

Vickers®

Power Units / Systems



Integrated Motor Pump

MP15, MP22, MP45, MP75 & MP92
15 kW, 20 hp to 92 kW, 125 hp



This edition of the Integrated Motor Pump brochure includes the following pump series:

Piston Pumps

PVQ20/32
PVQ40/45
PVH57
PVH63
PVH74

PVH81
PVH98
PVH106
PVH131
PVH141

Vane Pumps

20V 2520V 4525V
25V 2525V 4535V
45V 3520V
3525V
4520V



Introduction

The Vickers Integrated Motor Pump is a unique combination of a conventional AC induction motor cooled with system hydraulic oil and a Vickers hydraulic pump, either fixed vane pump or variable piston type, housed in a special sound reduction enclosure.

This combination provides an exceptionally quiet and small pumping package for any industrial application requiring up to 125 horsepower (92 kilowatts) of continuous hydraulic power.

The package comes completely assembled, tested, and ready for installation.

Circulating the hydraulic oil through the motor, bathing both the rotor and stator, makes it possible to obtain twice the normal continuous output power from the motor windings. Physical size reductions of 35% to 50% compared with conventional pumping packages are possible as a result. Normal operation of the motor is not affected by circulating oil through it, nor is the system's hydraulic oil damaged.

Heat generated within the electric motor is carried away by the hydraulic fluid and dissipated by the hydraulic cooling system. A motor fan is not needed,

which makes it practical to cover the entire assembly (motor and pump) with a compact, polyethylene sound reduction enclosure. This reduces the sound from the pump as well as the motor, resulting in a noise level reduction that is unsurpassed in the industry.

A complete line of standard Vickers pumps can be fitted to the Integrated Motor Pump including single fixed vane pumps, single variable piston pumps, double vane pumps, double piston pumps or mixed vane and piston combinations.

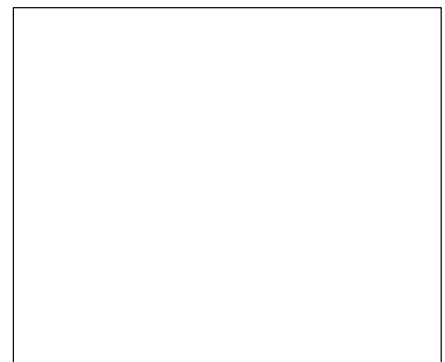
Features & Benefits

- Smaller package size because of oil cooled electric motor.
- Heat generated by the electric motor is carried away by the hydraulic fluid.
- 70% reduction in sound compared to conventional power unit systems (approximately 10 dBA).
- All external leakage points for both oil leaking out and air leaking in are sealed by static o-rings.
- External leakage from dynamic shaft seals has been eliminated.
- The specially designed coupling connecting the pump and motor drive shafts is oil lubricated and factory installed by Vickers. This eliminates labor to align and install the coupling.
- Only normal filtration practices are required.
- Meets the requirements of International Standard IEC 34-5 (1991-01) for IP57 degrees of protection when installed using a sealed electrical conduit.
- The electric motor stator components have UL recognition.
- Motor bearings are continuously lubricated by hydraulic fluid.
- System sound is significantly reduced by eliminating the fan and enclosing the motor and pump.

Supporting Literature

The following literature items can be ordered through your local Vickers Distributor.

- PVQ Piston Pumps #GB-C-2132
- PVQ Service Literature:
Overhaul Manual, I-3230-S
PVQ20/32 I-3233-S
PVQ40/45 I-3234-S
- PVH Piston Pumps #GB-C-2010
- PVH Service Literature:
Overhaul Manual, M-2210-S
PVH57 M-2206-S
PVH74 M-2207-S
PVH98 M-2208-S
PVH131 M-2209-S
- V-Series Vane Pumps #560
- Vane Pump Service Literature:
Overhaul Manual, I-3157-S
20V I-3195-S
25V I-3196-S
35V I-3197-S
45V I-3199-S
2520V I-3200-S
2525V I-3212-S
3520V I-3202-S
3525V I-3203-S
4520V I-3204-S
4525V I-3208-S
4535V I-3209-S
- Systemic Contamination Control #561
- Fluid Analysis Service #588
- Noise Control in Hydraulic Systems #510

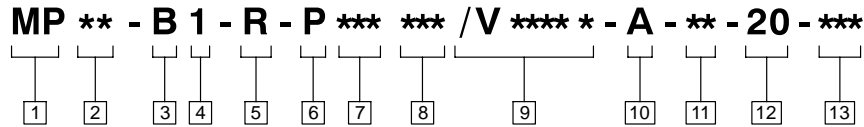


Single and double Integrated Motor Pumps (MP45 shown)

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Model Code



1 Model Series

MP - Integrated Motor Pump

2 Motor Power (sizes)

15 - 15 kW, 20 hp
 22 - 22 kW, 30 hp
 45 - 45 kW, 60 hp
 75 - 75 kW, 100 hp
 92 - 92 kW, 125 hp

3 Voltage*

A▲ - 230V 60 Hz
 B† - 460V 60 Hz
 C - 575V 60 Hz
 D - 380V 50 Hz
 E - 380V 60 Hz
 F - 400V 50 Hz
 G - 220V 60 Hz
 H - 500V 50 Hz

4 Winding Type

1 - Standard (1.50 service factor)
 2 - Low current (1.00 service factor)

5 Terminal Box Position (viewed from motor end)

R† - Right side
 L - Left side

6 Hydraulic Pump Type

P - Variable piston
 V - Vane

7 Pump Displacement (cm³/rev)

Piston:

20, 32, 40, 45, 57, 63, 74, 81,
 98, 106, 131, 141

Single vane:

18, 27, 36, 40, 45, 55, 67, 81, 97,
 112, 121, 138, 162, 193

Double vane - shaft end:

40, 45, 55, 67, 81, 97, 112, 121,
 138, 162, 193

Double vane - cover end:

18, 27, 36, 40, 45, 55, 67, 81,
 97, 112, 121

Example: P20
 V40
 V4018

NOTE: When ordering double vane pump, designate shaft and cover end displacements.

8 Pump Control Type

N - No control (vane pump only)

Piston pumps with cm³/rev displacements of 20, 32, 40, 45:

C - Pressure compensator (20, 40 cm³/rev) - Range is 25-210 bar (350-3000 psi).

C - Pressure compensator (32, 45 cm³/rev) - Range is 25-140 bar (350-2000 psi).

CM - Pressure compensator range is 25-100 bar (350-1500 psi).

CV - Pressure compensator with load sensing (20, 40 cm³/rev) - Range is 25-210 bar (350-3000 psi).

CV - Pressure compensator with load sensing (32, 45 cm³/rev) - Range is 25-140 bar (350-2000 psi).

Piston pumps with cm³/rev displacements of 57, 74, 98, 131:

C - Pressure compensator - Range is 70-250 bar (1000-3625 psi).

CM - Pressure compensator range is 40-130 bar (580-1900 psi).

CV - Pressure compensator with load sensing, range is 70-280 bar (1000-4060 psi).

9 Second Pump Code (if required)

NOTE: Second pump code must be preceded by a slash (/).

Example: P57C / V45N; or P57C/P57C

10 Outlet Position (1st pump) (viewed from electric motor end)

A† - 12 o'clock
 B - 3 o'clock
 C - 9 o'clock

Note: On piston pump units the case drain will always be at the 12 o'clock position.

Outlet Position (2nd pump) (viewed from electric motor end)

A† - 12 o'clock
 B - 3 o'clock
 C - 9 o'clock

Note: The position of mounting bolts on piston pump thru-drive flange adaptors requires that vane pump outlets be located at either 90° CW or CCW from the piston pump outlet.

11 Main Port Connections

F1† - 4-bolt flange port, ISO 6162-Type 1 (inch)
 F2 - 4-bolt flange port, ISO 6162-Type 2 (metric)

12 Design Number

Subject to change. Installation dimensions unaltered for design numbers 20 through 29 inclusive.

13 Special Feature Suffix

S4 - IC Compensator
 S5 - Non-flooded inlet
 S22 -WYE start/DELTA run motor winding, six leads.
 S54 -Non-flooded inlet and WYE start/DELTA run motor winding with six leads.
 S66 -WYE start/DELTA run motor winding with electrical terminal block.

† Preferred option

▲ Only available on MP15 & MP22 models.

◆ See page 5 for current ratings.

General Information

Vickers oil-cooled Motor Pumps combine hydraulic and electrical technologies into a single package rated two times higher than conventional air-cooled motor units of the same size. Operating the electric motor at these higher levels results in a lighter weight, more compact unit for the same hydraulic power output.

Because heat generated in the motor is carried away by the oil, it is possible to enclose the pump and motor, providing a total pumping package with unsurpassed low sound levels.

Electrical supply equipment for the oil-cooled Integrated Motor Pumps is identical to conventional air-cooled AC motors.

Components

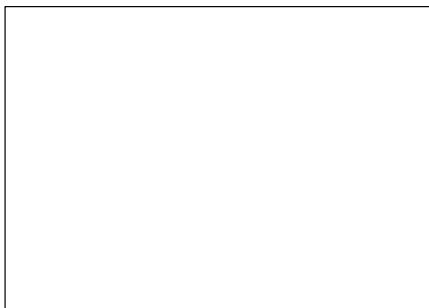
Shroud

The acoustic shroud is made of durable polyethylene plastic, impervious to common industrial coolants and hydraulic fluids. The specially engineered material dampens sound.

Pumps

The Integrated Motor Pump can be configured with a variety of Vickers pumps:

- Single and double variable piston pumps with load sensing or pressure compensating controls.
- Single and double vane pumps.
- Double pumps with one variable displacement piston pump and one fixed vane pump.



Hydraulic compensator adjustment access opening (MP45 shown)

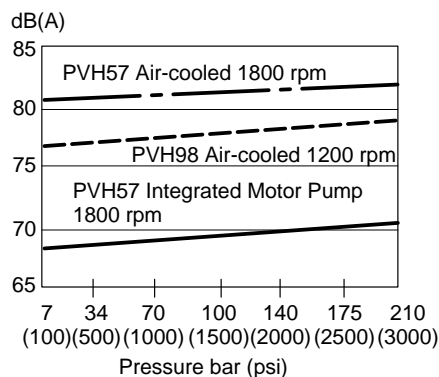
Cooling Operation

Hydraulic oil, at low velocity, first flows through the electric motor, around the rotor, stator poles, and winding, removing heat. Oil then passes to the inlet of the pump, to the load, and through the hydraulic system.

The cooling properties of oil (heat transfer coefficient and specific heat) are superior to those of air by a full order of magnitude. The Integrated Motor Pump system can therefore maintain rotor and stator winding temperatures significantly lower than those in air-cooled motors, while raising the oil temperature only a few degrees from inlet to outlet.

Sound Comparisons

The following chart illustrates the dramatic reduction in airborne noise provided by the Integrated Motor Pump in typical power unit applications.



The Integrated Motor Pump has very low sound levels, but it is necessary to design power units with proper sound reduction techniques such as isolation of the Integrated Motor Pump from the power unit base, proper use of hose and tubing, and isolation of structural elements of the power unit which could amplify sound. Refer to Vickers literature #510, *Noise Control in Hydraulic Systems*, for design guidelines.

Port Connections

Port sizes are available for a full range of flow rates:

Inlet:

ISO 6162 4-bolt - 63,5 mm (2.50"), 76,2 mm (3.00") and 101,6 mm (4.00") inlet ports are provided depending on pump selection (see page 64).

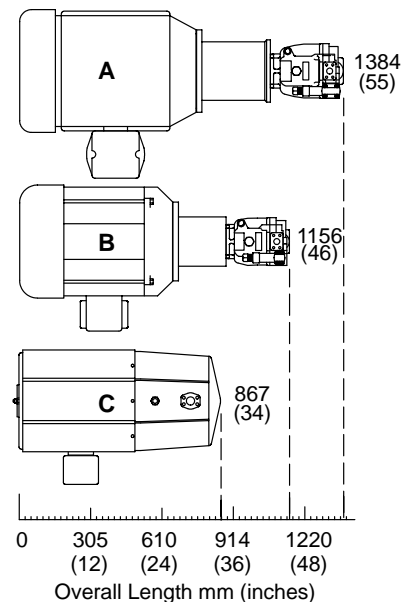
Outlet:

Pressure ports are ISO 6162 4-bolt flange. Case drain: SAE o-ring face seal (ORFS) connection.

Controls (load sensing):

SAE o-ring face seal (ORFS) connection.

Footprint Comparisons for Identical Hydraulic Outputs



A Conventional 1200 rpm, 60 Hz 60 hp, air-cooled electric motor and PVH98 pump

B Conventional 1800 rpm, 60 Hz 60 hp, air-cooled electric motor and PVH57 pump

C Integrated Motor Pump 1800 rpm, 60 Hz 60 hp, oil-cooled electric motor and PVH57 pump

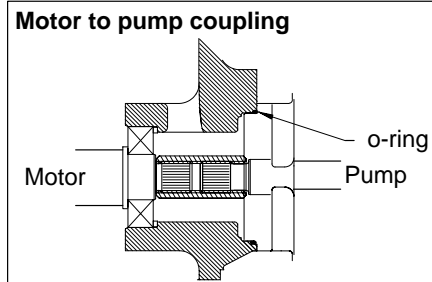
Application

The unit is delivered fully assembled and tested. There is no motor coupling or bellhousing requiring assembly.

The Integrated Motor Pump uses a static o-ring sealed flange to eliminate any potential leakage.

Pump to Motor Alignment

The motor shaft on the Integrated Motor Pump is machined with a spline. Pumps fitted to the motor are also supplied with splines. An internal splined coupling connects the motor to the pump.



This coupling mechanism, used in conjunction with the machined mounting flange, provides for precise alignment of the pump to the motor. Vibration is minimized as a result.

If it becomes necessary to remove or replace a pump for any reason, precise alignment is achieved without the need to indicate shafts and separately align the pump to the motor.

The entire area around the splined coupling is bathed in oil and sealed by a static o-ring seal formed by the mounting flange and the pump itself. In addition, any minute shaft seal leakage from the pump stays within the sealed motor.

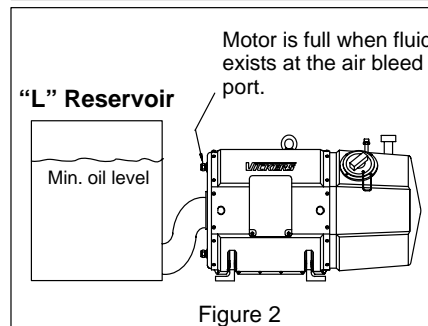
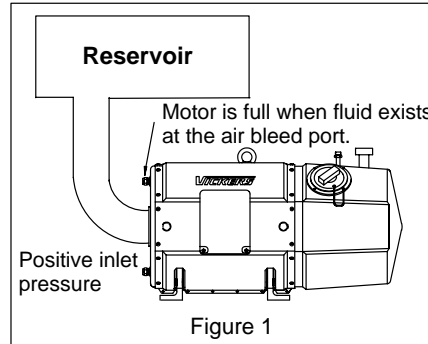
Inlet Condition

Standard models require a positive inlet pressure, normally provided by using an overhead reservoir (Figure 1) or an "L" shaped reservoir (Figure 2) with its oil level up to the motor pump air bleed port connection. The maximum positive inlet pressure is 2 bar (29 psi).

Vickers recommends a positive inlet pressure for all Integrated Motor Pump installations.

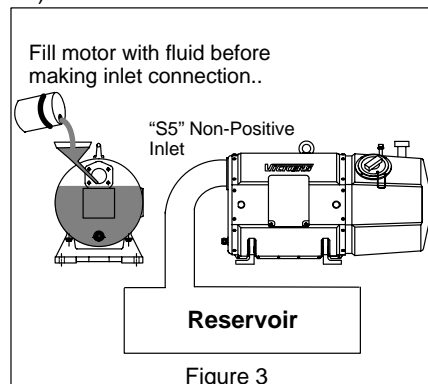
NOTE: Prior to start-up, the electric motor should be filled with hydraulic fluid

until the oil level reaches the air bleed connection as shown in Figures 1 and 2. This will ensure proper oil cooling of the stator winding.



If a positive inlet application is not feasible, "S5" suffix models are available (Figure 3) with the motor inlet connection at the top (12 o'clock) position of the end bell.

Fill the electric motor with hydraulic fluid as shown in Figure 3 below prior to making the inlet connection. (See Inlet End Bell dimensions, page 64).



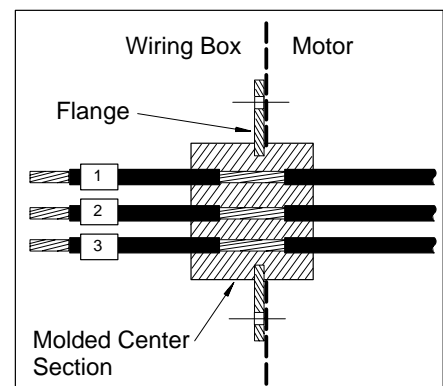
CAUTION

Do not attempt to lift or move this unit using the sound shroud. This could cause damage to the plastic enclosure. Use the lifting eye-bolts.

Wire Sealing Connector

In conventional air-cooled motors, the stator wires are brought out of the motor housing into a terminal box for hook up.

In the Integrated Motor Pump, a custom oil tight connector is used to bring the wires out to the terminal box. The connector consists of a flange with a molded center section (see below). The molded center section is actually a continuation of the wire insulation, so there is no leakage point or joint between the flange and the wires as they pass through the flange.



Noise-reducing Mounting Rails

Vickers offers these accessories for use with the Integrated Motor Pump to enhance the overall sound reduction of power units. Descriptions and assembly numbers for these items are shown on page 63.

The mounting rail kits include integral shock and vibration absorbers sized specifically for the Integrated Motor Pump. Rail sets are available for single and double pump versions, with an outboard pump support for large overhung double piston pumps.

These sound reduction accessories are highly recommended to achieve the lowest possible sound levels.

Starter Sizing and Phasing

Sizing

The Vickers Integrated Motor Pump uses industrial, 3-phase, induction motor components. Starter equipment and associated hardware are used in exactly the same fashion as with traditional air-cooled motors with the same rated power.

Normal Full Load Current (Amps)				
Model	230V 60 Hz	460V 60 Hz	575V 60 Hz	380V 50 Hz
MP15	56	28	22	34
MP22	72	36	29	45
MP45	NA	73	58	89
MP75	NA	121	97	150
MP92	NA	150	120	183

The three lead wires used to connect the electrical service are the same size as those used for the same current with a standard air-cooled motor.

Phasing

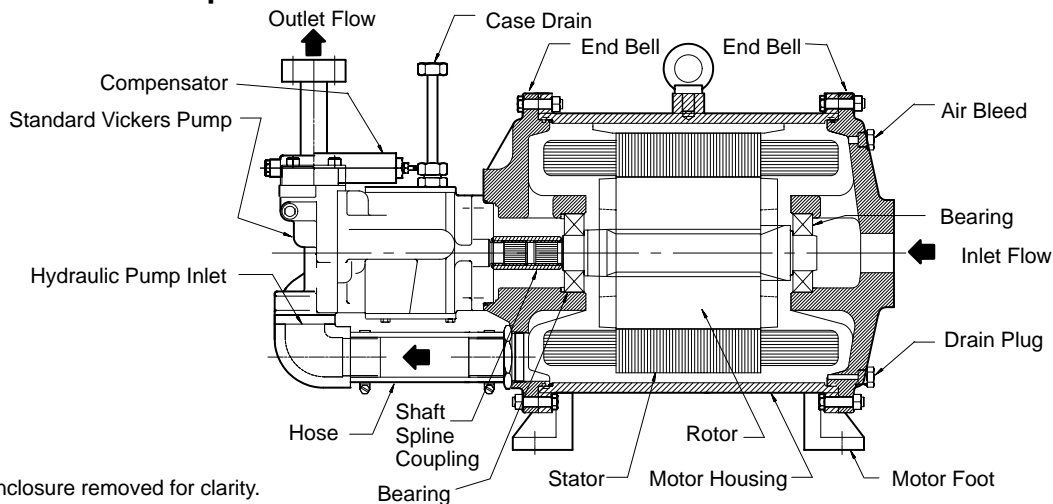
The motor lead wires are labeled #1, #2, and #3. Correct direction of rotation requires that they be connected to the 3-phase, NEMA Code F rating service as follows:

- #1 to phase A
- #2 to phase B
- #3 to phase C

Because the motor pump shaft is completely enclosed, it is not possible to check the direction of rotation visually. Vickers recommends use of a phase meter* in connecting the power service, to assure correct rotation. Prolonged running in the wrong direction might result in equipment damage.

* One suitable phase meter, Quantum-Precision Inc. Model K/K-3-44030/44050 is available from :
Quantum-Precision Inc.
225 Broadway, Suite 3404
New York, New York 10007
Tel. 212-406-0490
Fax. 212-608-3698

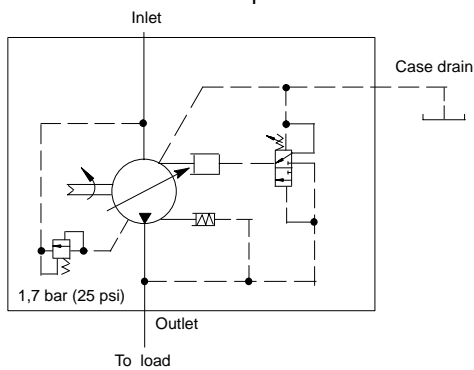
Basic Internal Components



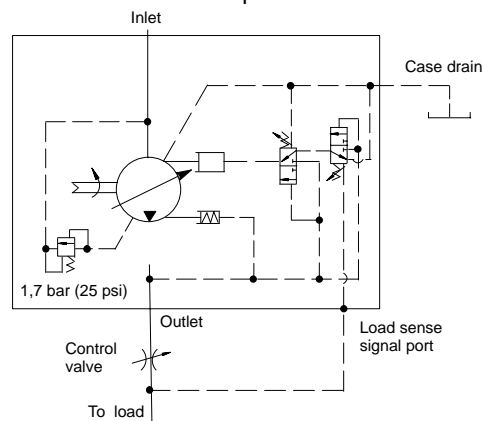
Sound enclosure removed for clarity.

Piston Pump Controls

C or CM Pressure Compensator



C**V or CM*V Pressure Compensator / Load Sensing



Cooling Capacity

Cooling provisions with the Vickers Integrated Motor Pump differ from conventional systems in two respects:

1. Electrical losses in the motor are cooled by the hydraulic fluid rather than by a fan on the motor. This eliminates one noise source (the fan) and permits complete enclosure of the motor and pump for further noise reduction. In addition, because oil is 10 times more effective than air as a coolant, the operating current (power) can be increased without overheating the motor. The Integrated Motor Pump can, therefore, use a more compact motor than an air-cooled unit with the same power rating and achieve a smaller package size.
2. Hydraulic fluid in the motor causes more drag torque than does air in a conventional motor. The difference, offset in part by the power saved through eliminating a fan, is the one small but real penalty in operating an Integrated Motor Pump.

Electrical losses vary with the input power actually used in an application. The following curves show the total electrical losses for each size Motor Pump, as a function of the input power. The input power is the sum of the pump input plus electrical losses and drag losses. These curves are the same for either 1500 rpm (50 Hz) or 1800 rpm (60 Hz) models.

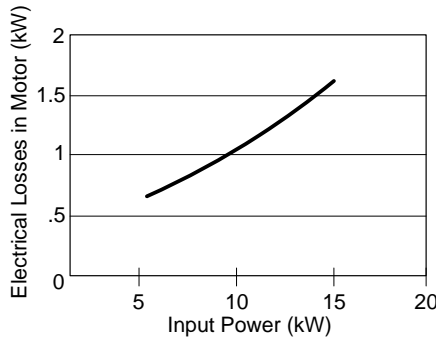
Fluid drag torque varies with fluid viscosity. This loss depends on fluid type and temperature, but not on input power. Page 7 shows drag losses with typical fluids (ISO grades VG22, VG32 and VG46) at temperatures from 30° to 60°C (86° to 140°F). These losses are lower at 1500 rpm than at 1800 rpm, shown in the separate curves.

The heat generated in a hydraulic circuit is the sum of all component losses, including head losses in fittings and fluid conductors, plus throttling losses in pressure and flow control valves. A common design provision is 20% of the installed hydraulic power. If the duty cycle is well defined, a more specific estimate based on detailed analysis or experience with similar systems may be made.

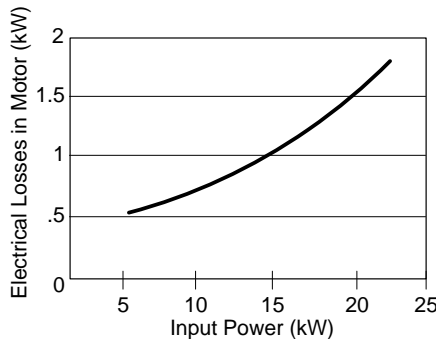
The cooling capacity needed in a system using a Vickers Integrated Motor Pump is:

$$\begin{aligned} & \text{Heat generated in the circuit} \\ & + \text{Electrical loss} \\ & + \text{Drag loss} \\ & = \text{Total cooling required} \end{aligned}$$

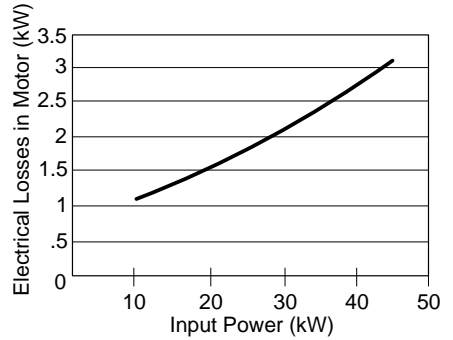
Electrical Losses in Motor - MP15



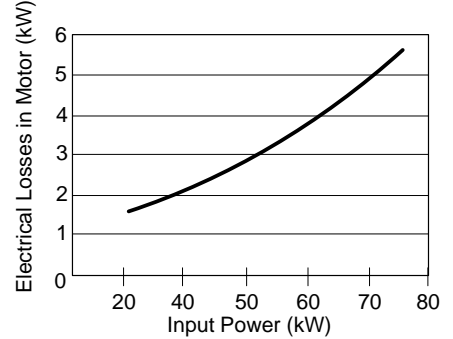
Electrical Losses in Motor - MP22



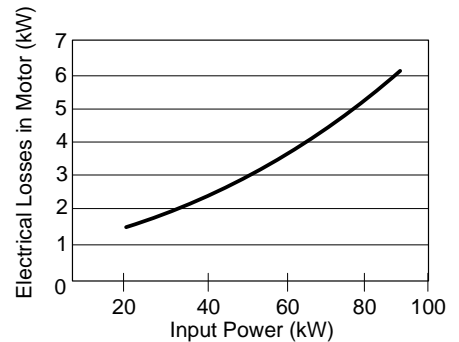
Electrical Losses in Motor - MP45



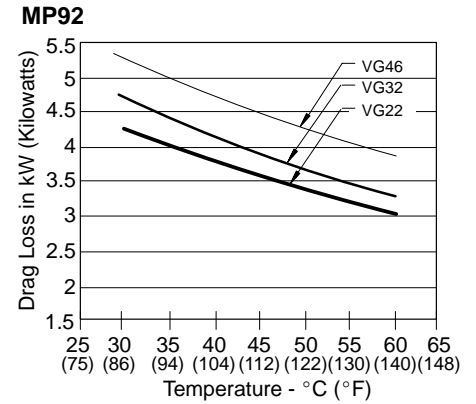
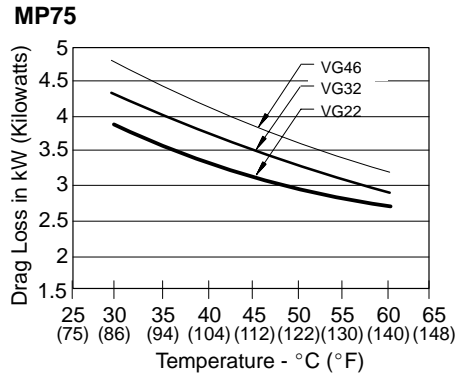
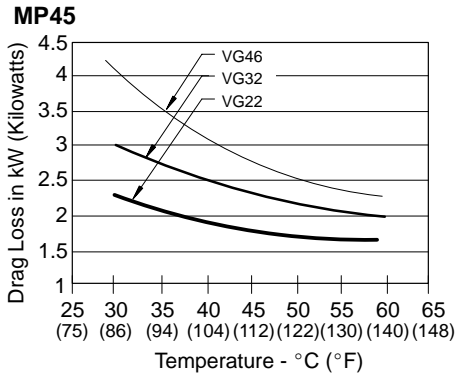
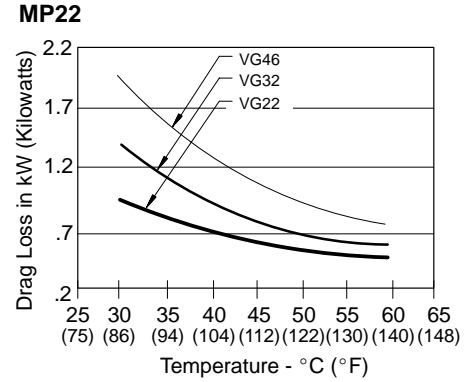
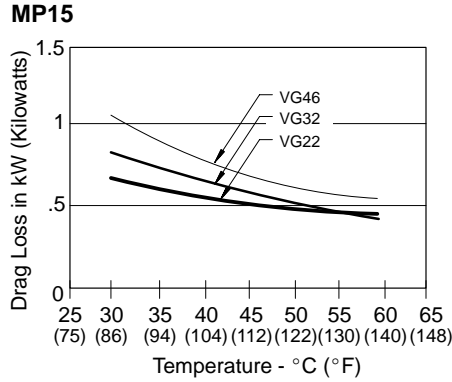
Electrical Losses in Motor - MP75



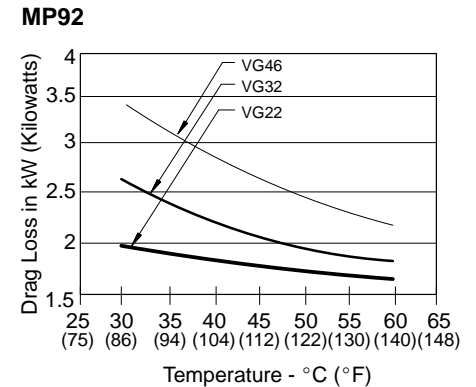
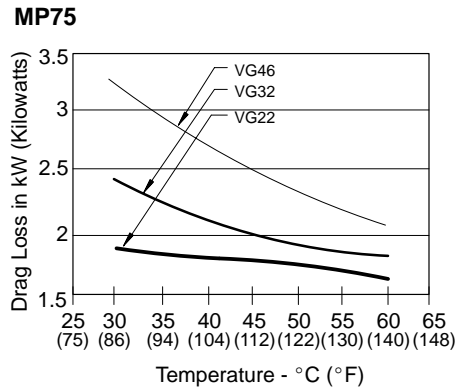
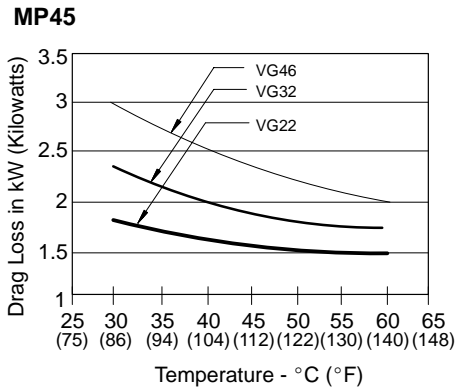
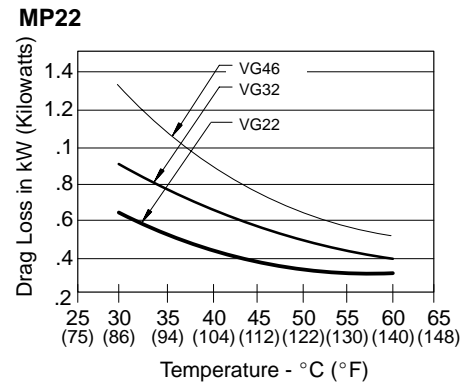
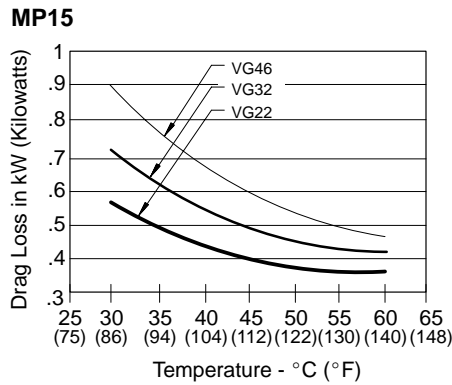
Electrical Losses in Motor - MP92



**Drag Loss (kW) for
1800 rpm (60 Hz)**



**Drag Loss (kW) for
1500 rpm (50 Hz)**



Cooling Capacity Requirements

Examples (60 Hz, 1800 r/min)

1. Replacing a conventional pump and motor in an existing system:

Given:
 Flow rate (variable) 100 l/min max.
 Pressure (compensator setting) 200 bar (2900 psi)
 Fluid ISO VG32 @32°C
 Average hydraulic power consumption (known duty cycle) 60% of max.

