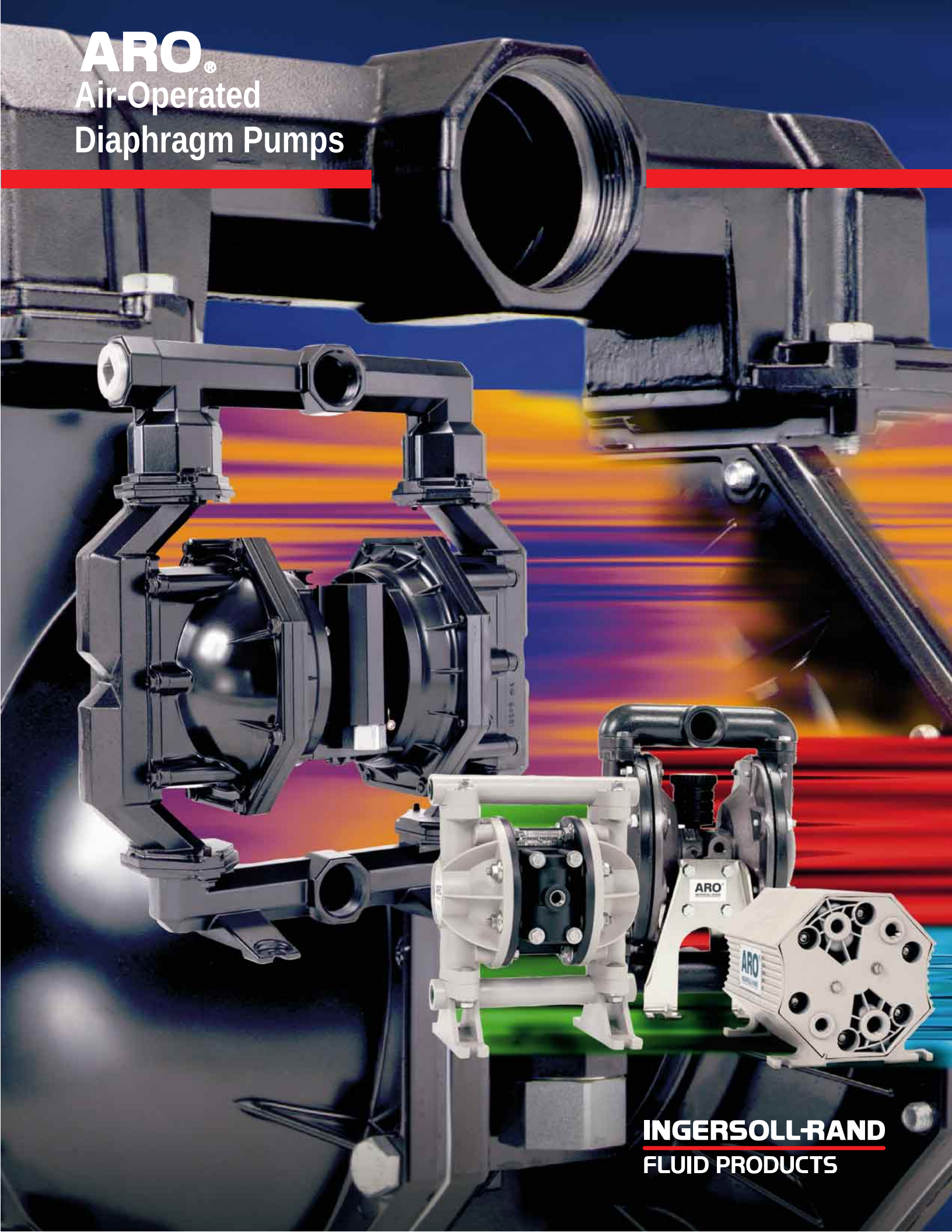
ARO®
Air-Operated Diaphragm Pumps

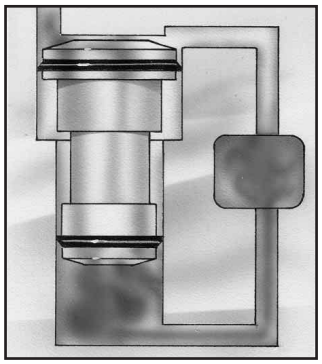


INGERSOLL-RAND
FLUID PRODUCTS

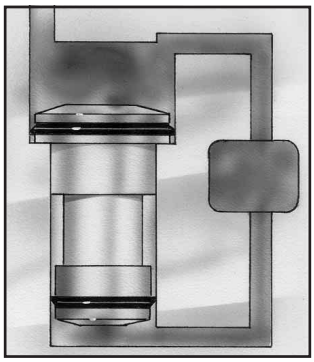
From “Unstallable™” to *Unstoppable,* with Aro, its *Features* that provide the Force.

