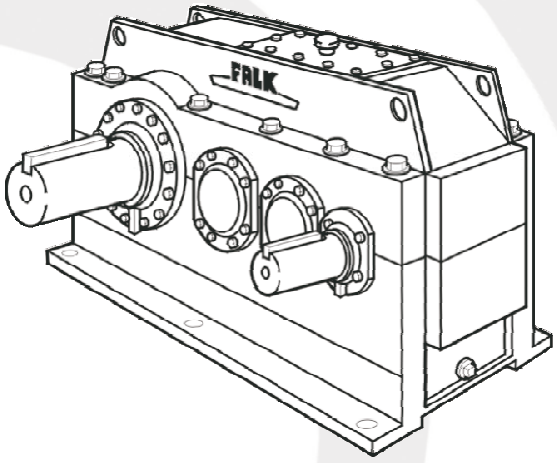
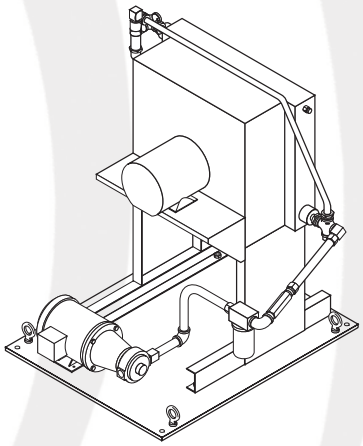
FALK™ TYPE PA PUMP & COOLER ASSEMBLIES (AIR/OIL) | SELECTION GUIDE

All Falk Gear Drives





REXNORD

Selection Guide 131-315, November 2002

Type PA
Pump & Cooler Assemblies
With Air/Oil Heat Exchanger

When compact gear drives require assistance to dissipate thermal energy, Rexnord offers the following cooling accessories:

- Shaft Driven Cooling Fans
- Electric Cooling Fans
- Cooling Tubes
- Type PC Pump and Cooler Assembly (Water/Oil)
- Type PA Pump and Cooler Assembly (Air/Oil)

Rexnord recommends the most economical cooling accessory that meets the demands of the application and any associated customer specifications. Pump & cooler assemblies are commonly suggested when the thermal requirements exceed that which can be accommodated by shaft driven fans, electric cooling fan, or cooling tubes.

Notice: Pump and cooler assemblies described in this guide are offered as **oil cooling** devices for use on gear drives that are splash lubricated (splash assures adequate oil flow to bearings and gearing regardless of whether the pump & cooler assembly is activated). When gear drives require pressure lube, jet lube, or other dependencies associated with continuous flow of lubrication supplied by the lube pump, refer to Factory.

Type PA Pump & Cooler Assemblies with Air/Oil Heat Exchanger are typically preferred when water is unavailable, water is corrosive, or where water is subject to freezing.

This selection guide covers Type PA Pump & Cooler Assemblies with Air/Oil Heat Exchanger. Six sizes are available. See Table 1, on Page 3, which provides the thermal capacity of each size of Type PA Pump and Cooler Assembly, as well as a general description of the individual components that make up each size. Rexnord reserves the right to substitute equivalent brands of components.

Each Type PA Pump and Cooler Assembly includes oil lube pump and associated lube pump motor, coupling (motor to lube pump), air/oil heat exchanger, oil filter, heat exchanger bypass valve, all pre-assembled with preformed hydraulic tubing and tube fittings on a common steel mounting plate which can be bolted to a suitable foundation.

Type PA Pump & Cooler Assemblies are furnished to be floor mounted. Rexnord furnishes only oil piping from the lube pump to the heat exchanger inlet. Refer to Table 2 , on Page 4, for recommended lube line sizes of the customer furnished oil suction and oil discharge lines.

When requested, and where determined feasible by Rexnord Engineering, pump and cooler assemblies may be mounted directly to the gear drive at additional charge.

When pump and cooler assemblies are mounted on the gear drive by Rexnord, all oil line connections are completed by Rexnord.

Pre-selected thermometer and pressure gauge are available as extra charge options. Contact Rexnord for other requirements including switch to activate warning device, flow indicator/switch, oil heater, oil sump tank, water control device, non-standard components, etc.

