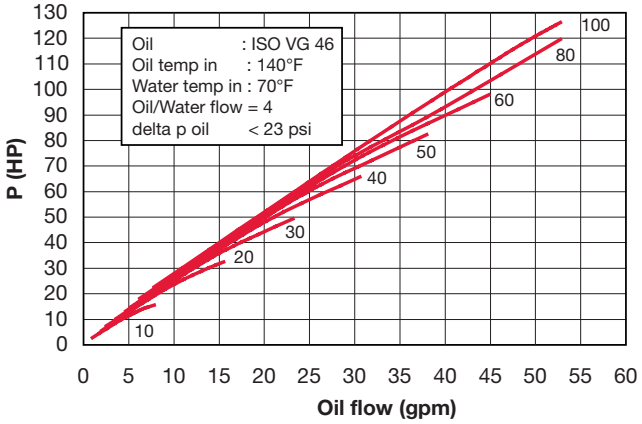
Technical Data

Size 610



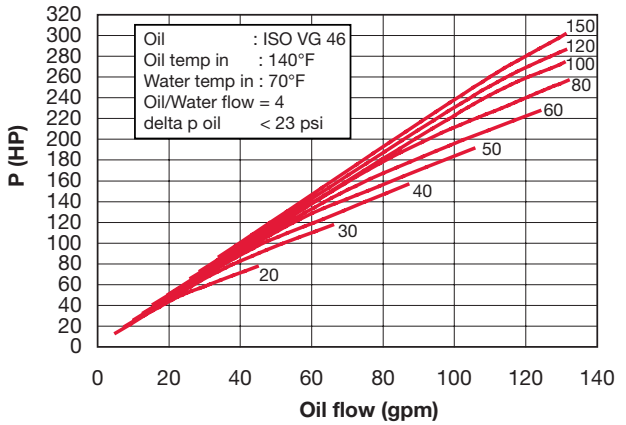
Number of plates (N)	H = 10 + Nx2.4	lbs
10	34	5.5
20	58	8.4
30	82	11.2
40	106	14.0
50	130	17.0
60	154	19.8
70	178	22.6
100	250	31.2
120	298	37.0

Size 615



Number of plates (N)	H = 10 + Nx2.4	lbs
10	34	9.2
20	58	14.3
30	82	19.4
40	106	24.4
50	130	29.7
60	154	35.5
80	202	44.6

Size 422



Number of plates (N)	H = 10 + Nx2.85 (mm)	lbs
20	67	34.7
30	95.5	44.5
40	124	54.1
50	152.5	63.8
60	181	73.5
80	238	92.8
100	295	112.2

The cooling capacity is also dependent on the viscosity class. At a lower viscosity class the cooling capacity increases, at a higher viscosity class it decreases. In order to make an accurate calculation, the following details are required:

- type of oil
- premissable tank temperature
- required outlet temperature of the oil or necessary cooling capacity
- inlet temperature of the water and maximum water quantity.

Selection Program

The cooler selection program calculates the correct heat exchanger in the case of non– standard operating data.

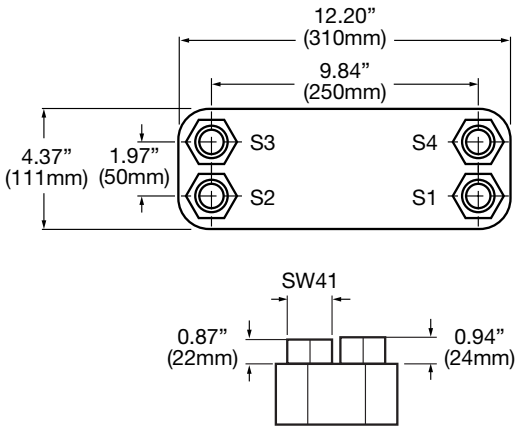
Please contact our technical sales department.

System requirements:

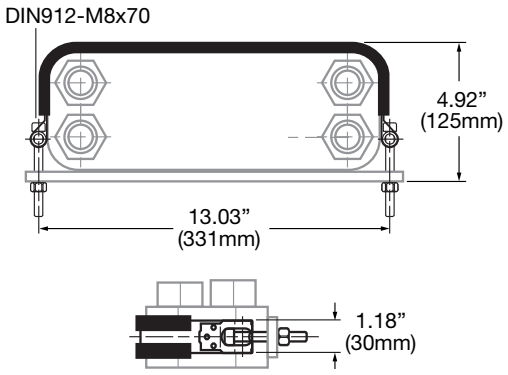
- Windows 95/
- Windows NT/
- Hard disk memory
- 8 MB RAM