- Select a PVH57 and the corresponding Motor Pump model:

MP45-B1-R-P57C-A-F1-20

- Determine average input power:

Pump (PVH57 at 1800 rpm and 200 bar (2900 psi) requires –
 40 kW max., However,
 Average for duty cycle (60%) = 24 kW
 Drag loss (from curve) = 2.9
 Subtotal = 26.9 kW
 Electrical loss (from curve) = 1.9
 Input power total = 29 kW

- Calculate required cooling capacity:

Circuit heat (same as for existing system; value assumed for example) 8 kW
 + Electrical losses 1.9
 + Drag loss 2.9
Total Cooling Capacity req'd. 12.8 kW

2. Designing a new double pump system for:

- 130 l/min (variable) at 138 bar (2000 psi) and 158 l/min (fixed) at 105 bar (1500 psi)
- ISO VG32 oil at 50°C.
- Average hydraulic power consumption for planned duty cycle = 40% of max.
- Estimated heat generated in hydraulic circuit = 20% of installed hydraulic power.

- Select Motor Pump model (PVH74 and 35V):

Variable piston pump -
 P74C input power = 32 kW
 Fixed vane pump -
 V97N input power = 36 kW
 68 kW

Motor pump model: MP75-B1-P74C/V97N-A-F1-20

- Determine average input power:

Pumps require (max. total) of - 68 kW
 Average for cycle (40%) = 27.2 kW
 Drag loss (from curve, MP75 at 1800 rpm with VG32 at 50°C) = 2.3 kW
 29.5 kW

Approx. electrical loss
 (at 29.5 kW input) = 1.8 kW
 Total input power (ave.) = 31.3 kW

- Estimate heat normally generated in circuit:

Installed hydraulic power:
 (Input to pumps) = 68 kW
 20% = 13.6

- Calculate required cooling capacity:

Circuit heating 13.6 kW
 + Drag loss 2.3 kW
 + Elect. loss (for 31.3 kW input) 1.9 kW
 17.8 kW
Total Cooling Capacity req'd. 18 kW

Sound Level Data

Determining Sound Levels of the Integrated Motor Pump

Sound pressure levels for the complete line of Integrated Motor Pumps are shown in tables on the following pages:

MP15	page 16
MP22	17-18
MP45	31-32
MP75	49-50
MP92	51-52

The tabulated data shows sound levels for the complete motor pump packages, by specific pump size at specific operating pressures.

Single Pumps

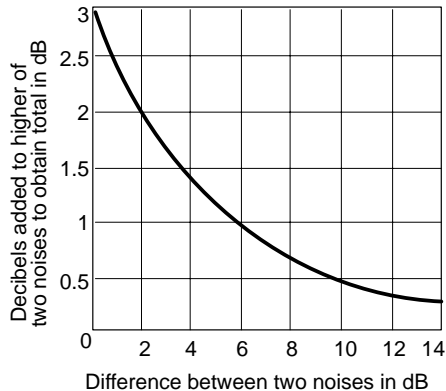
Select the motor pump size (MP**) for the application. Locate the pump displacement in the cm^3/rev column and move down the table to the desired operating pressure. The sound level in dB(A) represents the complete motor pump package.

Example: A MP15, using a PVQ variable piston pump with a displacement of $32 \text{ cm}^3/\text{rev}$ operating at 1800 rpm and 70 bar (1000 psi) will have a sound level of 64 dB(A).

Double Pumps

Select the motor pump size based on the two pumps with the required displacements and operating pressures. Refer to the appropriate motor pump sound level table and read the sound levels for both pumps. To combine these two sound levels, subtract the lower level from the higher and use the graph shown (upper right) to calculate the sound level of the motor pump package. This procedure also applies to double vane pumps.

Example: The 1800 rpm MP75 motor pump is chosen using a thru-drive PVH57 variable piston pump ($57 \text{ cm}^3/\text{rev}$) at 210 bar (3000 psi) and a PVQ40 ($40 \text{ cm}^3/\text{rev}$) at 175 bar (2500 psi). The two sound levels from the MP75 table are 74 dB(A) and 68 dB(A) respectively. Subtracting the lower level from the higher results in a 6 dB(A) difference. The graph shows that for a difference of 6 dB(A), 1 dB(A) should be added to the higher level sound (74). The combined value is 75 dB(A).



MP15 Performance Data

Input Shaft Power Vane Pumps																	
Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		18		27		36		40		45		55		67			
Pump Type		20V		20V		20V		25V		25V		25V		25V			
Rated Pressure		bar psi		210 3000						175 2500							
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800		
Max. Flow [†] @ Rated Pressure		l/min USgpm		22 6	27 7	35 9	42 11	48 13	58 15	52 14	62 16	58 15	70 18	72 19	86 23	90 24	108 29
Motor Output Power to Drive Pump* at Pressure of:		kW		35 bar (500 psi)		70 bar (1000 psi)		100 bar (1500 psi)		140 bar (2000 psi)		175 bar (2500 psi)		210 bar (3000 psi)			
		2	2	3	3	4	4	4	5	5	6	6	7	7	8		
		4	4	6	7	7	9	8	10	9	11	11	14	14	–	–	–
		6	7	8	10	11	13	12	15	14	–	–	–	–	–	–	–
		7	9	11	13	15	–	16	–	–	–	–	–	–	–	–	–
		9	11	14	16	–	–	–	–	–	–	–	–	–	–	–	–
		11	13	16	–	–	–	–	–	–	–	–	–	–	–	–	–

* NOTE: To find the shaft power to drive a single piston pump or vane pump at 1800 rpm, select the required displacement and operating pressure, then read across the chart for the kilowatt power input.

To determine the total input power for thru-drive pumps, add the kilowatts for the front pump and the rear pump together, at the selected operating pressures. The input kilowatts should not exceed 16 kW with only one pumping unit in operation, or with two pumping units in operation simultaneously.

For example: A thru-drive pump with a displacement of 20 cm³/rev will require 8 kW of power at 100 bar (1500 psi).
The second pump with a displacement of 18 cm³/rev will require 7 kW of power at 100 bar (1500 psi).
With both pumping units operating simultaneously, they require 15 kW of input power.

- [†]1. As operating pressure reduces to minimum, flow increases from chart values by approximately 4 to 5% for piston pumps and 10 to 12% for vane pumps.
2. As the motor pump reaches full load, the motor speed droop will reduce output flow from chart values by approximately 2%.

MP15 Performance Data

Input Shaft Power Double Vane Pumps

Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)	40		45		55		67		18		27		36		
Pump Type	25**V Shaft End Pump								**20V Cover End Pump						
Rated Pressure	bar	175								210					
	psi	2500								3000					
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800
Max. Flow [†] @ Rated Pressure	l/min USgpm	52 13	62 16	58 15	70 18	72 19	86 23	90 24	108 29	23 6	27 7	35 9	42 11	48 13	58 15
Motor Output Power to Drive Pump* at Pressure of:															
35 bar (500 psi)	kW	4	5	5	6	6	7	7	8	2	2	3	3	3	4
70 bar (1000 psi)	kW	8	10	9	11	12	14	14	–	3	4	6	7	8	9
100 bar (1500 psi)	kW	13	15	14	–	–	–	–	–	6	7	8	10	11	13
140 bar (2000 psi)	kW	16	–	–	–	–	–	–	–	8	9	11	13	15	–
175 bar (2500 psi)	kW	–	–	–	–	–	–	–	–	9	11	13	16	–	–
210 bar (3000 psi)	kW	–	–	–	–	–	–	–	–	11	13	–	–	–	–

* NOTE: To find the shaft power for a double vane pump at 1800 rpm, select the displacement and operating pressure for the shaft end and cover end pumps separately, read the kilowatt power input for each, and add the two together. If the shaft end and cover end pumps will not be loaded simultaneously, find the *maximum sum* of the two power requirements, considering their load cycles separately. The input kilowatts should not exceed 16 kW.

For example: A shaft end pump with a displacement of 40 cm³ will require 10 kilowatts at 70 bar (1000 psi). A cover end pump with a displacement of 18 cm³ will require 4 kilowatts at 70 bar (1000 psi). With both cartridges loaded simultaneously, the double vane pump will require 14 kilowatts of input power.

[†]1. As operating pressure reduces to minimum, flow increases from chart values by approximately 4 to 5% for piston pumps and 10 to 12% for vane pumps.

2. As the motor pump reaches full load, the motor speed droop will reduce output flow from chart values by approximately 2%.

Vane Pump Displacements

Frame Size	Code	cm ³ /rev
20V	5	18
	8	27
	11	36
25V	12	39
	14	45
	17	55
	21	67
35V	25	81
	30	97
	35	112
	38	121
45V	42	138
	50	162
	60	193

MP22 Performance Data

Input Shaft Power Piston Pumps											
Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		20		32		40		45		57	
Pump Type		PVQ		PVQ		PVQ		PVQ		PVH	
Rated Pressure	bar psi	210 3000		140 2000		210 3000		186 2700		250 3625	
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800
Max. Flow [†] @ Rated Pressure	l/min USgpm	28 7	34 9	48 13	58 15	56 15	67 18	63 17	76 20	82 22	98 26
Motor Output Power to Drive Pump* at Pressure of:											
35 bar (500 psi)	kW	3	3	4	5	5	6	5	5	7	10
70 bar (1000 psi)	kW	4	5	7	8	9	11	9	11	12	15
100 bar (1500 psi)	kW	7	8	10	12	13	15	14	17	18	21
140 bar (2000 psi)	kW	9	11	14	17	16	19	19	22	–	–
175 bar (2500 psi)	kW	11	13	–	–	20	–	–	–	–	–
210 bar (3000 psi)	kW	14	16	–	–	–	–	–	–	–	–

Input Shaft Power Piston Pumps											
Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		63		74		81		98		106	
Pump Type		PVH		PVH		PVH		PVH		PVH	
Rated Pressure	bar psi	210 3000		250 3625		210 3000		250 3625		210 3000	
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800
Max. Flow [†] @ Rated Pressure	l/min USgpm	92 24	110 29	110 29	132 35	117 31	140 37	150 40	170 45	152 40	183 48
Motor Output Power to Drive Pump* at Pressure of:											
35 bar (500 psi)	kW	9	11	9	12	11	13	13	16	14	17
70 bar (1000 psi)	kW	14	17	15	18	17	20	20	–	23	–
100 bar (1500 psi)	kW	19	23	21	–	23	–	–	–	–	–
140 bar (2000 psi)	kW	–	–	–	–	–	–	–	–	–	–
175 bar (2500 psi)	kW	–	–	–	–	–	–	–	–	–	–
210 bar (3000 psi)	kW	–	–	–	–	–	–	–	–	–	–

MP22 Performance Data

Input Shaft Power Vane Pumps

Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		18		27		36		40		45		55		67	
Pump Type		20V		20V		20V		25V		25V		25V		25V	
Rated Pressure	bar psi	210 3000						175 2500							
		1500		1800		1500		1800		1500		1800		1500	
Max. Flow [†] @ Rated Pressure	l/min USgpm	22 6	27 7	35 9	42 11	48 13	58 15	52 14	62 16	58 15	70 18	72 19	86 23	90 24	108 29
Motor Output Power to Drive Pump* at Pressure of:															
35 bar (500 psi)	kW	2	2	3	3	4	4	4	5	5	6	6	7	7	8
70 bar (1000 psi)	kW	4	4	6	7	7	9	8	10	9	11	11	14	14	17
100 bar (1500 psi)	kW	6	7	8	10	11	13	12	15	14	17	17	20	21	–
140 bar (2000 psi)	kW	7	9	11	13	15	18	16	19	18	22	22	–	–	–
175 bar (2500 psi)	kW	9	11	14	16	18	22	20	–	23	–	–	–	–	–
210 bar (3000 psi)	kW	11	13	16	20	22	–	–	–	–	–	–	–	–	–

* NOTE: To find the shaft power to drive a single piston pump or vane pump at 1800 rpm, select the required displacement and operating pressure, then read across the chart for the kilowatt power input.

To determine the total input power for thru-drive pumps, add the kilowatts for the front pump and the rear pump together, at the selected operating pressures. The input kilowatts should not exceed 23 kW with only one pumping unit in operation, or with two pumping units in operation simultaneously.

For example: A thru-drive pump with a displacement of 40 cm³/rev will require 11 kW of power at 70 bar (1000 psi).
The second pump with a displacement of 27 cm³/rev will require 10 kW of power at 100 bar (1500 psi).
With both pumping units operating simultaneously, they require 21 kW of input power.

[†]1. As operating pressure reduces to minimum, flow increases from chart values by approximately 4 to 5% for piston pumps and 10 to 12% for vane pumps.

2. As the motor pump reaches full load, the motor speed droop will reduce output flow from chart values by approximately 2%.

MP22 Performance Data

Input Shaft Power Double Vane Pumps									
Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		40		45		55		67	
Pump Type		25**V Shaft End Pump							
Rated Pressure	bar psi	175 2500							
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800
Max. Flow [†] @ Rated Pressure	l/min USgpm	52 13	62 16	58 15	70 18	72 19	86 23	90 24	108 29
Motor Output Power to Drive Pump* at Pressure of:									
35 bar (500 psi)	kW	4	5	5	6	6	7	7	8
70 bar (1000 psi)	kW	8	10	9	11	12	14	14	17
100 bar (1500 psi)	kW	13	15	14	17	17	20	21	–
140 bar (2000 psi)	kW	16	19	18	22	23	–	–	–
175 bar (2500 psi)	kW	20	–	23	–	–	–	–	–

Input Shaft Power Double Vane Pumps															
Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		18		27		36		40		45		55		67	
Pump Type		**20V Cover End Pump						**25V Cover End Pump							
Rated Pressure	bar psi	210 3000						175 2500							
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800
Max. Flow [†] @ Rated Pressure	l/min USgpm	23 6	27 7	35 9	42 11	58 15	58 15	52 13	62 16	58 15	70 18	72 19	86 23	90 24	108 29
Motor Output Power to Drive Pump* at Pressure of:															
35 bar (500 psi)	kW	2	2	3	3	3	4	4	5	5	6	6	7	7	8
70 bar (1000 psi)	kW	3	4	6	7	8	9	8	10	9	11	12	14	14	17
100 bar (1500 psi)	kW	6	7	8	10	11	13	13	15	14	17	17	20	21	–
140 bar (2000 psi)	kW	8	9	11	13	15	18	16	19	18	22	23	–	–	–
175 bar (2500 psi)	kW	9	11	13	16	18	22	20	–	23	–	–	–	–	–
210 bar (3000 psi)	kW	11	13	17	20	22	–	–	–	–	–	–	–	–	–

* NOTE: To find the shaft power for a double vane pump at 1800 rpm, select the displacement and operating pressure for the shaft end and cover end pumps separately, read the kilowatt power input for each, and add the two together. If the shaft end and cover end pumps will not be loaded simultaneously, find the *maximum sum* of the two power requirements, considering their load cycles separately. The input kilowatts should not exceed 23 kW.

For example: A shaft end pump with a displacement of 40 cm³ will require 15 kilowatts at 100 bar (1500 psi). A cover end pump with a displacement of 55 cm³ will require 7 kilowatts at 35 bar (500 psi). With both cartridges loaded simultaneously, the double vane pump will require 22 kilowatts of input power.

- †1. As operating pressure reduces to minimum, flow increases from chart values by approximately 4 to 5% for piston pumps and 10 to 12% for vane pumps.
2. As the motor pump reaches full load, the motor speed droop will reduce output flow from chart values by approximately 2%.

MP15 Sound Level Data

Piston Pumps

Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		20		32		40		45		57	
Pump Type		PVQ		PVQ		PVQ		PVQ		PVH	
Max. Operating Pressure @1800 rpm	bar psi	175 2500		100 1500		100 1500		70 1000		70 1000	
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800
Max. Flow	l/min USgpm	28 7	34 9	48 13	58 15	56 15	67 18	63 17	76 20	82 22	98 26
Sound Level at full flow and pressure of:											
35 bar (500 psi)	dB(A)	58	60	61	63	63	65	63	65	64	66
70 bar (1000 psi)	dB(A)	58	60	62	64	63	65	63	65	65	67
100 bar (1500 psi)	dB(A)	59	61	63	65	63	65	–	–	–	–
140 bar (2000 psi)	dB(A)	59	61	–	–	–	–	–	–	–	–
175 bar (2500 psi)	dB(A)	60	62	–	–	–	–	–	–	–	–

Vane Pumps

Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		18		27		36		40		45		55		67	
Pump Type		20V		20V		20V		25V		25V		25V		25V	
Max. Operating Pressure @1800 rpm	bar psi	210 3000		140 2000		100 1500		100 1500		70 1000		70 1000		35 500	
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800
Max. Flow	l/min USgpm	22 6	27 7	35 9	42 11	48 13	58 15	52 14	62 16	58 15	70 18	72 19	86 23	90 24	108 29
Sound Level at full flow and pressure of:															
35 bar (500 psi)	dB(A)	58	60	58	60	58	60	58	60	58	60	58	60	58	60
70 bar (1000 psi)	dB(A)	58	60	58	60	58	60	59	61	59	61	59	61	–	–
100 bar (1500 psi)	dB(A)	60	62	60	62	60	62	61	63	–	–	–	–	–	–
140 bar (2000 psi)	dB(A)	61	63	61	63	–	–	–	–	–	–	–	–	–	–
175 bar (2500 psi)	dB(A)	62	64	–	–	–	–	–	–	–	–	–	–	–	–
210 bar (3000 psi)	dB(A)	63	65	–	–	–	–	–	–	–	–	–	–	–	–

These sound levels are typical of the Integrated Motor Pump operating with the pump(s) shown at the listed conditions and are accurate within 2 dB(A), including unit to unit variability and data repeatability. In the case of piston pumps, the Motor Pump sound levels represent the loudest condition at either full flow or cutoff.

MP22 Sound Level Data

Piston Pumps

Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		20		32		40		45		57	
Pump Type		PVQ		PVQ		PVQ		PVQ		PVH	
Max. Operating Pressure @1800 rpm	bar psi	210 3000		140 2000		140 2000		140 2000		100 1500	
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800
Max. Flow	l/min USgpm	28 7	34 9	48 13	58 15	56 15	67 18	63 17	76 20	82 22	98 26
Sound Level at full flow and pressure of:											
35 bar (500 psi)	dB(A)	58	60	62	64	64	66	64	66	65	67
70 bar (1000 psi)	dB(A)	58	60	63	65	64	66	64	66	65	67
105 bar (1500 psi)	dB(A)	59	61	64	66	64	66	64	66	66	68
140 bar (2000 psi)	dB(A)	59	61	64	66	64	66	64	66	–	–
175 bar (2500 psi)	dB(A)	60	62	–	–	–	–	–	–	–	–
210 bar (3000 psi)	dB(A)	60	62	–	–	–	–	–	–	–	–

Piston Pumps (con't)

Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		63		74		81		98		106	
Pump Type		PVH		PVH		PVH		PVH		PVH	
Max. Operating Pressure @1800 rpm	bar psi	100 1500		70 1000		70 1000		35 500		35 500	
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800
Max. Flow	l/min USgpm	92 24	110 29	110 29	132 35	117 31	140 37	150 40	170 45	152 40	183 48
Sound Level at full flow and pressure of:											
35 bar (500 psi)	dB(A)	65	67	66	68	66	68	68	70	68	70
70 bar (1000 psi)	dB(A)	65	67	67	69	67	69	–	–	–	–
105 bar (1500 psi)	dB(A)	66	68	–	–	–	–	–	–	–	–
140 bar (2000 psi)	dB(A)	–	–	–	–	–	–	–	–	–	–
175 bar (2500 psi)	dB(A)	–	–	–	–	–	–	–	–	–	–
210 bar (3000 psi)	dB(A)	–	–	–	–	–	–	–	–	–	–

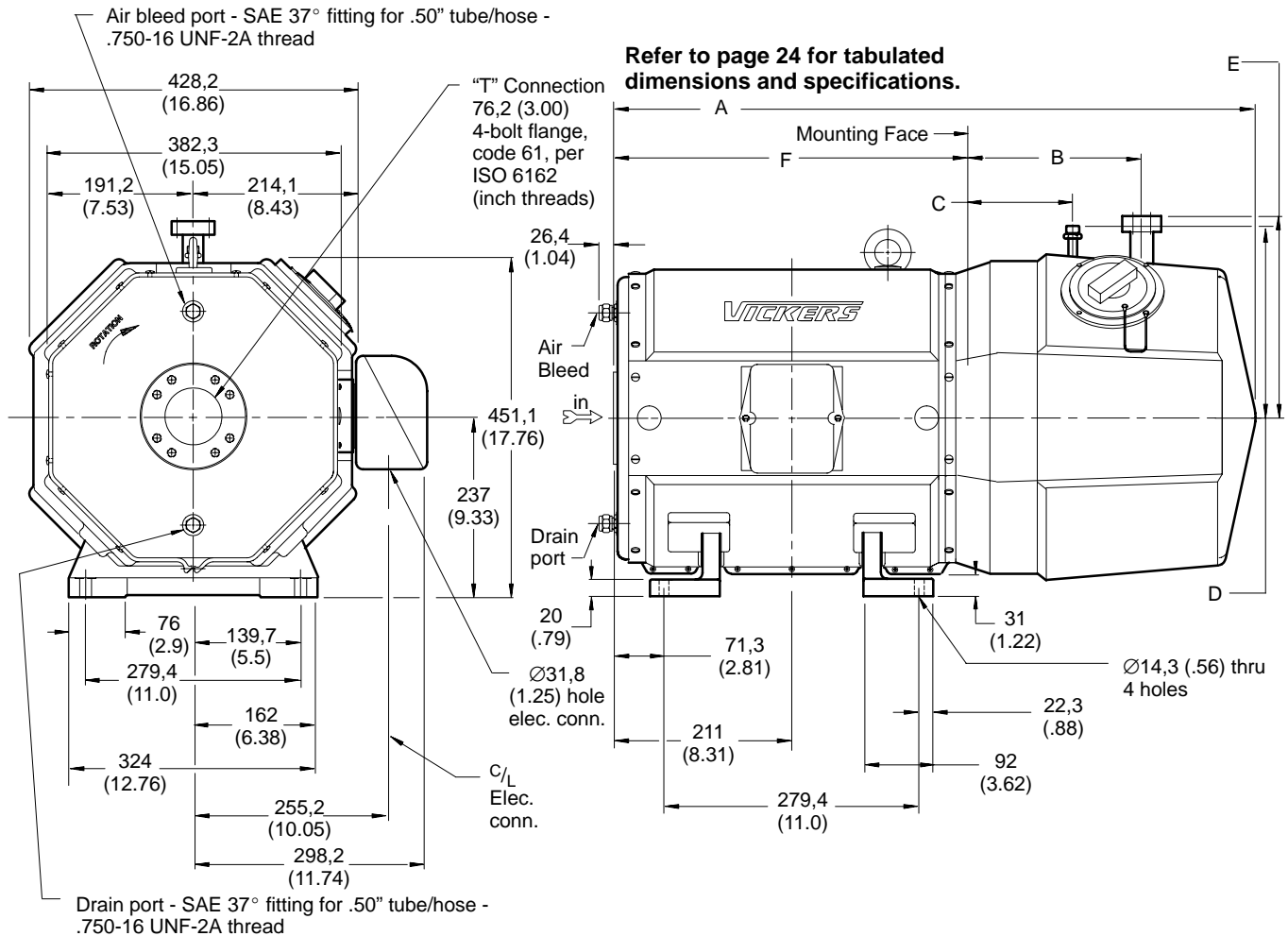
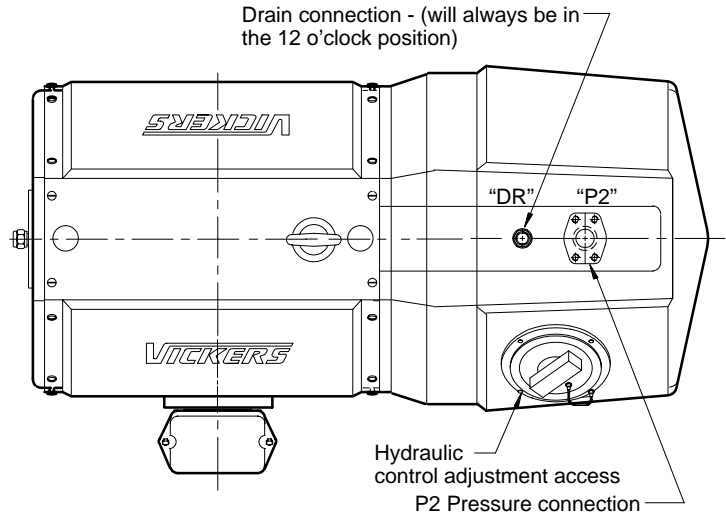
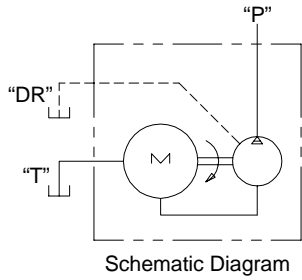
Vane Pumps

Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		18		27		36		40		45		55		67	
Pump Type		20V		20V		20V		25V		25V		25V		25V	
Max. Operating Pressure @1800 rpm	bar psi	210 3000		210 3000		175 2500		140 2000		140 2000		100 1500		70 1000	
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800
Max. Flow	l/min USgpm	22 6	27 7	35 9	42 11	48 13	58 15	52 14	62 16	58 15	70 18	72 19	86 23	90 24	108 29
Sound Level at full flow and pressure of:															
35 bar (500 psi)		dB(A)		58	60	58	60	58	60	58	60	58	60	58	60
70 bar (1000 psi)		dB(A)		58	60	58	60	58	60	59	61	59	61	59	61
100 bar (1500 psi)		dB(A)		60	62	60	62	60	62	61	63	61	63	61	63
140 bar (2000 psi)		dB(A)		62	64	62	64	62	64	63	65	63	65	–	–
175 bar (2500 psi)		dB(A)		63	65	63	65	63	65	–	–	–	–	–	–
210 bar (3000 psi)		dB(A)		64	66	64	66	–	–	–	–	–	–	–	–

These sound levels are typical of the Integrated Motor Pump operating with the pump(s) shown at the listed conditions and are accurate within 2 dB(A), including unit to unit variability and data repeatability. In the case of piston pumps, the Motor Pump sound levels represent the loudest condition at either full flow or cutoff.