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Oil Immersion Heater

Lubricant viscosity recommendations shown in Rexnord service manuals for enclosed gear drives are applicable to these pump and cooler assemblies. However, for operation at ambient temperatures at less than 50° F (10° C), a gear drive equipped with Type PA Pump & Cooler Assembly should also be equipped with an oil immersion heater (extra charge option).

Temperature Switch

When gear drives equipped with pump and cooler assemblies are started after extended idle periods, lubricant in the gear drive sump will not be at operating temperature, and may be at viscosities exceeding 8000 SSU (1725 cSt). Startups with lubricant at elevated viscosity levels can result in pump cavitation, pump motor overload, and damage to components. Where cold start situations are anticipated, specify a temperature switch (extra charge option) when ordering the pump and cooler assembly.

Installation & Maintenance

Caution *– Lock out power source and remove all external loads from the gear drive before servicing the gear drive or accessories.*

For detailed maintenance instructions and specifications for components such as heat exchanger, oil filter, lube pump, etc, refer to the product manufacturer's literature.

When ordering parts, or requesting information, provide the Rexnord M.O. Number, gear drive size, H.S. shaft rpm, ratio, and date that are stamped on the gear drive nameplate.

Always locate floor-mounted pump and cooler assemblies in close proximity to the gear drive to minimize pressure drop in the oil lines. It is recommended that oil lube pumps be mounted below the gear drive oil level to maintain a prime. Minimum lube line sizes are indicated in Table 2, on Page 4.

Refer to gear drive certified prints for final designation of components, and exact location and description of inlet/outlet hookup points.

The atmosphere in the immediate area of the Pump & Cooler Assembly must be free of lint, dirt, etc. to maintain efficient operation of the assembly.

Prior to filling gear drives with oil, remove the gear drive inspection cover and flood the oil troughs to insure a generous flow of oil to the bearings.

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Quick Selection Method — Type PA Pump & Cooler Assemblies

The following selection method is conservative, and assumes the pump & cooler assembly will dissipate the complete thermal burden. Contact Rexnord when an optimized selection is required. Optimized selections also take into account thermal dissipation contribution from gear drive housing surfaces, and gear drive sump capacity.

Notice: For Falk gear drives, Types ABX and AXV, use pre-selected pump and cooler assemblies indicated in Table 5.

1. Determine the Power Rating of the Prime Mover. It is not necessary to use a service factor.
2. Determine BTU/Hr that will be used to select the pump & cooler assembly as follows:

   If the Prime Mover is rated in Horsepower

   Single Reduction Gear Drives –

   BTU/Hr = Power Rating of the Prime Mover (HP) X 38.2

   Double Reduction Gear Drives –

   BTU/Hr = Power Rating of the Prime Mover (HP) X 76.4

   Triple Reduction Gear Drives –

   BTU/Hr = Power Rating of the Prime Mover (HP) X 114.6

   If the Prime Mover is rated in Kilowatts

   Single Reduction Gear Drives –

   BTU/Hr = Power Rating of the Prime Mover (kW) X 51.3

   Double Reduction Gear Drives –
   BTU/Hr = Power Rating of the Prime Mover (kW) X 102.5

   Triple Reduction Gear Drives –

   BTU/Hr = Power Rating of the Prime Mover (kW) X 153.7

3. From Table 1, choose the size of pump & cooler assembly that has a Max Dissipation BTU/Hr that equals or exceeds the BTU/Hr that was determined in Step 2. Note that each size of pump & cooler assembly has two values for Max Dissipation BTU/Hr, one value when the pump motor is 60 Hz, and a lower value when the pump motor is 50 Hz.
4. Dissipation rates (BTU) in Table 1 are based on sea level elevation and ambient temperature of 80°F (27°C). See Tables 3 & 4, on Page 4, in order to correct for alternate altitude or ambient temperature.