Dimensions

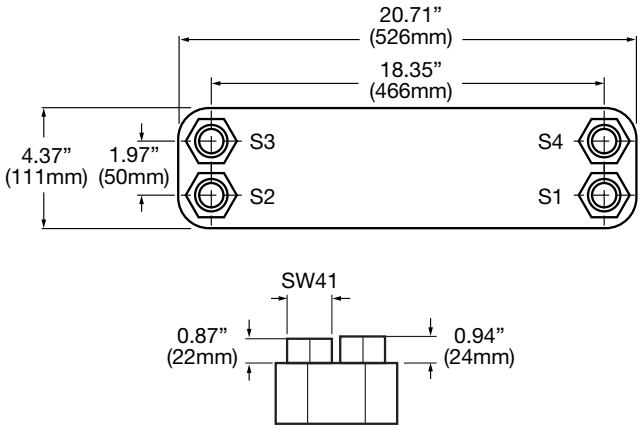
Size 610



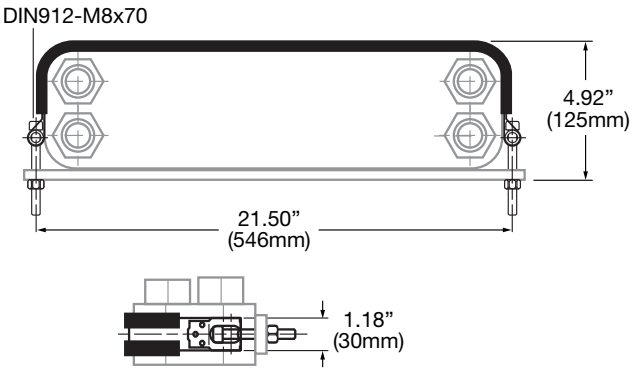
Mounting Bracket
610 Mounting Bracket



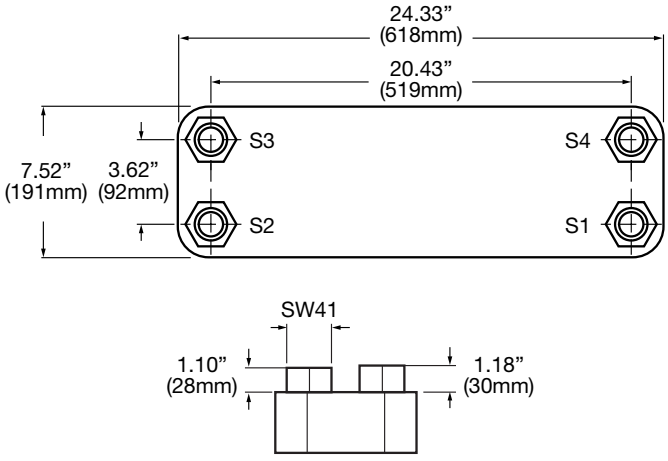
Size 615



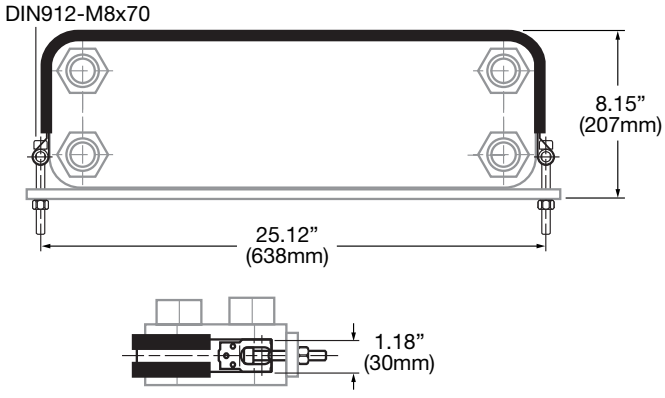
Mounting Bracket
615 Mounting Bracket



Size 422



Mounting Bracket
422 Mounting Bracket

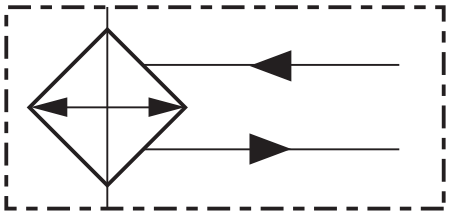


Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.
Dimensions are in inches.

Please note: For mounting heat exchangers with 60 plates and above, two clamps are recommended.

H Series
Gasketed Plate Heat Exchanger

Hydraulic Symbol



Description
Heat exchangers are used to transfer heat between two media. Gasketed plate heat exchangers are high performance components and provide a high level of efficiency combined with compact dimensions. They also have a high degree of flexibility. For higher capacity ranges this series is a useful supplement to the brazed version.

Features
The gasketed plate heat exchanger consists of a pack of individual, embossed heat transfer plates made of stainless steel 1.4401 (AISI 316), 1.4306 (AISI 304). The plates are sealed and the media kept separate by using gaskets in nitrile rubber (NBR) or optionally FKM (Viton) or EPDM.

The plate pack is installed in a frame which consists of a fixed plate and a pressure plate, tightening bolts and supports. There are several sizes with different numbers of plates available to cover the capacity range.

The heat exchanger is connected inline via threaded or flange connections. Depending on the application, special models are available with higher grade materials (Titanium). For such applications, please contact the relevant department.

Operating Details
Fluids:
- Water glycol *(coolants)*
- HFC operating fluids
- Water
- Oil

Contamination:

The quantity of particles in suspension should be less than 10 mg/l. Particle size < 0.6 mm *(spherical)*.

Thread–like particles cause a rapid rise in pressure drops.

Temperature Range:
- max. 284°F (140°C)

Pressure:
- max. 145 psi (10 bar)
- max. 232 psi (16 bar)
- max. 363 psi (25 bar)

Note: Pressure surges must be avoided.

Applications
For cooling circuits in reverse flow which can be operated using water, coolants, HFC operating fluids or oils. For applications using other media, please contact the relevant department.

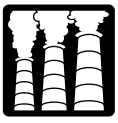
Typical applications are:
- Hydraulic systems
- Presses
- Lubrication systems
- Test rigs
- Motors

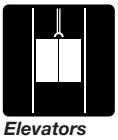

Agricultural


Automotive


Construction


Gearboxes


Industrial


Elevators


Commercial Municipal


Power Generation


Pulp & Paper


Railways


Shipbuilding


Steel / Heavy Industry

Model Code

H38 - IG 10 - 12 - TKTM 33 - LIQUID

Series
H2, H8, H14, H16, H18, H28, H38, H40, H42,
H44, H62, H82, H84, H94, H128, H128, H172, H220

Carbon Steel Frame Type
IG = For sizes H8A,H16A,H18A,H38A,H62A,H42A,H44,H94 and H128
IS = For sizes H42,H94,H128 *(ASME and length above 1300 mm)*, H82, H46, H162
ST = For sizes H14A,H28A,H40A

Working Pressure
10 = 150 psi
16 = 232 psi
25 = 362 psi

Number of Plates
XX = Number of plates

Plate Design
TMTL = Plate configuration
TL = Thermal long
TK = Thermal short
TM = Thermal mix i.e TL + TK
TMTL = Thermal long + Thremal mix
TKTM = Thermal mix + thermal short
TX = Thermal long + Thermal X
XX % of last plate configuration *(example: TMTL80 = 80% Themal long + 20% Thermal Mix)*

