

ARO[®]

PISTON PUMPS

HYDRAULIC PUMP MODELS



ARO® hydraulic powered piston pumps offer the same great quality and reliability as air operated pumps with increased versatility and efficiency.

For over 85 years, the ARO® Fluid Products business of Ingersoll Rand® has developed relationships with hundreds of original equipment manufacturers and distributors, enabling us to better focus on the unique pumping needs of many industries. It's a strategic merger of our customers' application expertise, along with our decades-long legacy of designing and building outstanding piston pumps.

No airline to run a piston pump? No problem. ARO® offers a complete line of hydraulically-driven piston pumps. 2-Ball, 4-Ball and chop-check pumps are all available with hydraulic motors. Units can be floor-mounted and draw fluid from nearby tanks, or ram-mounted to work with high viscosity fluids.

ARO® hydraulic pumps provide the same features as air-driven models: high displacement for long service life and multiple packing options to maximize fluid compatibility.

Hydraulic pumps are used in:

- ▶ Shop areas where little air pressure is available but have a nearby source of hydraulic power
- ▶ On truck beds where the vehicle power take off (PTO) is utilized



Simply better pumps

ARO® LOWER PUMP END TECHNOLOGY

Whether your application requires a 2-ball, 4-ball, or chop-check piston pump, with ARO® you get a pump that's better engineered, from the inside out. We offer design features and performance enhancements that ensure your pump is as durable and dependable as possible — maximizing output and minimizing downtime for a long time to come.

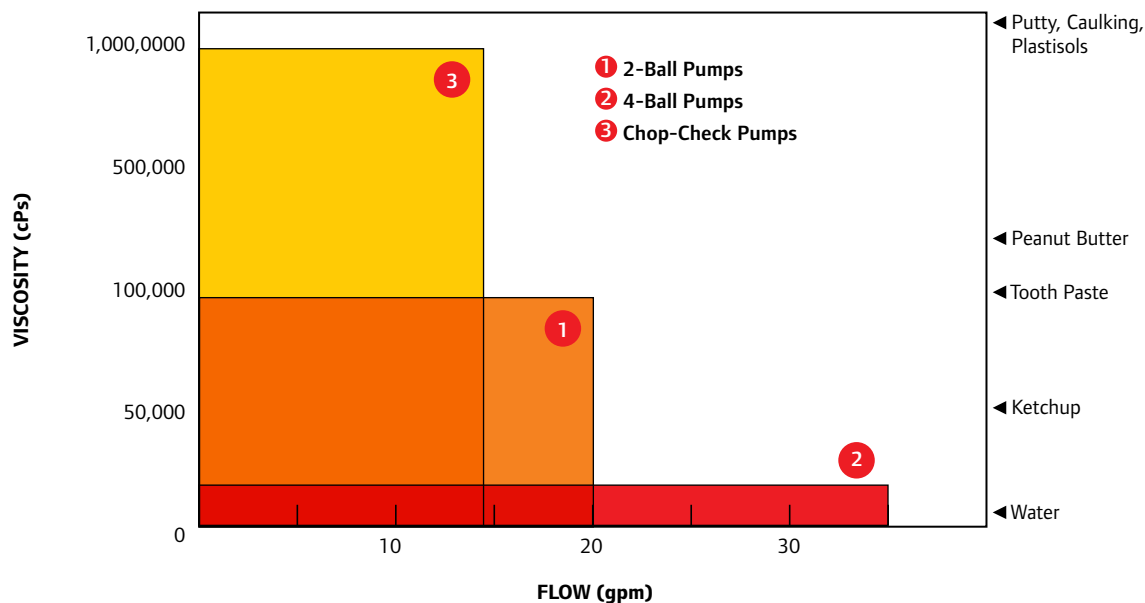
Pump selection made simple

With an ARO® piston pump, you can be assured of getting reliable equipment with the least amount of effort, calculation, or hassle on your part. There are basically four factors to take into consideration when selecting the right configuration for your application:

- ▶ Type of fluid
- ▶ Viscosity or thickness
- ▶ Required flow rate
- ▶ Required output pressure

Pump selection at a glance

Knowing fluid viscosity and flow rates makes it easier to choose the right pump for your application. Not sure what size air motor or piston pump you need? No problem. You can find out by calling ARO® Technical Support and working directly with our expert pump consultants, or by visiting our website to access specific pump performance data. Either way, you'll be sure to get a motor and pump package that operates efficiently, reliably, and safely.



Best-in-class output

- Our 6" stroke delivers best-in-class displacement per cycle, delivering better flow rate, better output, and less fatigue on parts.

Easy serviceability

- Plungers and packings are easily accessible, minimizing downtime.
- Pump packings on the lower pumps are adjustable, featuring a wave spring and guide arrangement.
- Parts are available in convenient service kits so you have the right parts at the right time.

Superior performance with abrasive fluids

- ARO® chop-check pumps feature plunger rods that are hard chrome-plated or made of hardened stainless steel. The result: components that resist the scoring caused by pumping abrasive fluids.
- Available in affordable **high-grade stainless-steel** construction.
- Electro-polished and passivated for material compatibility and corrosion-free operation.
- **Eight packing options** are available, including ultra-high molecular weight polyethylene (UHMW-PE), for even better material compatibility and excellent abrasion resistance.

Piston Pump Applications and Types

Piston Pump Applications

Piston pumps are used in a wide variety of fluid handling applications. The majority of these can be broken down into four different categories:

Transfer



Moving a low-to-medium viscosity fluid from one location to another. 2-ball and 4-ball style pumps are the most frequently used in transfer applications.