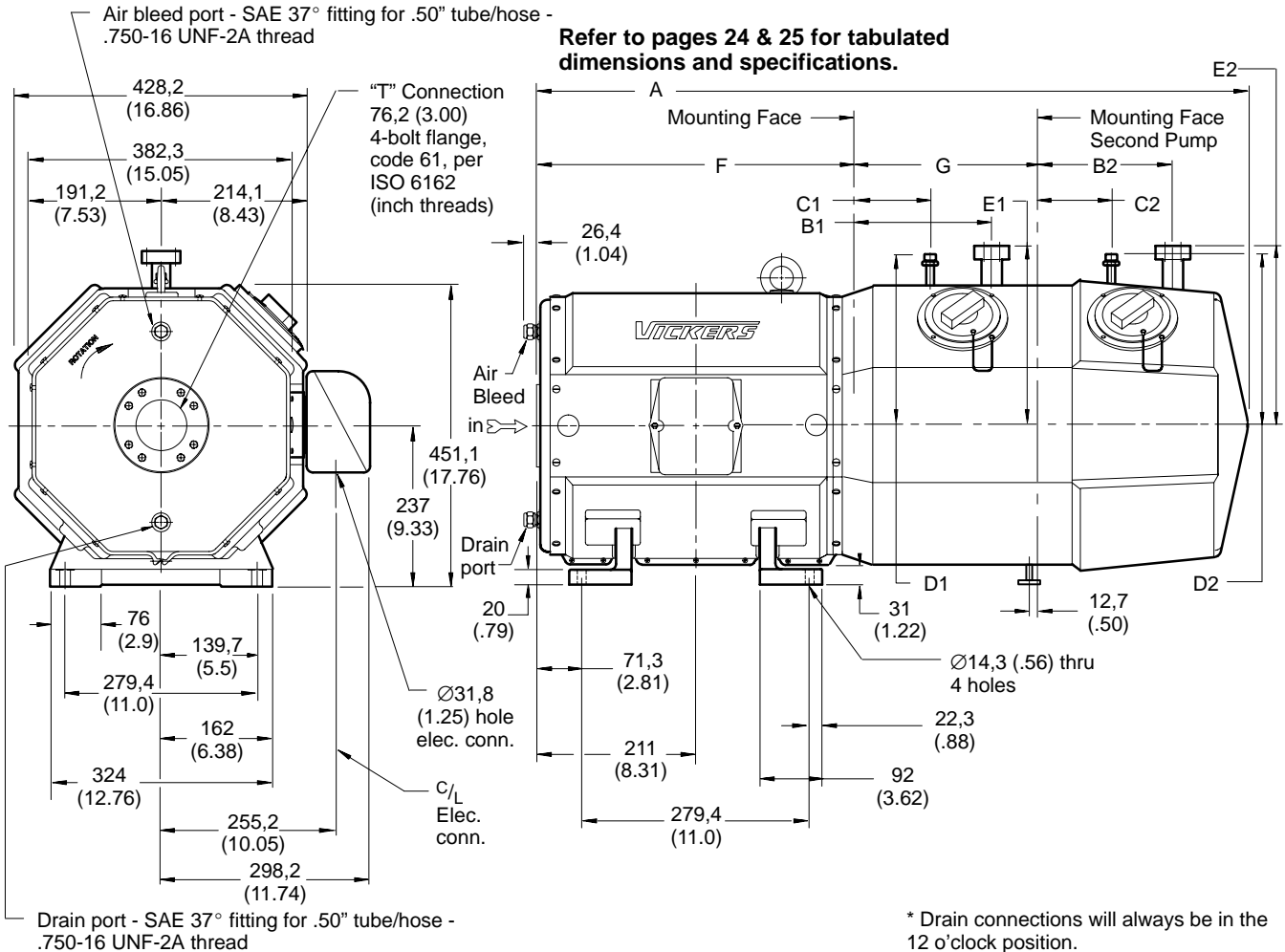
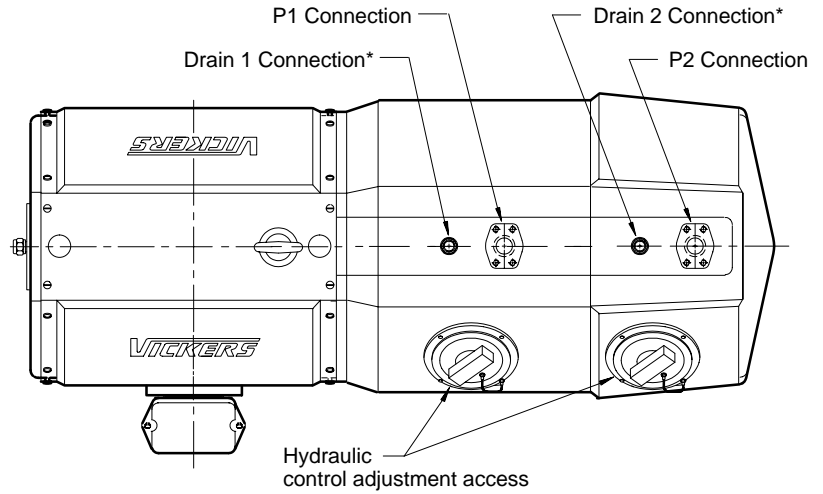
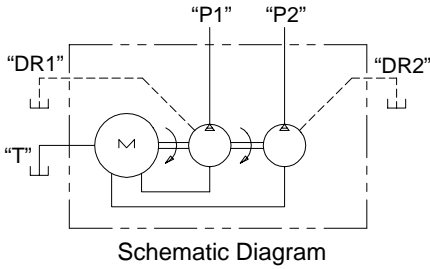
MP 15/22 Installation Dimensions

Single Pump - Piston



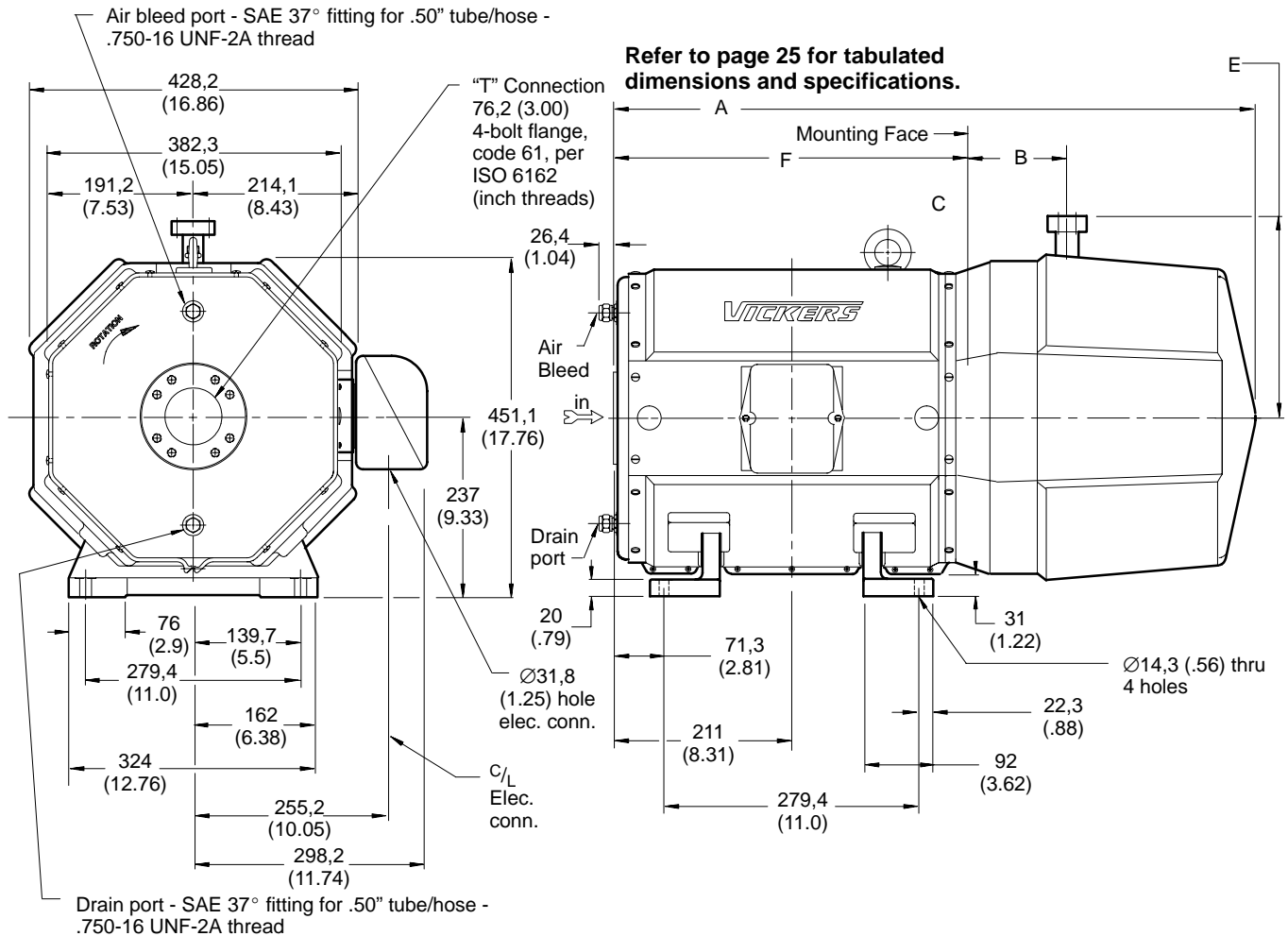
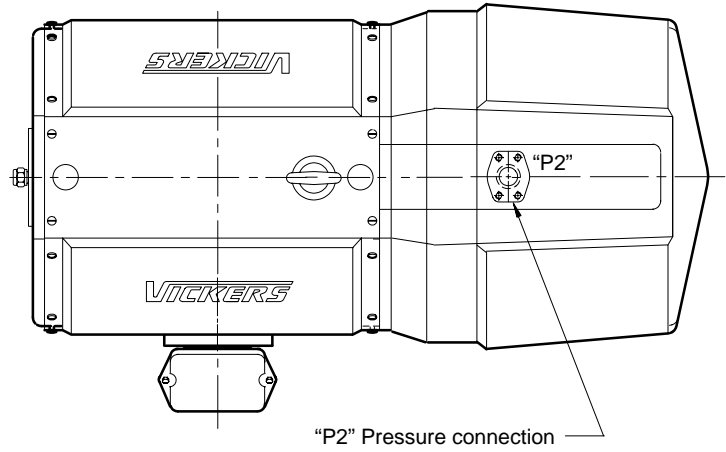
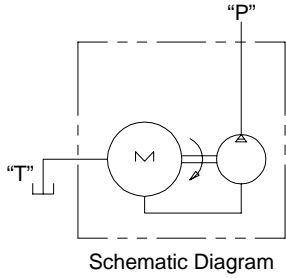
MP 15/22 Installation Dimensions

Double Pump - Piston



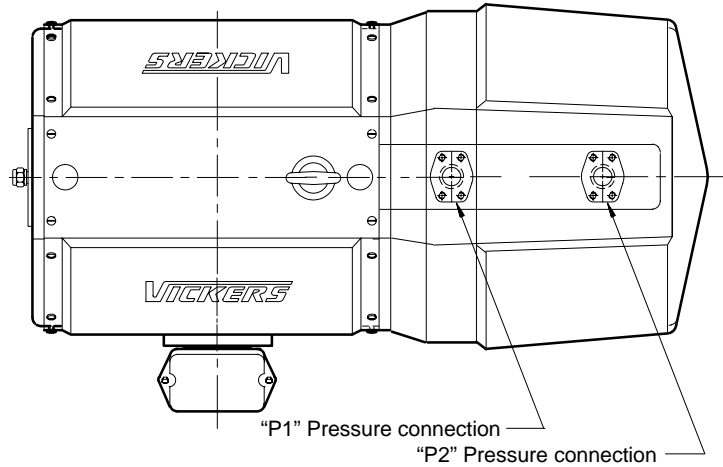
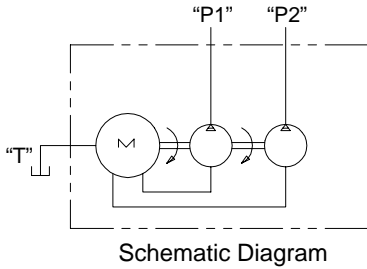
MP 15/22 Installation Dimensions

Single Pump - Vane

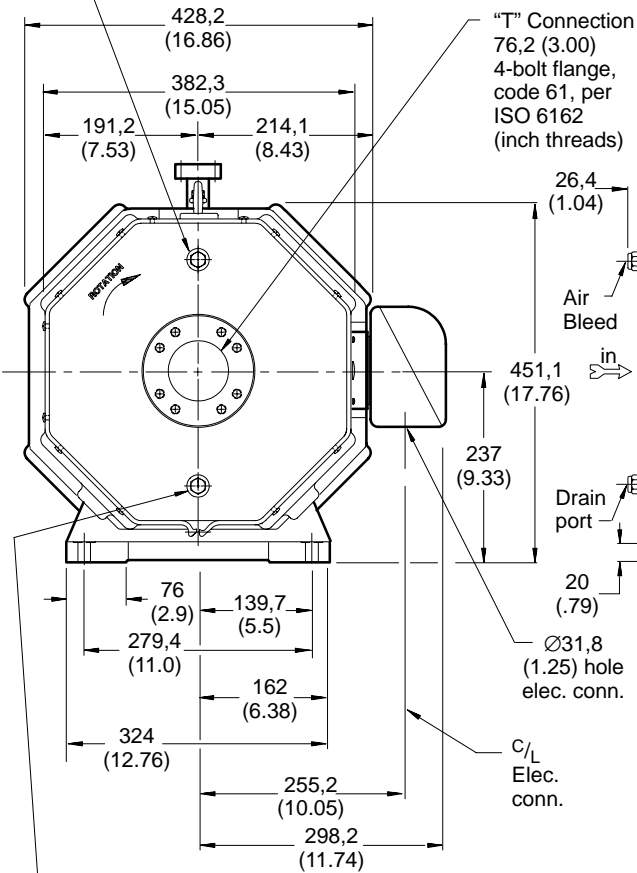


MP 15/22 Installation Dimensions

Double Pump - Vane

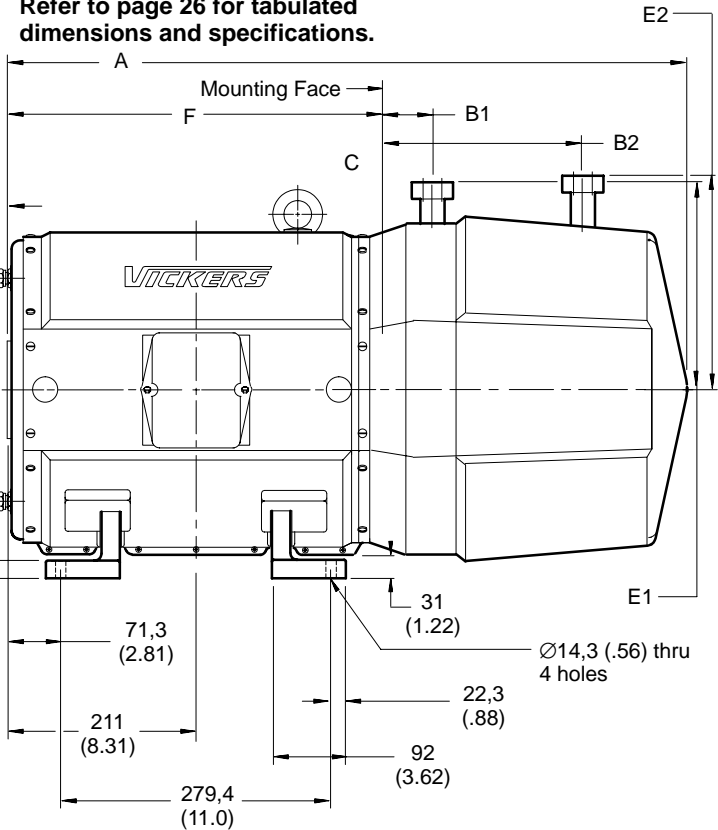


Air bleed port - SAE 37° fitting for .50" tube/hose - .750-16 UNF-2A thread



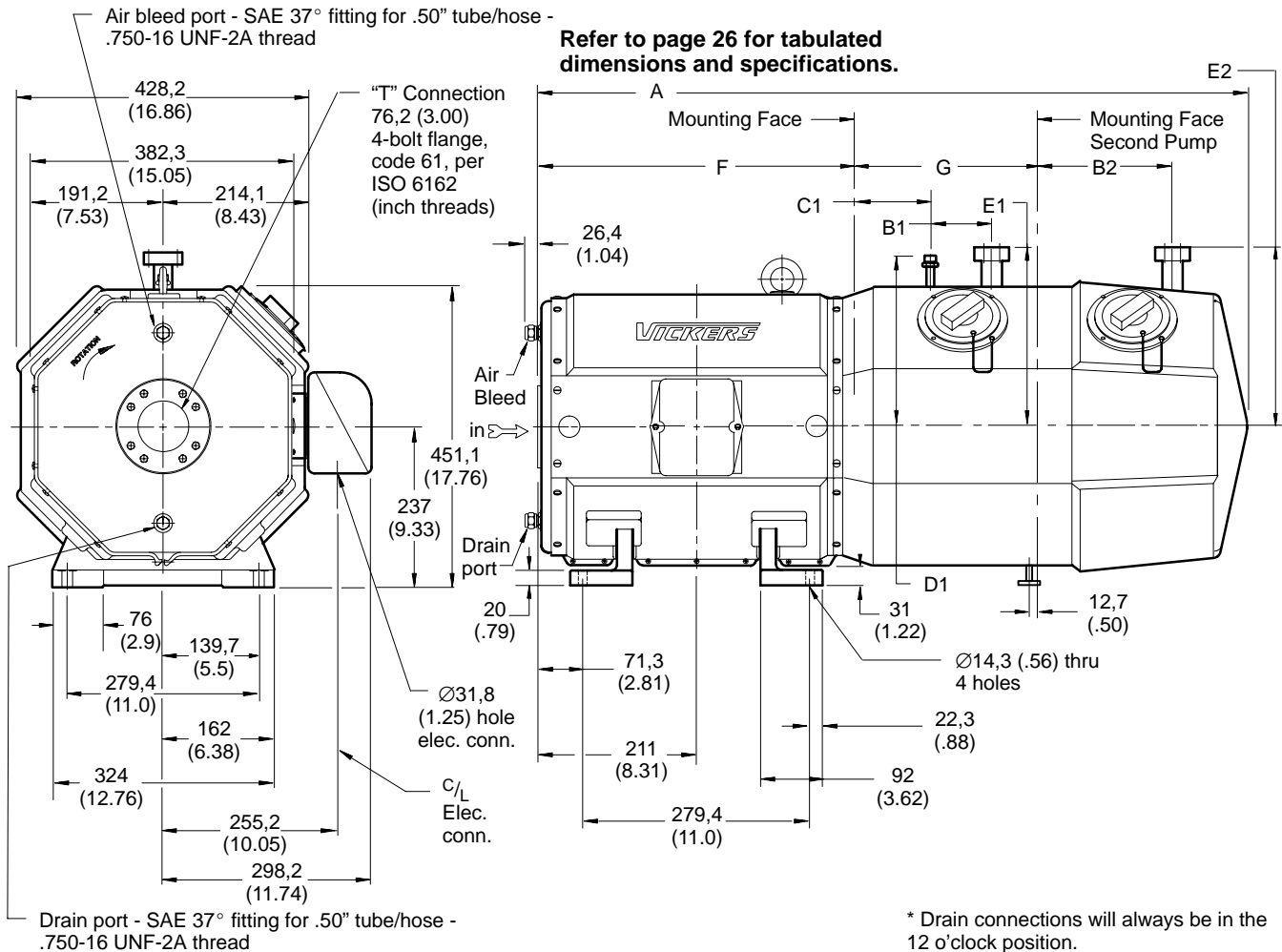
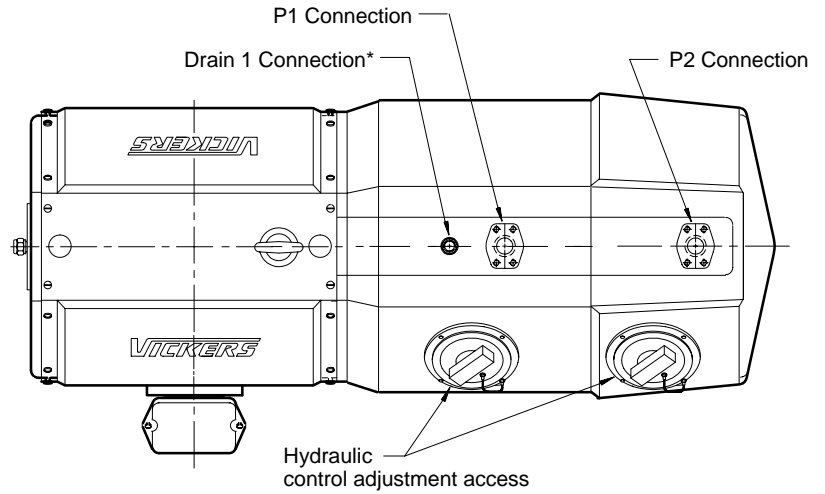
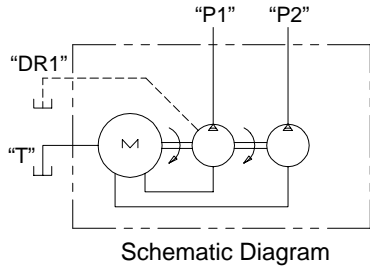
Drain port - SAE 37° fitting for .50" tube/hose - .750-16 UNF-2A thread

Refer to page 26 for tabulated dimensions and specifications.



MP 15/22 Installation Dimensions

Double Pump - Piston/Vane



MP 15/22 Tabulated Installation Dimensions & Specifications

Single Pump - Piston (from page 19)			Dimensions mm (inch)						Port Connection Sizes	
Single Piston Pump Displacement cm ³ /rev (in ³ /rev)	Pump Model Series	Est. Wt. kg (lbs)	A	B	C	D	E	F	* DR	** P2
57,4 (3.5)	PVH57	208 (460)	848,5 (33.4)	216,4 (8.52)	127 (5.00)	238 (9.37)	251 (9.88)	463 (18.23)	12,7 (.50)	25,4 (1.00)
73,7 (4.5)	PVH74 [†]	217 (480)	848,5 (33.4)	241,2 (9.50)	152,4 (6.00)	244 (9.60)	257 (10.12)	463 (18.23)	12,7 (.50)	25,4 (1.00)
98,3 (6.0)	PVH98 [†]	222 (489)	848,5 (33.4)	251,3 (9.89)	162,3 (6.39)	246,5 (9.70)	259,5 (10.22)	463 (18.23)	15,9 (.625)	25,4 (1.00)
21,1 (1.29)	PVQ20	190 (418)	848,5 (33.4)	174,5 (6.87)	39,4 (1.55)	241,3 (9.50)	263,5 (10.37)	433 (17.05)	12,7 (.50)	31,75 (1.25)
32,9 (2.01)	PVQ32	190 (418)	848,5 (33.4)	174,5 (6.87)	39,4 (1.55)	241,3 (9.50)	263,5 (10.37)	433 (17.05)	12,7 (.50)	31,75 (1.25)
41,0 (2.50)	PVQ40	196 (433)	848,5 (33.4)	191 (7.52)	77,7 (3.06)	241,3 (9.50)	240,3 (9.46)	433 (17.05)	15,9 (.625)	25,4 (1.00)
45,1 (2.75)	PVQ45	196 (433)	848,5 (33.4)	191 (7.52)	77,7 (3.06)	241,3 (9.50)	240,3 (9.46)	433 (17.05)	15,9 (.625)	25,4 (1.00)

Double Pump - Piston (from page 20)				Dimensions mm (inch)						
Double Piston Pump Displacement cm ³ /rev (in ³ /rev)	2nd Pump	Pump Model Series	Est. Wt. kg (lbs)	A	B1	B2	C1	C2	D1	D2
57,4 (3.5)	57,4 (3.5)	PVH57/PVH57 [†]	243 (536)	1123,5 (44.2)	216,4 (8.52)	216,4 (8.52)	127 (5.00)	127 (5.00)	238 (9.37)	238 (9.37)
57,4 (3.5)	21,1 (1.29)	PVH57/PVQ20 [†]	224 (494)	1123,5 (44.2)	216,4 (8.52)	174,5 (6.87)	127 (5.00)	39,4 (1.55)	238 (9.37)	241,3 (9.50)
57,4 (3.5)	32,9 (2.01)	PVH57/PVQ32 [†]	224 (494)	1123,5 (44.2)	216,4 (8.52)	174,5 (6.87)	127 (5.00)	39,4 (1.55)	238 (9.37)	241,3 (9.50)
57,4 (3.5)	41 (2.50)	PVH57/PVQ40 [†]	231 (509)	1123,5 (44.2)	216,4 (8.52)	191 (7.52)	127 (5.00)	77,7 (3.06)	238 (9.37)	241,3 (9.50)
57,4 (3.5)	45,1 (2.75)	PVH57/PVQ45 [†]	231 (509)	1123,5 (44.2)	216,4 (8.52)	191 (7.52)	127 (5.00)	77,7 (3.06)	238 (9.37)	241,3 (9.50)
41 (2.50)	21,1 (1.29)	PVQ40/PVQ20 [†]	212 (467)	1123,5 (44.2)	191 (7.52)	174,5 (6.87)	77,7 (3.06)	39,4 (1.55)	241,3 (9.50)	241,3 (9.50)
41 (2.50)	32,9 (2.01)	PVQ40/PVQ32 [†]	212 (467)	1123,5 (44.2)	191 (7.52)	174,5 (6.87)	77,7 (3.06)	39,4 (1.55)	241,3 (9.50)	241,3 (9.50)
41 (2.50)	41 (2.50)	PVQ40/PVQ40 [†]	219 (482)	1123,5 (44.2)	191 (7.52)	191 (7.52)	77,7 (3.06)	77,7 (3.06)	241,3 (9.50)	241,3 (9.50)
45,1 (2.75)	21,1 (1.29)	PVQ45/PVQ20 [†]	212 (467)	1123,5 (44.2)	191 (7.52)	174,5 (6.87)	77,7 (3.06)	39,4 (1.55)	241,3 (9.50)	241,3 (9.50)
45,1 (2.75)	32,9 (2.01)	PVQ45/PVQ32 [†]	212 (467)	1123,5 (44.2)	191 (7.52)	174,5 (6.87)	77,7 (3.06)	39,4 (1.55)	241,3 (9.50)	241,3 (9.50)
45,1 (2.75)	41 (2.50)	PVQ45/PVQ40 [†]	219 (482)	1123,5 (44.2)	191 (7.52)	191 (7.52)	77,7 (3.06)	77,7 (3.06)	241,3 (9.50)	241,3 (9.50)
45,1 (2.75)	45,1 (2.75)	PVQ45/PVQ45 [†]	219 (482)	1123,5 (44.2)	191 (7.52)	191 (7.52)	77,7 (3.06)	77,7 (3.06)	241,3 (9.50)	241,3 (9.50)

* ORFS Female thread fitting for SAE J1453.

