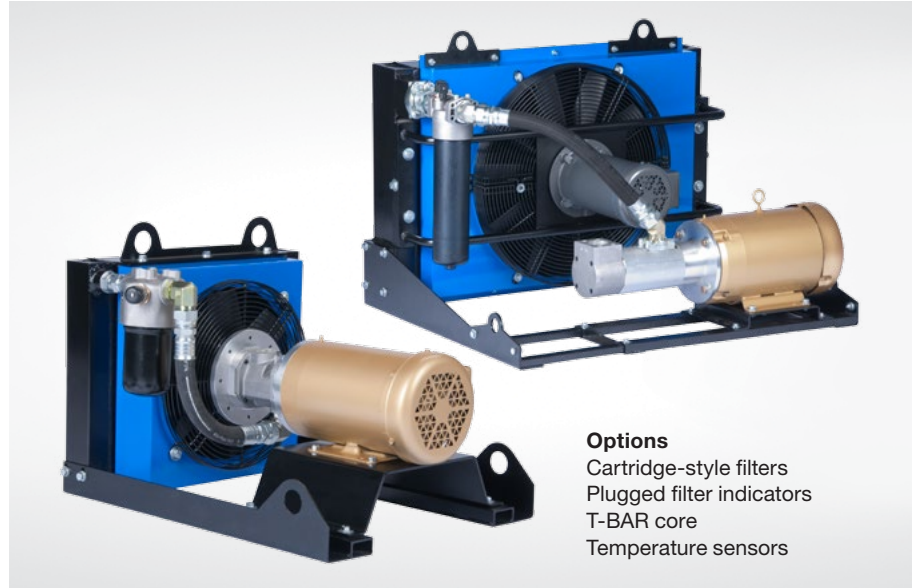


Fluid Cooling Industrial COL Series

BRAZED ALUMINUM CONSTRUCTION

Performance Notes

- Ideal for independent cooling and filtering of system oils
- Low to medium pressure applications utilizing low noise screw pump technology
- Pump flows ranging 9.5 GPM to 45 GPM
- Bar and plate brazed aluminum P-BAR core with optional T-BAR core
- Standard SAE ports - NPT and BSPP port adapters available
- Direct mount; no coupler or bell housing



- Options**
- Cartridge-style filters
 - Plugged filter indicators
 - T-BAR core
 - Temperature sensors

Ratings

Maximum Operating Pressure

250 PSI (17 BAR)

Maximum Operating Temperature

300°F (150°C) without filter
230°F (110°C) with filter

Maximum Viscosity

P-BAR 150 cst
T-BAR 320 cst

Materials

Mounting Feet Steel

Standard Core Brazed aluminum plate and bar (T-BAR is optional)

- Tanks 5052 Aluminum
- Nose Bar and Little Bar 3003-H Aluminum
- Air Fin, Plate, Turbulator and End Plate 3003-O Aluminum

Fanguard and Shroud Steel

Connectors Aluminum

Fan Aluminum Hub, Plastic Blades

Motor NEMA

Fluid Compatability

Petroleum
Water/ethylene glycol
Cutting oils (contact TTP)
Water-oil emulsions
Water-Ethylene Glycol emulsions
Mineral oil HLP and HLVP
Ecologic fluids HETG-HEPG-HEE
Lubrication high viscosity oils
MIL-H, SKYDROL/HFDR phosphate ester*
**Standard pump seals are not compatible with phosphate ester. Special pumps with EPDM seals are required. Consult factory for details.*

Micron Filtration

Utilizes a modern in-line filter housing and cartridge

- Standard cartridge element
- Filter Options:
 - 10 micron fiberglass, standard
 - 3, 6, and 25 micron fiberglass, optional
 - Consult factory for high viscosity fluids
- β 1000 filtration efficiency
- Filtration indicator
 - Visual, visual/electrical or electrical

Screw Pump Technology

Offers significant maintenance and performance advantages.

Screw pumps meet the need of having a silent hydraulic component, unique pump design offers the characteristics of a gear pump and the silence of a screw pump.

- Reliable, high performance, low noise
- Run without pulsation, providing long life to your application
- Positive displacement rotary pump with axial flow design
- Only three moving parts
- Rolling action eliminates noise and vibration



How to Order

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Model Series COL		Model Size Selected 8 • 16 • 30 400 • 725 • 950 1200 • 1600		Ports 1 - NPT 2 - SAE 3 - BSPP		Pump* 20 - 20cc 40 - 40cc 80 - 80cc 100 - 100cc		Motor 0 - No Motor 3 - 3ph		Filter Blank - None 3 - 3µ 6 - 6µ 10 - 10µ 25 - 25µ		Indicator Blank - None V - Visual E - Electrical EV - Electrical/ Visual		Core Blank - Standard TB** - T-BAR Optional		Heresite Blank - Standard Paint HC - Heresite		

*20cc & 40cc – Sizes 8, 16, 30, and 400 only. 80cc & 100cc – Sizes 725, 950, 1200, and 1600 only.

**T-BAR Core option provides a T-BAR core in COL frame. Used for high fouling or high viscosity fluids. Performance is typically 15-25% less than the bar and plate core. Consult factory for details.