Thermal Length

Liquid

Corrosion Limits

Water Ingredient	Concentration of Ingredient in mg/l	Advice 1.4401
Aluminium (Al) – in Solution	< 0.2 / > 0.2	A / A
Ammonia (NH3)	< 2 / 2 – 20 / > 20	A / A / A
Chlorides (Cl)- (max. 60°C)	< 250 / > 250	A / B
Electric Conductivity	< 10 µ S/cm / 10 – 500 µ S/cm / > 500 µ S/cm	A / A / A
Iron (Fe) – in Solution	< 0.2 / > 0.2	A / A
Free Aggressive Carbonic Acid (CO2)	< 5 / 5 – 20 / > 20	A / A / A
Total Hardness	4.0 – 8.5°dH	A
Glycol Content	< 20% / 20 – 50 / > 50%	A / A / A
HCO3 SO4-2	< 1.0 / > 1.0	A / A
Hydrocarbonate HCO3	< 70 / 70 – 300 / > 300	A / A / A
Manganese (Mn) – in Solution	< 0.1 / > 0.1	A / A
Nitrate – in Solution NO3	< 100 / > 100	A / A
pH-Value	< 6 / 6.0 – 7.5 / 7.5 – 9.0 / > 9	B / A/B / A / A
Sulfate SO42-	< 70 / 70 – 300 / > 300	A / A / C
Sulfite So3 / Freies Chlorgas Cl2	< 1 / 1 – 5 / > 5	A / A / A/B
Hydrosulfide H2S	< 0.05 / > 0.05	A / A

A = Under normal conditions good consistency
B = Subject to corrosion, especially if several substances with B
C = Unsuitable

Other Limits

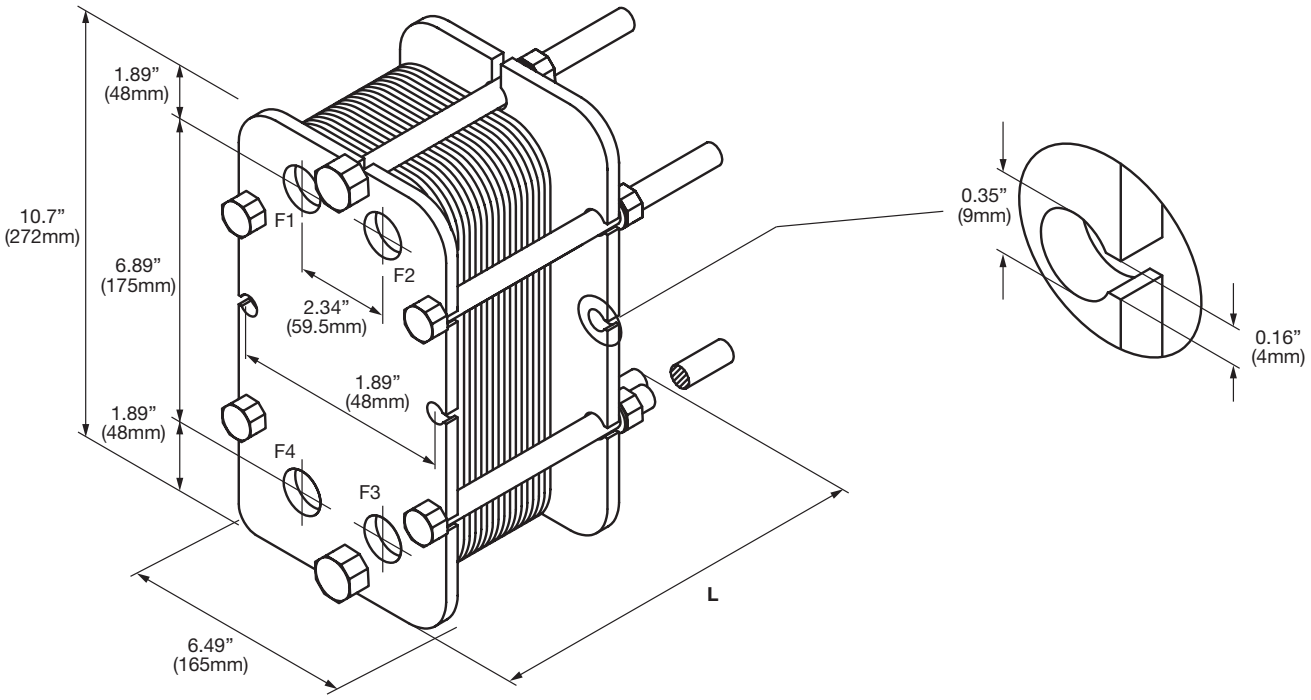
Chloride Contant	max. Temperature of Wall Surface			
	140°F (60°C)	176°F (80°C)	248°F (120°C)	266°F (130°C)
≤ 10 ppm	304 SS	304 SS	304 SS	316 SS
≤ 25 ppm	304 SS	304 SS	316 SS	316 SS
≤ 50 ppm	304 SS	316 SS	316 SS	Titan
≤ 80 ppm	316 SS	316 SS	316 SS	Titan
≤ 150 ppm	316 SS	316 SS	Titan	Titan
≤ 300 ppm	316 SS	Titan	Titan	Titan
> 300 ppm	Titan	Titan	Titan	Titan

Note: This spreadsheet is not complete, just for orientation (no guarantee)