Selection Example

Prime mover is 750 HP at 1750 rpm

Available electric source to drive pump motor is 60 Hz

Mechanical Service Factor is 1.25

Nominal ratio of the gear drive is 5.60:1

The gear drive is splash lubricated

From Selection Guide 131-110:

Size of the gear drive is 425A2, double reduction, (mechanical service factor = 1215/750 = 1.62)

Power Rating of the Prime Mover is 750 HP

BTU/Hr for double reduction gear drive, with Prime Mover rated in HP = 750 HP X 76.40 = 57,300 BTU/Hr

From Table 1, choose 220PA, which provides Max Dissipation of 79,700 BTU/Hr with 60 Hz pump motor

Table 1 — Typical Specifications for Type PA Pump & Cooler Assemblies (Air/Oil) ★

Pump & Cooler Assembly		205PA	210PA	220PA	230PA	240PA	250PA
Lube Pump		HAIGHT or Equal	HAIGHT or Equal	HAIGHT or Equal	HAIGHT or Equal	HAIGHT or Equal	HAIGHT or Equal
Coupling		LOVEJOY or Equal	LOVEJOY or Equal	LOVEJOY or Equal	LOVEJOY or Equal	LOVEJOY or Equal	LOVEJOY or Equal
Heat Exchanger		Air/Oil Cooler With Fulflo Relief Valve & Electric Fan 16" Dia	Air/Oil Cooler With Fulflo Relief Valve & Electric Fan 22" Dia	Air/Oil Cooler With Fulflo Relief Valve & Electric Fan 22" Dia	Air/Oil Cooler With Fulflo Relief Valve & Electric Fan 24" Dia	Air/Oil Cooler With Fulflo Relief Valve & Electric Fan 30" Dia	Air/Oil Cooler With Fulflo Relief Valve & Electric Fan 36" Dia
Filter - 20 micron		PARKER or Equal	PARKER or Equal	PARKER or Equal	PARKER or Equal	PARKER or Equal	PARKER or Equal
Pressure gauge (Optional) Furnished Only When Specified		ASHCROFT or Equal	ASHCROFT or Equal	ASHCROFT or Equal	ASHCROFT or Equal	ASHCROFT or Equal	ASHCROFT or Equal
Thermometer (Optional) Furnished Only When Specified		ASHCROFT or Equal	ASHCROFT or Equal	ASHCROFT or Equal	ASHCROFT or Equal	ASHCROFT or Equal	ASHCROFT or Equal
Lube Pump Motor Options	60 Hz AC Electric Motor	3 Phase, 60 Hz, TEFC 208-230/460 Volts	3 Phase, 60 Hz, TEFC 208-230/460 Volts	3 Phase, 60 Hz, TEFC 208-230/460 Volts	3 Phase, 60 Hz, TEFC 208-230/460 Volts	3 Phase, 60 Hz, TEFC 208-230/460 Volts	3 Phase, 60 Hz, TEFC 208-230/460 Volts
	50 Hz AC Electric Motor	3 Phase, 50 Hz, TEFC 220/380/440 Volts	3 Phase, 50 Hz, TEFC 220/380/440 Volts	3 Phase, 50 Hz, TEFC 220/380/440 Volts	3 Phase, 50 Hz, TEFC 220/380/440 Volts	3 Phase, 50 Hz, TEFC 220/380/440 Volts	3 Phase, 50 Hz, TEFC 220/380/440 Volts
	60 Hz AC Electric Motor	3 Phase, 60 Hz, TEFC 575 Volt	3 Phase, 60 Hz, TEFC 575 Volt	3 Phase, 60 Hz, TEFC 575 Volt	3 Phase, 60 Hz, TEFC 575 Volt	3 Phase, 60 Hz, TEFC 575 Volt	3 Phase, 60 Hz, TEFC 575 Volt
Heat Exchanger Fan Motor Specifications		208-230/460 Volt/3 Phase/60Hz/TEFC					
Typical Motor HP	Lube Pump *	1.00	2.00	3.00	5.00	7.50	10.00
	Heat Exchanger Fan	.25	.25	.25	1.00	1.00	3.00
Pump Oil Flow Rate Max Dissipation BTU/Hr †		@60 Hz 3 GPM 31,000	@50 Hz 2.5 GPM 25,700	@60 Hz 5 GPM 49,700	@50 Hz 4 GPM 41,800	@60 Hz 11 GPM 79,700	@50 Hz 9 GPM 68,100	@60 Hz 20 GPM 150,000	@50 Hz 17 GPM 131,000	@60 Hz 29 GPM 222,000	@50 Hz 24 GPM 191,000	@60 Hz 40 GPM 311,000	@50 Hz 36 GPM 277,000

★ Rexnord reserves the right to substitute equivalent brands or components.