** 4-bolt flange, code 61, per ISO 6162 inch threads.

† MP 22 model only

MP 15/22 Tabulated Installation Dimensions & Specifications

Double Pump - Piston (con't)	Dimensions mm (inch)				Port Connection Sizes			
	E1	E2	F	G	* DR1	** P1	* DR2	** P2
Pump Model Series								
PVH57/PVH57†	251 (9.88)	251 (9.88)	463 (18.2)	312,9 (12.32)	12,7 (.50)	25,4 (1.00)	12,7 (.50)	25,4 (1.00)
PVH57/PVQ20†	251 (9.88)	263,5 (10.4)	463 (18.2)	312,9 (12.32)	12,7 (.50)	25,4 (1.00)	12,7 (.50)	38,1 (1.25)
PVH57/PVQ32†	251 (9.88)	263,5 (10.4)	463 (18.2)	312,9 (12.32)	12,7 (.50)	25,4 (1.00)	12,7 (.50)	38,1 (1.25)
PVH57/PVQ40†	251 (9.88)	240,3 (9.46)	463 (18.2)	312,9 (12.32)	12,7 (.50)	25,4 (1.00)	15,9 (.625)	25,4 (1.00)
PVH57/PVQ45†	251 (9.88)	240,3 (9.46)	463 (18.2)	312,9 (12.32)	12,7 (.50)	25,4 (1.00)	15,9 (.625)	25,4 (1.00)
PVQ40/PVQ20†	240,3 (9.46)	263,5 (10.4)	433 (17.0)	254,8 (10.03)	15,9 (.62)	25,4 (1.00)	12,7 (.50)	38,1 (1.25)
PVQ40/PVQ32†	240,3 (9.46)	263,5 (10.4)	433 (17.0)	254,8 (10.03)	15,9 (.62)	25,4 (1.00)	12,7 (.50)	38,1 (1.25)
PVQ40/PVQ40†	240,3 (9.46)	240,3 (9.46)	433 (17.0)	254,8 (10.03)	15,9 (.62)	25,4 (1.00)	15,9 (.625)	25,4 (1.00)
PVQ45/PVQ20†	240,3 (9.46)	263,5 (10.4)	433 (17.0)	254,8 (10.03)	15,9 (.62)	25,4 (1.00)	12,7 (.50)	38,1 (1.25)
PVQ45/PVQ32†	240,3 (9.46)	263,5 (10.4)	433 (17.0)	254,8 (10.03)	15,9 (.62)	25,4 (1.00)	12,7 (.50)	38,1 (1.25)
PVQ45/PVQ40†	240,3 (9.46)	240,3 (9.46)	433 (17.0)	254,8 (10.03)	15,9 (.62)	25,4 (1.00)	15,9 (.625)	25,4 (1.00)
PVQ45/PVQ45†	240,3 (9.46)	240,3 (9.46)	433 (17.0)	254,8 (10.03)	15,9 (.62)	25,4 (1.00)	15,9 (.625)	25,4 (1.00)

Single Pump - Vane (from page 21)			Dimensions mm (inch)				Port Conn. Size
Single Van Pump Displacement cm ³ /rev (in ³ /rev)	Pump Model Series	Est. Wt. kg (lbs)	A	B	E	F	** P
18 (1.10) 27 (1.67) 36 (2.22)	20V	187 (413)	848,5 (33.4)	132,6 (5.22)	241,2 (9.50)	433 (17.05)	19,0 (.75)
40 (2.47) 45 (2.78) 55 (3.39) 67 (4.13)	25V	191 (420)	848,5 (33.4)	38,1 (1.50)	241,2 (9.50)	433 (17.05)	25,4 (1.00)

* ORFS Female thread fitting for SAE J1453.

** 4-bolt flange, code 61, per ISO 6162 inch threads.

† MP 22 model only

MP 15/22 Tabulated Installation Dimensions & Specifications

Double Pump - Vane (from page 22)				Dimensions mm (inch)						Port Conn. Sizes	
Double Pump - Vane Displ. cm ³ /rev (in ³ /rev) Shaft end Cover end	Pump Model Series	Est. Wt. kg (lbs)	A	B1	B2	E1	E2	F	**	**	
									P1	P2	
39 (2.47) 18 (1.10) 45 (2.78) 27 (1.67) 55 (3.39) 36 (2.22) 67 (4.13) 40 (2.47) 45 (2.78)	2520V	197 (435)	848,5 (33.4)	38,1 (1.50)	227,8 (8.97)	249 (9.80)	257,3 (10.13)	433 (17.05)	25,4 (1.00)	19 (.75)	
39 (2.47) 39 (2.47) 45 (2.78) 45 (2.78) 55 (3.39) 55 (3.39) 67 (4.13) 67 (4.13)	2525V†	202 (445)	848,5 (33.4)	38,1 (1.50)	237,2 (9.34)	249 (9.80)	239,6 (9.43)	433 (17.05)	25,4 (1.00)	25,4 (1.00)	

Double Pump - Piston/Vane (from page 23)				Dimensions mm (inch)							
Double Pump - Piston/Vane Displacement cm ³ /rev (in ³ /rev) Piston Vane		Pump Model Series	Est. Wt. kg (lbs)	A	B1	B2	C	D1	E1	E2	
57,4 (3.5)	18 (1.1)										PVH57/20V†
57,4 (3.5)	39 (2.47)	PVH57/25V†	225 (496)	1123,5 (44.2)	216,4 (8.52)	38,1 (1.50)	127 (5.00)	238 (9.37)	251 (9.88)	241,2 (9.50)	
73,7 (4.5)	18 (1.1)	PVH74/20V†	231 (509)	1123,5 (44.2)	241,2 (9.50)	132,6 (5.22)	152,4 (6.00)	244 (9.60)	257 (10.1)	241,2 (9.50)	
73,7 (4.5)	39 (2.47)	PVH74/25V†	234 (516)	1123,5 (44.2)	241,2 (9.50)	38,1 (1.50)	152,4 (6.00)	244 (9.60)	257 (10.1)	241,2 (9.50)	
41,0 (2.50)	18 (1.1)	PVQ40/20V	210 (462)	1123,5 (44.2)	191 (7.52)	132,6 (5.22)	77,7 (3.06)	241,3 (9.50)	240,3 (9.46)	241,2 (9.50)	
41,0 (2.50)	39 (2.47)	PVQ40/25V	213 (469)	1123,5 (44.2)	191 (7.52)	38,1 (1.50)	77,7 (3.06)	241,3 (9.50)	240,3 (9.46)	241,2 (9.50)	
45,1 (2.75)	18 (1.1)	PVQ45/20V	210 (462)	1123,5 (44.2)	191 (7.52)	132,6 (5.22)	77,7 (3.06)	241,3 (9.50)	240,3 (9.46)	241,2 (9.50)	
45,1 (2.75)	39 (2.47)	PVQ45/25V	213 (469)	1123,5 (44.2)	191 (7.52)	38,1 (1.50)	77,7 (3.06)	241,3 (9.50)	240,3 (9.46)	241,2 (9.50)	

Pump Model Series	Dimensions mm (inch)		Port Connection Sizes		
	F	G	* DR1	** P1	** P2
PVH57/20V	463 (18.23)	312,9 (12.32)	12,7 (.50)	25,4 (1.00)	19 (.75)
PVH57/25V	463 (18.23)	312,9 (12.32)	12,7 (.50)	25,4 (1.00)	25,4 (1.00)
PVH74/20V	463 (18.23)	335,6 (13.22)	12,7 (.50)	25,4 (1.00)	19 (.75)
PVH74/25V	463 (18.23)	335,6 (13.22)	12,7 (.50)	25,4 (1.00)	25,4 (1.00)
PVQ40/20V	433 (17.04)	254,8 (10.03)	15,9 (.62)	25,4 (1.00)	19 (.75)
PVQ40/25V	433 (17.04)	254,8 (10.03)	15,9 (.62)	25,4 (1.00)	25,4 (1.00)
PVQ45/20V	433 (17.04)	254,8 (10.03)	15,9 (.62)	25,4 (1.00)	19 (.75)
PVQ45/25V	433 (17.04)	254,8 (10.03)	15,9 (.62)	25,4 (1.00)	25,4 (1.00)

* ORFS Female thread fitting for SAE J1453. ** 4-bolt flange, code 61, per ISO 6162 inch threads. † MP 22 model only

MP45 Performance Data

Input Shaft Power Piston Pumps													
Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		20		32		40		45		57		63	
Pump Type		PVQ		PVQ		PVQ		PVQ		PVH		PVH	
Rated Pressure	bar psi	210 3000		140 2000		210 3000		186 2700		250 3625		210 3000	
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800
Max. Flow [†] @ Rated Pressure	l/min USgpm	28 7	34 9	48 13	58 15	56 15	67 18	63 17	76 20	82 22	98 26	92 24	110 29
Motor Output Power to Drive Pump* at Pressure of:													
35 bar (500 psi)	kW	3	3	4	5	5	6	5	5	7	10	9	11
70 bar (1000 psi)	kW	4	5	7	8	9	11	9	11	12	15	14	17
100 bar (1500 psi)	kW	7	8	10	12	13	15	14	17	18	21	19	23
140 bar (2000 psi)	kW	9	11	14	17	16	19	19	22	23	27	25	30
175 bar (2500 psi)	kW	11	13	–	–	20	24	24	28	28	33	30	36
210 bar (3000 psi)	kW	14	16	–	–	24	29	–	–	33	40	37	44
250 bar (3625 psi)	kW	–	–	–	–	–	–	–	–	41	–	–	–

Piston Pumps (con't)													
Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		74		81		98		106		131**		141**	
Pump Type		PVH		PVH		PVH		PVH		PVH		PVH	
Rated Pressure	bar psi	250 3625		210 3000		250 3625		210 3000		250 3625		210 3000	
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800
Max. Flow [†] @ Rated Pressure	l/min USgpm	110 29	132 35	117 31	140 37	150 40	170 45	152 40	183 48	187 50	225 59	201 53	242 64
Motor Output Power to Drive Pump* at Pressure of:													
35 bar (500 psi)	kW	9	12	11	13	13	16	14	17	18	21	19	23
70 bar (1000 psi)	kW	15	18	17	20	20	25	23	27	27	33	30	36
100 bar (1500 psi)	kW	21	25	23	27	31	36	33	39	39	47	43	–
140 bar (2000 psi)	kW	27	32	29	35	38	46	42	–	–	–	–	–
175 bar (2500 psi)	kW	33	40	37	44	47	–	–	–	–	–	–	–
210 bar (3000 psi)	kW	40	–	44	–	–	–	–	–	–	–	–	–

MP45 Performance Data

Input Shaft Power Vane Pumps

Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		18	27	36	40	45	55	67								
Pump Type		20V	20V	20V	25V	25V	25V	25V								
Rated Pressure	bar psi	210 3000						175 2500								
		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	
Max. Flow [†] @ Rated Pressure	l/min USgpm	22 6	27 7	35 9	42 11	48 13	58 15	52 14	62 16	58 15	70 18	72 19	86 23	90 24	108 29	
Motor Output Power to Drive Pump* at Pressure of:																
35 bar (500 psi)	kW	2	2	3	3	4	4	4	5	5	6	6	7	7	8	
70 bar (1000 psi)	kW	4	4	6	7	7	9	8	10	9	11	11	14	14	17	
100 bar (1500 psi)	kW	6	7	8	10	11	13	12	15	14	17	17	20	21	25	
140 bar (2000 psi)	kW	7	9	11	13	15	18	16	19	18	22	22	27	27	33	
175 bar (2500 psi)	kW	9	11	14	16	18	22	20	24	23	27	28	33	34	41	
210 bar (3000 psi)	kW	11	13	16	20	22	26	-	-	-	-	-	-	-	-	

Vane Pumps (con't)

Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		81	97	112	121	138	162	193								
Pump Type		35V	35V	35V	35V	45V	45V	45V								
Rated Pressure	bar psi	175 2500														
		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	
Max. Flow [†] @ Rated Pressure	l/min USgpm	106 28	127 34	132 35	158 42	158 42	190 50	170 45	204 54	192 51	230 61	225 59	270 71	258 68	310 82	
Motor Output Power to Drive Pump* at Pressure of:																
35 bar (500 psi)	kW	8	10	10	12	12	14	12	15	14	17	17	20	20	24	
70 bar (1000 psi)	kW	17	20	20	24	23	28	25	30	28	34	33	40	40	-	
100 bar (1500 psi)	kW	25	30	30	36	35	42	37	45	43	-	-	-	-	-	
140 bar (2000 psi)	kW	33	39	39	47	45	-	-	-	-	-	-	-	-	-	
175 bar (2500 psi)	kW	41	-	-	-	-	-	-	-	-	-	-	-	-	-	

* NOTE: To find the shaft power to drive a single piston pump or vane pump at 1800 rpm, select the required displacement and operating pressure, then read across the chart for the kilowatt power input.

To determine the total input power for thru-drive pumps, add the kilowatts for the front pump and the rear pump together, at the selected operating pressures. The input kilowatts should not exceed 47 kW with only one pumping unit in operation, or with two pumping units in operation simultaneously.

For example: A thru-drive pump (piston) with a displacement of 74 cm³/rev will require 32 kW of power at 140 bar (2000 psi).
The second pump (vane) with a displacement of 40 cm³/rev will require 10 kW of power at 70 bar (1000 psi).
With both pumping units operating simultaneously, they require 42 kW of input power.

[†]1. As operating pressure reduces to minimum, flow increases from chart values by approximately 4 to 5% for piston pumps and 10 to 12% for vane pumps.

2. As the motor pump reaches full load, the motor speed droop will reduce output flow from chart values by approximately 2%.

MP45 Performance Data

Input Shaft Power Double Vane Pumps											
Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		40		45		55		67			
Pump Type		25**V Shaft End Pump									
Rated Pressure		bar psi		175 2500							
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800		
Max. Flow [†] @ Rated Pressure		l/min USgpm		52 13	62 16	58 15	70 18	72 19	86 23	90 24	108 29
Motor Output Power to Drive Pump* at Pressure of:		kW									
35 bar (500 psi)		4	5	5	6	6	7	7	8		
70 bar (1000 psi)		8	10	9	11	12	14	14	17		
100 bar (1500 psi)		13	15	14	17	17	20	21	25		
140 bar (2000 psi)		16	19	18	22	23	27	28	33		
175 bar (2500 psi)		20	24	23	27	28	33	34	41		

Input Shaft Power Double Vane Pumps											
Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		81		97		112		121			
Pump Type		35**V Shaft End Pump									
Rated Pressure		bar psi		175 2500							
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800		
Max. Flow [†] @ Rated Pressure		l/min USgpm		106 28	127 34	132 35	158 42	158 42	190 50	170 45	204 54
Motor Output Power to Drive Pump* at Pressure of:		kW									
35 bar (500 psi)		8	10	10	12	12	14	13	15		
70 bar (1000 psi)		17	20	20	24	23	28	25	30		
100 bar (1500 psi)		25	30	30	36	35	42	38	45		
140 bar (2000 psi)		33	39	39	47	46	–	–	–		
175 bar (2500 psi)		41	–	–	–	–	–	–	–		

* NOTE: To find the shaft power for a double vane pump at 1800 rpm, select the displacement and operating pressure for the shaft end and cover end pumps separately, read the kilowatt power input for each, and add the two together. If the shaft end and cover end pumps will not be loaded simultaneously, find the *maximum sum* of the two power requirements, considering their load cycles separately. The input kilowatts should not exceed 45 kW.

For example: A shaft end pump with a displacement of 45 cm³ will require 27 kilowatts at 175 bar (2500 psi). A cover end pump with a displacement of 27 cm³ will require 16 kilowatts at 175 bar (2500 psi). With both cartridges loaded simultaneously, the double vane pump will require 43 kilowatts of input power.

- †1. As operating pressure reduces to minimum, flow increases from chart values by approximately 4 to 5% for piston pumps and 10 to 12% for vane pumps.
2. As the motor pump reaches full load, the motor speed droop will reduce output flow from chart values by approximately 2%.

MP45 Performance Data

Input Shaft Power Double Vane Pumps

Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		18		27		36		40		45		55		67	
Pump Type		**20V Cover End Pump						**25V Cover End Pump							
Rated Pressure		210 3000						175 2500							
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800
Max. Flow [†] @ Rated Pressure	l/min USgpm	23 6	27 7	35 9	42 11	48 13	58 15	52 13	62 16	58 15	70 18	72 19	86 23	90 24	108 29
Motor Output Power to Drive Pump* at Pressure of:															
35 bar (500 psi)	kW	2	2	3	3	3	4	4	5	5	6	6	7	7	8
70 bar (1000 psi)	kW	3	4	6	7	8	9	8	10	9	11	12	14	14	17
100 bar (1500 psi)	kW	6	7	8	10	11	13	13	15	14	17	17	20	21	25
140 bar (2000 psi)	kW	8	9	11	13	15	18	16	19	18	22	23	27	28	33
175 bar (2500 psi)	kW	9	11	13	16	18	22	20	24	23	27	28	33	34	41
210 bar (3000 psi)	kW	11	13	17	20	22	26	-	-	-	-	-	-	-	-

* NOTE: To find the shaft power for a double vane pump at 1800 rpm, select the displacement and operating pressure for the shaft end and cover end pumps separately, read the kilowatt power input for each, and add the two together. If the shaft end and cover end pumps will not be loaded simultaneously, find the *maximum sum* of the two power requirements, considering their load cycles separately. The input kilowatts should not exceed 45 kW.

For example: A shaft end pump with a displacement of 45 cm³ will require 27 kilowatts at 175 bar (2500 psi). A cover end pump with a displacement of 27 cm³ will require 16 kilowatts at 175 bar (2500 psi). With both cartridges loaded simultaneously, the double vane pump will require 43 kilowatts of input power.

- †1. As operating pressure reduces to minimum, flow increases from chart values by approximately 4 to 5% for piston pumps and 10 to 12% for vane pumps.
2. As the motor pump reaches full load, the motor speed droop will reduce output flow from chart values by approximately 2%.

MP45 Sound Level Data

Piston Pumps

Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		20		32		40		45		57	
Pump Type		PVQ		PVQ		PVQ		PVQ		PVH	
Max. Operating Pressure @1800 rpm	bar psi	210 3000		140 2000		210 3000		186 2700		210 3000	
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800
Max. Flow	l/min USgpm	28 7	34 9	48 13	58 15	56 15	67 18	63 17	76 20	82 22	98 26
Sound Level at full flow and pressure of:											
35 bar (500 psi)	dB(A)	58	60	62	64	64	66	64	66	66	68
70 bar (1000 psi)	dB(A)	58	60	63	65	65	67	65	67	67	69
100 bar (1500 psi)	dB(A)	59	61	64	66	65	67	65	67	68	70
140 bar (2000 psi)	dB(A)	59	61	64	66	65	67	65	67	68	70
175 bar (2500 psi)	dB(A)	60	62	–	–	66	68	67	69	70	72
210 bar (3000 psi)	dB(A)	60	62	–	–	67	69	–	–	70	72

Piston Pumps (con't)

Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		63		74		81		98		106	
Pump Type		PVH		PVH		PVH		PVH		PVH	
Max. Operating Pressure @1800 rpm	bar psi	175 2500		175 2500		175 2500		140 2000		140 2000	
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800
Max. Flow	l/min USgpm	92 24	110 29	110 29	132 35	117 31	140 37	150 40	170 45	152 40	183 48
Sound Level at full flow and pressure of:											
35 bar (500 psi)	dB(A)	66	68	68	70	68	70	69	71	69	71
70 bar (1000 psi)	dB(A)	67	69	68	70	68	70	70	72	70	72
100 bar (1500 psi)	dB(A)	68	70	68	70	68	70	70	72	70	72
140 bar (2000 psi)	dB(A)	68	70	69	71	69	71	71	72	71	72
175 bar (2500 psi)	dB(A)	70	72	70	72	70	72	–	–	–	–
210 bar (3000 psi)	dB(A)	–	–	–	–	–	–	–	–	–	–

MP45 Sound Level Data (con't)

Vane Pumps

Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		18		27		36		40		45		55		67		
Pump Type		20V		20V		20V		25V		25V		25V		25V		
Max. Operating Pressure @1800 rpm	bar psi	210 3000		210 3000		210 3000		175 2500		175 2500		175 2500		175 2500		
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	
Max. Flow	l/min	22	27	35	42	48	58	52	62	58	70	72	86	90	108	
	USgpm	6	7	9	11	13	15	14	16	15	18	19	23	24	29	
Sound Level at full flow and pressure of:	35 bar (500 psi)	dB(A)	58	60	58	60	58	60	58	60	58	60	58	60	58	60
	70 bar (1000 psi)	dB(A)	58	60	58	60	58	60	59	61	59	61	59	61	59	61
	100 bar (1500 psi)	dB(A)	60	62	60	62	60	62	61	63	61	63	61	63	61	63
	140 bar (2000 psi)	dB(A)	62	64	62	64	62	64	63	65	63	65	63	65	63	65
	175 bar (2500 psi)	dB(A)	63	65	63	65	63	65	64	66	64	66	64	66	64	66
	210 bar (3000 psi)	dB(A)	64	66	64	66	64	66	-	-	-	-	-	-	-	-

These sound levels are typical of the Integrated Motor Pump operating with the pump(s) shown at the listed conditions and are accurate within 2 dB(A), including unit to unit variability and data repeatability. In the case of piston pumps, the Motor Pump sound levels represent the loudest condition at either full flow or cutoff.

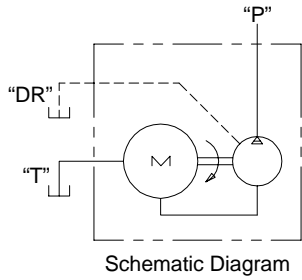
Vane Pumps (con't)

Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		81		97		112		121		138		162		193		
Pump Type		35V		35V		35V		35V		45V		45V		45V		
Max. Operating Pressure @1800 rpm	bar psi	140 2000		100 1500		100 1500		100 1500		70 1000		70 1000		35 500		
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	
Max. Flow	l/min	106	127	132	158	158	190	170	204	192	230	225	270	258	310	
	USgpm	28	34	35	42	42	50	45	54	51	61	59	71	68	82	
Sound Level at full flow and pressure of:	35 bar (500 psi)	dB(A)	60	62	60	62	60	62	60	62	64	66	64	66	64	66
	70 bar (1000 psi)	dB(A)	61	63	61	63	61	63	61	63	65	67	65	67	-	-
	100 bar (1500 psi)	dB(A)	63	65	63	65	63	65	63	65	-	-	-	-	-	-
	140 bar (2000 psi)	dB(A)	65	67	-	-	-	-	-	-	-	-	-	-	-	-
	175 bar (2500 psi)	dB(A)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	210 bar (3000 psi)	dB(A)	-	-	-	-	-	-	-	-	-	-	-	-	-	-

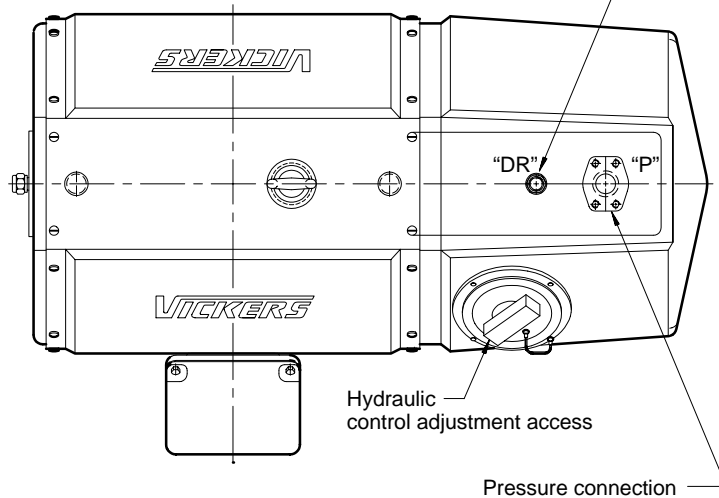
These sound levels are typical of the Integrated Motor Pump operating with the pump(s) shown at the listed conditions and are accurate within 2 dB(A), including unit to unit variability and data repeatability. In the case of piston pumps, the Motor Pump sound levels represent the loudest condition at either full flow or cutoff.

MP 45 Installation Dimensions

Single Pump - Piston

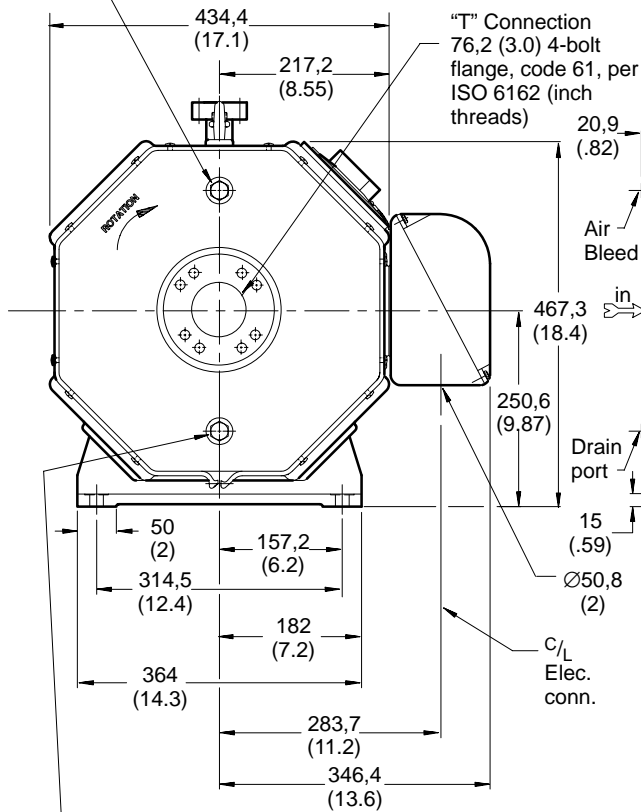


Drain connection - (will always be in the 12 o'clock position)

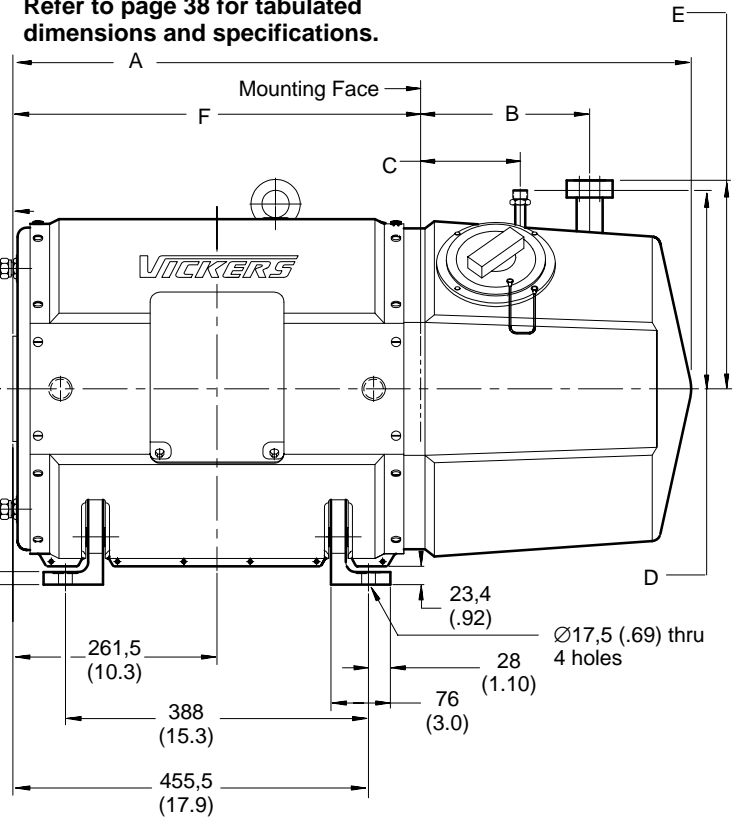


Air bleed port - SAE 37° fitting for .50" tube/hose - .750-16 UNF-2A thread

Refer to page 38 for tabulated dimensions and specifications.