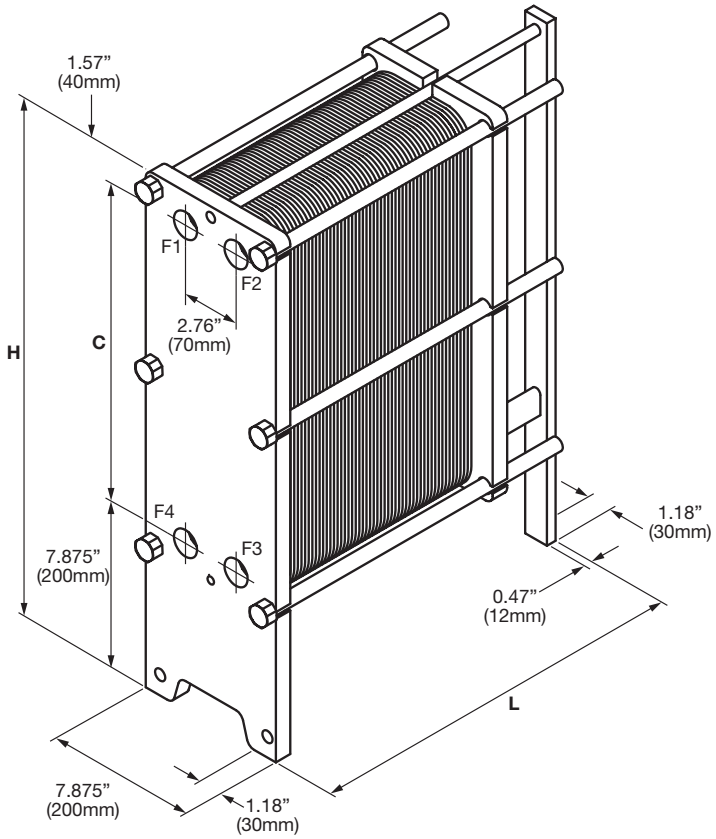
Series H

Dimensions

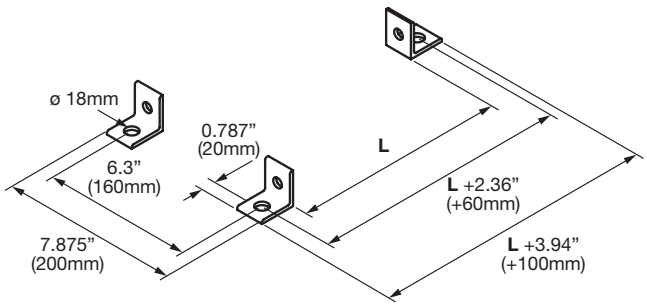
Sizes H2



Sizes H8 / H16



Size	H	C
H8	24.45" (621mm)	15" (381mm)
H16	35.28" (896mm)	25.83" (656mm)

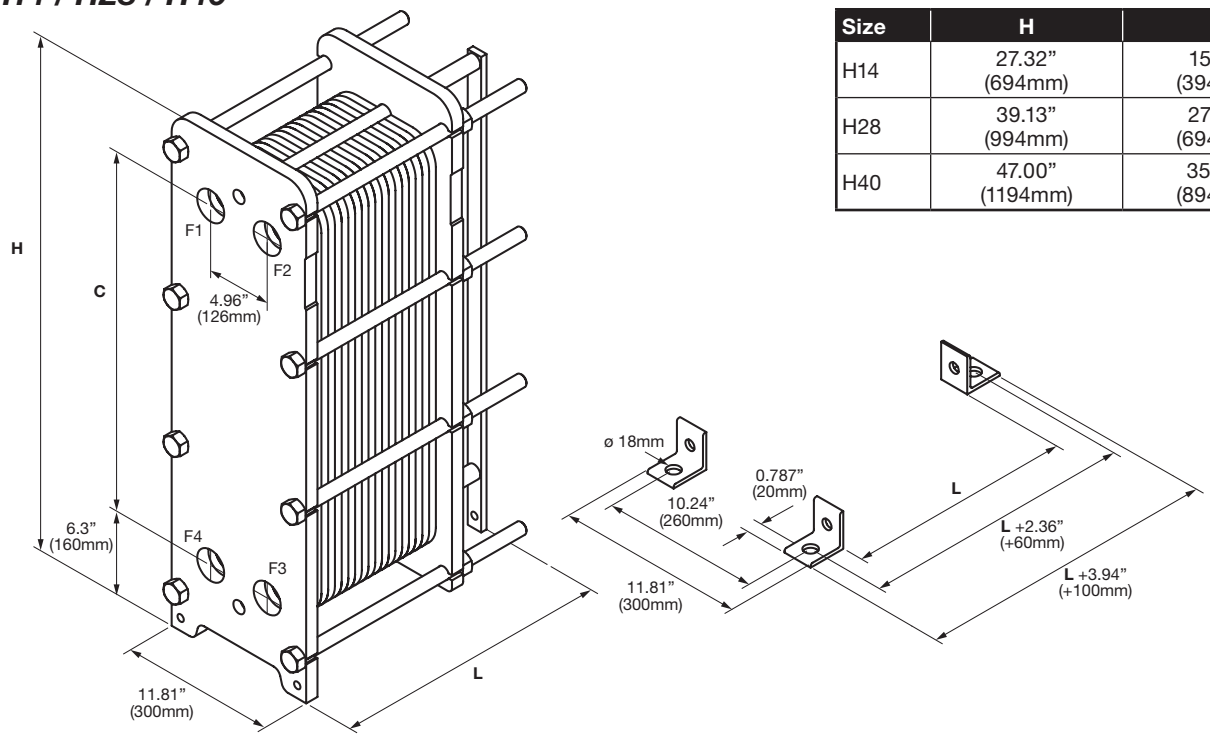


Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.
Dimensions are in inches.