Specifications

Pump/Fan Motor Data (COL-8 – COL-400)

Model	Actual Displacement CUIN (CC)	GPM (LPM) Flow	Operating Pressure PSI (BAR)	Motor HP	RPM	Voltage	PH/HZ	Full Load Amps 208-230/460	Frame Size	Fan CFM (CMM) Air Flow	Overall Sound dB(A) at 3 FT (1 M)
COL-8	1.22 (20)	9.5 (36)	130 (9)	1.5	1800	208-230/460	3/60	4.5-4.4/2.2	145TC	418 (11.83)	67
	2.44 (40)	21 (79)	130 (9)	3	1800	208-230/460	3/60	9-8.4/4.2	182TC	418 (11.83)	67
COL-16	1.22 (20)	9.5 (36)	130 (9)	1.5	1800	208-230/460	3/60	4.5-4.4/2.2	145TC	745 (21.09)	73
	2.44 (40)	21 (79)	130 (9)	3	1800	208-230/460	3/60	9-8.4/4.2	182TC	745 (21.09)	73
COL-30	1.22 (20)	9.5 (36)	130 (9)	1.5	1800	208-230/460	3/60	4.5-4.4/2.2	145TC	2200 (62.29)	85
	2.44 (40)	21 (79)	130 (9)	3	1800	208-230/460	3/60	9-8.4/4.2	182TC	2200 (62.29)	85
COL-400	1.22 (20)	9.5 (36)	130 (9)	1.5	1800	208-230/460	3/60	4.5-4.4/2.2	145TC	1149 (32.53)	77
	2.44 (40)	21 (79)	130 (9)	3	1800	208-230/460	3/60	9-8.4/4.2	182TC	1149 (32.53)	77

Performance based upon 46 cSt oil, 60 HZ

Pump Motor Data (COL-725 – COL-1600)

Model	Actual Displacement CUIN (CC)	GPM (LPM) Flow	Operating Pressure PSI (BAR)	Motor HP	RPM	Voltage	PH/HZ	Full Load Amps 208-230/460	Frame Size	Overall Sound dB(A) at 3 FT (1 M)
COL-725	4.52 (74)	35 (133)	218 (15)	7.5	1800	208-230/460	3/60	21-18.8/9.4	213TC	100
	5.68 (93)	45 (169)	203 (14)	7.5	1800	208-230/460	3/60	21-18.8-9.4	213TC	100
COL-950	4.52 (74)	35 (133)	218 (15)	7.5	1800	208-230/460	3/60	21-18.8/9.4	213TC	92
	5.68 (93)	45 (169)	203 (14)	7.5	1800	208-230/460	3/60	21-18.8-9.4	213TC	92
COL-1200	4.52 (74)	35 (133)	218 (15)	7.5	1800	208-230/460	3/60	21-18.8/9.4	213TC	94
	5.68 (93)	45 (169)	203 (14)	7.5	1800	208-230/460	3/60	21-18.8-9.4	213TC	94
COL-1600	4.52 (74)	35 (133)	218 (15)	7.5	1800	208-230/460	3/60	21-18.8/9.4	213TC	96
	5.68 (93)	45 (169)	203 (14)	7.5	1800	208-230/460	3/60	21-18.8-9.4	213TC	96

Performance based upon 46 cSt oil, 60 HZ

Fan Motor Data (COL-725 – COL-1600)

Model	Motor HP	RPM	Voltage	PH/HZ	Full Load Amps 208-230/460	Frame Size	Fan CFM (CMM) Air Flow
COL-725	1.5	3450	208-230/460	3/60	4.9-4.6/2.3	56C	3600 (101.94)
COL-950	1.5	1750	208-230/460	3/60	5.1-4.8/2.4	145TC	4700 (133.10)
COL-1200	3	1750	208-230/460	3/60	9.1-8.4/4.2	182TC	7000 (198.22)
COL-1600	5	1750	208-230/460	3/60	14.2-13.6/6.8	184TC	7900 (223.75)

Performance based upon 46 cSt oil, 60 HZ

Desired Reservoir Temperature

Oil Temperature: Oil coolers can be selected using entering or leaving oil temperatures.

Off-Line Recirculation Cooling Loop: Desired reservoir temperature is the oil temperature entering the cooler.

Return Line Cooling: Desired reservoir temperature is the oil temperature leaving the cooler. In this case, the oil temperature change must be determined so that the actual oil entering temperature can be found. Calculate the oil temperature change (oil ΔT) with this formula:

$$\text{Oil } \Delta T \text{ } ^\circ\text{F (} ^\circ\text{C)} = \frac{\text{BTU/HR} \div [\text{GPM oil flow} \times 210]}{[\text{KW} \div (\text{LPM Oil Flow} \times .029)]}$$

To calculate the oil entering temperature to the cooler, use this formula:

$$\text{Oil Entering Temp.} = \text{Oil Leaving Temp} + \text{Oil } \Delta T.$$

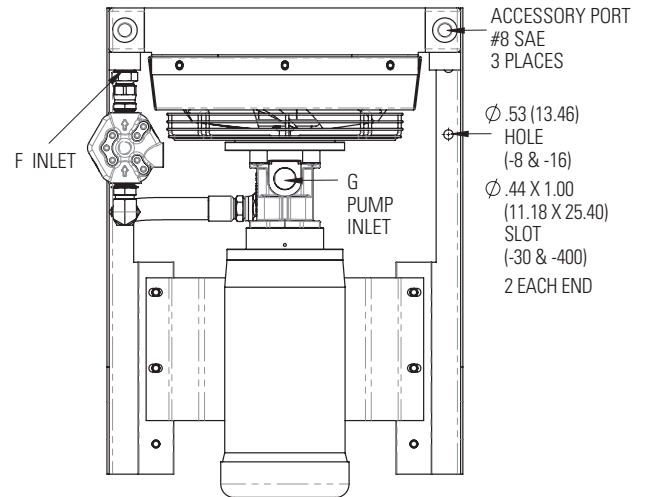
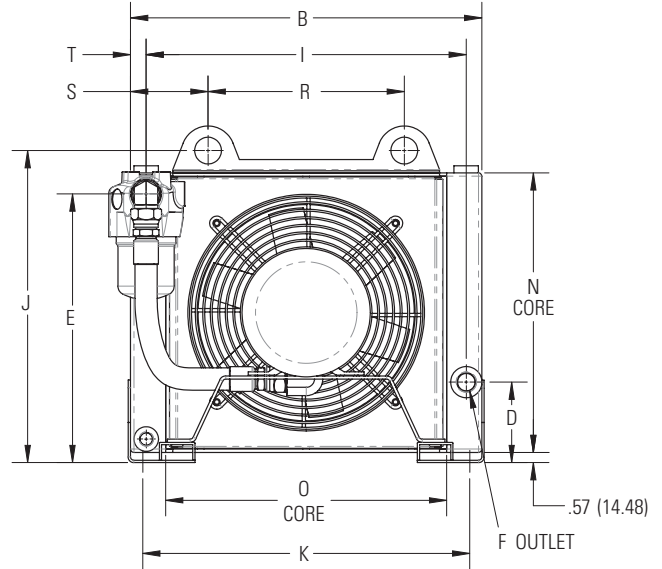
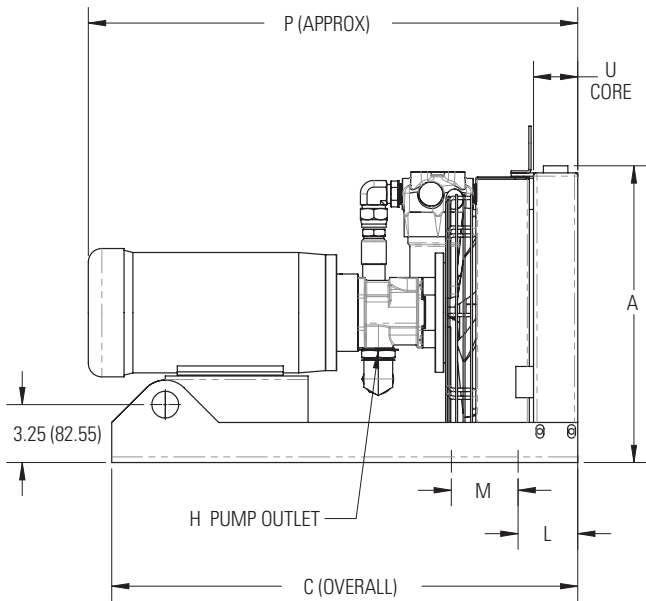
Oil Pressure Drop: Most systems can tolerate a pressure drop through the heat exchanger of 19 to 30 PSI (1.3 to 2.1 BAR). Excessive pressure drop should be avoided. Care should be taken to limit pressure drop to 5 PSI (.35 BAR) or less for case drain applications where high back pressure may damage the pump shaft seals.