Extrusion



Involves using a piston pump to apply medium-to-high viscosity materials. Typical extrusion applications require accessories like rams and fluid regulators to meet customer requirements. Chop-check and 2-ball pumps are used in extrusion applications.

Coating



This involves application of material by either spray or dipping. Coating applications use 2-ball and 4-ball pumps.

Measuring/Dispense



Measuring and dispense involves the delivery of a specified quantity of fluid on a repetitive basis. Measuring and dispense applications use 2-ball, 4-ball and chop-check pumps.

2-ball pumps



Spray

Materials

- Oils
- Coatings
- Paint
- Chemicals



Extrusion



Transfer & Supply



2-ball pumps are among the most versatile in the ARO® line. They are capable of handling applications from simple transfer to the extrusion of low- to medium- viscosity materials up to 100,000 centipoise (cPs) with fluid delivery up to 18.1 gpm (68.6 L/min).

4-ball pumps



Transfer & Supply

Materials

- Paint
- Chemicals
- Varnishes
- Enamels
- Lacquers



ARO-Force 4-ball piston pumps are designed to transfer high volumes of low- and medium-viscosity fluids up to 12,500 cPs with fluid delivery up to 32.8 gpm (124.0 L/min), depending on the application. A common use involves circulating fluid from the original container, to the point of use, and then back.

Chop-check pumps



Extrusion

Materials

- Caulking
- Heavy lubricants
- Mastics
- Sealants
- Inks
- Grease



Transfer & Supply



Lubrication



The heavy-hitters of the line, ARO® chop-check pumps are designed to move medium- to high- viscosity fluids ranging from 15,000 to more than 1,000,000 cPs, and at delivery rates up to 12.2 gpm (46.3 L/min).

Selection Chart



2-Ball Series Pumps

				See Page
0.8:1		12.9 gal/min	48.8 l/min	<i>Stainless steel</i> 8
1.7:1		3.1 gal/min	11.9 l/min	<i>Stainless steel</i> 9
3.3:1		1.6 gal/min	6.1 l/min	<i>Stainless steel</i> 10

4-Ball Series Pumps

0.2:1		22.4 gal/min	84.9 l/min	<i>Stainless steel</i> 11
0.3:1		17 gal/min	64.4 l/min	<i>Stainless steel</i> 12

Chop-Check Series Pumps

1.2:1		8.7 gal/min	32.9 l/min	<i>Carbon steel</i> 13
2:1		2.7 gal/min	10.2 l/min	<i>Carbon steel</i> 14
3.6:1		1.5 gal/min	5.7 l/min	<i>Carbon steel</i> 15

Viscosity Guide

Flow (gpm)	Max. Delivery Rate gpm (L/min)	Ratio	Fluid Pressure Range psi (bar)	Pump Model Number	Material of Construction	Lower End Type	500 cPs	1,000 cPs
0-2	1.5 (5.7)	3.6:1 Hyd	180 - 4320 (12.4-297.9)	650935-C43-C	Carbon Steel	Chop-Check		
	1.6 (6.1)	3.3:1 Hyd	165 - 3960 (11.4 - 273.1)	650944-C43-B	Stainless Steel	2-Ball	Siphon	
2-4	2.7 (10.2)	2:1 Hyd	100 - 2400 (6.9 - 165.5)	650934-XX-C	Carbon Steel	Chop-Check		
	3.1 (11.9)	1.7:1 Hyd	85 - 2054 (5.9 - 140.7)	650943-XXX-B	Stainless Steel	2-Ball	Siphon	
4-10	8.7 (32.9)	1.2:1 Hyd	60-2670 (4.1 - 184.1)	650941-XXX-C	Carbon Steel	Chop-Check		
10-20	12.9 (48.8)	0.8:1 Hyd	40 - 1600 (2.8 - 110.3)	650940-XXX-B	Stainless Steel	2-Ball	Siphon	
	17 (64.4)	0.3:1 Hyd	15 - 386 (1 - 26.6)	650949-XXX	Stainless Steel	4-Ball	Siphon	
20-25	22.4 (84.9)	0.2:1 Hyd	10 - 278 (0.6 - 19.2)	650950-XXX	Stainless Steel	4-Ball	Siphon	

▶ **Note:** Maximum pump outlet pressure in specification tables are the theoretical maximum pressures that can be obtained by the pumps. Pressure and flow in the pump performance curves (following pages) are actual test data based on the conditions described.

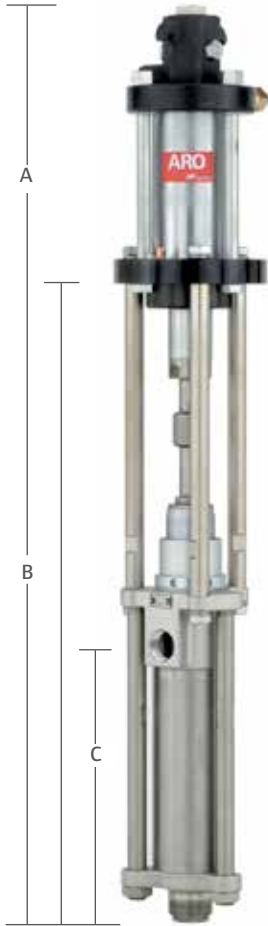
	5,000 cPs	7,500 cPs	10,000 cPs	12,500 cPs	15,000 cPs	20,000 cPs	35,000 cPs	50,000 cPs	75,000 cPs	100,000 cPs
Flooded inlet										
Flooded Inlet										
Flooded inlet										
Flooded Inlet										
Flooded inlet										
Flooded Inlet										
Flooded Inlet										
Flooded Inlet										