Series

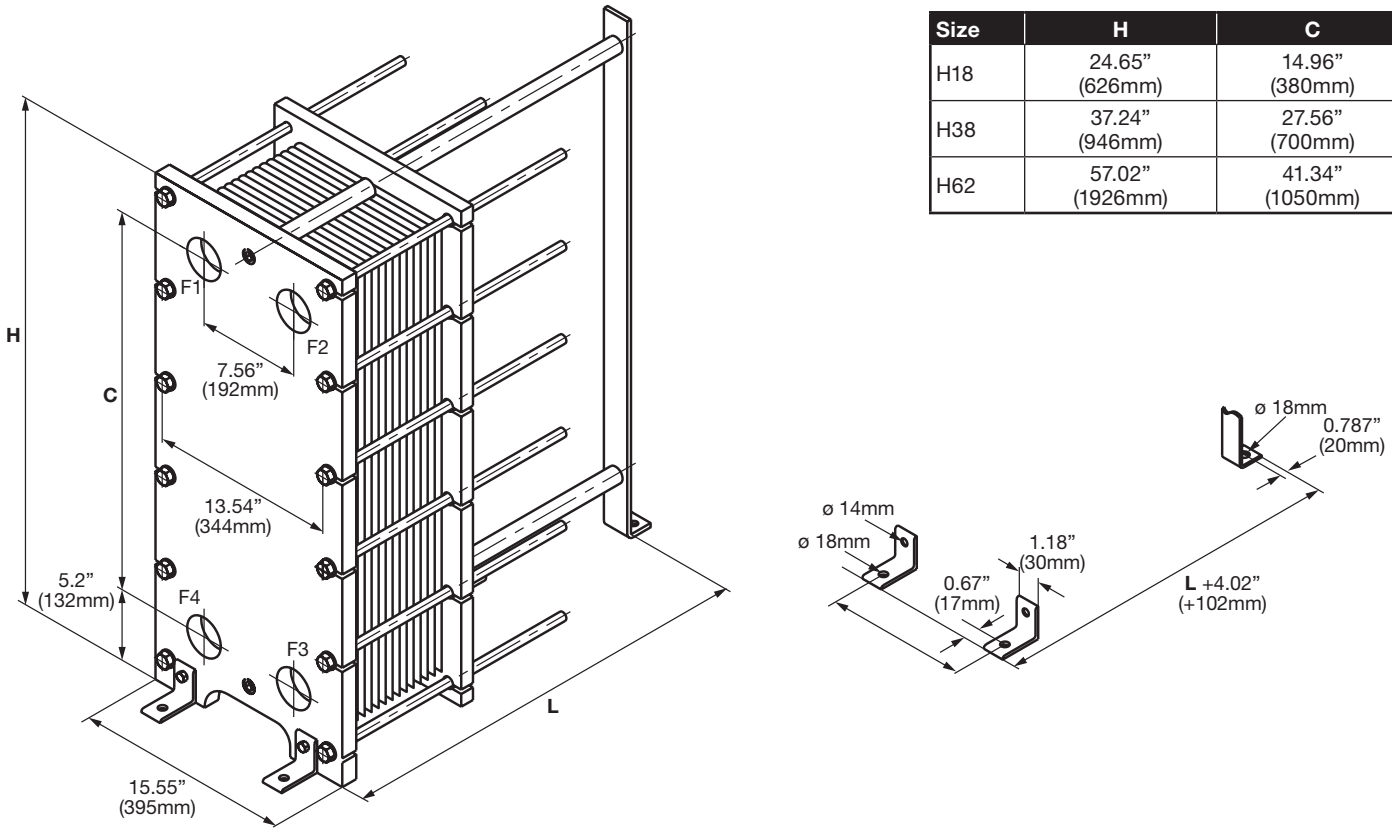
Dimensions

Sizes H14 / H28 / H40



Size	H	C
H14	27.32" (694mm)	15.51" (394mm)
H28	39.13" (994mm)	27.32" (694mm)
H40	47.00" (1194mm)	35.20" (894mm)

Sizes H18 / H38 / H62



Size	H	C
H18	24.65" (626mm)	14.96" (380mm)
H38	37.24" (946mm)	27.56" (700mm)
H62	57.02" (1926mm)	41.34" (1050mm)

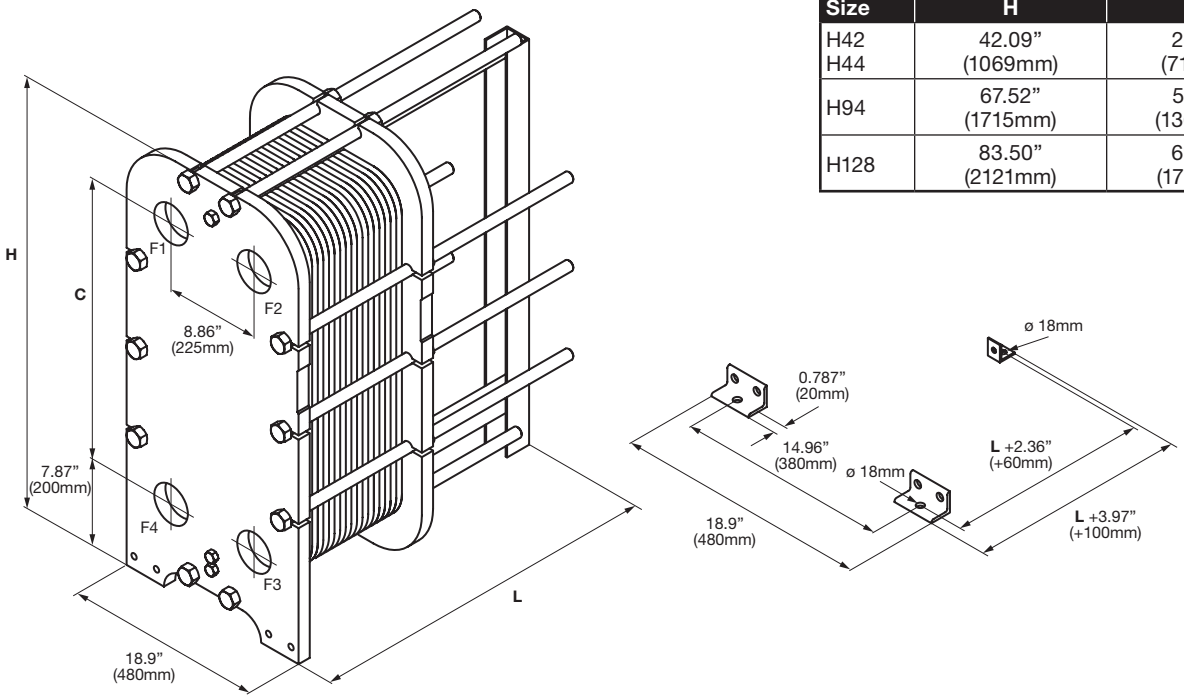
Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.
Dimensions are in inches.