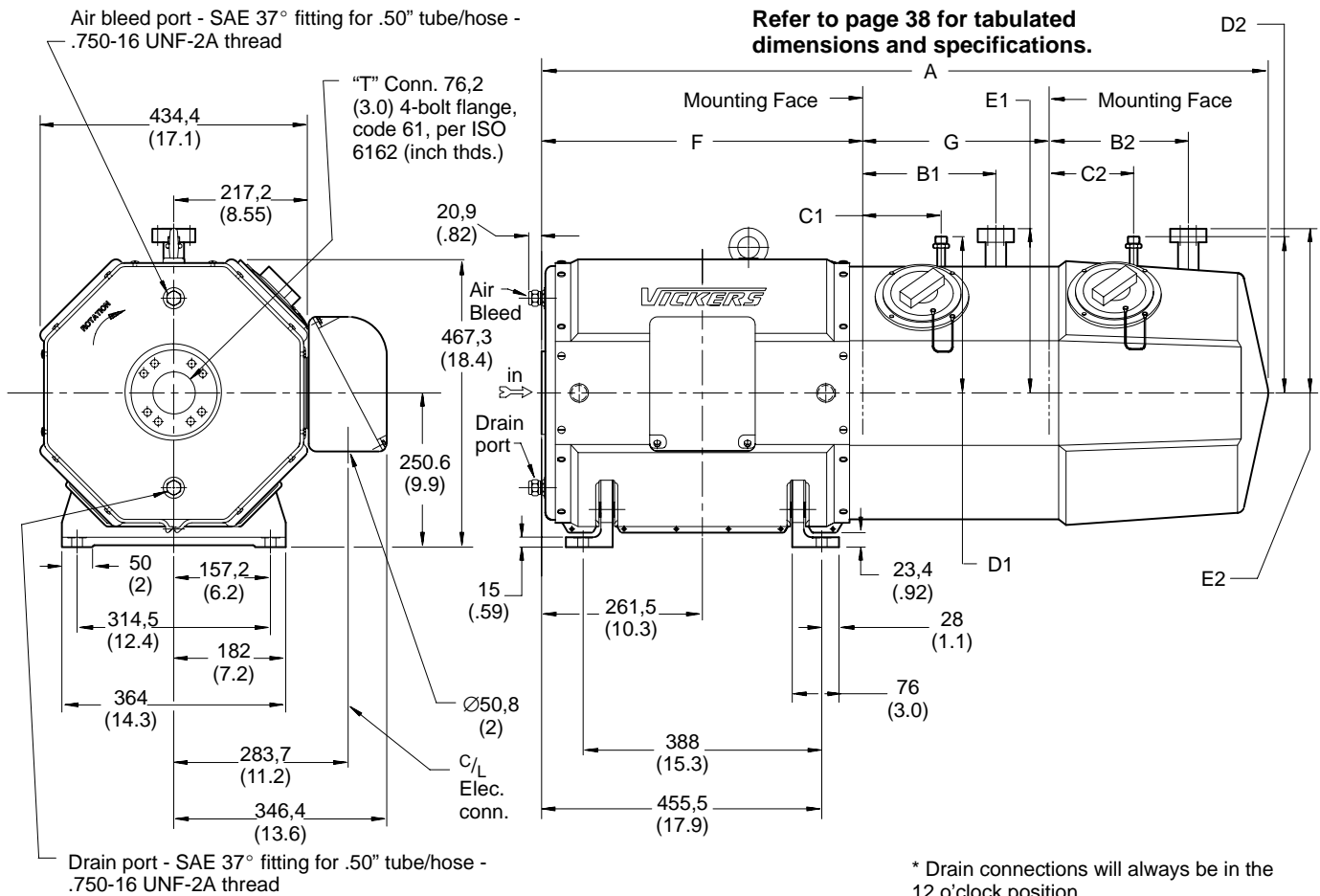
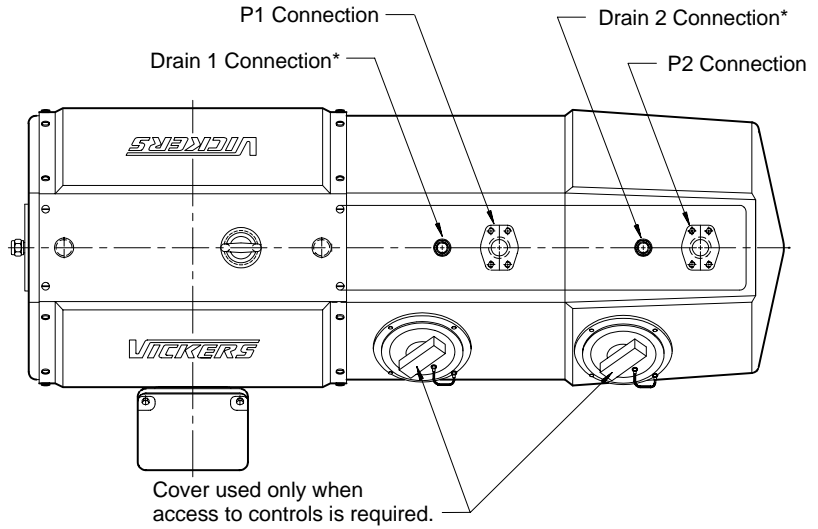
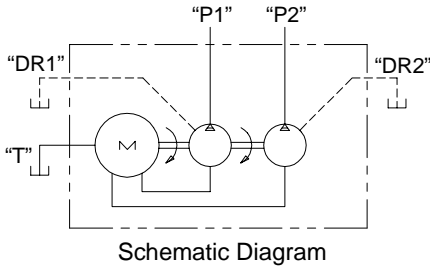


Drain port - SAE 37° fitting for .50" tube/hose - .750-16 UNF-2A thread



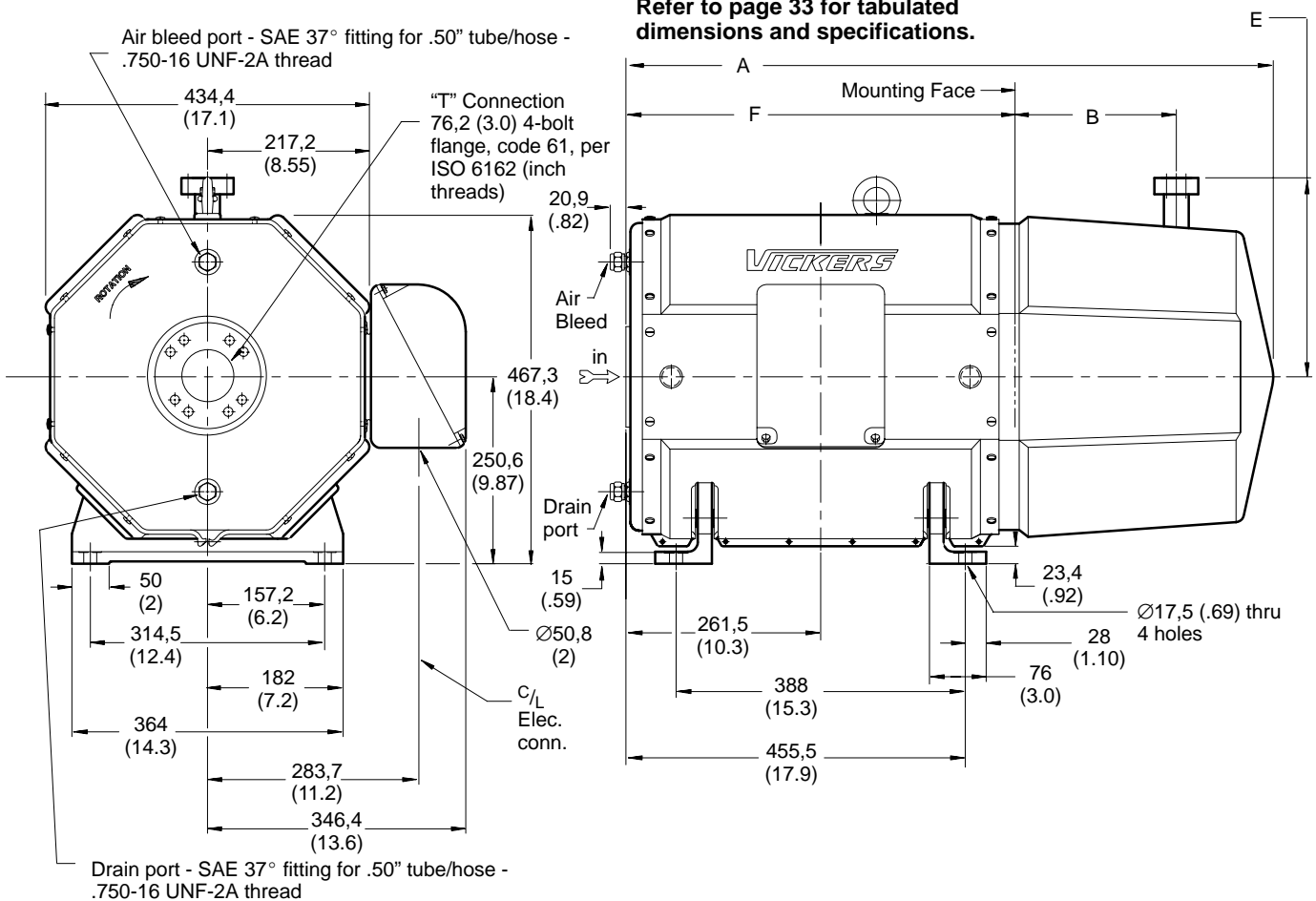
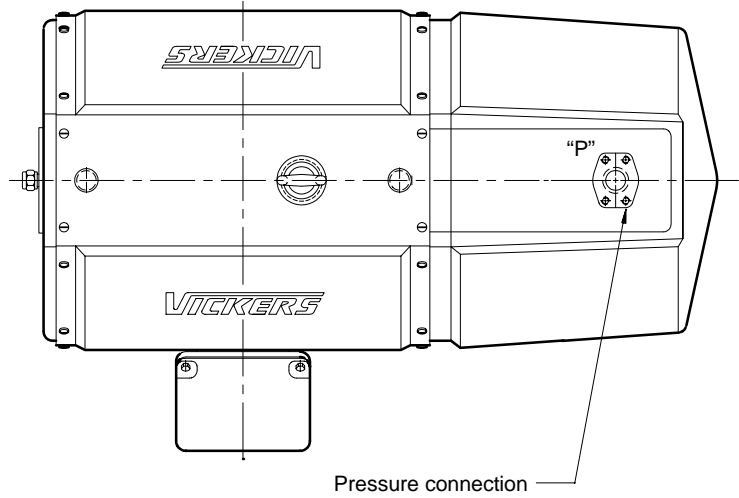
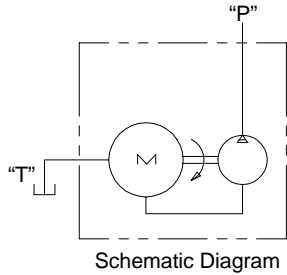
MP 45 Installation Dimensions

Double Pump - Piston



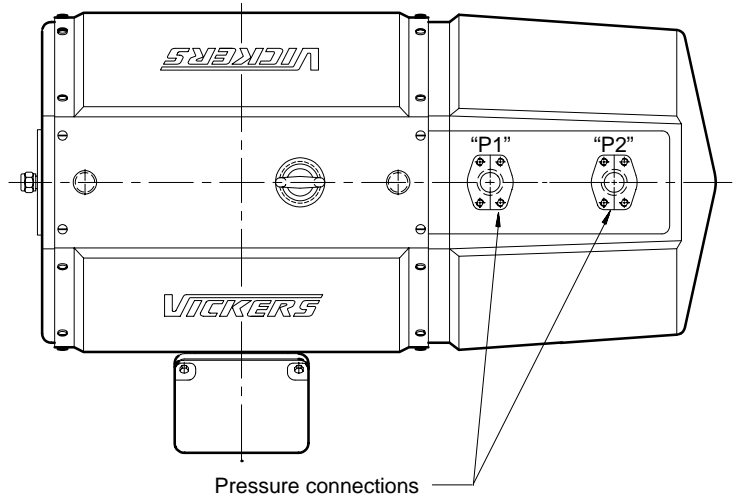
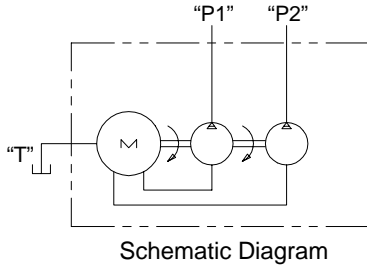
MP 45 Installation Dimensions

Single Pump - Vane

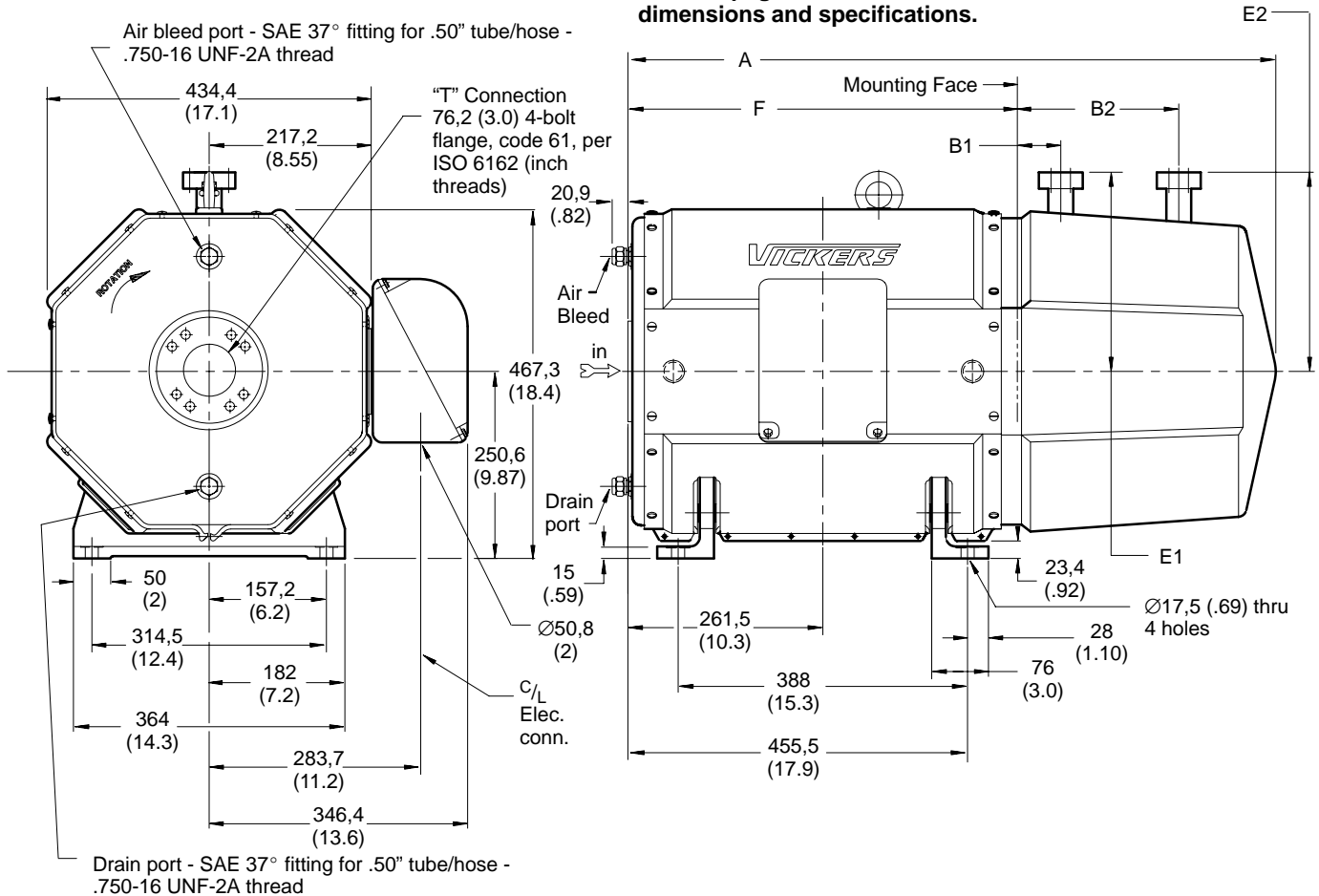


MP 45 Installation Dimensions

Double Pump - Vane

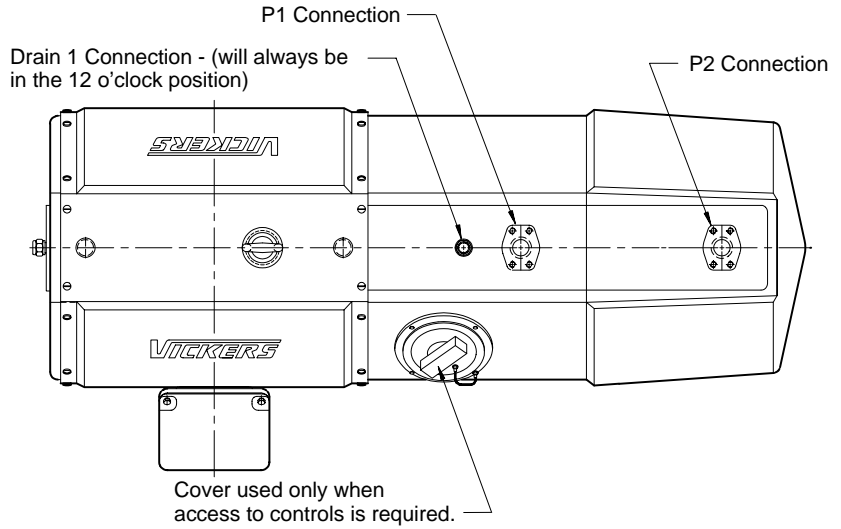
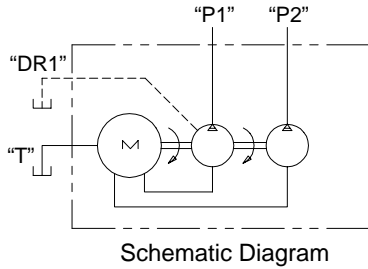


Refer to page 39 for tabulated dimensions and specifications.



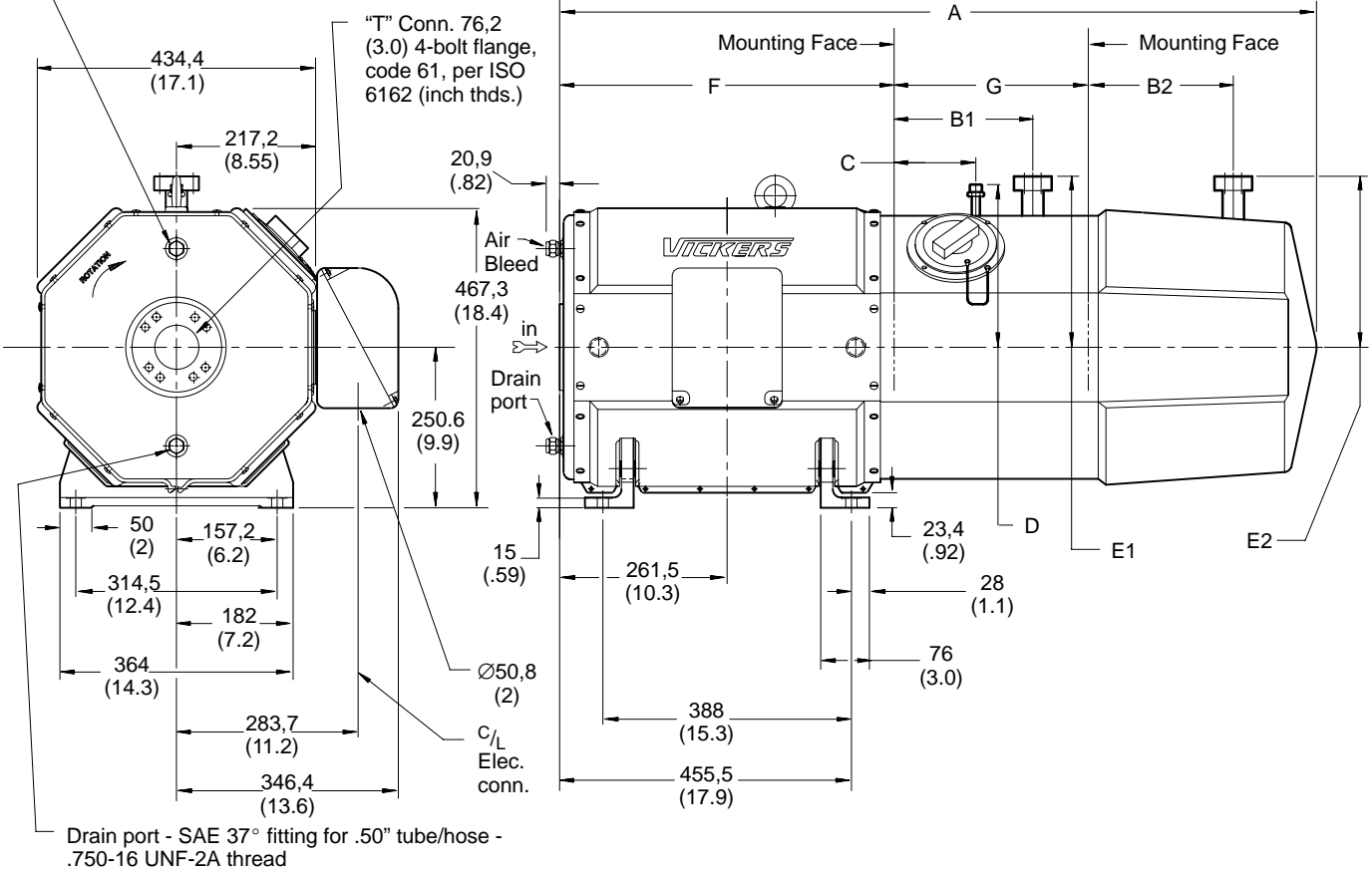
MP 45 Installation Dimensions

Double Pump - Piston/Vane



Air bleed port - SAE 37° fitting for .50" tube/hose - .750-16 UNF-2A thread

Refer to page 40 for tabulated dimensions and specifications.



MP 45 Tabulated Installation Dimensions & Specifications

Single Pump - Piston (from page 33)			Dimensions mm (inch)						Port Connection Sizes	
Single Piston Pump Displacement cm ³ /rev (in ³ /rev)	Pump Model Series	Est. Wt. kg (lbs)	A	B	C	D	E	F	* DR	** P
57,4 (3.5)	PVH57	288 (634)	870 (34.3)	216,4 (8.52)	127 (5.00)	238 (9.37)	251 (9.88)	522 (20.56)	12,7 (.50)	25,4 (1.00)
73,7 (4.5)	PVH74	293 (645)	1010 (39.8)	241,2 (9.50)	152,4 (6.00)	244 (9.60)	257 (10.12)	522 (20.56)	12,7 (.50)	25,4 (1.00)
98,3 (6.0)	PVH98	301 (662)	1010 (39.8)	251,3 (9.89)	162,3 (6.39)	246,5 (9.70)	259,5 (10.22)	522 (20.56)	15,9 (.625)	25,4 (1.00)
21,1 (1.29)	PVQ20	269 (592)	870 (34.3)	174,5 (6.87)	39,4 (1.55)	241,3 (9.50)	263,5 (10.37)	522 (20.56)	12,7 (.50)	31,75 (1.25)
32,9 (2.01)	PVQ32	269 (592)	870 (34.3)	174,5 (6.87)	39,4 (1.55)	241,3 (9.50)	263,5 (10.37)	522 (20.56)	12,7 (.50)	31,75 (1.25)
41,0 (2.50)	PVQ40	276 (607)	870 (34.3)	191 (7.52)	77,7 (3.06)	241,3 (9.50)	240,3 (9.46)	522 (20.56)	15,9 (.625)	25,4 (1.00)
45,1 (2.75)	PVQ45	276 (607)	870 (34.3)	191 (7.52)	77,7 (3.06)	241,3 (9.50)	240,3 (9.46)	522 (20.56)	15,9 (.625)	25,4 (1.00)

Double Pump - Piston (from page 34)				Dimensions mm (inch)							
Double Piston Pump Displacement cm ³ /rev (in ³ /rev) Thru-drive	2nd Pump	Pump Model Series	Est. Wt. kg (lbs)	A	B1	B2	C1	C2	D1	D2	E1
57,4 (3.5)	57,4 (3.5)	PVH57/PVH57	325 (715)	1181 (46.5)	216,4 (8.52)	216,4 (8.52)	127 (5.00)	127 (5.00)	238 (9.37)	238 (9.37)	251 (9.88)
73,7 (4.5)	73,7 (4.5)	PVH74/PVH74	345 (759)	1181 (46.5)	241,2 (9.50)	241,2 (9.50)	152,4 (6.00)	152,4 (6.00)	244 (9.60)	244 (9.60)	257 (10.12)
98,3 (6.0)	98,3 (6.0)	PVH98/PVH98	351 (722)	1181 (46.5)	251,3 (9.89)	251,3 (9.89)	162,3 (6.39)	162,3 (6.39)	246,5 (9.70)	246,5 (9.70)	259,5 (10.22)
73,7 (4.5)	57,4 (3.5)	PVH74/PVH57	329 (724)	1181 (46.5)	241,2 (9.50)	216,4 (8.52)	152,4 (6.00)	127 (5.00)	244 (9.60)	238 (9.37)	257 (10.1)
98,3 (6.0)	57,4 (3.5)	PVH98/PVH57	337 (741)	1181 (46.5)	251,3 (9.89)	216,4 (8.52)	162,3 (6.39)	127 (5.00)	246,5 (9.70)	238 (9.37)	259,5 (10.22)

Pump Model Series	Dimensions mm (inch)			Port Connection Sizes			
	E2	F	G	* DR1	** P1	* DR2	** P2
PVH57/PVH57	251 (9.88)	522 (20.6)	312,9 (12.32)	12,7 (.50)	25,4 (1.00)	12,7 (.50)	25,4 (1.00)
PVH74/PVH74	257 (10.1)	522 (20.6)	335,6 (13.22)	12,7 (.50)	25,4 (1.00)	12,7 (.50)	25,4 (1.00)
PVH98/PVH98	259,5 (10.2)	522 (20.6)	347,7 (13.7)	15,9 (.625)	25,4 (1.00)	15,9 (.625)	25,4 (1.00)
PVH74/PVH57	251 (9.88)	522 (20.6)	335,6 (13.22)	12,7 (.50)	25,4 (1.00)	12,7 (.50)	25,4 (1.00)
PVH98/PVH57	251 (9.88)	522 (20.6)	347,7 (13.7)	15,9 (.625)	25,4 (1.00)	12,7 (.50)	25,4 (1.00)

* ORFS Female thread fitting for SAE J1453.

** 4-bolt flange, code 61, per ISO 6162 inch threads.

MP 45 Tabulated Installation Dimensions & Specifications

Single Pump - Vane (from page 35)			Dimensions mm (inch)				Port Connection Size
Single Van Pump Displacement cm ³ /rev (in ³ /rev)	Pump Model Series	Est. Wt. kg (lbs)	A	B	E	F	* P
18 (1.10) 27 (1.67) 36 (2.22)	20V	267 (587)	870 (34.3)	132,6 (5.22)	241,2 (9.50)	552 (21.7)	19.0 (.75)
40 (2.47) 45 (2.78) 55 (3.39) 67 (4.13)	25V	270 (594)	870 (34.3)	38,1 (1.50)	241,2 (9.50)	552 (21.7)	25,4 (1.00)
81 (4.94) 97 (5.91) 112 (6.83) 121 (7.37)	35V	278 (612)	870 (34.3)	38,1 (1.50)	247,6 (9.75)	522 (20.6)	31,75 (1.25)
138 (8.41) 162 (9.85)	45V	289 (636)	870 (34.3)	42,9 (1.69)	258,7 (10.19)	522 (20.6)	38,1 (1.50)

Double Pump - Vane (from page 36)				Dimensions mm (inch)						Port Connection Sizes	
Double Pump - Vane Displacement cm ³ /rev (in ³ /rev)		Pump Model Series	Est. Wt. kg (lbs)	A	B1	B2	E1	E2	F	* P1	* P2
Shaft end	Cover end										
39 (2.47) 45 (2.78) 55 (3.39) 67 (4.13)	18 (1.10) 27 (1.67) 36 (2.22) 40 (2.47) 45 (2.78)	2520V	276 (607)	870 (34.3)	38,1 (1.50)	227,8 (8.97)	249 (9.80)	257,3 (10.13)	522 (20.56)	25,4 (1.00)	19 (.75)
39 (2.47) 45 (2.78) 55 (3.39) 67 (4.13)	39 (2.47) 45 (2.78) 55 (3.39) 67 (4.13)	2525V	277 (609)	870 (34.3)	38,1 (1.50)	237,2 (9.34)	249 (9.80)	239,6 (9.43)	522 (20.56)	25,4 (1.00)	25,4 (1.00)
81 (4.94) 97 (5.91) 112 (6.83) 121 (7.37)	18 (1.10) 27 (1.67) 36 (2.22) 40 (2.47) 45 (2.78)	3520V	289 (636)	870 (34.3)	38,1 (1.50)	252 (9.92)	247,6 (9.75)	257,3 (10.13)	522 (20.56)	31,7 (1.25)	19 (.75)
81 (4.94) 97 (5.91) 112 (6.83) 121 (7.37)	39 (2.47) 45 (2.78) 55 (3.39) 67 (4.13)	3525V	290 (638)	870 (34.3)	38,1 (1.50)	261,9 (10.3)	251,6 (9.91)	258,6 (10.18)	522 (20.56)	31,7 (1.25)	25,4 (1.00)

* 4-bolt flange, code 61, per ISO 6162 inch threads.

MP 45 Tabulated Installation Dimensions & Specifications

Double Pump - Piston/Vane (from page37)				Dimensions mm (inch)							
Double Pump - Piston/Vane Displacement cm ³ /rev (in ³ /rev)	Piston	Vane	Pump Model Series	Est. Wt. kg (lbs)	A	B1	B2	C	D	E1	E2
57,4 (3.5)		18 (1.1)	PVH57/20V	303 (667)	1181 (46.5)	216,4 (8.52)	132,6 (5.22)	127 (5.00)	238 (9.37)	251 (9.88)	241,2 (9.50)
57,4 (3.5)		39 (2.47)	PVH57/25V	306 (673)	1181 (46.5)	216,4 (8.52)	38,1 (1.50)	127 (5.00)	238 (9.37)	251 (9.88)	241,2 (9.50)
57,4 (3.5)		81 (4.94)	PVH57/35V	314 (691)	1181 (46.5)	216,4 (8.52)	38,1 (1.50)	127 (5.00)	238 (9.37)	251 (9.88)	247,6 (9.75)
73,7 (4.5)		39 (2.47)	PVH74/25V	311 (684)	1181 (46.5)	241,2 (9.50)	38,1 (1.50)	152,4 (6.00)	244 (9.60)	257 (10.1)	241,2 (9.50)
73,7 (4.5)		81 (4.94)	PVH74/35V	319 (702)	1181 (46.5)	241,2 (9.50)	38,1 (1.50)	152,4 (6.00)	244 (9.60)	257 (10.1)	247,6 (9.75)
98,3 (6.0)		39 (2.47)	PVH98/25V	320 (704)	1181 (46.5)	251,3 (9.89)	38,1 (1.50)	162,3 (6.39)	246,5 (9.70)	259,5 (10.2)	241,2 (9.50)
98,3 (6.0)		81 (4.94)	PVH98/35V	327 (719)	1181 (46.5)	251,3 (9.89)	38,1 (1.50)	162,3 (6.39)	246,5 (9.70)	259,5 (10.2)	247,6 (9.75)
45,1 (2.75)		18 (1.1)	PVQ45/20V	286 (630)	1010 (39.8)	191 (7.52)	132,6 (5.22)	77,7 (3.06)	241,3 (9.50)	240,3 (9.46)	241,2 (9.50)
45,1 (2.75)		39 (2.47)	PVQ45/25V	288 (635)	1010 (39.8)	191 (7.52)	38,1 (1.50)	77,7 (3.06)	241,3 (9.50)	240,3 (9.46)	241,2 (9.50)

Pump Model Series	Dimensions mm (inch)		Port Connection Sizes		
	G	F	* DR1	** P1	** P2
PVH57/20V	312,9 (12.32)	522 (20.6)	12,7 (.50)	25,4 (1.00)	19 (.75)
PVH57/25V					25,4 (1.00)
PVH57/35V					31,8 (1.25)
PVH74/25V	335,6 (13.22)		25,4 (1.00)		
PVH74/35V			31,8 (1.25)		
PVH98/25V			25,4 (1.00)		
PVH98/35V	347,7 (13.7)	552 (21.7)	15,9 (.62)	31,8 (1.25)	
PVQ45/20V	242,6 (9.55)			19 (.75)	
PVQ45/25V	254,8 (10.03)			25,4 (1.00)	

* ORFS Female thread fitting for SAE J1453.