0.8 : 1

Hydraulic

650940-XXD-B

2-BALL SERIES PUMP



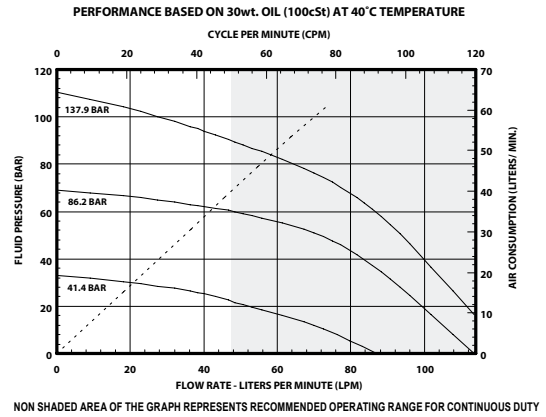
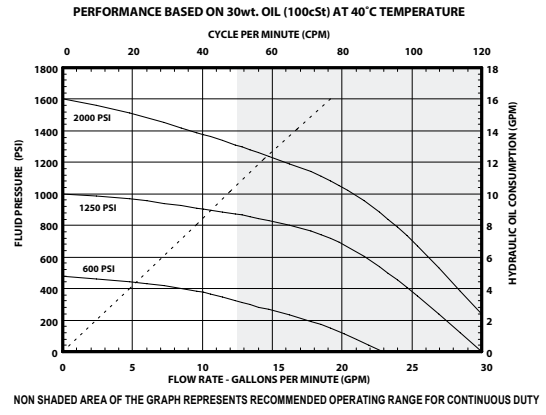
Materials: Oils, Paint, Coatings, Chemicals

Pump Specifications

Ratio	0.8 : 1
Hydraulic Inlet Pressure Range psi (bar)	50 - 2,000 (3.4 - 13.9)
Fluid Pressure Range psi (bar)	40 - 1,600 (4.1 - 110.3)
Max Cycles/Minute	50
Displacement/Cycle cu in (cm ³)	59.6 (976.6)
Cycles/gal (L)	3.9 (1.0)
Flow @ 50 Cycles gpm (L/min)	12.9 (48.8)
Maximum Hydraulic Temp Limit	130° F (54° C)

DIMENSIONS

A in (mm)	47.875 (1216)
B in (mm)	33.50 (850.9)
C in (mm)	14.812 (376.2)



Pump Model	Lower Pump Material	Plunger Material	Hydraulic Motor	Stroke in (mm)	Hydraulic Inlet	Hydraulic Return	Lower Pump Model	Mat. Inlet	Mat. Outlet	Weight lb (kg)
650940-XXD-B	CF8M Stainless Steel*	15-5 Stainless Steel*	67314-B	6 (152)	1/2" NPT(F)	3/4" NPT(F)	66941-XXD	2" NPT(M)	1-1/4" NPT(F)	140 (63.5)

*Hard chrome-plated

Recommended Accessories



66334-B
1-Gallon Wet-Sol
66333-B
1-Quart Wet-Sol



67136
Floor Mount Adapter



637211-XX3
Lower Pump Repair Kit



61938-1
Wall Mount Bracket

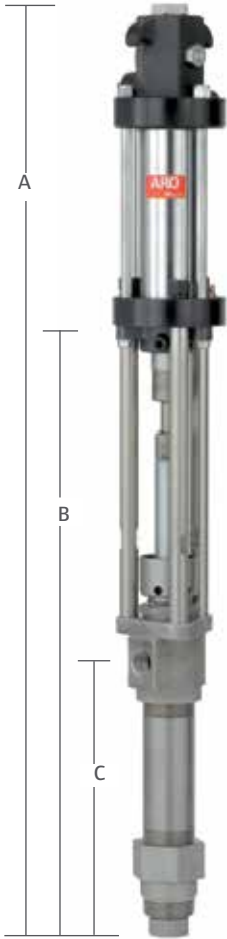
65138
Floor Mount

1.7:1

Hydraulic

650943-X4X-B

2-BALL SERIES PUMP



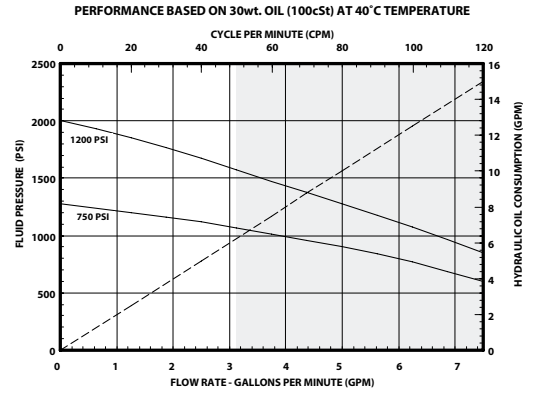
Materials: Oils, Paint, Coatings, Chemicals