Series H

Dimensions

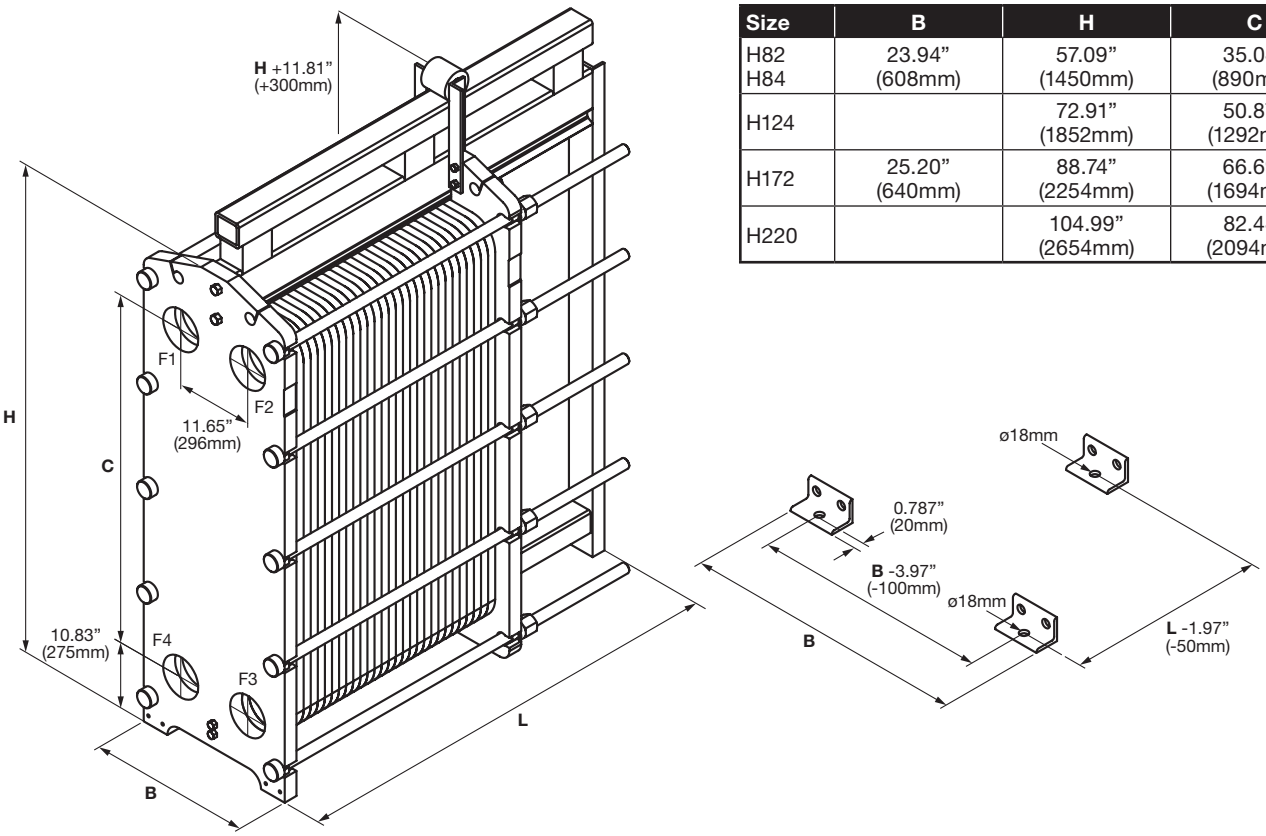
Sizes H42 / H44 / H94 / H128

Size	H	C
H42 H44	42.09” (1069mm)	28.31” (719mm)
H94	67.52” (1715mm)	53.74” (1365mm)
H128	83.50” (2121mm)	69.72” (1771mm)



Sizes H82 / H84 / H124 / H172 / H220

Size	B	H	C
H82 H84	23.94” (608mm)	57.09” (1450mm)	35.04” (890mm)
H124		72.91” (1852mm)	50.87” (1292mm)
H172	25.20” (640mm)	88.74” (2254mm)	66.69” (1694mm)
H220		104.99” (2654mm)	82.44” (2094mm)



Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.
Dimensions are in inches.