Typical operating temperature ranges are:

Hydraulic Motor Oil	120 - 180°F (49 - 82°C)
Hydrostatic Drive Oil	160 - 180°F (71 - 82°C)
Engine Lube Oil	180 - 199°F (82 - 93°C)
Automatic Transmission Fluid	199 - 300°F (93 - 149°C)

Dimensions

COL-8 through COL-400

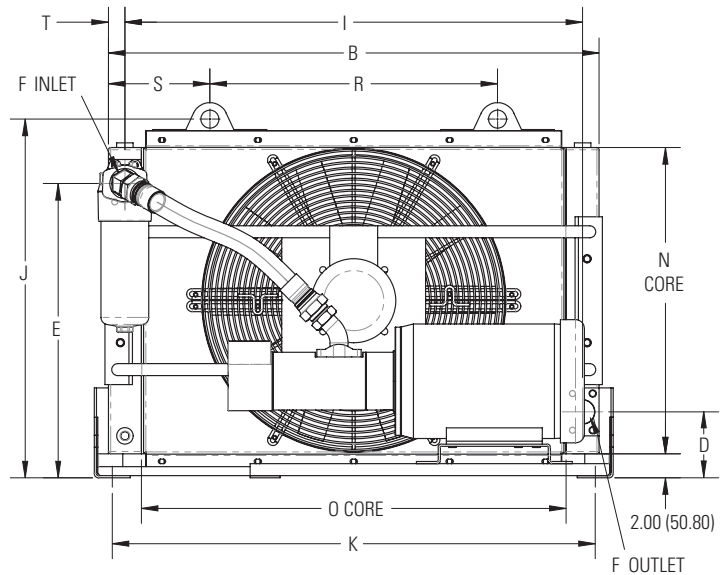
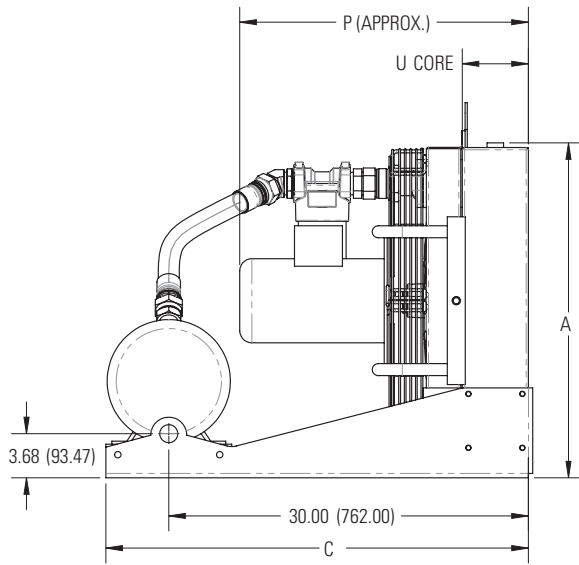