** 4-bolt flange, code 61, per ISO 6162 inch threads.

MP75 Performance Data

Input Shaft Power Piston Pumps													
Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		20		32		40		45		57		63	
Pump Type		PVQ		PVQ		PVQ		PVQ		PVH		PVH	
Rated Pressure	bar psi	210 3000		140 2000		210 3000		186 2700		250 3625		210 3000	
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800
Max. Flow [†] @ Rated Pressure	l/min USgpm	28 7	34 9	48 13	58 15	56 15	67 18	63 17	76 20	82 22	98 26	92 24	110 29
Motor Output Power to Drive Pump* at Pressure of:													
35 bar (500 psi)	kW	3	3	4	5	5	6	5	5	7	10	9	11
70 bar (1000 psi)	kW	4	5	7	8	9	11	9	11	12	15	14	17
100 bar (1500 psi)	kW	7	8	10	12	13	15	14	17	18	21	19	23
140 bar (2000 psi)	kW	9	11	14	17	16	19	19	22	23	27	25	30
175 bar (2500 psi)	kW	11	13	–	–	20	24	24	28	28	33	30	36
210 bar (3000 psi)	kW	14	16	–	–	24	29	–	–	33	40	37	44
250 bar (3625 psi)	kW	–	–	–	–	–	–	–	–	41	49	–	–

Piston Pumps (con't)													
Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		74		81		98		106		131		141	
Pump Type		PVH		PVH		PVH		PVH		PVH		PVH	
Rated Pressure	bar psi	250 3625		210 3000		250 3625		210 3000		250 3625		210 3000	
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800
Max. Flow [†] @ Rated Pressure	l/min USgpm	110 29	132 35	117 31	140 37	150 40	170 45	152 40	183 48	187 50	225 59	201 53	242 64
Motor Output Power to Drive Pump* at Pressure of:													
35 bar (500 psi)	kW	9	12	11	13	13	16	14	17	18	21	19	23
70 bar (1000 psi)	kW	15	18	17	20	20	25	23	27	27	33	30	36
100 bar (1500 psi)	kW	21	25	23	27	31	36	33	39	39	47	43	57
140 bar (2000 psi)	kW	27	32	29	35	38	46	42	50	52	62	56	67
175 bar (2500 psi)	kW	33	40	37	44	47	56	51	61	64	77	69	–
210 bar (3000 psi)	kW	40	48	44	53	56	67	60	72	77	–	–	–
250 bar (3625 psi)	kW	50	60	–	–	68	–	–	–	–	–	–	–

MP75 Performance Data

Input Shaft Power Vane Pumps

Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		18	27	36	40	45	55	67								
Pump Type		20V	20V	20V	25V	25V	25V	25V								
Rated Pressure	bar psi	210 3000						175 2500								
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	
Max. Flow [†] @ Rated Pressure	l/min USgpm	22 6	27 7	35 9	42 11	48 13	58 15	52 14	62 16	58 15	70 18	72 19	86 23	90 24	108 29	
Motor Output Power to Drive Pump* at Pressure of:																
35 bar (500 psi)	kW	2	2	3	3	4	4	4	5	5	6	6	7	7	8	
70 bar (1000 psi)	kW	4	4	6	7	7	9	8	10	9	11	11	14	14	17	
100 bar (1500 psi)	kW	6	7	8	10	11	13	12	15	14	17	17	20	21	25	
140 bar (2000 psi)	kW	7	9	11	13	15	18	16	19	18	22	22	27	27	33	
175 bar (2500 psi)	kW	9	11	14	16	18	22	20	24	23	27	28	33	34	41	
210 bar (3000 psi)	kW	11	13	16	20	22	26	-	-	-	-	-	-	-	-	

Vane Pumps (con't)

Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		81	97	112	121	138	162	193								
Pump Type		35V	35V	35V	35V	45V	45V	45V								
Rated Pressure	bar psi	175 2500														
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	
Max. Flow [†] @ Rated Pressure	l/min USgpm	106 28	127 34	132 35	158 42	158 42	190 50	170 45	204 54	192 51	230 61	225 59	270 71	258 68	310 82	
Motor Output Power to Drive Pump* at Pressure of:																
35 bar (500 psi)	kW	8	10	10	12	12	14	12	15	14	17	17	20	20	24	
70 bar (1000 psi)	kW	17	20	20	24	23	28	25	30	28	34	33	40	40	48	
100 bar (1500 psi)	kW	25	30	30	36	35	42	37	45	43	51	50	60	60	72	
140 bar (2000 psi)	kW	33	39	39	47	45	55	49	59	56	67	66	-	-	-	
175 bar (2500 psi)	kW	41	49	49	59	57	68	61	73	70	-	-	-	-	-	

* NOTE: To find the shaft power to drive a single piston pump or vane pump at 1800 rpm, select the required displacement and operating pressure, then read across the chart for the kilowatt power input.

To determine the total input power for thru-drive pumps, add the kilowatts for the front pump and the rear pump together, at the selected operating pressures. The input kilowatts should not exceed 78 kW with only one pumping unit in operation, or with two pumping units in operation simultaneously.

For example: A thru-drive pump (piston) with a displacement of 57 cm³/rev will require 40 kW of power at 210 bar (3000 psi).
The second pump (vane) with a displacement of 55 cm³/rev will require 33 kW of power at 175 bar (2500 psi).
With both pumping units operating simultaneously, they require 73 kW of input power.

[†]1. As operating pressure reduces to minimum, flow increases from chart values by approximately 4 to 5% for piston pumps and 10 to 12% for vane pumps.

2. As the motor pump reaches full load, the motor speed droop will reduce output flow from chart values by approximately 2%.

MP75 Performance Data

Input Shaft Power Double Vane Pumps									
Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		40		45		55		67	
Pump Type		25**V Shaft End Pump							
Rated Pressure	bar psi	175 2500							
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800
Max. Flow [†] @ Rated Pressure	l/min USgpm	52 13	62 16	58 15	70 18	72 19	86 23	90 24	108 29
Motor Output Power to Drive Pump* at Pressure of:									
35 bar (500 psi)	kW	4	5	5	6	6	7	7	8
70 bar (1000 psi)	kW	8	10	9	11	12	14	14	17
100 bar (1500 psi)	kW	13	15	14	17	17	20	21	25
140 bar (2000 psi)	kW	16	19	18	22	23	27	28	33
175 bar (2500 psi)	kW	20	24	23	27	28	33	34	41

Input Shaft Power Double Vane Pumps															
Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		81		97		112		121		138		162		193	
Pump Type		35**V Shaft End Pump								45**V Shaft End Pump					
Rated Pressure	bar psi	175 2500								175 2500					
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800
Max. Flow [†] @ Rated Pressure	l/min USgpm	106 28	127 34	132 35	158 42	158 42	190 50	170 45	204 54	192 51	230 61	225 59	270 71	258 68	310 82
Motor Output Power to Drive Pump* at Pressure of:															
35 bar (500 psi)	kW	8	10	10	12	12	14	13	15	14	17	17	20	20	24
70 bar (1000 psi)	kW	17	20	20	24	23	28	25	30	28	34	33	40	40	48
100 bar (1500 psi)	kW	25	30	30	36	35	42	38	45	43	51	50	60	60	72
140 bar (2000 psi)	kW	33	39	39	47	46	55	49	59	56	67	66	–	–	–
175 bar (2500 psi)	kW	41	49	49	59	57	68	61	73	70	–	–	–	–	–

* NOTE: To find the shaft power for a double vane pump at 1800 rpm, select the displacement and operating pressure for the shaft end and cover end pumps separately, read the kilowatt power input for each, and add the two together. If the shaft end and cover end pumps will not be loaded simultaneously, find the *maximum sum* of the two power requirements, considering their load cycles separately. The input kilowatts should not exceed 78 kW.

For example: A shaft end pump with a displacement of 81 cm³ will require 49 kilowatts at 175 bar (2500 psi). A cover end pump with a displacement of 40 cm³ will require 19 kilowatts at 140 bar (2000 psi). With both cartridges loaded simultaneously, the double vane pump will require 68 kilowatts of input power.

- †1. As operating pressure reduces to minimum, flow increases from chart values by approximately 4 to 5% for piston pumps and 10 to 12% for vane pumps.
2. As the motor pump reaches full load, the motor speed droop will reduce output flow from chart values by approximately 2%.

MP75 Performance Data

Input Shaft Power Double Vane Pumps

Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)	18		27		36		40		45		55		67		
Pump Type	**20V Cover End Pump						**25V Cover End Pump								
Rated Pressure	bar	210						175							
	psi	3000						2500							
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800
Max. Flow [†] @ Rated Pressure	l/min USgpm	23 6	27 7	35 9	42 11	48 13	58 15	52 13	62 16	58 15	70 18	72 19	86 23	90 24	108 29
Motor Output Power to Drive Pump* at Pressure of:															
35 bar (500 psi)	kW	2	2	3	3	3	4	4	5	5	6	6	7	7	8
70 bar (1000 psi)	kW	3	4	6	7	8	9	8	10	9	11	12	14	14	17
100 bar (1500 psi)	kW	6	7	8	10	11	13	13	15	14	17	17	20	21	25
140 bar (2000 psi)	kW	8	9	11	13	15	18	16	19	18	22	23	27	28	33
175 bar (2500 psi)	kW	9	11	13	16	18	22	20	24	23	27	28	33	34	41
210 bar (3000 psi)	kW	11	13	17	20	22	26	-	-	-	-	-	-	-	-

Input Shaft Power Double Vane Pumps

Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)	81		97		112		121		
Pump Type	**35V Cover End Pump								
Rated Pressure	bar	175				175			
	psi	2500				2500			
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800
Max. Flow [†] @ Rated Pressure	l/min USgpm	106 28	127 34	132 35	158 42	158 42	190 50	170 45	204 54
Motor Output Power to Drive Pump* at Pressure of:									
35 bar (500 psi)	kW	8	10	10	12	12	14	13	15
70 bar (1000 psi)	kW	17	20	20	24	23	28	25	30
100 bar (1500 psi)	kW	25	30	30	36	35	42	38	45
140 bar (2000 psi)	kW	33	39	39	47	46	55	49	59
175 bar (2500 psi)	kW	41	49	49	59	57	68	61	73

* NOTE: To find the shaft power for a double vane pump at 1800 rpm, select the displacement and operating pressure for the shaft end and cover end pumps separately, read the kilowatt power input for each, and add the two together. If the shaft end and cover end pumps will not be loaded simultaneously, find the *maximum sum* of the two power requirements, considering their load cycles separately. The input kilowatts should not exceed 78 kW.

For example: A shaft end pump with a displacement of 81 cm³ will require 49 kilowatts at 175 bar (2500 psi). A cover end pump with a displacement of 40 cm³ will require 19 kilowatts at 140 bar (2000 psi). With both cartridges loaded simultaneously, the double vane pump will require 68 kilowatts of input power.

- †1. As operating pressure reduces to minimum, flow increases from chart values by approximately 4 to 5% for piston pumps and 10 to 12% for vane pumps.
2. As the motor pump reaches full load, the motor speed droop will reduce output flow from chart values by approximately 2%.

MP92 Performance Data

Input Shaft Power Piston Pumps													
Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		20		32		40		45		57		63	
Pump Type		PVQ		PVQ		PVQ		PVQ		PVH		PVH	
Rated Pressure	bar psi	210 3000		140 2000		210 3000		186 2700		250 3625		210 3000	
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800
Max. Flow [†] @ Rated Pressure	l/min USgpm	28 7	34 9	48 13	58 15	56 15	67 18	63 17	76 20	82 22	98 26	92 24	110 29
Motor Output Power to Drive Pump* at Pressure of:													
35 bar (500 psi)	kW	3	3	4	5	5	6	5	5	7	10	9	11
70 bar (1000 psi)	kW	4	5	7	8	9	11	9	11	12	15	14	17
100 bar (1500 psi)	kW	7	8	10	12	13	15	14	17	18	21	19	23
140 bar (2000 psi)	kW	9	11	14	17	16	19	19	22	23	27	25	30
175 bar (2500 psi)	kW	11	13	–	–	20	24	24	28	28	33	30	36
210 bar (3000 psi)	kW	14	16	–	–	24	29	–	–	33	40	37	44
250 bar (3625 psi)	kW	–	–	–	–	–	–	–	–	41	49	–	–

Piston Pumps (con't)													
Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		74		81		98		106		131		141	
Pump Type		PVH		PVH		PVH		PVH		PVH		PVH	
Rated Pressure	bar psi	250 3625		210 3000		250 3625		210 3000		250 3625		210 3000	
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800
Max. Flow [†] @ Rated Pressure	l/min USgpm	110 29	132 35	117 31	140 37	150 40	170 45	152 40	183 48	187 50	225 59	201 53	242 64
Motor Output Power to Drive Pump* at Pressure of:													
35 bar (500 psi)	kW	9	12	11	13	13	16	14	17	18	21	19	23
70 bar (1000 psi)	kW	15	18	17	20	20	25	23	27	27	33	30	36
100 bar (1500 psi)	kW	21	25	23	27	31	36	33	39	39	47	43	57
140 bar (2000 psi)	kW	27	32	29	35	38	46	42	50	52	62	56	67
175 bar (2500 psi)	kW	33	40	37	44	47	56	51	61	64	77	69	83
210 bar (3000 psi)	kW	40	48	44	53	56	67	60	72	77	92	83	–
250 bar (3625 psi)	kW	50	60	–	–	68	81	–	–	–	–	–	–

MP92 Performance Data

Input Shaft Power Vane Pumps

Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		18	27	36	40	45	55	67							
Pump Type		20V	20V	20V	25V	25V	25V	25V							
Rated Pressure	bar psi	210 3000						175 2500							
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800
Max. Flow [†] @ Rated Pressure	l/min USgpm	22 6	27 7	35 9	42 11	48 13	58 15	52 14	62 16	58 15	70 18	72 19	86 23	90 24	108 29
Motor Output Power to Drive Pump* at Pressure of:															
35 bar (500 psi)	kW	2	2	3	3	4	4	4	5	5	6	6	7	7	8
70 bar (1000 psi)	kW	4	4	6	7	7	9	8	10	9	11	11	14	14	17
100 bar (1500 psi)	kW	6	7	8	10	11	13	12	15	14	17	17	20	21	25
140 bar (2000 psi)	kW	7	9	11	13	15	18	16	19	18	22	22	27	27	33
175 bar (2500 psi)	kW	9	11	14	16	18	22	20	24	23	27	28	33	34	41
210 bar (3000 psi)	kW	11	13	16	20	22	26	-	-	-	-	-	-	-	-

Vane Pumps (con't)

Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		81	97	112	121	138	162	193							
Pump Type		35V	35V	35V	35V	45V	45V	45V							
Rated Pressure	bar psi	175 2500													
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800
Max. Flow [†] @ Rated Pressure	l/min USgpm	106 28	127 34	132 35	158 42	158 42	190 50	170 45	204 54	192 51	230 61	225 59	270 71	258 68	310 82
Motor Output Power to Drive Pump* at Pressure of:															
35 bar (500 psi)	kW	8	10	10	12	12	14	12	15	14	17	17	20	20	24
70 bar (1000 psi)	kW	17	20	20	24	23	28	25	30	28	34	33	40	40	48
100 bar (1500 psi)	kW	25	30	30	36	35	42	37	45	43	51	50	60	60	72
140 bar (2000 psi)	kW	33	39	39	47	45	55	49	59	56	67	66	79	78	94
175 bar (2500 psi)	kW	41	49	49	59	57	68	61	73	70	84	82	-	-	-

* NOTE: To find the shaft power to drive a single piston pump or vane pump at 1800 rpm, select the required displacement and operating pressure, then read across the chart for the kilowatt power input.

To determine the total input power for thru-drive pumps, add the kilowatts for the front pump and the rear pump together, at the selected operating pressures. The input kilowatts should not exceed 96 kW with only one pumping unit in operation, or with two pumping units in operation simultaneously.

For example: A thru-drive pump (piston) with a displacement of 131 cm³/rev will require 62 kW of power at 140 bar (2000 psi).
The second pump (vane) with a displacement of 121 cm³/rev will require 30 kW of power at 70 bar (1000 psi).
With both pumping units operating simultaneously, they require 92 kW of input power.

[†]1. As operating pressure reduces to minimum, flow increases from chart values by approximately 4 to 5% for piston pumps and 10 to 12% for vane pumps.

2. As the motor pump reaches full load, the motor speed droop will reduce output flow from chart values by approximately 2%.

MP92 Performance Data

Input Shaft Power Double Vane Pumps									
Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		40		45		55		67	
Pump Type		25**V Shaft End Pump							
Rated Pressure	bar psi	175 2500							
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800
Max. Flow [†] @ Rated Pressure	l/min USgpm	52 13	62 16	58 15	70 18	72 19	86 23	90 24	108 29
Motor Output Power to Drive Pump* at Pressure of:									
35 bar (500 psi)	kW	4	5	5	6	6	7	7	8
70 bar (1000 psi)	kW	8	10	9	11	12	14	14	17
100 bar (1500 psi)	kW	13	15	14	17	17	20	21	25
140 bar (2000 psi)	kW	16	19	18	22	23	27	28	33
175 bar (2500 psi)	kW	20	24	23	27	28	33	34	41

Input Shaft Power Double Vane Pumps															
Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		81		97		112		121		138		162		193	
Pump Type		35**V Shaft End Pump								45**V Shaft End Pump					
Rated Pressure	bar psi	175 2500								175 2500					
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800
Max. Flow [†] @ Rated Pressure	l/min USgpm	106 28	127 34	132 35	158 42	158 42	190 50	170 45	204 54	192 51	230 61	225 59	270 71	258 68	310 82
Motor Output Power to Drive Pump* at Pressure of:															
35 bar (500 psi)	kW	8	10	10	12	12	14	13	15	14	17	17	20	20	24
70 bar (1000 psi)	kW	17	20	20	24	23	28	25	30	28	34	33	40	40	48
100 bar (1500 psi)	kW	25	30	30	36	35	42	38	45	43	51	50	60	60	72
140 bar (2000 psi)	kW	33	39	39	47	46	55	49	59	56	67	66	79	80	96
175 bar (2500 psi)	kW	41	49	49	59	57	68	61	73	70	84	–	–	–	–

* NOTE: To find the shaft power for a double vane pump at 1800 rpm, select the displacement and operating pressure for the shaft end and cover end pumps separately, read the kilowatt power input for each, and add the two together. If the shaft end and cover end pumps will not be loaded simultaneously, find the *maximum sum* of the two power requirements, considering their load cycles separately. The input kilowatts should not exceed 96 kW.

For example: A shaft end pump with a displacement of 97 cm³ will require 59 kilowatts at 175 bar (2500 psi). A cover end pump with a displacement of 55 cm³ will require 27 kilowatts at 140 bar (2000 psi). With both cartridges loaded simultaneously, the double vane pump will require 86 kilowatts of input power.

- †1. As operating pressure reduces to minimum, flow increases from chart values by approximately 4 to 5% for piston pumps and 10 to 12% for vane pumps.
2. As the motor pump reaches full load, the motor speed droop will reduce output flow from chart values by approximately 2%.

MP92 Performance Data

Input Shaft Power Double Vane Pumps

Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)	18		27		36		40		45		55		67		
Pump Type	**20V Cover End Pump						**25V Cover End Pump								
Rated Pressure	bar	210						175							
	psi	3000						2500							
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800
Max. Flow [†] @ Rated Pressure	l/min USgpm	23 6	27 7	35 9	42 11	48 13	58 15	52 13	62 16	58 15	70 18	72 19	86 23	90 24	108 29
Motor Output Power to Drive Pump* at Pressure of:															
35 bar (500 psi)	kW	2	2	3	3	3	4	4	5	5	6	6	7	7	8
70 bar (1000 psi)	kW	3	4	6	7	8	9	8	10	9	11	12	14	14	17
100 bar (1500 psi)	kW	6	7	8	10	11	13	13	15	14	17	17	20	21	25
140 bar (2000 psi)	kW	8	9	11	13	15	18	16	19	18	22	23	27	28	33
175 bar (2500 psi)	kW	9	11	13	16	18	22	20	24	23	27	28	33	34	41
210 bar (3000 psi)	kW	11	13	17	20	22	26	-	-	-	-	-	-	-	-

Input Shaft Power Double Vane Pumps

Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)	81		97		112		121		
Pump Type	**35V Cover End Pump								
Rated Pressure	bar	175				175			
	psi	2500				2500			
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800
Max. Flow [†] @ Rated Pressure	l/min USgpm	106 28	127 34	132 35	158 42	158 42	190 50	170 45	204 54
Motor Output Power to Drive Pump* at Pressure of:									
35 bar (500 psi)	kW	8	10	10	12	12	14	13	15
70 bar (1000 psi)	kW	17	20	20	24	23	28	25	30
100 bar (1500 psi)	kW	25	30	30	36	35	42	38	45
140 bar (2000 psi)	kW	33	39	39	47	46	55	49	59
175 bar (2500 psi)	kW	41	49	49	59	57	68	61	73

* NOTE: To find the shaft power for a double vane pump at 1800 rpm, select the displacement and operating pressure for the shaft end and cover end pumps separately, read the kilowatt power input for each, and add the two together. If the shaft end and cover end pumps will not be loaded simultaneously, find the *maximum sum* of the two power requirements, considering their load cycles separately. The input kilowatts should not exceed 96 kW.

For example: A shaft end pump with a displacement of 97 cm³ will require 59 kilowatts at 175 bar (2500 psi). A cover end pump with a displacement of 55 cm³ will require 27 kilowatts at 140 bar (2000 psi). With both cartridges loaded simultaneously, the double vane pump will require 86 kilowatts of input power.

[†]1. As operating pressure reduces to minimum, flow increases from chart values by approximately 4 to 5% for piston pumps and 10 to 12% for vane pumps.

2. As the motor pump reaches full load, the motor speed droop will reduce output flow from chart values by approximately 2%.

MP75 Sound Level Data

Piston Pumps

Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		20		32		40		45		57		63	
Pump Type		PVQ		PVQ		PVQ		PVQ		PVH		PVH	
Max. Operating Pressure @1800 rpm	bar psi	210 3000		140 2000		210 3000		186 2700		250 3625		210 3000	
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800
Max. Flow	l/min	28	34	48	58	56	67	63	76	82	98	92	110
	USgpm	7	9	13	15	15	18	17	20	22	26	24	29
Sound Level at full flow and pressure of:													
35 bar (500 psi)	dB(A)	58	60	62	64	64	66	64	66	66	68	66	68
70 bar (1000 psi)	dB(A)	58	60	63	65	65	67	65	67	67	69	67	69
100 bar (1500 psi)	dB(A)	59	61	64	66	65	67	65	67	68	70	68	70
140 bar (2000 psi)	dB(A)	59	61	64	66	65	67	65	67	69	71	69	71
175 bar (2500 psi)	dB(A)	60	62	–	–	66	68	67	69	71	73	71	73
210 bar (3000 psi)	dB(A)	60	62	–	–	67	69	–	–	72	74	72	74
250 bar (3625 psi)	dB(A)	–	–	–	–	–	–	–	–	73	75	–	–

Piston Pumps (con't)

Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		74		81		98		106		131		141	
Pump Type		PVH		PVH		PVH		PVH		PVH		PVH	
Max. Operating Pressure @1800 rpm	bar psi	250 3625		210 3000		210 3000		210 3000		175 2500		140 2000	
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800
Max. Flow	l/min	110	125	117	140	150	170	152	183	187	225	201	242
	USgpm	29	33	31	37	40	45	40	48	50	59	53	64
Sound Level at full flow and pressure of:													
35 bar (500 psi)	dB(A)	68	70	68	70	70	72	70	72	75	77	75	77
70 bar (1000 psi)	dB(A)	69	71	69	71	71	73	71	73	76	78	76	78
100 bar (1500 psi)	dB(A)	69	71	69	71	71	73	71	73	78	80	78	80
140 bar (2000 psi)	dB(A)	70	72	70	72	72	74	72	74	80	82	80	82
175 bar (2500 psi)	dB(A)	72	74	72	74	73	75	73	75	82	84	–	–
210 bar (3000 psi)	dB(A)	72	74	72	74	74	76	74	76	–	–	–	–
250 bar (3625 psi)	dB(A)	73	75	–	–	–	–	–	–	–	–	–	–

These sound levels are typical of the Integrated Motor Pump operating with the pump(s) shown at the listed conditions and are accurate within 2 dB(A), including unit to unit variability and data repeatability. In the case of piston pumps, the Motor Pump sound levels represent the loudest condition at either full flow or cutoff.

MP75 Sound Level Data

Vane Pumps

Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		18		27		36		40		45		55		67			
Pump Type		20V		20V		20V		25V		25V		25V		25V			
Max. Operating Pressure @1800 rpm		bar psi		210 3000						175 2500							
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800		
Max. Flow		l/min USgpm		23 6	27 7	35 9	42 11	48 13	58 15	52 13	62 16	58 15	70 18	72 19	86 23	90 24	108 29
Sound Level at full flow and pressure of:		dB(A)															
35 bar (500 psi)		58	60	58	60	58	60	58	60	58	60	58	60	58	60	58	60
70 bar (1000 psi)		58	60	58	60	58	60	59	61	59	61	59	61	59	61	59	61
100 bar (1500 psi)		60	62	60	62	60	62	61	63	61	63	61	63	61	63	61	63
140 bar (2000 psi)		62	64	62	64	62	64	63	65	63	65	63	65	63	65	63	65
175 bar (2500 psi)		63	65	63	65	63	65	64	66	64	66	64	66	64	66	64	66
210 bar (3000 psi)		64	66	64	66	64	66	-	-	-	-	-	-	-	-	-	-

Vane Pumps (con't)

Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		81		97		112		121		138		162		193			
Pump Type		35V		35V		35V		35V		45V		45V		45V			
Max. Operating Pressure @1800 rpm		bar psi		175 2500						140 2000		100 1500		100 1500			
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800		
Max. Flow		l/min USgpm		106 28	127 34	132 35	158 42	158 42	190 50	170 45	204 54	192 51	230 61	225 59	270 71	258 68	310 82
Sound Level at full flow and pressure of:		dB(A)															
35 bar (500 psi)		60	62	60	62	60	62	60	62	64	66	64	66	64	66	64	66
70 bar (1000 psi)		61	63	61	63	61	63	61	63	65	67	65	67	65	67	65	67
100 bar (1500 psi)		63	65	63	65	63	65	63	65	67	69	67	69	67	69	67	69
140 bar (2000 psi)		65	67	65	67	65	67	65	67	68	70	-	-	-	-	-	-
175 bar (2500 psi)		66	68	66	68	66	68	66	68	-	-	-	-	-	-	-	-
210 bar (3000 psi)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

These sound levels are typical of the Integrated Motor Pump operating with the pump(s) shown at the listed conditions and are accurate within 2 dB(A), including unit to unit variability and data repeatability. In the case of piston pumps, the Motor Pump sound levels represent the loudest condition at either full flow or cutoff.