Gasketed Plate Heat Exchanger
Technical Data Inquiry Sheet

Internal Use Only	
Project Responsibility	
Date	

Customer Information

Name		Title			
Company		E-mail			
Address		State		Zip	
Phone		Fax			

Application

Sizing Data

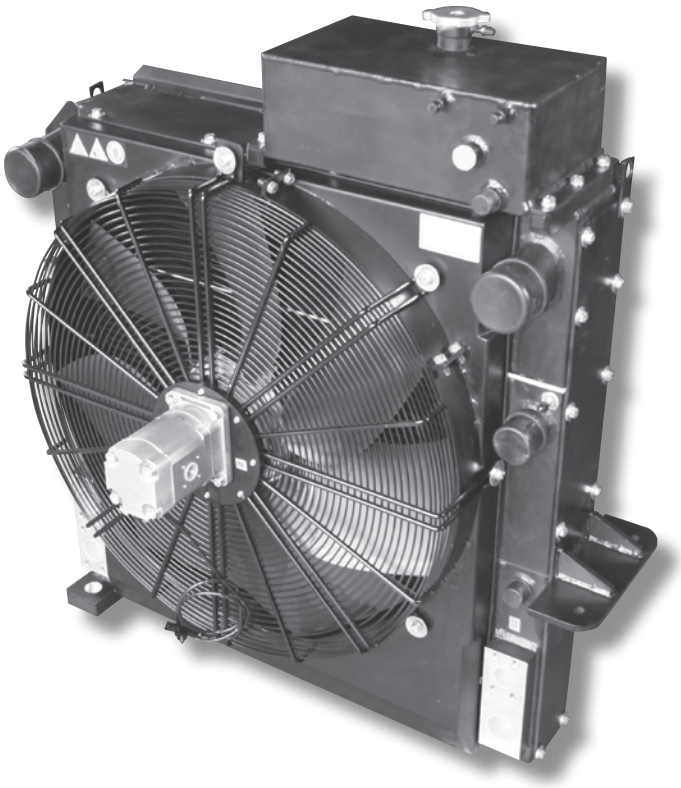
	Unit of Measurement	Hot Side	Cold Side
Power Dissipation			
Fluid			
State of Aggregation			
Flow Rate			
Inlet Temperature			
Outlet Temperature			
Permissible Pressure Drop			
Density			
Specific Heat Capacity			
Thermal Conductivity			
Viscosity			
Operating Pressure			
Design Pressure			
Test Pressure			
Design Temperature			

Design

Type of Construction	
Material	
Plates	
Gaskets	

Miscellaneous

Combi-Coolers
for Mobile Applications
All of Your Needs in ONE Package!



With the increased demands for energy efficiency and noise emission requirements for Mobile Equipment requires Cooling Systems to be developed to specific custom dimensions for each vehicle.

HYDAC coolers use a combination of high performance cooling elements combined with high capacity hydraulic driven fan solutions.

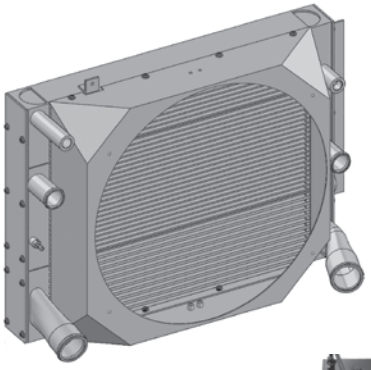
Long life DC electrical fans provide long trouble free operation in mobile hydraulic applications. The compact design of HYDAC cooling systems allows us to fit in most equipment, providing highest cooling performance.

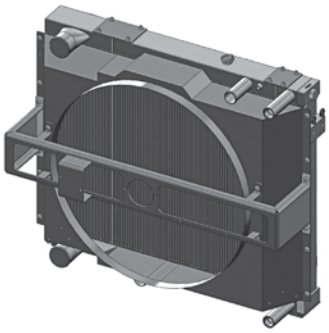
To comply with legal requirements for noise, fuel economy and emissions (TIER IV) we have a series of advantageous solutions, space optimization and increased cooling efficiency available.

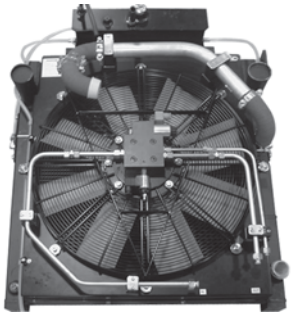
- integrated pressure / thermal bypass valves
- hydraulic driven fan with proportional and reversible function
- electrical speed controlled fan drive systems

Multiple Combined Cooling Systems Available For:

- Hydraulic
- Radiator
- Charge Air
- Fuel
- Auxillary Cooler
- Transmission







Please see following page for our technical data inquiry sheet and contact our cooling department for more details.

Combi-Coolers
Technical Data Inquiry Sheet

Internal Use Only	
Project Responsibility	
Date	

Customer Information

Name		Title			
Company		E-mail			
Address		State		Zip	
Phone		Fax			

Specifications

Description	Combi-Cooler: CAC / RAD / TC
Project	
Engine Type	
Customer	
Ambient Requirement	

Ambient Requirement

Cooling Circuit 1 CAC Required Data

Heat Rejection		KW
Mass Flow		Kg/min
Temperature Inlet		°C
Temperature Outlet		°C
CAC Pressure Drop		mbar
Max. Working Pressure		bar

Cooling Circuit 2 RAD Required Data

Heat Rejection		KW
Volume Flow		L/min
Temperature Inlet		°F
RAD Pressure Drop		mbar
Max. Working Pressure		bar

Cooling Circuit 4 T/C OIL Required Data

Type Of Oil		
Heat Rejection		KW
Volume Flow		L/min
Temperature Inlet		°C
Max. Working Pressure		bar