Model	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	R	S	T	U
COL-8-20	13.13 (334)	15.81 (402)	26.13 (664)	4.51 (115)	11.34 (288)	#12 SAE	#16 SAE	#12 SAE	13.99 (355)	13.99 (355)	14.45 (367)	3.35 (85)	3.74 (95)	12.17 (309)	11.87 (302)	27.25 (692)	6.50 (165)	4.63 (117)	.91 (23)	2.64 (67)
COL-8-40	13.13 (334)	15.81 (402)	26.13 (664)	4.51 (115)	11.34 (288)	#12 SAE	#24 SAE	#20 SAE	13.99 (355)	13.99 (355)	14.45 (367)	3.35 (85)	3.74 (95)	12.17 (309)	11.87 (302)	29.87 (759)	6.50 (165)	4.63 (117)	.91 (23)	2.64 (67)
COL-16-20	16.91 (429)	19.69 (500)	26.13 (664)	4.51 (115)	15.06 (382)	#12 SAE	#16 SAE	#12 SAE	17.95 (456)	17.76 (451)	18.32 (465)	3.35 (85)	3.74 (95)	15.94 (405)	15.75 (400)	27.59 (701)	11.00 (279)	4.34 (1110)	.87 (22)	2.64 (67)
COL-16-40	16.91 (429)	19.69 (500)	26.13 (664)	4.51 (115)	15.06 (382)	#12 SAE	#24 SAE	#20 SAE	17.95 (456)	17.76 (451)	18.32 (465)	3.35 (85)	3.74 (95)	15.94 (405)	15.75 (400)	30.21 (767)	11.00 (279)	4.34 (1110)	.87 (22)	2.64 (67)
COL-30-20	21.46 (545)	26.38 (670)	26.86 (682)	5.27 (134)	19.50 (495)	#20 SAE	#16 SAE	#12 SAE	24.34 (618)	22.44 (570)	24.73 (628)	4.25 (108)	5.00 (127)	19.74 (501)	21.88 (556)	27.99 (711)	17.00 (432)	4.69 (119)	1.02 (26)	3.50 (89)
COL-30-40	21.46 (545)	26.38 (670)	26.86 (682)	5.27 (134)	19.50 (495)	#20 SAE	#24 SAE	#20 SAE	24.34 (618)	22.44 (570)	24.73 (628)	4.25 (108)	5.00 (127)	19.74 (501)	21.88 (556)	30.61 (778)	17.00 (432)	4.69 (119)	1.02 (26)	3.50 (89)
COL-400-20	19.28 (490)	22.38 (568)	26.86 (682)	6.50 (165)	17.31 (440)	#20 SAE	#16 SAE	#12 SAE	20.07 (510)	20.77 (527)	22.23 (565)	4.25 (108)	5.00 (127)	16.89 (429)	17.72 (450)	28.27 (718)	11.00 (279)	5.69 (144)	1.16 (29)	3.50 (89)
COL-400-40	19.28 (490)	22.38 (568)	26.86 (682)	6.50 (165)	17.31 (440)	#20 SAE	#24 SAE	#20 SAE	20.07 (510)	20.77 (527)	22.23 (565)	4.25 (108)	5.00 (127)	16.89 (429)	17.72 (450)	30.89 (785)	11.00 (279)	5.69 (144)	1.16 (29)	3.50 (89)

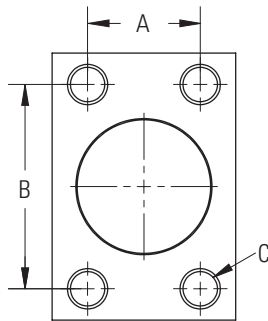
Note: We reserve the right to make reasonable design changes without notice. All dimensions in inches (millimeters), unless noted otherwise.

Dimensions

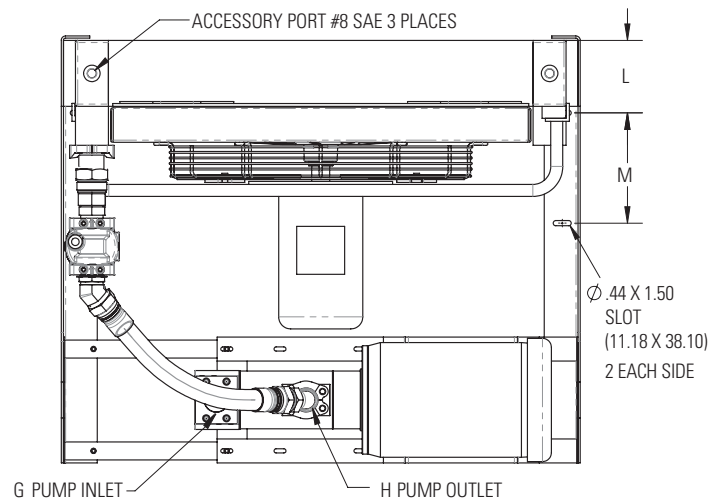
COL-725 through COL-1600



SAE Flange



SAE Flange Size	A INCHES (MM)	B INCHES (MM)	C
1½"	1.41 (36)	2.75 (70)	1½ - 13 UNC
2"	1.69 (43)	3.06 (78)	1½ - 13 UNC
2½"	2.00 (51)	3.50 (89)	1½ - 13 UNC