Pump Specifications

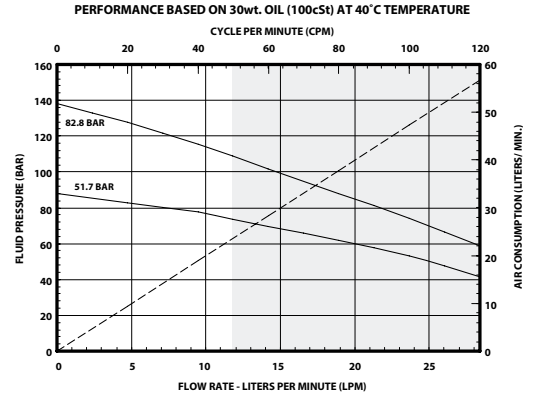
Ratio	1.7 :1
Hydraulic Inlet Pressure Range psi (bar)	50 - 1,200 (3.4 - 82.8)
Fluid Pressure Range psi (bar)	85 - 2,054 (5.9 - 141)
Max Cycles/Minute	50
Displacement/Cycle cu in (cm ³)	14.5 (237.6)
Cycles/gal (L)	15.9 (4.2)
Flow @ 50 Cycles gpm (L/min)	3.1 (11.9)
Maximum Hydraulic Temp Limit	130° F (54° C)

DIMENSIONS

A in (mm)	47.218 (1072)
B in (mm)	27.843 (706.9)
C in (mm)	12.656 (450.49)



NON SHADED AREA OF THE GRAPH REPRESENTS RECOMMENDED OPERATING RANGE FOR CONTINUOUS DUTY



NON SHADED AREA OF THE GRAPH REPRESENTS RECOMMENDED OPERATING RANGE FOR CONTINUOUS DUTY

Pump Model	Lower Pump Material	Plunger Material	Hydraulic Motor	Stroke in (mm)	Hydraulic Inlet	Lower Pump Model	Material Inlet	Material Outlet	Weight lb (kg)
650943-X4X-B	304 Stainless Steel*	17-4 Stainless Steel*	67147-B	6 (152)	3/8" NPT(F)	66300-X4X	1-1/2" NPT(F) 2" NPT(M)	1" NPT(F)	41.3 (18.7)

*Hard chrome-plated

Recommended Accessories

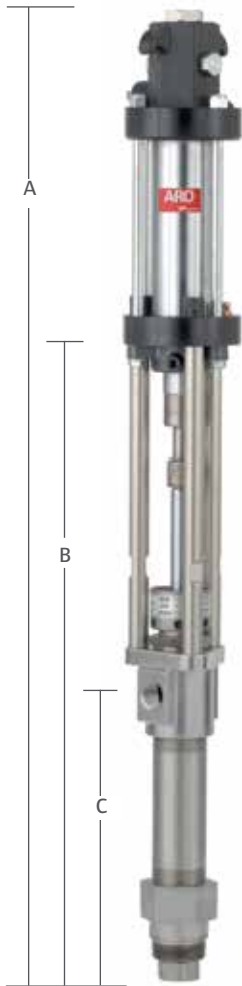
			
95595 Solvent Cup Cover	66333-B Wet-Sol	637305-X43 Lower Pump Repair Kit	67069 Wall Mount

3.3 : 1

Hydraulic

650944-C43-B

2-BALL SERIES PUMP



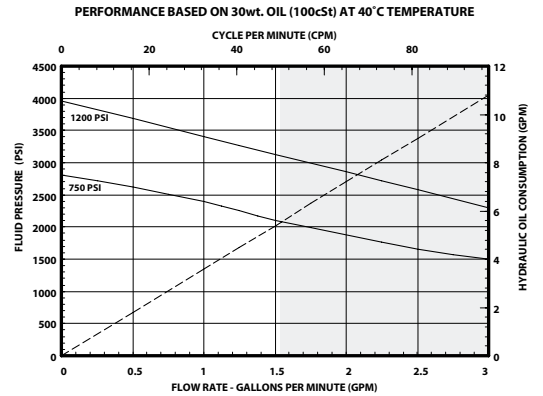
Materials: Oils, Paint, Coatings, Chemicals

Pump Specifications

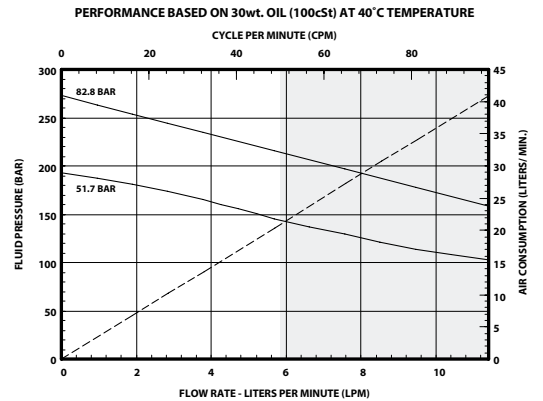
Ratio	3.3 : 1
Hydraulic Inlet Pressure Range psi (bar)	50 - 1,200 (3.4 - 82.8)
Fluid Pressure Range psi (bar)	165 - 3,960 (11.4 - 273.1)
Max Cycles/Minute	50
Displacement/Cycle cu in (cm ³)	7.4 (121.2)
Cycles/gal (L)	31.1 (8.2)
Flow @ 50 Cycles gpm (L/min)	1.6 (6.1)
Maximum Hydraulic Temp Limit	130° F (54° C)

DIMENSIONS

A in (mm)	42.218 (1072)
B in (mm)	27.843 (706.9)
C in (mm)	12.687 (322.2)



NON SHADED AREA OF THE GRAPH REPRESENTS RECOMMENDED OPERATING RANGE FOR CONTINUOUS DUTY



NON SHADED AREA OF THE GRAPH REPRESENTS RECOMMENDED OPERATING RANGE FOR CONTINUOUS DUTY

Pump Model	Lower Pump Material	Plunger Material	Hydraulic Motor	Stroke in (mm)	Hydraulic Inlet	Hydraulic Return	Lower Pump Model	Mat. Inlet	Mat. Outlet	Weight lb (kg)
650944-C43-B	316 Stainless Steel*	17-4 Stainless Steel*	3/8" NPT(F)	6 (152)	33/8"-18" NPT(F)	1/2" NPT(F)	66301-XXX	1-1/2" NPT(F) 2" NPT(M)	1" NPT(F)	41.3 (18.7)