MP92 Sound Level Data

Piston Pumps

Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		20		32		40		45		57		63	
Pump Type		PVQ		PVQ		PVQ		PVQ		PVH		PVH	
Max. Operating Pressure @ 1800 rpm	bar psi	210 3000		140 2000		210 3000		186 2700		250 3625		210 3000	
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800
Max. Flow	l/min USgpm	28 7	34 9	48 13	58 15	56 15	67 18	63 17	76 20	82 22	98 26	92 24	110 29
Sound Level at full flow and pressure of:													
35 bar (500 psi)	dB(A)	58	60	62	64	64	66	64	66	66	68	66	68
70 bar (1000 psi)	dB(A)	58	60	63	65	65	67	65	67	67	69	67	69
100 bar (1500 psi)	dB(A)	59	61	64	66	65	67	65	67	68	70	68	70
140 bar (2000 psi)	dB(A)	59	61	64	66	65	67	65	67	69	71	69	71
175 bar (2500 psi)	dB(A)	60	62	–	–	66	68	67	69	71	73	71	73
210 bar (3000 psi)	dB(A)	60	62	–	–	67	69	–	–	72	74	72	74
250 bar (3625 psi)	dB(A)	–	–	–	–	–	–	–	–	73	75	–	–

Piston Pumps (con't)

Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		74		81		98		106		131		141	
Pump Type		PVH		PVH		PVH		PVH		PVH		PVH	
Max. Operating Pressure @ 1800 rpm	bar psi	250 3625		210 3000		250 3625		210 3000		210 3000		175 2500	
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800
Max. Flow	l/min USgpm	110 29	125 33	117 31	140 37	150 40	170 45	152 40	183 48	187 50	225 59	201 53	242 64
Sound Level at full flow and pressure of:													
35 bar (500 psi)	dB(A)	68	70	68	70	70	72	70	72	75	77	75	77
70 bar (1000 psi)	dB(A)	69	71	69	71	71	73	71	73	76	78	76	78
100 bar (1500 psi)	dB(A)	69	71	69	71	71	73	71	73	78	80	78	80
140 bar (2000 psi)	dB(A)	70	72	70	72	72	74	72	74	80	82	80	82
175 bar (2500 psi)	dB(A)	72	74	72	74	73	75	73	75	81	83	81	83
210 bar (3000 psi)	dB(A)	73	75	73	75	74	76	74	76	82	84	83	–
250 bar (3625 psi)	dB(A)	73	75	–	–	76	78	–	–	–	–	–	–

These sound levels are typical of the Integrated Motor Pump operating with the pump(s) shown at the listed conditions and are accurate within 2 dB(A), including unit to unit variability and data repeatability. In the case of piston pumps, the Motor Pump sound levels represent the loudest condition at either full flow or cutoff.

MP92 Sound Level Data

Vane Pumps

Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		18	27	36	40	45	55	67							
Pump Type		20V	20V	20V	25V	25V	25V	25V							
Max. Operating Pressure @1800 rpm	bar psi	210 3000						175 2500							
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800
Max. Flow	l/min USgpm	22 6	27 7	35 9	42 11	48 13	58 15	52 14	62 16	58 15	70 18	72 19	86 23	90 24	108 29
Sound Level at full flow and pressure of: 35 bar (500 psi)	dB(A)	58	60	58	60	58	60	58	60	58	60	58	60	58	60
70 bar (1000 psi)	dB(A)	58	60	58	60	58	60	59	61	59	61	59	61	59	61
100 bar (1500 psi)	dB(A)	60	62	60	62	60	62	61	63	61	63	61	63	61	63
140 bar (2000 psi)	dB(A)	62	64	62	64	62	64	63	65	63	65	63	65	63	65
175 bar (2500 psi)	dB(A)	63	65	63	65	63	65	64	66	64	66	64	66	64	66
210 bar (3000 psi)	dB(A)	64	66	64	66	64	66	-	-	-	-	-	-	-	-

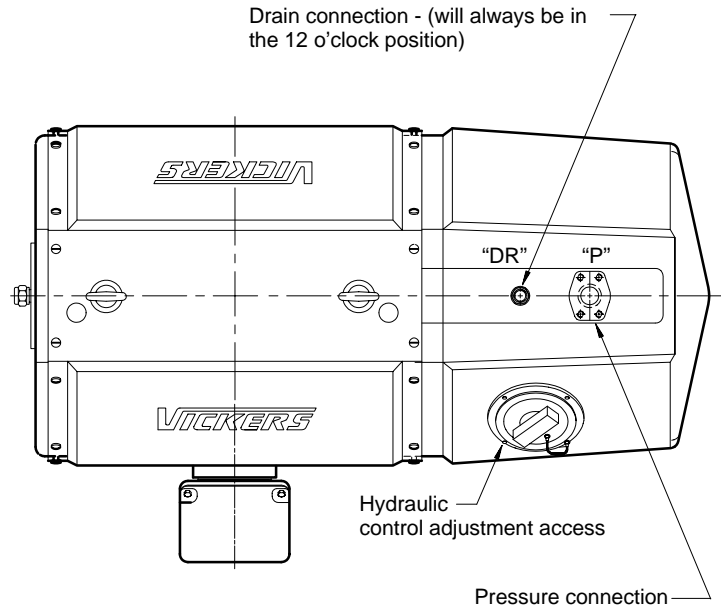
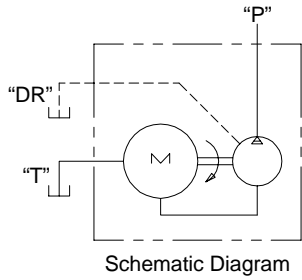
Vane Pumps (con't)

Pump Displacement (cm ³ /rev) (Model Code positions 6, 7, 8)		81	97	112	121	138	162	193							
Pump Type		35V	35V	35V	35V	45V	45V	45V							
Max. Operating Pressure @1800 rpm	bar psi	175 2500						140 2000		100 1500					
Motor rpm		1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800	1500	1800
Max. Flow	l/min USgpm	106 28	127 34	132 35	158 42	158 42	190 50	170 45	204 54	192 51	230 61	225 59	270 71	258 68	310 82
Sound Level at full flow and pressure of: 35 bar (500 psi)	dB(A)	60	62	60	62	60	62	60	62	64	66	64	66	64	66
70 bar (1000 psi)	dB(A)	61	63	61	63	61	63	61	63	65	67	65	67	65	67
100 bar (1500 psi)	dB(A)	63	65	63	65	63	65	63	65	67	69	67	69	67	69
140 bar (2000 psi)	dB(A)	65	67	65	67	65	67	65	67	68	70	68	70	68	70
175 bar (2500 psi)	dB(A)	66	68	66	68	66	68	66	68	69	71	-	-	-	-
210 bar (3000 psi)	dB(A)	-	-	-	-	-	-	-	-	-	-	-	-	-	-

These sound levels are typical of the Integrated Motor Pump operating with the pump(s) shown at the listed conditions and are accurate within 2 dB(A), including unit to unit variability and data repeatability. In the case of piston pumps, the Motor Pump sound levels represent the loudest condition at either full flow or cutoff.

MP 75/92 Installation Dimensions

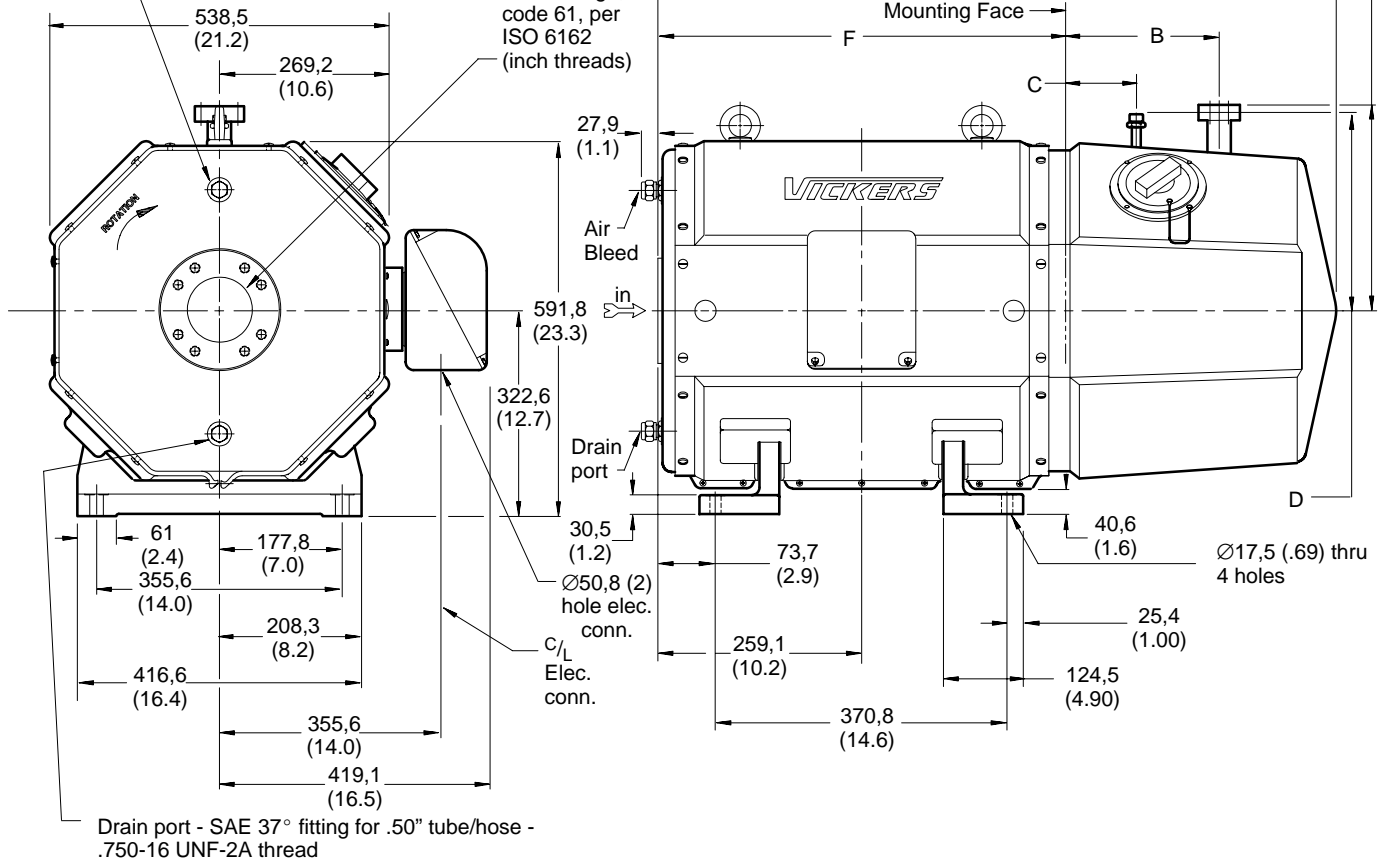
Single Pump - Piston



Air bleed port - SAE 37° fitting for .50" tube/hose - .750-16 UNF-2A thread

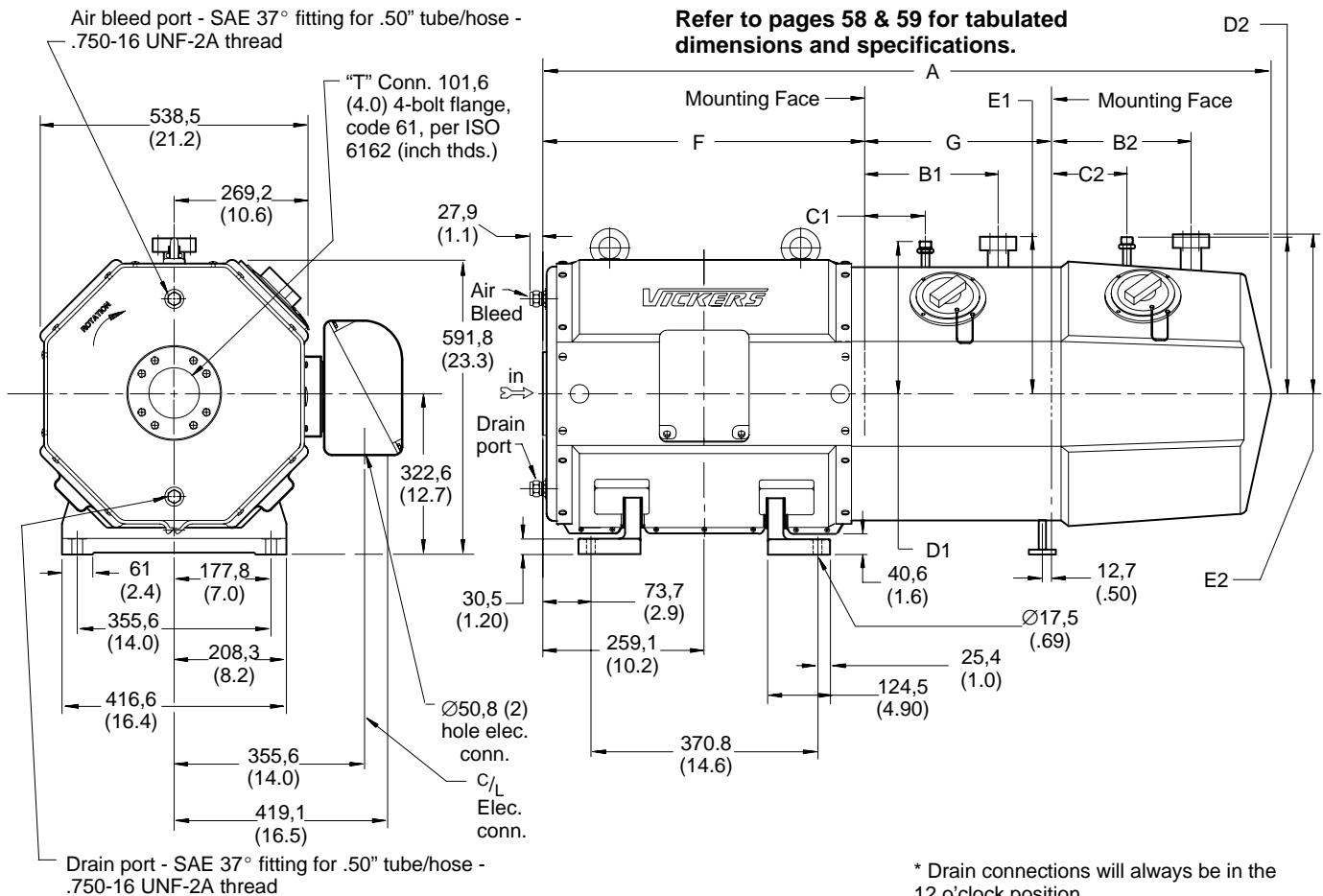
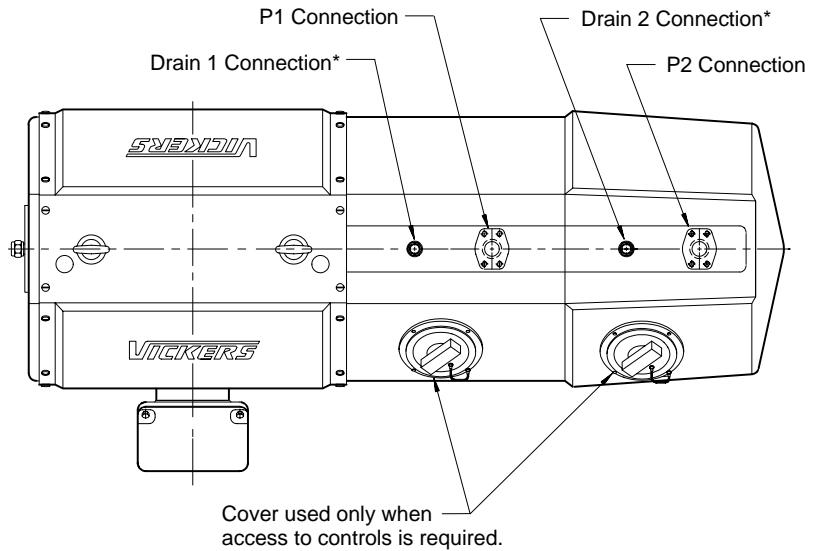
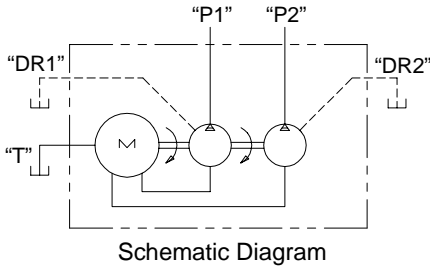
"T" Connection 101,6 (4.00) 4-bolt flange, code 61, per ISO 6162 (inch threads)

Refer to page 58 for tabulated dimensions and specifications.



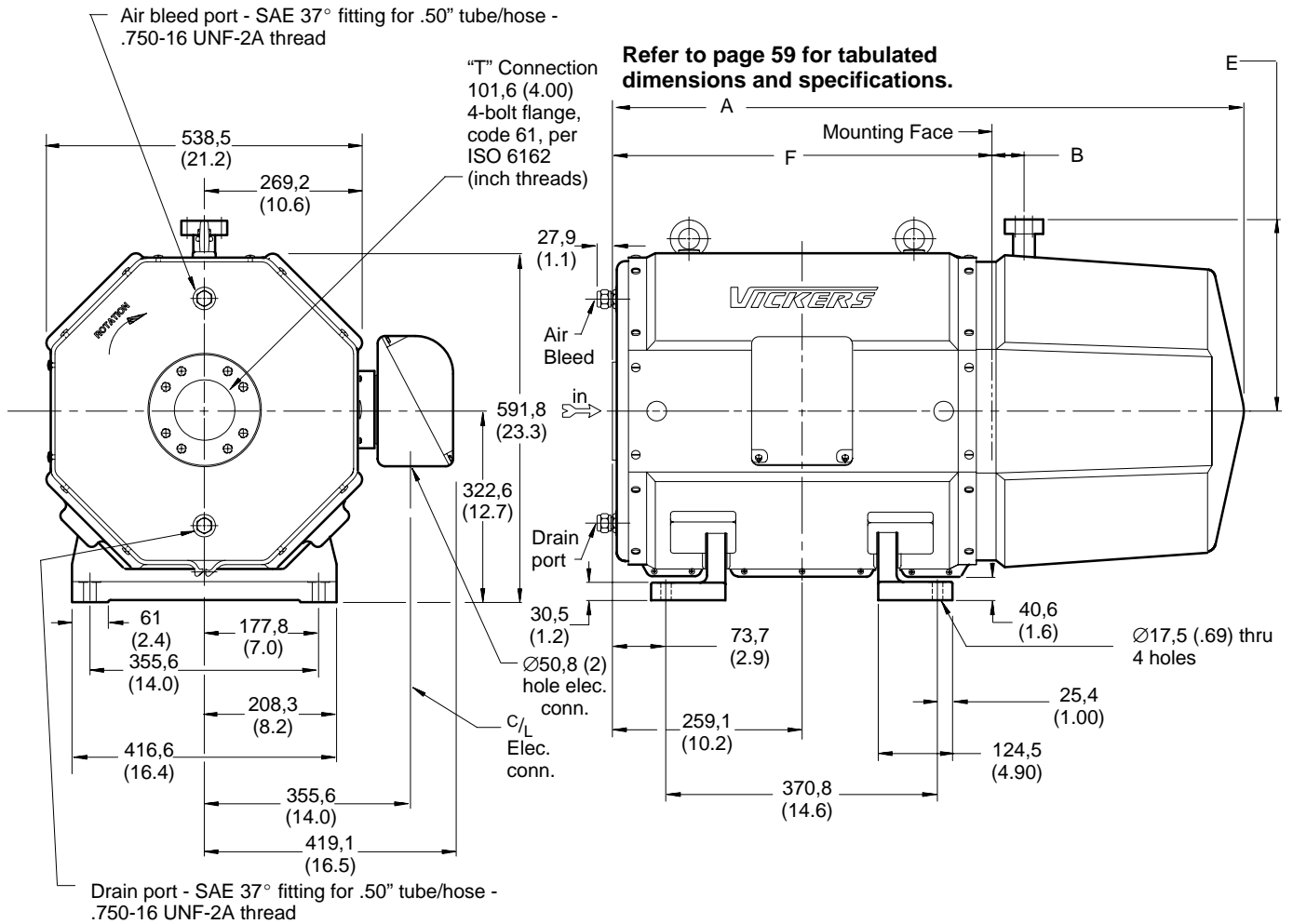
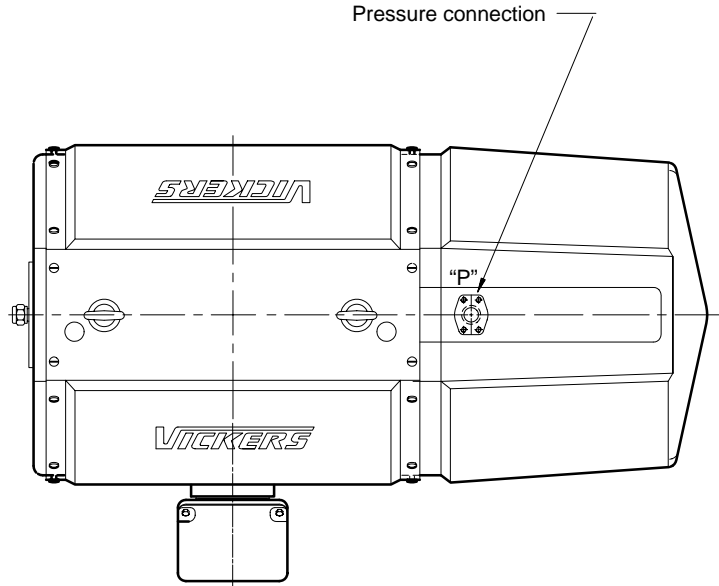
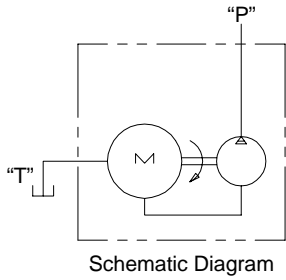
MP 75/92 Installation Dimensions

Double Pump - Piston



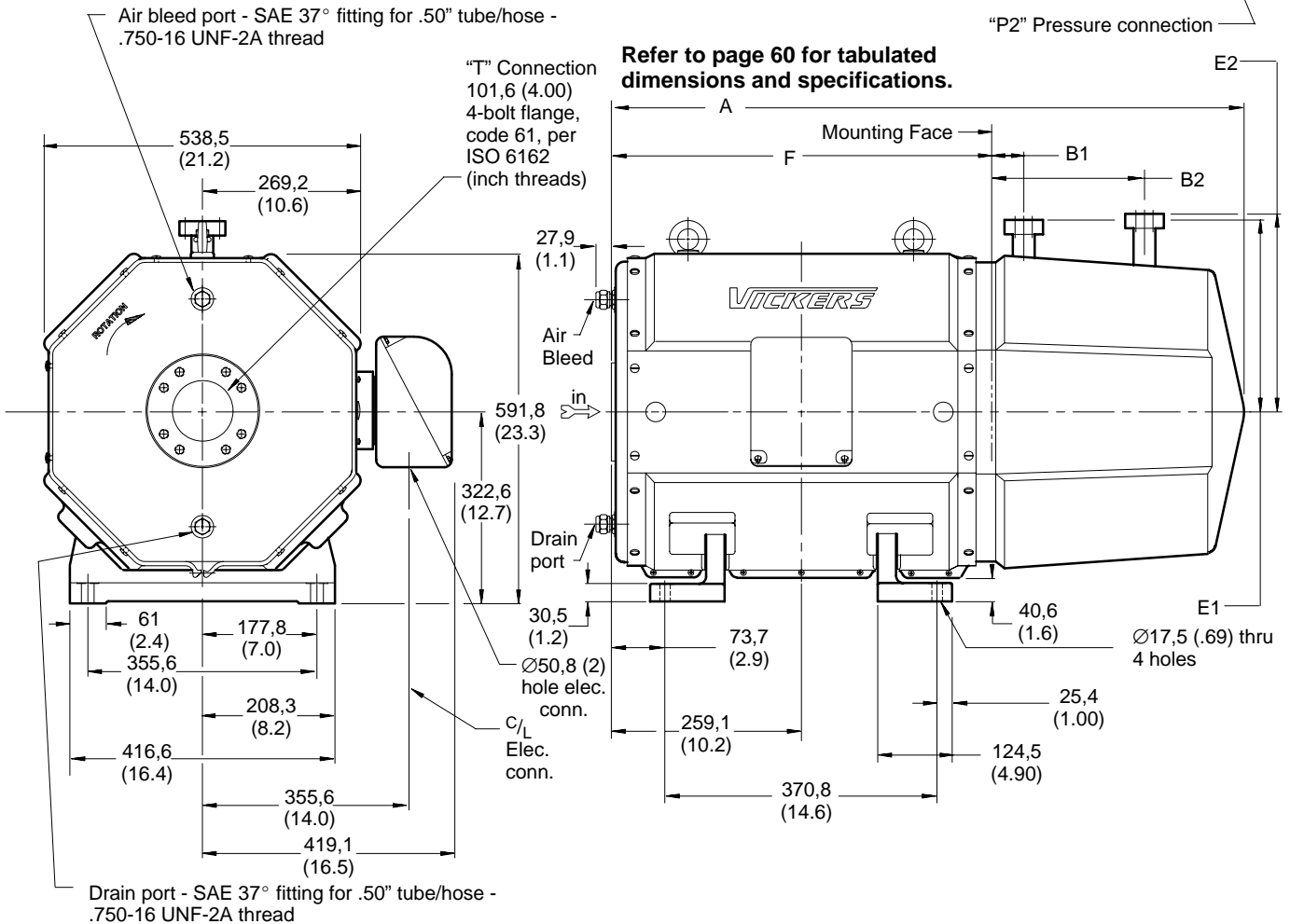
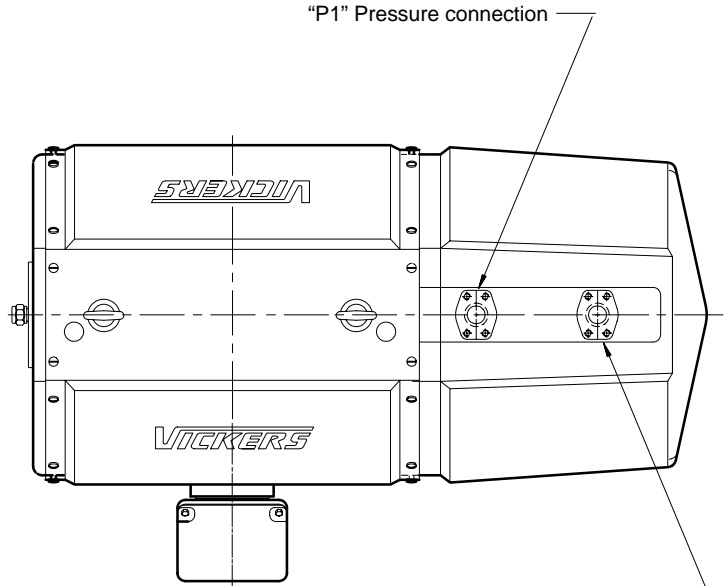
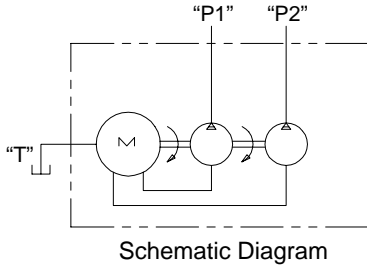
MP 75/92 Installation Dimensions

Single Pump - Vane



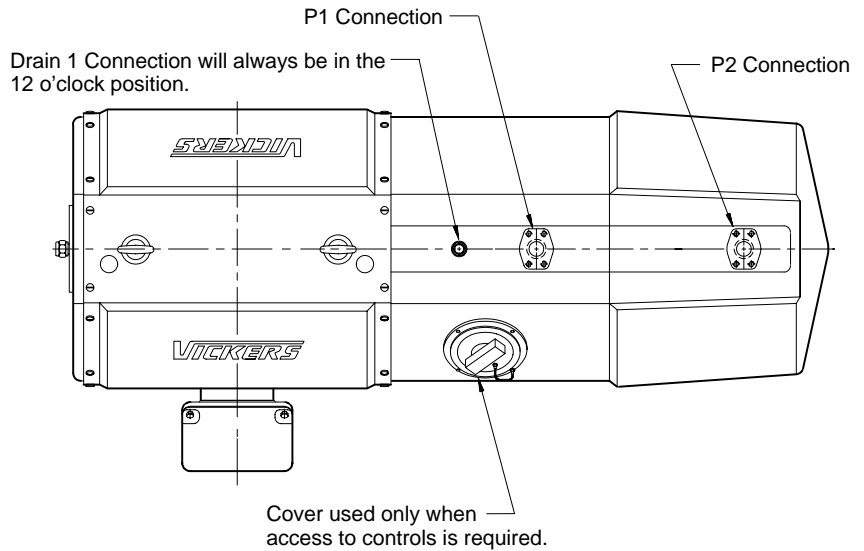
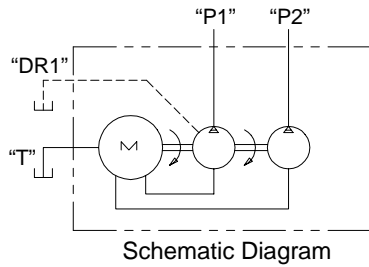
MP 75/92 Installation Dimensions

Double Pump - Vane



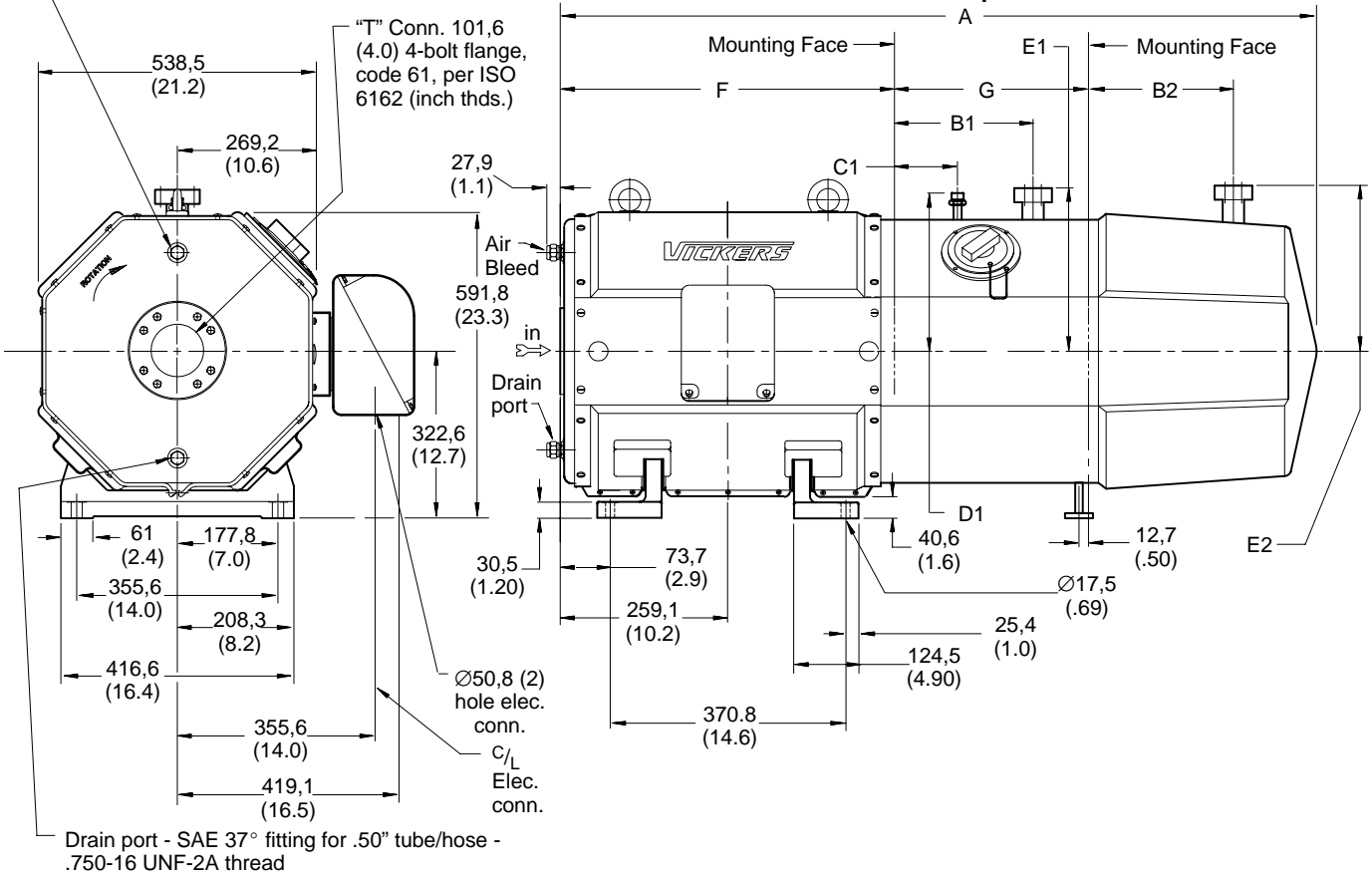
MP 75/92 Installation Dimensions

Double Pump - Piston/Vane



Air bleed port - SAE 37° fitting for .50" tube/hose - .750-16 UNF-2A thread

Refer to pages 61 & 62 for tabulated dimensions and specifications.