OKC / OK / ELD / ELH Series

Crossovers

HYDAC	Thermal Transfer	AKG	Oil Air	American Industrial	Hayden
OKC-1H	AO5	–	–	–	108-028510
OKC-2H	AO10, AO15, AOVH5, AOC-19, AOC-22	–	OAI 04	AC5, AC10, AC15	108-028514
OKC-3H	AO20, AOVH10, AOC-24, BOL-8	AC8	OAI07-4, OAI07-2	AOCH5	–
OKC-4S	AO25, AOVH15, AOC-33, BOL-16		OAI11-4	AC 20, AOCH10	208-028518, 208-028522
OKC-5S	AO30, AOVH20, AOC-37	AC16	OAI11-2, OAI16-6, OAI16-4	AC25, AOCH15, AOCH20	213-028538
OKC-6H	AOVH25, AOC-50	AC30	OAI23-6, OAI23-4	AC30	113-028526, 113-028530, 213-028534
OKC-6S	AO35	–	–	–	–
OKC-7S	BOL-30. APC-54. BOL-400, AO40	–	–	AC35, AOCH25	–
OK-1H	–	–	–		108-028510
OK-2S	AO5, AO10, AOC-19, AOC-22	–	–	AC5, AC10	108-028514
OK-2H	–	AC8	OAI-04, OAI07-4	AC15, AOCH5	–
OK-3S	BOL-8	–	OAI07-2	–	–
OK-3H	AO20	–	OAI11-4	AC20	208-028518, 208-028522
OK-4L	AOVH15, AOC33	–	–	AOCH10	–
OK-4S	AOVH20, AOC-37	–	OAI11-2	AC25	–
OK-5L	AO25, BOL-16	–	–	–	–
OK-5S	–	–	OAI23-6, OAI16-4	–	–
OK-6L	AO30, AOC-50	AC16	OAI-16-4	AOCH15	113-028530
OK-6S	AO35, AOVH25	AC30	–	AC30, AOCH20	113-028526, 213-028534
OK-7L	AO40	–	–	–	213-028534
OK-7S	–	–	–	–	313-028542, 313-028546
OK-8L	AOVH30, AOC-54, BOL-30, BOL-400	–	–	AC35, AOCH25	–
OK-8S	AOC-57, BOL-725	AC40	OAI33-6, OAI33-4, OAI44-6	AC40	318-028926
OK-9L	AOVH35	–	–	–	318-028926
OK-10L	AOC-70, BOL-950	AC10	OAI44-4, QAI56-6	AOCH35	–
OK-11L	AOVH40, BOL-1200, BOL-1600	AC100	OAI56-4, OAI76-8, OAI76-6	AOCH40	–
ELD-1H	AOC-19	–	–	AOMF-1, LP15	–
ELD-1.5H	DF-11	DC-10	OATBD04	EOC-220	–
ELD-2H	AOC-22, AOC-24, DF-12, MA-12	DC-16	OATBD07	AOMF-2, AOMF-4, LP-30, LP-60, EOC-249	–
ELD-3H	AOC-33	DC-20	–	EOC-337	–
ELD-4H	AOC-37, DF-22, MA-32	–	OATBD11, OATBD16	EOC-375, EOC-505	–
ELD-4.5H	AOC-50	–	–	EOC-545	–
ELD-5H	AOC-54	–	OATBD23	–	–
ELD-6H	AOC-57	–	–	–	–
ELH-2	AOC-70, DF-11, DF12	HC-14	–	–	–
ELH-3	AOC-22, AOC-24	HC-26	OAH007	–	–
ELH-4	AOC-33, DF-22	HC-32	OAH011, OAH016	–	–
ELH-5	AOC-37	–	OAH023	–	–
ELH-6	AOC-50	–	–	–	–
ELH-7	–	HC-48	OAH033, OAH094	–	–
ELH-8	AOC-54	–	OAH056	–	–
ELH-9	AOC-57	HC-120	OAH058, OAH076	–	–
ELH-10	AOC-70	–	OAH028, OAH110	–	–
ELH-11	–	HC-180	OAH112	–	–

Every effort has been made to insure the accuracy of the cooler data and cross reference information. However, due to manufacturer design changes, HYDAC cannot accept responsibility for selection or misapplication of the product. Please contact HYDAC for additional information.

HYDAC the Reliable Partner for Wind Turbines

With 4,000 employees HYDAC is one of the leading manufacturers of fluid technology, hydraulics and electronics worldwide.

We help our customers develop wind energy systems from concept to completion. Our knowledge and application experience is your asset. HYDAC products and solutions can be found in thousands of wind energy systems worldwide:

Complete systems and filtration concepts for lubrication and hydraulics as well as cooling systems for gear drives and generators.

HYDAC is a leading supplier to the Wind Industry and having tens of thousands of coolers installed in many major OEM applications HYDAC is your reliable source for your wind turbine cooling needs. From innovative designs with built in pressure and thermal bypasses and all climate/altitude conditions and ranging applications from gearbox, inverter/electronics and generator cooling HYDAC has the systems to meet your wind turbine cooling needs.

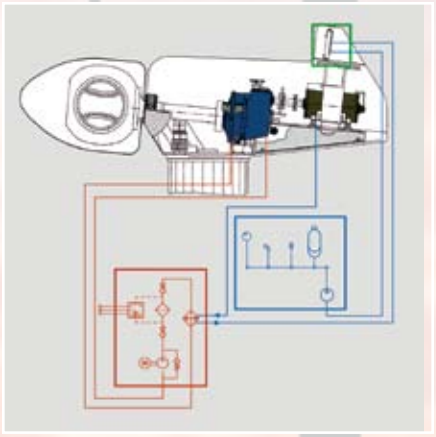
Global yet local.

With 40+ subsidiaries, more than 500 Distributors and service centers HYDAC is a reliable partner, Worldwide.

Solution packages.
One supplier.
One contact.

Wherever you need us, we're there to help you find the best solution. For every application, from components to a complete system.

Cooling and Filter Systems for Hydraulic and Lube Oil Applications



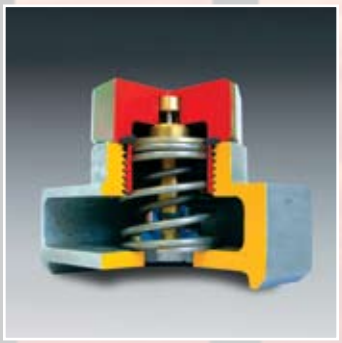
Cooling of the gearbox oil is via a plate heat exchanger which is supplied by a water / glycol mixture also used to cool the generator. Heat is then dissipated via a heat exchanger.

Air Cooled lubrication system with motor / pump filtration system.

Gearbox Generator Cooling:
Fluid: Oil or Water / Glycol

Gearbox Filtration:
Motor Pump Unit with Filtration

Gearbox Generator Inverter Cooling:
Water pump / control package



Integral pressure and thermally-controlled bypass valve on the cooler

- System consultation and design *(also for extreme climates to -40°F)*
- Gearbox lubrication
- Gearbox cooling
- Generator cooling
- Combined cooling of gearbox and generator
- Inverter cooling
- Hydraulic power unit for cooling and filtration

HYDAC INTERNATIONAL
Innovative Solutions

Accumulators
Filters
Process Filtration
Fluid Service Products
Valves
Clamps
Accessories
Electronics
Coolers
Compact Power Units
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