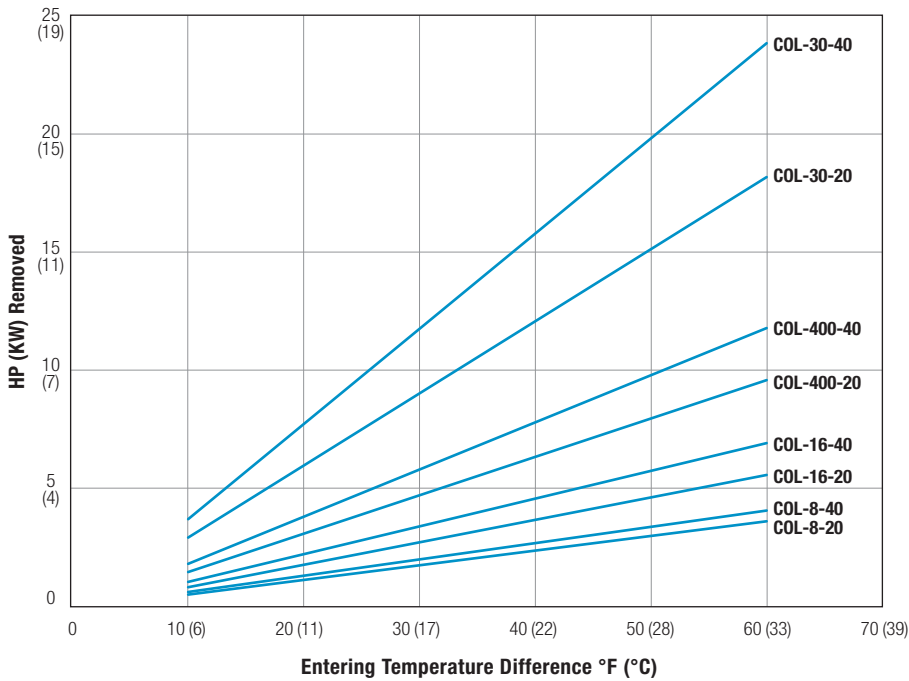


Model	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	R	S	T	U
COL-725-80	23.61 (600)	30.25 (768)	35.00 (889)	6.50 (165)	21.62 (549)	#20 SAE	2" SAE FLANGE	1.5" SAE FLANGE	27.95 (710)	25.60 (650)	30.11 (765)	4.15 (105)	5.00 (127)	21.22 (539)	25.75 (654)	17.43 (443)	12.00 (305)	9.13 (232)	1.15 (29)	3.50 (89)
COL-725-100	23.61 (600)	30.25 (768)	35.00 (889)	6.50 (165)	21.62 (549)	#20 SAE	2.5" SAE FLANGE	2" SAE FLANGE	27.95 (710)	25.60 (650)	30.11 (765)	4.15 (105)	5.00 (127)	21.22 (539)	25.75 (654)	17.43 (443)	12.00 (305)	9.13 (232)	1.15 (29)	3.50 (89)
COL-950-80	27.94 (710)	37.01 (940)	35.25 (895)	9.50 (241)	24.55 (624)	2" SAE FLANGE	2" SAE FLANGE	1.5" SAE FLANGE	34.26 (870)	29.93 (760)	35.87 (911)	6.05 (154)	9.20 (234)	25.55 (649)	31.50 (800)	22.81 (579)	18.00 (457)	9.51 (241)	1.38 (35)	5.50 (140)
COL-950-100	27.94 (710)	37.01 (940)	35.25 (895)	9.50 (241)	24.55 (624)	2" SAE FLANGE	2.5" SAE FLANGE	2" SAE FLANGE	34.26 (870)	29.93 (760)	35.87 (911)	6.05 (154)	9.20 (234)	25.55 (649)	31.50 (800)	22.81 (579)	18.00 (457)	9.51 (241)	1.38 (35)	5.50 (140)
COL-1200-80	27.94 (710)	40.98 (1041)	35.25 (895)	5.50 (140)	24.55 (624)	2" SAE FLANGE	2" SAE FLANGE	1.5" SAE FLANGE	38.18 (970)	29.93 (760)	40.31 (1024)	6.05 (154)	9.20 (234)	25.55 (649)	35.51 (902)	24.05 (611)	24.00 (610)	8.49 (216)	1.40 (36)	5.51 (140)
COL-1200-100	27.94 (710)	40.98 (1041)	35.25 (895)	5.50 (140)	24.55 (624)	2" SAE FLANGE	2.5" SAE FLANGE	2" SAE FLANGE	38.18 (970)	29.93 (760)	40.31 (1024)	6.05 (154)	9.20 (234)	25.55 (649)	35.51 (902)	24.05 (611)	24.00 (610)	8.49 (216)	1.40 (36)	5.51 (140)
COL-1600-80	36.06 (916)	40.96 (1040)	35.25 (895)	9.50 (241)	32.80 (833)	2" SAE FLANGE	2" SAE FLANGE	1.5" SAE FLANGE	38.18 (970)	38.04 (966)	40.31 (1024)	6.05 (154)	9.20 (234)	33.66 (855)	35.51 (902)	25.43 (646)	24.00 (610)	8.53 (217)	1.38 (35)	5.51 (140)
COL-1600-100	36.06 (916)	40.96 (1040)	35.25 (895)	9.50 (241)	32.80 (833)	2" SAE FLANGE	2.5" SAE FLANGE	2" SAE FLANGE	38.18 (970)	38.04 (966)	40.31 (1024)	6.05 (154)	9.20 (234)	33.66 (855)	35.51 (902)	25.43 (646)	24.00 (610)	8.53 (217)	1.38 (35)	5.51 (140)

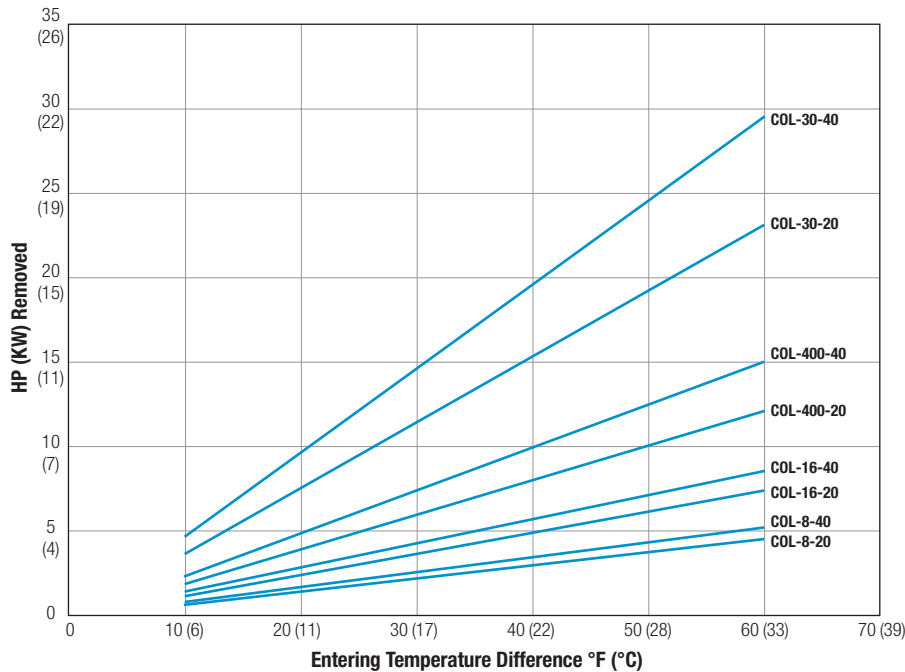
Note: We reserve the right to make reasonable design changes without notice. All dimensions in inches (millimeters), unless noted otherwise.

Performance Curves

Single Motor 50 HZ/1500 RPM



Single Motor 60 HZ/1800 RPM



Note: T-BAR cores derate performance 15-25%. Consult factory for sizing information.