* Lube pump HP shown is a minimum value based on lubricant viscosity <8000 SSU (1725 cSt), and appropriate customer lube piping (length, diameter, elevation, free of excessive bends/elbows).

† Dissipation rates (BTU) are based on sea level elevation and ambient temperature of 80°F (27°C). See Tables 3 and 4 in order to correct for alternate altitude or ambient temperature.

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TABLE 2 — Type PA Pump & Cooler Assemblies – Minimum Lube Line Sizes

Lube Line Function	Lube Line Length, Feet	Minimum Lube Line Inside Diameter, Inches					
		PA Size					
		205PA	210PA	220PA	230PA	240PA	250PA
Oil Suction Line Gear Drive to Pump Inlet	3	1.00	1.00	1.25	1.75	2.00	2.25
	5	1.00	1.25	1.50	1.75	2.00	2.25
	10	1.25	1.50	1.75	2.00	2.25	2.50
	15	1.50	1.50	2.00	2.25	2.50	2.50
	20	1.50	1.75	2.00	2.25	2.75	2.75
Oil Discharge Line Heat Exchanger Outlet to Gear Drive	5	0.75	1.00	1.25	1.25	1.50	1.50
	10	1.00	1.00	1.25	1.50	1.75	1.75
	15	1.00	1.25	1.50	1.75	2.00	2.00
	20	1.25	1.25	1.50	1.75	2.00	2.25
	25	1.25	1.25	1.75	2.00	2.00	2.25

NOTES: 1. Minimum lube line sizes assume the use of a lubricant meeting Rexnord recommendations, and that lubricant entering the oil inlet of the pump is at a nominal viscosity not exceeding 8000 SSU (1725cSt).

2. Assumes pump inlet located below gear drive outlet.

3. To achieve optimal system performance, it is strongly recommended that pump and cooler assemblies be located as close as possible to the gear drive, thereby minimizing the length of lube lines. Lube lines should be constant diameter, and free of unnecessary bends and elbows. Observing these recommended measures will reduce the potential for line losses (pressure drop) and cavitation.

Table 3 — Altitude Factor

Altitude — ft Sea Level = 0	Altitude — meters Sea Level = 0	Factor
0 to 2,500	0 to 762	1.00
2,500	762	.95
5,000	1 524	.90
7,500	2 286	.85
10,000	3 048	.81
12,500	3 810	.76
15,000	4 572	.72
17,500	5 334	.68

Table 4 — Ambient Temperature Factor

Ambient Temperature ★	Factor
50°F/10°C	1.19
60°F/16°C	1.13
70°F/21°C	1.07
80°F/27°C	1.00
90°F/32°C	.93
100°F/38°C	.85
110°F/43°C	.78
120°F/49°C	.69

★ Factors for other ambient temperatures can be interpolated.

Table 5 — Pre Selected Pump & Cooler Assemblies for Falk™ Type ABX and ABX Gear Drives Only

DRIVE SIZE	Pre-Selected Pump & Cooler Assembly ●
405	210PA
425	210PA
445	220PA
465	220PA
485	220PA
505	230PA
535	230PA
555	230PA

● When Pump & Cooler Assemblies are specified, Pre-Selected sizes provide the required flow of oil. Do not use a larger or smaller size than is Pre-Selected. In the event the Pre-Selected size does not have adequate thermal capacity for the specific application, a special design Pump and Cooler Assembly, with oversize heat exchanger, is necessary. Contact Rexnord for price and delivery of special design Pump & Cooler Assemblies.