*Hard chrome-plated

Recommended Accessories



66334-B
1-Gallon Wet-Sol
66333-B
1-Quart Wet-Sol



67136
Floor Mount Adapter



637306-X43
Lower Pump Repair Kit



61938-1
Wall Mount Bracket

65138
Floor Mount

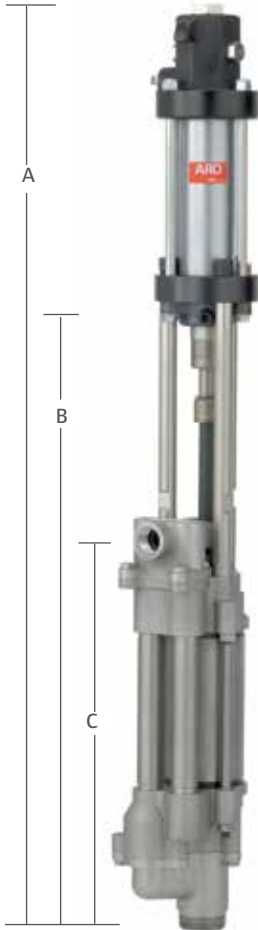
Reference mounting footprint "A" or "D" for related rams and accessories.

0.2 : 1

Hydraulic

650950-X4B

4-BALL SERIES PUMP

**Materials:** Paint, Chemicals, Varnishes, Enamels, Lacquers

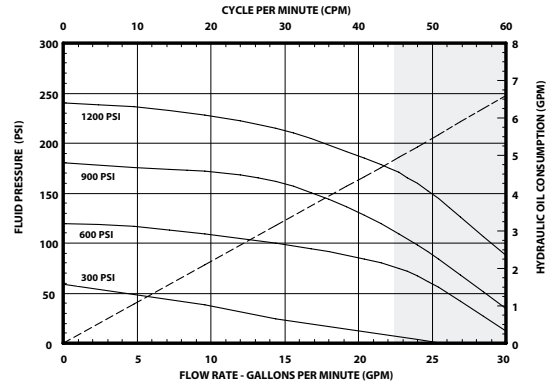
Pump Specifications

Ratio	0.2 : 1
Hydraulic Inlet Pressure Range psi (bar)	50 - 1,200 (3.4 - 82.8)
Fluid Pressure Range psi (bar)	10 - 278 (0.6 - 19.2)
Max Cycles/Minute	50
Displacement/Cycle cu in (cm ³)	103.6 (1,697.6)
Cycles/gal (L)	2.2 (0.5)
Flow @ 50 Cycles gpm (L/min)	22.4 (84.9)
Maximum Hydraulic Temp Limit	130° F (54° C)

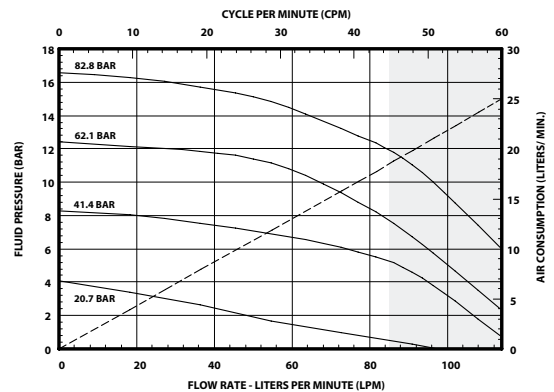
DIMENSIONS

A in (mm)	45.312 (1150.3)
B in (mm)	30.937 (785.2)
C in (mm)	19.562 (496.1)

PERFORMANCE BASED ON 30wt. OIL (100cSt) AT 40°C TEMPERATURE



PERFORMANCE BASED ON 30wt. OIL (100cSt) AT 40°C TEMPERATURE



Pump Model	Lower Pump Material	Plunger Material	Hydraulic Motor	Stroke in (mm)	Hydraulic Inlet	Hydraulic Return	Lower Pump Model	Mat. Inlet	Mat. Outlet	Weight lb (kg)
650950-X4B	304 Stainless Steel*	17-4 Stainless Steel*	67147-B	5.7 (144)	3/8" NPT(F)	1/2" NPT(F)	67201-X4B	1-12" NPT(F) 2" NPT(M)	1" NPT(F)	72 (32.7)

*Ceramic coating

Recommended Accessories

ServiceKits

ARO ARO

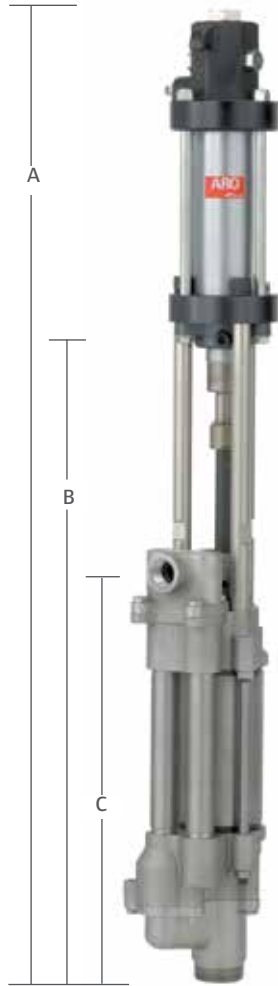
637315 Motor Repair Kit	637318-X4B Lower Pump Repair Kit	61937-1 Wall Mount	65138 Floor Mount
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0.3 : 1