Selection Procedure

STEP 1 Determine Heat Load. Most applications can have a cooler sized for 1/3 of the input HP (KW).

STEP 2 Determine Entering Temperature Difference. (Actual ETD)

$$ETD = \text{Entering oil temperature } ^\circ\text{F } (^{\circ}\text{C}) - \text{Entering ambient air temperature } ^\circ\text{F } (^{\circ}\text{C})$$

The entering oil temperature is generally the maximum desired system oil temperature.

Entering air temperature is the highest ambient air temperature the application will see.

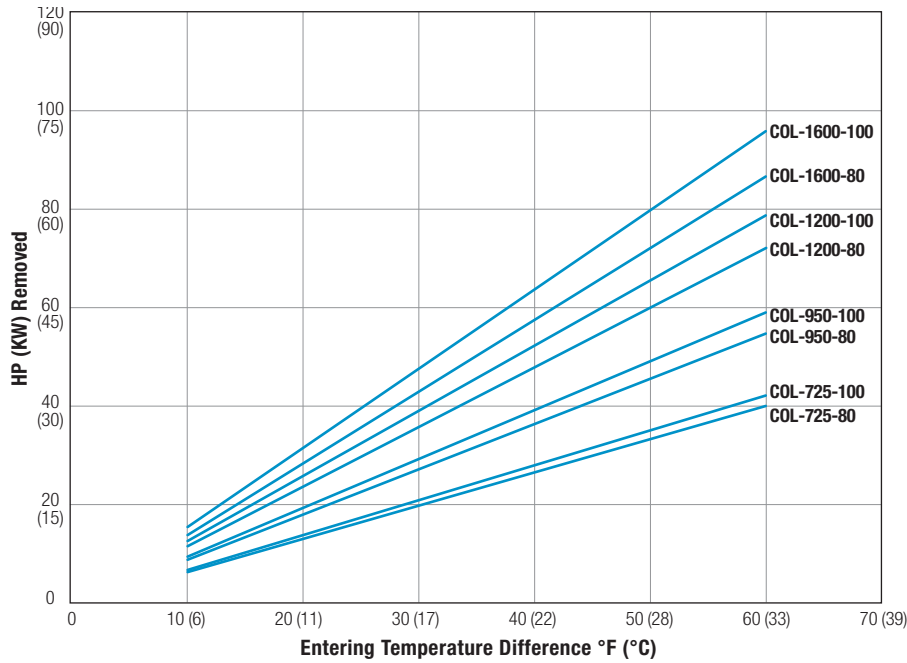
STEP 3 Select Model From Curves. Enter the Performance Curves at the bottom with the GPM (LPM) oil flow and proceed upward to the adjusted Heat Rejection from Step 3. Any Model or Curve on or above this point will meet these conditions.

Listed Performance Curves are based on 46 cSt oil. If your application conditions are different, consult factory for assistance.

Model	50 HZ Flow Rate GPM (LPM)	60 HZ Flow Rate GPM (LPM)
COL-8-20	8 (30)	9.5 (36)
COL-8-40	16 (60)	21 (79)
COL-16-20	8 (30)	9.5 (36)
COL-16-40	16 (60)	21 (79)
COL-30-20	8 (30)	9.5 (36)
COL-30-40	16 (60)	21 (79)
COL-400-20	8 (30)	9.5 (36)
COL-400-40	16 (60)	21 (79)