MP 75/92 Tabulated Installation Dimensions & Specifications

Single Pump - Piston (from page 53)			Dimensions mm (inch)						Port Connection Sizes	
Single Piston Pump Displacement cm ³ /rev (in ³ /rev)	Pump Model Series	Est. Wt. kg (lbs)	A	B	C	D	E	F	* DR	** P
73,7 (4.5)	PVH74	462 (1018)	975 (38.4)	241,2 (9.50)	129,2 (5.09)	316,5 (12.46)	322,5 (12.69)	520,1 (20.5)	12,7 (.50)	25,4 (1.00)
98,3 (6.0)	PVH98	466 (1027)	905 (35.6)	251,3 (9.89)	111,8 (4.40)	321,6 (12.66)	325 (12.79)	520,1 (20.5)	15,9 (.62)	25,4 (1.00)
131 (8.0)	PVH131	482 (1064)	870 (34.3)	280,4 (11.04)	128,1 (5.04)	311 (12.24)	323 (12.71)	520,1 (20.5)	15,9 (.62)	31,8 (1.25)

Double Pump - Piston (from page 54)				Dimensions mm (inch)						
Double Piston Pump Displacement cm ³ /rev (in ³ /rev) Thru-drive	2nd Pump	Pump Model Series	Est. Wt. kg (lbs)	A	B1	B2	C1	C2	D1	D2
57,4 (3.5)	57,4 (3.5)	PVH57/PVH57	488 (1076)	1220 (48.0)	216,4 (8.52)	216,4 (8.52)	124,8 (4.91)	124,8 (4.91)	308,5 (12.14)	308,5 (12.14)
73,7 (4.5)	57,4 (3.5)	PVH74/PVH57	479 (1096)	1347 (53.0)	241,2 (9.50)	216,4 (8.52)	129,2 (5.09)	124,8 (4.91)	316,5 (12.46)	308,5 (12.14)
73,7 (4.5)	73,7 (4.5)	PVH74/PVH74	506 (1116)	1347 (53.0)	241,2 (9.50)	241,2 (9.50)	129,2 (5.09)	129,2 (5.09)	316,5 (12.46)	316,5 (12.46)
98,3 (6.0)	57,4 (3.5)	PVH98/PVH57	501 (1105)	1347 (53.0)	251,3 (9.89)	216,4 (8.52)	111,8 (4.40)	124,8 (4.91)	321,6 (12.66)	308,5 (12.14)
98,3 (6.0)	73,7 (4.5)	PVH98/PVH74	510 (1125)	1347 (53.0)	251,3 (9.89)	241,2 (9.50)	111,8 (4.40)	129,2 (5.09)	321,6 (12.66)	316,5 (12.46)
98,3 (6.0)	98,3 (6.0)	PVH98/PVH98	514 (1134)	1347 (53.0)	251,3 (9.89)	251,3 (9.89)	111,8 (4.40)	111,8 (4.40)	321,6 (12.66)	321,6 (12.66)
131 (8.0)	57,4 (3.5)	PVH131/ PVH57	518 (1142)	1347 (53.0)	280,4 (11.04)	216,4 (8.52)	128,1 (5.04)	124,8 (4.91)	311 (12.24)	308,5 (12.14)
131 (8.0)	73,7 (4.5)	PVH131/ PVH74	527 (1162)	1347 (53.0)	280,4 (11.04)	241,2 (9.50)	128,1 (5.04)	129,2 (5.09)	311 (12.24)	316,5 (12.46)
131 (8.0)	98,3 (6.0)	PVH131/ PVH98	531 (1171)	1347 (53.0)	280,4 (11.04)	251,3 (9.89)	128,1 (5.04)	111,8 (4.40)	311 (12.24)	321,6 (12.66)
131 (8.0)	131 (8.0)	PVH131/ PVH131	548 (1208)	1347 (53.0)	280,4 (11.04)	280,4 (11.04)	128,1 (5.04)	128,1 (5.04)	311 (12.24)	311 (12.24)

MP 75/92 Tabulated Installation Dimensions & Specifications

Double Pump - Piston (con't.) Pump Model Series	Dimensions mm (inch)				Port Connection Sizes			
	E1	E2	F	G	* DR1	** P1	* DR2	** P2
PVH57/PVH57	316,5 (12.46)	316,5 (12.46)	520,1 (20.5)	312,9 (12.32)	12,7 (.50)	25,4 (1.00)	12,7 (.50)	25,4 (1.00)
PVH74/PVH57	322,5 (12.69)	316,5 (12.46)	520,1 (20.5)	335,7 (13.22)	12,7 (.50)	25,4 (1.00)	12,7 (.50)	25,4 (1.00)
PVH74/PVH74	322,5 (12.69)	322,5 (12.69)	520,1 (20.5)	335,7 (13.22)	12,7 (.50)	25,4 (1.00)	12,7 (.50)	25,4 (1.00)
PVH98/PVH57	325 (12.79)	322,5 (12.69)	520,1 (20.5)	347,8 (13.69)	15,9 (.625)	25,4 (1.00)	12,7 (.50)	25,4 (1.00)
PVH98/PVH74	325 (12.79)	322,5 (12.69)	520,1 (20.5)	347,8 (13.69)	15,9 (.625)	25,4 (1.00)	12,7 (.50)	25,4 (1.00)
PVH98/PVH98	325 (12.79)	325 (12.79)	520,1 (20.5)	347,8 (13.69)	15,9 (.625)	25,4 (1.00)	15,9 (.625)	25,4 (1.00)
PVH131/PVH57	323 (12.71)	316,5 (12.46)	520,1 (20.5)	372,1 (14.65)	15,9 (.625)	31,8 (1.25)	12,7 (.50)	25,4 (1.00)
PVH131/PVH74	323 (12.71)	322,5 (12.69)	520,1 (20.5)	372,1 (14.65)	15,9 (.625)	31,8 (1.25)	12,7 (.50)	25,4 (1.00)
PVH131/PVH98	323 (12.71)	325 (12.79)	520,1 (20.5)	372,1 (14.65)	15,9 (.625)	31,8 (1.25)	15,9 (.625)	25,4 (1.00)
PVH131/PVH131	323 (12.71)	323 (12.71)	520,1 (20.5)	372,1 (14.65)	15,9 (.625)	31,8 (1.25)	15,9 (.625)	31,8 (1.25)

* ORFS Female thread fitting for SAE J1453.

** 4-bolt flange, code 61, per SAE J518 inch threads, except PVH131 which is high pressure series, code 62.

Single Pump - Vane (from page 55)			Dimensions mm (inch)				Port Connection Size
Single Van Pump Displacement cm ³ /rev (in ³ /rev)	Pump Model Series	Est. Wt. kg (lbs)	A	B	E	F	* P
81 (4.94) 97 (5.91) 112 (6.83) 121 (7.37)	35V	442 (975)	975 (38.4)	38,1 (1.50)	307,1 (12.09)	520,1 (20.5)	31,8 (1.25)
138 (8.41) 162 (9.85) 193 (11.75)	45V	454 (1000)	975 (38.4)	42,9 (1.69)	316,7 (12.47)	520 (20.5)	38,1 (1.50)

MP 75/92 Tabulated Installation Dimensions & Specifications

Double Pump - Vane (from page 56)				Dimensions mm (inch)						Port Connection Sizes	
Double Pump - Vane Displacement cm ³ /rev (in ³ /rev) Shaft end Cover end		Pump Model Series	Est. Wt. kg (lbs)	A	B1	B2	E1	E2	F	* P1	* P2
40 (2.47)	18 (1.10)	2520V	440 (970)	975 (38.4)	38,1 (1.50)	113,8 (4.48)	306,7 (12.07)	302,5 (11.91)	550,1 (21.7)	25,4 (1.00)	19 (.75)
45 (2.78)	27 (1.67)										
55 (3.39)	36 (2.22)										
67 (4.13)											
40 (2.47)	40 (2.47)	2525V	445 (980)	975 (38.4)	38,1 (1.50)	113,8 (4.48)	306,7 (12.07)	305,5 (12.03)	550,1 (21.7)	25,4 (1.00)	25,4 (1.00)
45 (2.78)	45 (2.78)										
55 (3.39)	55 (3.39)										
67 (4.13)	67 (4.13)										
81 (4.94)	18 (1.10)	3520V	454 (1000)	975 (38.4)	38,1 (1.50)	138 (5.43)	307,1 (12.09)	302,5 (11.91)	520,1 (20.5)	31,8 (1.25)	19 (.75)
97 (5.91)	27 (1.67)										
112 (6.83)	36 (2.22)										
121 (7.37)											
81 (4.94)	40 (2.47)	3525V	455 (1001)	975 (38.4)	38,1 (1.50)	138 (5.43)	307,1 (12.09)	305,5 (12.03)	520,1 (20.5)	31,8 (1.25)	25,4 (1.00)
97 (5.91)	45 (2.78)										
112 (6.83)	55 (3.39)										
121 (7.37)	67 (4.13)										
138 (8.41)	18 (1.10)	4520V	463 (1020)	975 (38.4)	42,9 (1.69)	168,3 (6.62)	316,7 (12.47)	302,5 (11.91)	520,1 (20.5)	38,1 (1.50)	19 (.75)
162 (9.85)	27 (1.67)										
193 (11.75)	36 (2.22)										
138 (8.41)	40 (2.47)	4525V	465 (1026)	975 (38.4)	42,9 (1.69)	167,9 (6.61)	316,7 (12.47)	305,5 (12.03)	520,1 (20.5)	38,1 (1.50)	25,4 (1.00)
162 (5.91)	45 (2.78)										
193 (11.75)	55 (3.39)										
	67 (4.13)										
138 (8.41)	81 (4.94)	4535V	473 (1043)	975 (38.4)	42,9 (1.69)	324,5 (12.77)	316,7 (12.47)	326,1 (12.84)	520,1 (20.5)	38,1 (1.50)	31,8 (1.25)
162 (9.85)	97 (5.91)										
193 (11.75)	112 (6.83)										
	121 (7.37)										

* 4-bolt flange, code 61, per SAE J518 inch threads.

Vane Pump Displacements		
Frame Size	Code	cm ³ /rev
20V	5	18
	8	27
	11	36
25V	12	39
	14	45
	17	55
	21	67
35V	25	81
	30	97
	35	112
	38	121
45V	42	138
	50	162
	60	193

MP 75/92 Tabulated Installation Dimensions & Specifications

Double Pump - Piston/Vane (from page 57)				Dimensions mm (inch)						
Double Pump - Piston/Vane Displacement cm ³ /rev (in ³ /rev)	Pump Model Series	Est. Wt. kg (lbs)		A	B1	B2	C1	C2	D1	D2
Piston	Vane									
45,1 (2.75)	39 (2.47)	PVQ45/25V	457 (1009)	1220 (48.0)	191,3 (7.53)	38,1 (1.50)	77,7 (3.06)	–	310,3 (12.22)	–
45,1 (2.75)	41 (2.50)	PVQ45/PVQ40	463 (1022)	1220 (48.0)	191,3 (7.53)	191,3 (7.53)	77,7 (3.06)	77,7 (3.06)	310,3 (12.22)	310,3 (12.22)
45,1 (2.75)	45,1 (2.75)	PVQ45/PVQ45	463 (1022)	1220 (48.0)	191,3 (7.53)	191,3 (7.53)	77,7 (3.06)	77,7 (3.06)	310,3 (12.22)	310,3 (12.22)
98,3 (6.0)	39 (2.47)	PVH98/25V	483 (1065)	1220 (48.0)	251,3 (9.89)	38,1 (1.50)	111,8 (4.40)	–	321,6 (12.66)	–
98,3 (6.0)	81 (4.94)	PVH98/35V	491 (1082)	1220 (48.0)	251,3 (9.89)	38,1 (1.50)	111,8 (4.40)	–	321,6 (12.66)	–
131 (8.0)	39 (2.47)	PVH131/25V	500 (1102)	1220 (48.0)	280,4 (11.04)	38,1 (1.50)	128,1 (5.04)	–	311 (12.24)	–
131 (4.5)	81 (4.94)	PVH131/35V	508 (1119)	1220 (48.0)	280,4 (11.04)	38,1 (1.50)	128,1 (5.04)	–	311 (12.24)	–
131 (8.0)	138 (8.41)	PVH131/45V	519 (1144)	1220 (48.0)	280,4 (11.04)	42,9 (1.69)	128,1 (5.04)	–	311 (12.24)	–
131 (8.0)	21,1 (1.29)	PVH131/PVQ20	499 (1100)	1347 (53.0)	280,4 (11.04)	174,7 (6.88)	128,1 (5.04)	39,4 (1.55)	311 (12.24)	308,5 (12.14)
131 (8.0)	32,9 (2.01)	PVH131/PVQ32	499 (1100)	1347 (53.0)	280,4 (11.04)	174,7 (6.88)	128,1 (5.04)	39,4 (1.55)	311 (12.24)	308,5 (12.14)
131 (8.0)	41 (2.50)	PVH131/PVQ40	506 (1115)	1347 (53.0)	280,4 (11.04)	191,3 (7.53)	128,1 (5.04)	77,7 (3.06)	311 (12.24)	310,3 (12.22)
131 (8.0)	45,1 (2.75)	PVH131/PVQ45	506 (1115)	1347 (53.0)	280,4 (11.04)	191,3 (7.53)	128,1 (5.04)	77,7 (3.06)	311 (12.24)	310,3 (12.22)

MP 75/92 Tabulated Installation Dimensions & Specifications

Pump Model Series	Dimensions mm (inch)				Port Connection Sizes			
	E1	E2	G	F	DR1*	DR2*	P1**	P2 **
PVQ45/25V	306,8 (12.08)	306,7 (12.07)	254,8 (10.03)	550,1 (21,7)	15,9 (.62)	–	25,4 (1.00)	25,4 (1.00)
PVQ45/PVQ40	306,8 (12.08)	306,8 (12.08)	254,8 (10.03)	550,1 (21,7)	15,9 (.62)	15,9 (.62)	25,4 (1.00)	25,4 (1.00)
PVQ45/PVQ45	306,8 (12.08)	306,8 (12.08)	254,8 (10.03)	550,1 (21,7)	15,9 (.62)	15,9 (.62)	25,4 (1.00)	25,4 (1.00)
PVH98/25V	325 (12.79)	306,7 (12.07)	377,8 (14.87)	520,1 (20.5)	15,9 (.62)	–	25,4 (1.00)	25,4 (1.00)
PVH98/35V	325 (12.79)	307,1 (12.09)	347,8 (13.69)	520,1 (20.5)	15,9 (.62)	–	25,4 (1.00)	31,8 (1.25)
PVH131/25V	323 (12.71)	306,7 (12.07)	402,1 (15.83)	520,1 (20.5)	15,9 (.62)	–	31,8 (1.25)	25,4 (1.00)
PVH131/35V	323 (12.71)	307,1 (12.09)	372,1 (14.65)	520,1 (20.5)	15,9 (.62)	–	31,8 (1.25)	31,8 (1.25)
PVH131/45V	323 (12.71)	316,7 (12.47)	372,1 (14.65)	520,1 (20.5)	15,9 (.62)	–	31,8 (1.25)	38,1 (1.50)
PVH131/PVQ20	323 (12.71)	315,4 (12.42)	402,1 (15.83)	520,1 (20.5)	15,9 (.62)	12,7 (.50)	31,8 (1.25)	31,8 (1.25)
PVH131/PVQ32	323 (12.71)	315,4 (12.42)	402,1 (15.83)	520,1 (20.5)	15,9 (.62)	12,7 (.50)	31,8 (1.25)	31,8 (1.25)
PVH131/PVQ40	323 (12.71)	306,8 (12.08)	402,1 (15.83)	520,1 (20.5)	15,9 (.62)	15,9 (.62)	31,8 (1.25)	25,4 (1.00)
PVH131/PVQ45	323 (12.71)	306,8 (12.08)	402,1 (15.83)	520,1 (20.5)	15,9 (.62)	15,9 (.62)	31,8 (1.25)	25,4 (1.00)

* ORFS Female thread fitting for SAE J1453.

** 4-bolt flange, code 61, per SAE J518 (inch threads) except PHV131 which is high pressure series, code 62.

Accessories

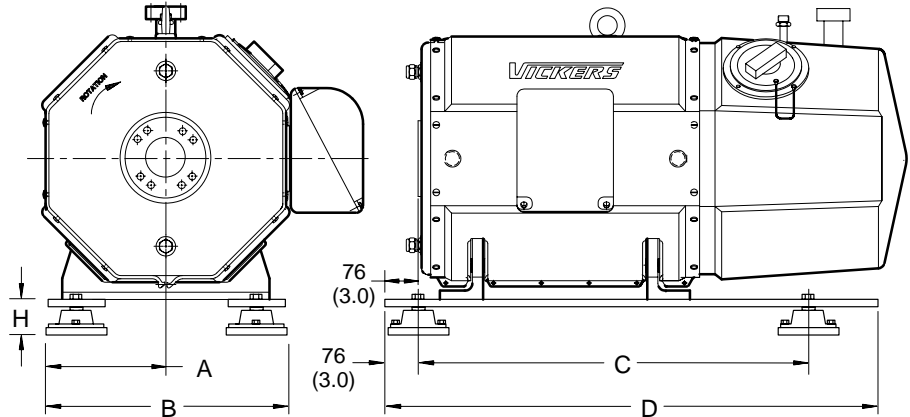
Mounting Rails

The motor pump mounting sets shown (right) provide convenient installation combined with effective isolation of structure-borne noise, or mechanical vibration.

Two sets are offered for each motor pump size. One is for single pump or lightweight double pump models, and a second for two-pump models in which the pump weight requires an outboard support to reduce the overhung load on the pump mounting flange.

The Vickers mounting sets help ensure low noise for the entire system, reflecting the quiet operation of the motor pump.

Single Pump or Lightweight Double Pump Models



Model/Size	Kit No.	Dimensions mm (inch)						
		A	B	C	D	H	Max.	Min.
MP15/MP22	930697	178 (7.0)	356 (14.0)	559 (22.0)	711 (28.0)		76,2 (3.00)	63,5 (2.50)
MP45	930558	196 (7.7)	392 (15.4)	635 (25.0)	787 (31.0)		82,6 (3.25)	69,8 (2.75)
MP75/MP92	930699	216 (8.5)	432 (17.0)	635 (25.0)	787 (31.0)		82,6 (3.25)	69,8 (2.75)

Rail Ordering Information

Vickers part numbers for mounting rail assemblies are:

Single or lightweight double pump -

MP15/22 930697
MP45 930558
MP75/92 930699

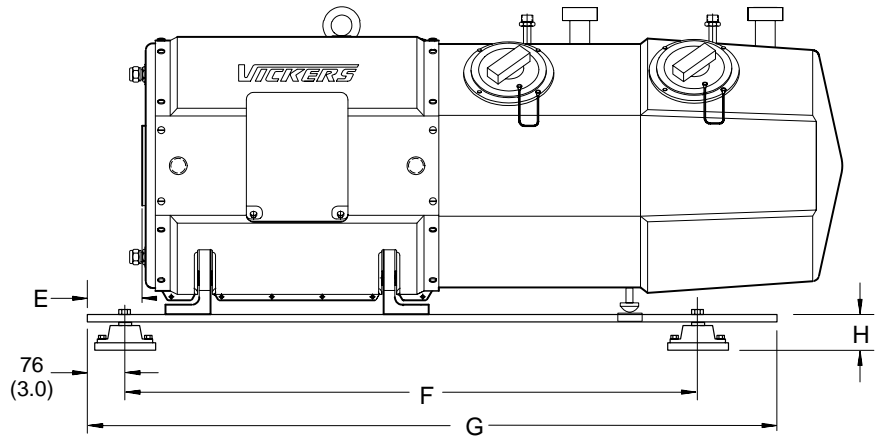
Double pump (w/overhang support) -

MP15/22 930698
MP45 930559
MP75/92 930700

Each kit includes:

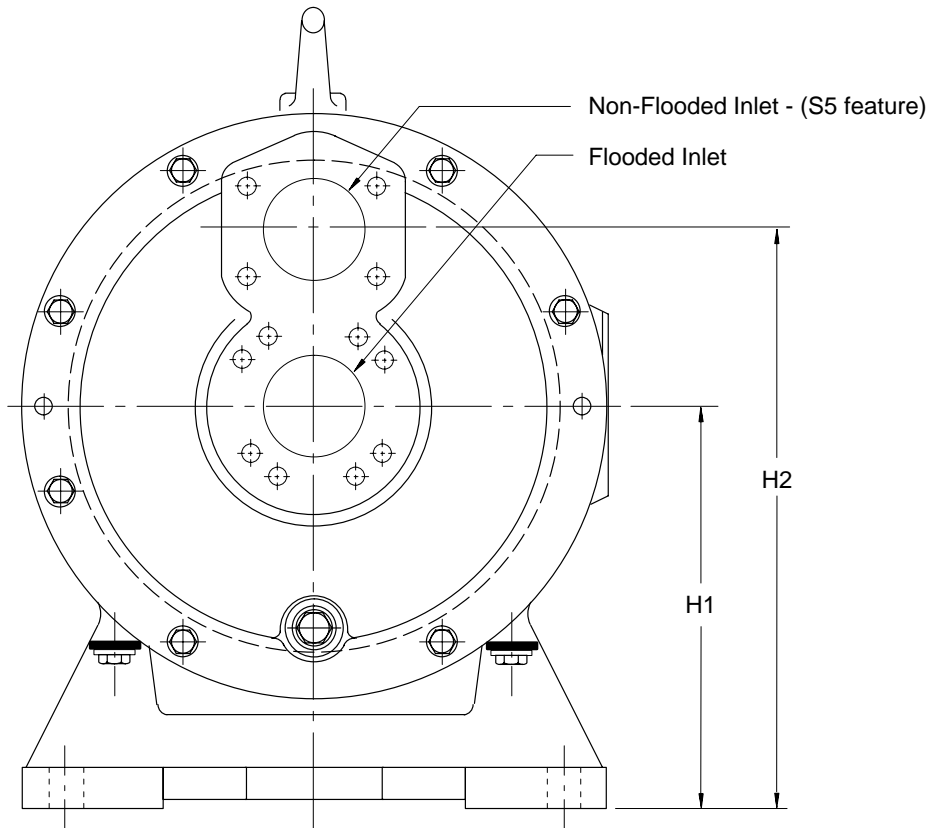
- 2 each rails
- 4 each isolator mounts
- Fasteners and associated parts for attaching the rails to the motor feet which mount to the rails.
- In double pump kits only - additional parts for attaching a support under the thru-drive adaptor.

Double Pumps (w/overhang support)



Model/Size	Kit No.	Dimensions mm (in)					
		E	F	G	H	Max.	Min.
MP15/MP22	930698	152 (6.0)	914 (36.0)	1067 (42.0)		76,2 (3.00)	63,5 (2.50)
MP45	930559	102 (4.0)	940 (37.0)	1092 (43.0)		82,6 (3.25)	69,8 (2.75)
MP75/MP92	930700	165 (6.5)	1016 (40.0)	1168 (46.0)		82,6 (3.25)	69,8 (2.75)

Inlet End Bell Dimensions



Model/Size	Dimensions mm (in)				Maximum Flow Rate for Non-Flooded Inlet Installations
	H1	H2	Flooded Inlet	Non-Flooded Inlet	
MP15/MP22	237 (9.3)	353 (13.9)	76,2 (3.00)	63,5 (2.50)	340 l/min (90 USgpm)
MP45	250 (9.90)	369,1 (14.5)	76,2 (3.00)	76,2 (3.00)	480 l/min (127 USgpm)
MP75/MP92	322,6 (12.7)	474,6 (18.7)	101,6 (4.00)	101,6 (4.00)	850 l/min (225 USgpm)

S5 Models for non-flooded inlet installations Installation Conditions:

- Maximum suction lift, from reservoir oil level to inlet port centerline - 0,7 meter (28 inches).
- Inlet line same diameter as inlet port; maximum length 3,5 meters (11.5 feet).
- Inlet strainer in reservoir; no check valve or other restriction.
- Fill motor housing using (non-flooded) inlet port as air bleed.

Fluid Cleanliness

Proper fluid condition is essential for long and satisfactory life of hydraulic components and systems. Hydraulic fluid must have the proper cleanliness and chemical composition for protection against wear of components.

Essential information on the maintenance of hydraulic fluid is included in Vickers publication 561; "Vickers Guide to Systemic Contamination Control," available from your local Vickers distributor or by contacting Vickers, Incorporated. Recommendations on filtration and the selection of products to control fluid condition are included in 561.

Recommended cleanliness levels, using petroleum oil under common conditions, are based on the highest fluid pressure levels in the system and are coded in the chart below. Fluids other than petroleum, severe service cycles or temperature extremes are cause for adjustment of these cleanliness codes. See **Vickers publication 561** for exact details.

Vickers products, as any components, will operate with apparent satisfaction in

fluids with higher cleanliness codes (higher levels of contamination) than those prescribed. Other manufacturers may recommend levels above those specified. Experience has shown, however, that life of any hydraulic components is shortened in fluids with higher cleanliness codes than those listed below. These codes have been proven to provide a long trouble-free service life for the products shown.

SYSTEM PRESSURE LEVEL

PRODUCT	<70 bar (1000 psi)	140-210 bar (2000-3000 psi)	210+ bar (3000+ psi)
Vane Pumps – Fixed	20/18/15	19/17/14	18/16/13
Vane Pumps – Variable	18/16/14	17/15/13	
Piston Pumps – Fixed	19/17/15	18/16/14	17/15/13
Piston Pumps – Variable	18/16/14	17/15/13	16/14/12
Directional Valves	20/18/15	20/18/15	19/17/14
Pressure/Flow Control Valves	19/17/14	19/17/14	19/17/14
CMX Valves	18/16/14	18/16/14	17/15/13
Servo Valves	16/14/11	16/14/11	15/13/10
Proportional Valves	17/15/12	17/15/12	15/13/11
Cylinders	20/18/15	20/18/15	20/18/15
Vane Motors	20/18/15	19/17/14	18/16/13
Axial Piston Motors	19/17/14	18/16/13	17/15/12
Radial Piston Motors	20/18/14	19/17/13	18/16/13

Fluids & Seals

Fluorocarbon seals are standard in Vickers Integrated Motor Pumps. However, the motor pumps are at this time, released for general application **only** with petroleum oils. Consult your Vickers representative on applications with other fluids.