Hydraulic

650949-X4B

4-BALL SERIES PUMP



Materials: Paint, Chemicals, Varnishes, Enamels, Lacquers

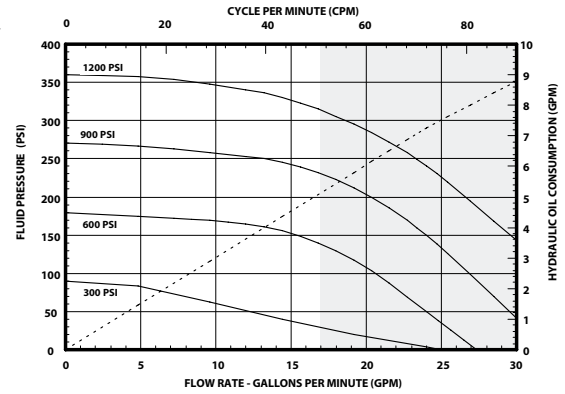
Pump Specifications

Ratio	0.3 : 1
Hydraulic Inlet Pressure Range psi (bar)	50 - 1,200 (3.4 - 82.8)
Fluid Pressure Range psi (bar)	15 - 386 (1.0 - 26.6)
Max Cycles/Minute	50
Displacement/Cycle cu in (cm ³)	78.6 (1288)
Cycles/gal (L)	2.9 (0.77)
Flow @ 50 Cycles gpm (L/min)	17.0 (64.4)
Maximum Hydraulic Temp Limit	130° F (54° C)

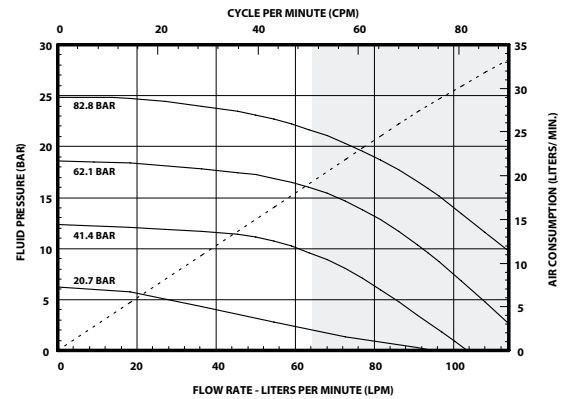
DIMENSIONS

A in (mm)	45.312 (1150.3)
B in (mm)	30.937 (785.2)
C in (mm)	19.562 (496.1)

PERFORMANCE BASED ON 30wt. OIL (100cSt) AT 40°C TEMPERATURE



PERFORMANCE BASED ON 30wt. OIL (100cSt) AT 40°C TEMPERATURE



Pump Model	Lower Pump Material	Plunger Material	Hydraulic Motor	Stroke in (mm)	Hydraulic Inlet	Hydraulic Return	Lower Pump Model	Mat. Inlet	Mat. Outlet	Weight lb (kg)
650949-X4B	304 Stainless Steel*	17-4 Stainless Steel*	67147-B	5.75 (146)	3/8" NPT(F)	1/2" NPT(F)	67200-X4B	1-1/2" NPT(F) 2" NPT(M)	1" NPT(F)	70 (31.8)

*Hard chrome-plated

Recommended Accessories



66334-B
1-Gallon Wet-Sol
66333-B
1-Quart Wet-Sol



67136
Floor Mount Adapter



637306-X43
Lower Pump Repair Kit



61938-1
Wall Mount Bracket

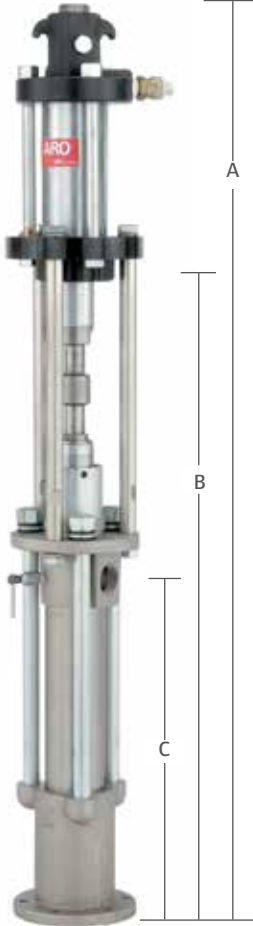
65138
Floor Mount

1.2 : 1

Hydraulic

650941-XXE-C

CHOP-CHECK SERIES PUMP



Materials: Caulking, Inks, Adhesives, Mastics, Heavy Lubricants, Sealants

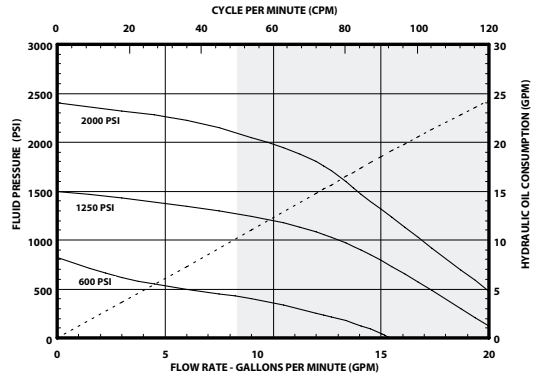
Pump Specifications

Ratio	1.2 : 1
Hydraulic Inlet Pressure Range psi (bar)	50 - 2,000 (3.4 - 137.9)
Fluid Pressure Range psi (bar)	60 - 2,670 (4.1 - 184.1)
Max Cycles/Minute	50
Displacement/Cycle cu in (cm3)	40.2 (658.7)
Cycles/gal (L)	5.7 (1.5)
Flow @ 50 Cycles gpm (L/min)	8.7 (32.9)
Maximum Hydraulic Temp Limit	130° F (54° C)