Performance Curves

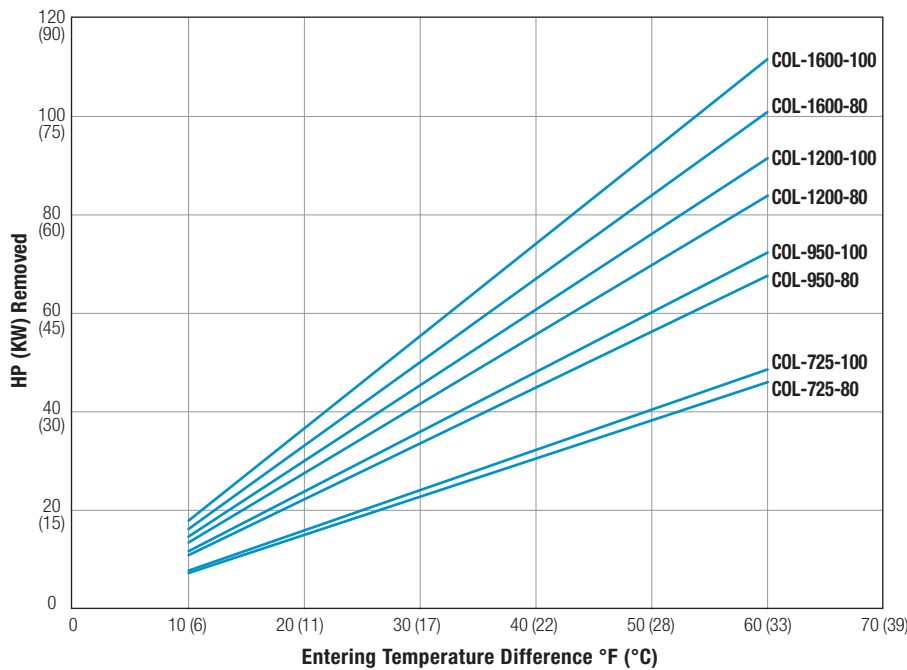
Dual Motor 50 HZ/1500 RPM



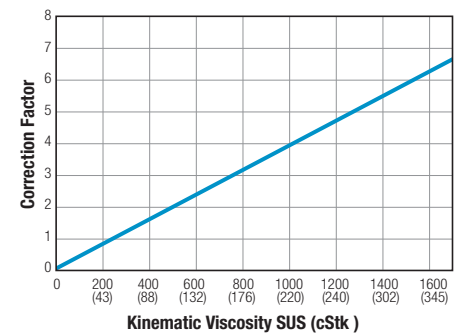
Model	Oil Flow Rate GPM (LPM)	Estimated Pressure Drop with Filter PSI (BAR)	Estimated Pressure Drop without Filter PSI (BAR)
COL-8-20	9.5 (36)	14 (1.0)	5 (0.3)
COL-8-40	21.0 (79)	28 (2.0)	17 (1.2)
COL-16-20	9.5 (36)	14 (1.0)	5 (0.3)
COL-16-40	21.0 (79)	27 (1.9)	16 (1.1)
COL-30-20	9.5 (36)	12 (0.8)	3 (0.2)
COL-30-40	21.0 (79)	23 (1.6)	12 (0.8)
COL-400-20	9.5 (36)	13 (0.9)	3 (0.2)
COL-400-40	21.0 (79)	24 (1.7)	13 (0.9)
COL-725-80	35.0 (133)	25 (1.7)	16 (1.1)
COL-725-100	45.0 (169)	33 (2.3)	19 (1.3)
COL-950-80	35.0 (133)	19 (1.3)	11 (0.8)
COL-960-100	45.0 (169)	25 (1.7)	12 (0.8)
COL-1200-80	35.0 (133)	20 (1.4)	12 (0.8)
COL-1200-100	45.0 (169)	27 (1.9)	13 (0.9)
COL-1600-80	35.0 (133)	17 (1.2)	9 (0.6)
COL-1600-100	45.0 (169)	24 (1.7)	10 (0.7)

Total pressure drop is estimated using 46 cStk oil. 10 micron mesh filter is used in calculating filter pressure drop.

Dual Motor 60 HZ/1800 RPM



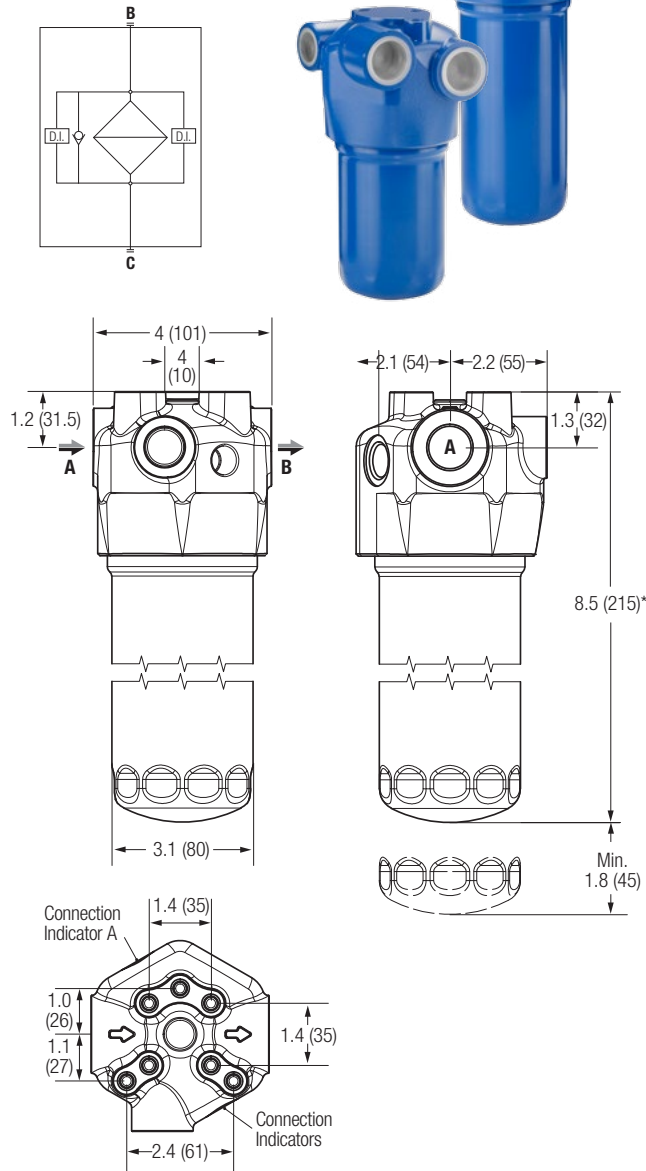
Oil Pressure Drop Correction



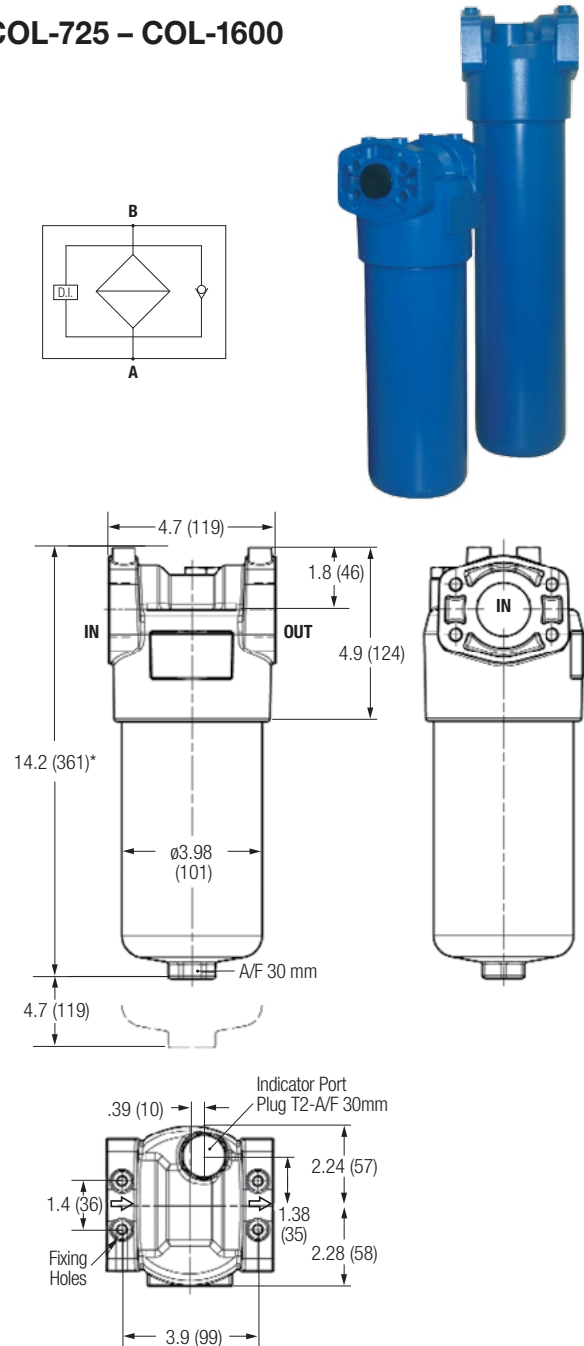
Model	50 HZ Flow Rate GPM (LPM)	60 HZ Flow Rate GPM (LPM)
COL-725-80	29.5 (112)	35 (133)
COL-725-100	37 (140)	45 (169)
COL-950-80	29.5 (112)	35 (133)
COL-950-100	37 (140)	45 (169)
COL-1200-80	29.5 (112)	35 (133)
COL-1200-100	37 (140)	45 (169)
COL-1600-80	29.5 (112)	35 (133)
COL-1600-100	37 (140)	45 (169)