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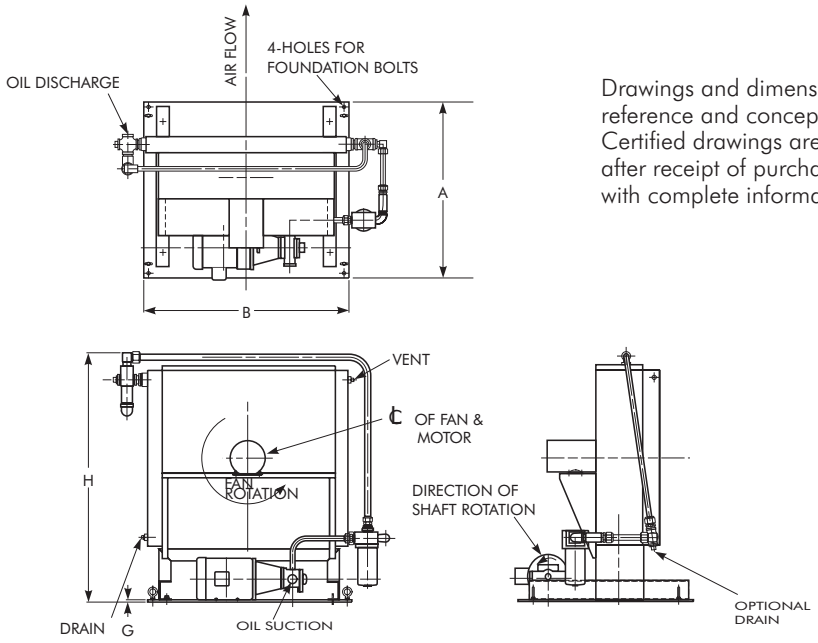
Type PA Pump & Cooler Assemblies

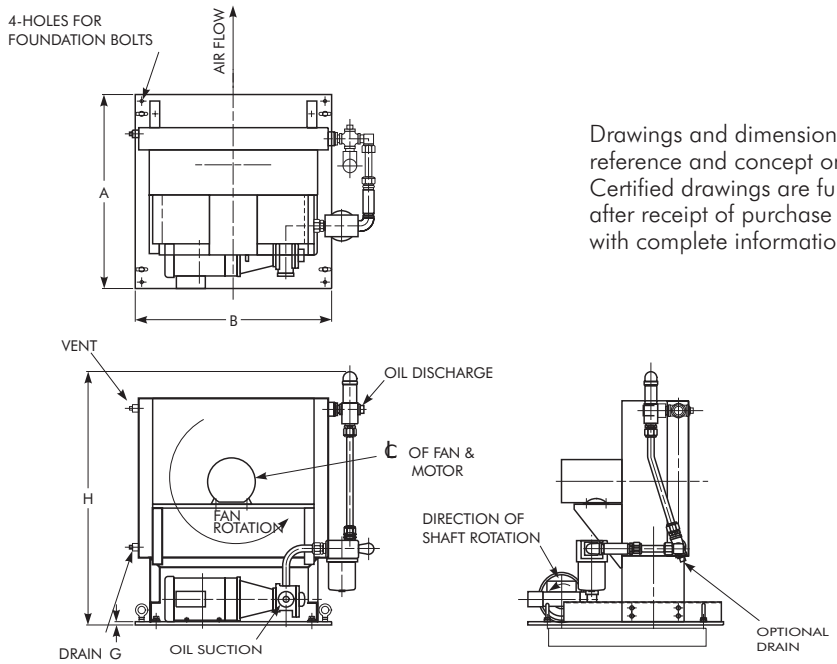
Sizes 205PA, 230PA, 240PA, & 250PA — Dimensions – Inches



Drawings and dimensions are for reference and concept only. Certified drawings are furnished after receipt of purchase order with complete information.

SIZE	A	B	G	H	Weight-lb
205PA	34.75	27.75	0.50	41.00	285
230PA	36.50	36.50	0.50	46.75	567
240PA	37.50	43.50	0.50	54.00	690
250PA	37.50	49.50	0.50	61.00	945

Sizes 210PA – 220PA — Dimensions – Inches



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SIZE	A	B	G	H	Weight-lb
210PA	30.50	30.50	0.50	40.25	305
220PA	30.50	30.50	0.50	40.25	365

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131-315 11/2002 Delzer Litho Printed in USA