DIMENSIONS

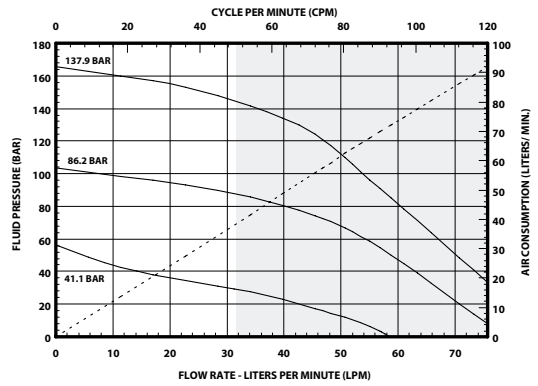
A in (mm)	52.843 (1342.2)
B in (mm)	38.468 (977.1)
C in (mm)	19.937 (506.4)

PERFORMANCE BASED ON 30wt. OIL (100cSt) AT 40° C TEMPERATURE



NON SHADED AREA OF THE GRAPH REPRESENTS RECOMMENDED OPERATING RANGE FOR CONTINUOUS DUTY

PERFORMANCE BASED ON 30wt. OIL (100cSt) AT 40° C TEMPERATURE



NON SHADED AREA OF THE GRAPH REPRESENTS RECOMMENDED OPERATING RANGE FOR CONTINUOUS DUTY

Pump Model	Lower Pump Material	Plunger Material	Hydraulic Motor	Stroke in (mm)	Hydraulic Inlet	Hydraulic Return	Lower Pump Model	Mat. Inlet	Mat. Outlet	Weight lb (kg)
650941-XXE-C	Carbon Steel*	Carbon Steel**	67314	6 (152)	1/2" NPT(F)	3/4" NPT(F)	66236-XXE-B	Bolted Flange	1-1/2" NPT(F)	144 (65.3)

*Nickel-plated **Hard chrome-plated

Recommended Accessories



66334-B
1-Gallon Wet-Sol



65139
Floor Mount



637211-XX3
Lower Pump Repair Kit

66333-B
1-Quart Wet-Sol

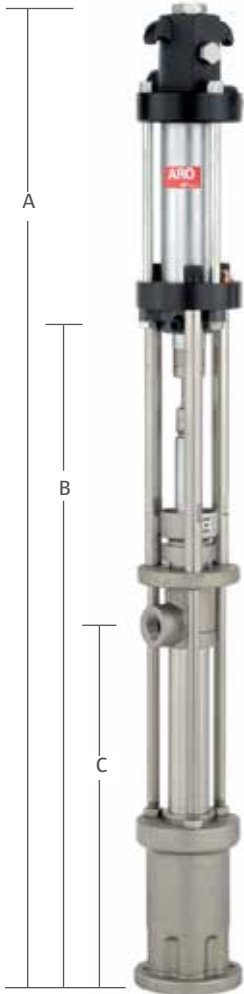
Reference mounting footprint "B" for related rams and accessories.

2:1

Hydraulic

650934-X43-C

CHOP-CHECK SERIES PUMP



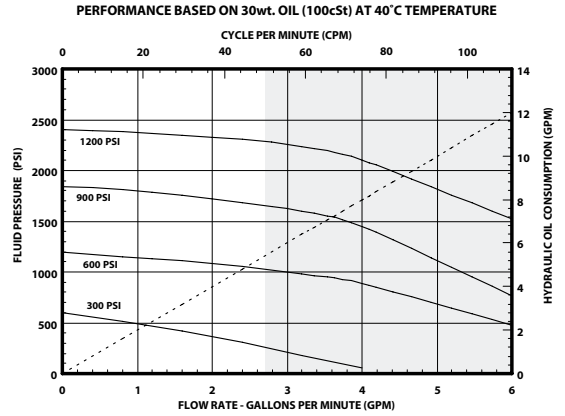
Materials: Caulking, Inks, Adhesives, Mastics, Heavy Lubricants, Sealants

Pump Specifications

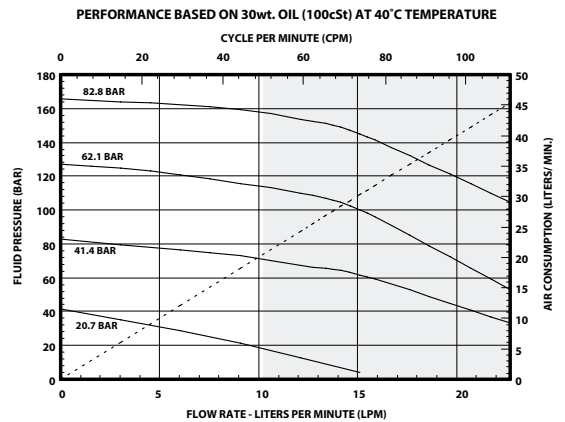
Ratio	2:1
Hydraulic Inlet Pressure Range psi (bar)	50 - 1,200 (3.4 - 82.8)
Fluid Pressure Range psi (bar)	100 - 2,400 (6.9 - 165.5)
Max Cycles/Minute	50
Displacement/Cycle cu in (cm ³)	12.5 (204.8)
Cycles/gal (L)	18.5 (4.8)
Flow @ 50 Cycles gpm (L/min)	2.7 (10.2)
Maximum Hydraulic Temp Limit	130° F (54° C)