Micron Filter Specifications

COL-8 – COL-400



COL-725 – COL-1600



*Other bowl lengths available. Consult factory for details.
All dimensions in inches (millimeters), unless noted otherwise.

Filter Housing Materials

- Head – Aluminum
- Housing – Phosphated Steel
- Pressure bypass valve – Brass/Aluminum

Maximum Temperature

- 230°F (110°C)

Pressure Bypass Valve

- Opening pressure – 51 PSI (3.5 BAR) ±10%
- Other opening pressures on request

Connection In/Out

- #12 SAE

Seals

- Standard NBR
- Optional FPM

Weight

- 4.0 LBS (1.8 KG)

Volume

- 0.21 gallons (0.81 liters)

Filter Housing Materials

- Head – Anodized Aluminum
- Housing – Anodized Aluminum
- Pressure bypass valve – Nylon

Maximum Temperature

- 230°F (110°C)

Pressure Bypass Valve

- Opening pressure – 51 PSI (3.5 BAR) ±10%
- Other opening pressures on request

Connection In/Out

- #24 SAE

Seals

- Standard NBR
- Optional FPM

Weight

- 7.7 LBS (3.5 KG)

Volume

- 0.40 gallons (1.5 liters)

Micron Filter Specifications

Filtration Media Composition

- Internal support mesh
- Filter media support
- Filtration media
- Prefilter media
- External support mesh

Compatibility with Fluids

The filter elements are compatible with:

- Mineral oils to ISO 2943-4
- Aqueous emulsions
- Synthetic fluids, water glycol

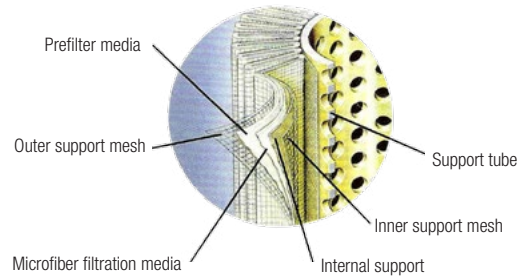
Seals, standard in NBR compatible with:

- Mineral oils to ISO 2943-4
- Aqueous emulsions
- Synthetic fluids, water glycol

FPM seals compatible with:

- Synthetic fluids type HS-HFDR-HFDS-HFDU to ISO 6743-4

Inorganic Microfiber



Multipass Test

In compliance with new ISO 16889 Standard
Contaminant ISO MTD

Value B	2	10	75	100	200	1000*
Filtration efficiency	50%	90%	98.70%	99%	99.50%	99.90%

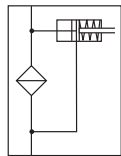
*TTP Standard

International Standards for Fluid Contamination Control

Components	Recommended Filtration									
	12/10/7	13/11/8	14/12/9	15/13/10	16/14/11	17/15/12	18/16/13	19/17/14	20/18/15	
Servo valves			●	●	●					
Proportional valves				●	●	●				
Variable displacement pumps					●	●	●			
Cartridge valves						●	●	●		
Piston pumps						●	●	●		
Vane pumps							●	●	●	
Pressure/flow rate control valves							●	●	●	
Solenoid valves							●	●	●	
ISO code	12/10/7	13/11/8	14/12/9	15/13/10	16/14/11	17/15/12	18/16/13	19/17/14	20/18/15	
NAS code	1	2	3	4	5	6	7	8	9	
Absolute filtration recommended	3 micron			6 micron			10 micron*		>10 micron	

*TTP Standard

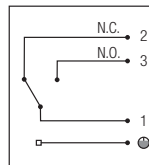
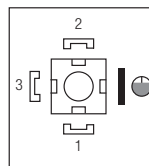
Filtration Indicators Visual "V"



- Cover and lens: nylon
- Visual indicator green: cartridge clean
- Visual indicator red: cartridge clogged
- Weight: 4.8 oz (136 g)
- Tightening torque: 70 FT-LBS (95 Nm)

Electrical/Visual "EV"

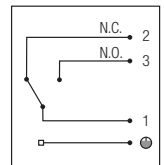
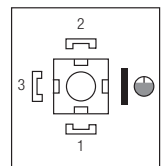
Connector EN 175301-803 A/ISO4400



- Protection rating: IP 65
- Maximum contact rating: 5 A/250V~
- Voltage: 230 V~
- Connector: DIN 43650 Microswitch contact
- Cable gland: PG 9
- Cover and lens: nylon
- Visual indicator green: cartridge clean
- Visual indicator red: cartridge clogged
- Weight: 6.6 oz (187 g)
- Tightening torque: 70 FT-LBS (95 Nm)

Electric "E"

Connector EN 175301-803 A/ISO4400



- Protection rating: IP 65
- Maximum contact rating: 5 A/250V~
- Voltage: 230 V~
- Connector: DIN 43650 Microswitch contact
- Cable gland: PG 9
- Weight: 6.5 oz (184 g)
- Tightening torque: 48 FT-LBS (65 Nm)