DIMENSIONS

A in (mm)	47.468 (1206)
B in (mm)	33.093 (841)
C in (mm)	17.750 (450.4)



NON SHADED AREA OF THE GRAPH REPRESENTS RECOMMENDED OPERATING RANGE FOR CONTINUOUS DUTY



NON SHADED AREA OF THE GRAPH REPRESENTS RECOMMENDED OPERATING RANGE FOR CONTINUOUS DUTY

Pump Model	Lower Pump Material	Plunger Material	Hydraulic Motor	Stroke in (mm)	Hydraulic Inlet	Hydraulic Return	Lower Pump Model	Mat. Inlet	Mat. Outlet	Weight lb (kg)
650934-X43-C	Carbon Steel*	17-4 Stainless Steel**	67147	6 (152)	3/8" NPT(F)	1/2" NPT(F)	66243-XX3-B	Bolted Flange	1" NPT(F)	62.4 (28.3)

*Nickel-plated **Hard chrome-plated

Recommended Accessories



66334-B 1-Gallon Wet-Sol	67136 Floor Mount Adapter	637071-XX3-B Lower Pump Repair Kit	65138 Floor Mount
66333-B 1-Quart Wet-Sol			

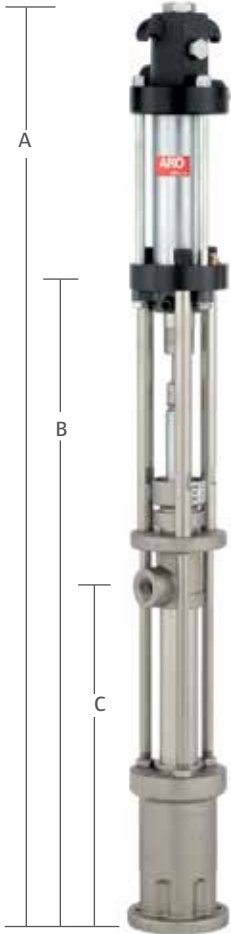
Reference mounting footprint "B" for related rams and accessories.

3.6 : 1

Hydraulic

650935-C43-C

CHOP-CHECK SERIES PUMP



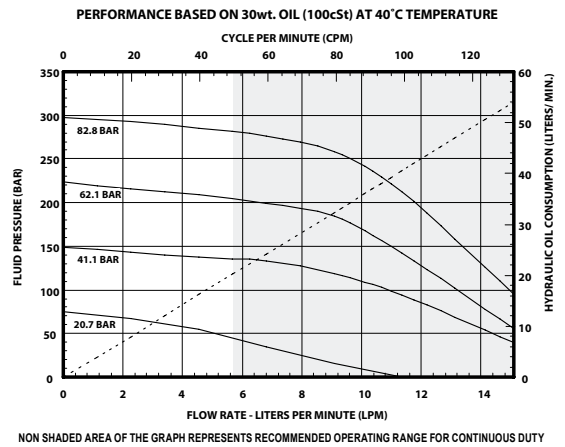
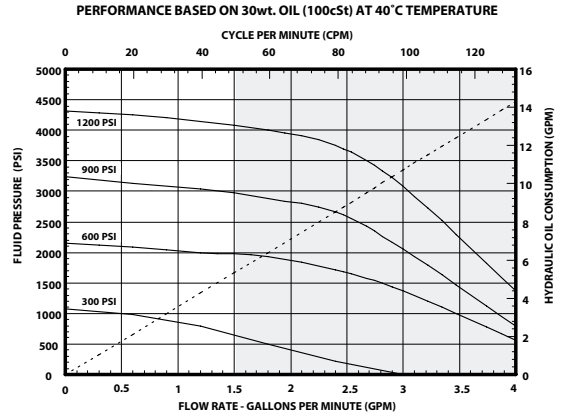
Materials: Caulking, Inks, Adhesives, Mastics, Heavy Lubricants, Sealants

Pump Specifications

Ratio	3.6 : 1
Hydraulic Inlet Pressure Range psi (bar)	50 - 1,200 (3.4 - 82.8)
Fluid Pressure Range psi (bar)	180 - 4,435 (12.4 - 306)
Max Cycles/Minute	50
Displacement/Cycle cu in (cm ³)	6.9 (113)
Cycles/gal (L)	33.2 (8.8)
Flow @ 50 Cycles gpm (L/min)	1.5 (5.7)
Maximum Hydraulic Temp Limit	130° F (54° C)

DIMENSIONS

A in (mm)	47.468 (1206)
B in (mm)	33.093 (841)
C in (mm)	17.750 (450.4)



Pump Model	Lower Pump Material	Plunger Material	Hydraulic Motor	Stroke in (mm)	Hydraulic Inlet	Hydraulic Return	Lower Pump Model	Mat. Inlet	Mat. Outlet	Weight lb (kg)
650935-C43-C	Carbon Steel*	17-4 Stainless Steel**	67147	6 (152)	3/8" NPT(F)	1/2" NPT(F)	66266-X43-B	Bolted Flange	1" NPT(F)	62.1 (28.2)

*Nickel-plated **Hard chrome-plated

Recommended Accessories



66334-B
1-Gallon Wet-Sol

66333-B
1-Quart Wet-Sol

637074-X43-B
Lower Pump
Repair Kit

65138
Floor Mount

Reference mounting footprint "A" for related rams and accessories.

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