Aro, Owner of the “Unstallable” Air Valve Design

As relevant today as the day it came to market, Aro is still the sole owner of the technology and the title: *Unstallable.* Aro uses no magnets, springs, re-set buttons, or other secondary actuators to insure pump shifting - only air.



Aro’s patented “unbalanced” major air valve has constant air pressure applied to its small end. This assures that the pump resets. Competitive designs lose their signal during every shift, making them vulnerable to stalling.



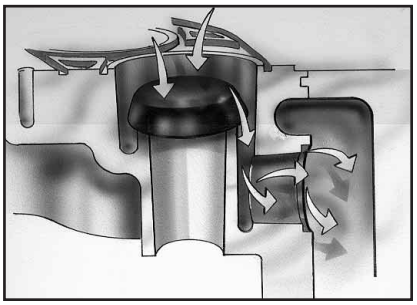
To reverse the valve, air pressure is supplied to the larger end of the valve, allowing the valve to shift - note that constant air pressure continues to be applied to the small end.

An Air Valve that Forgives and Forgets

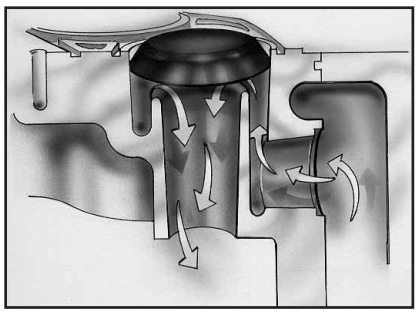
Aro’s major air valve requires no added lubrication and the “wiping” action of the seals makes it extremely forgiving of contaminated compressed air supplies.

The Ice Age Is Over.

Following closely on the heels of pump stall-out is the infamous freezing problem inherent in most diaphragm pumps. At Aro, the ice age has been over since the introduction of our unique, enlarged “Quick Dump™” patented air exhaust valve, which diverts air exhaust from critical, ice-prone passages. Available on the Aro 2” (Ball & Flap) and 3” models.



When the main valve opens and pressurizes the diaphragm air chamber, the Quick Dump operates like a normal air passage and admits air into the diaphragm’s air chamber.



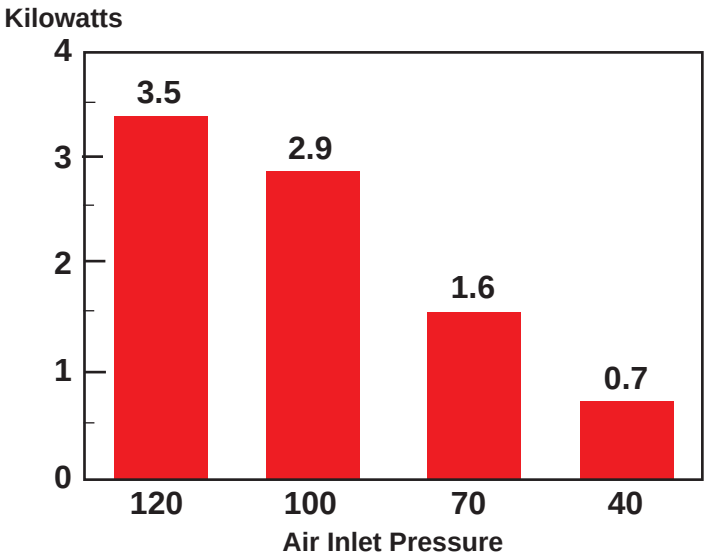
When the main air valve is ready to exhaust, the Quick Dump diverts all of the cold/wet exhaust air coming from the diaphragm air chamber away from the main air valve, avoiding ice formation in the critical valve passages.

NEW! This edition of Aro's Diaphragm Pump Catalog contains a host of new products and information. Just look for this emblem.

Lost Air Is *No* Bargain

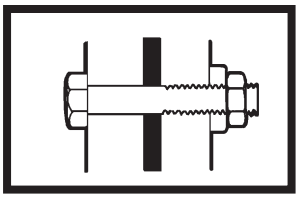
If your diaphragm pumps are not ARO Diaphragm Pumps, chances are their air valves are blowing out perfectly good air to atmosphere, at no small expense. And this is not intermittent. This is whenever and wherever these pumps are operating.

Competitive Pump Design Kilowatts Wasted



The close fitting air valve designs used on competitive pumps allow air to by-pass continually - wasting air - even when not pumping!

For Safety, Reliability and Ease of Assembly: *Bolted Is Better*



ARO Diaphragm Pumps feature bolted construction to avoid the proven problems created by clampband type pump fasteners. These include material spills and leaks, bolt loosening and breakage due to poor joint integrity, and difficult reassembly.

REGISTERED FIRM

Aro's Bryan, Ohio facility, where our diaphragm pumps are manufactured, is registered by Underwriters Laboratories Inc. to ISO 9001 Quality Standards.

5 YEARS

ARO Diaphragm Pumps are backed by a generous 5-year warranty on materials and workmanship for your purchasing peace of mind.

CE

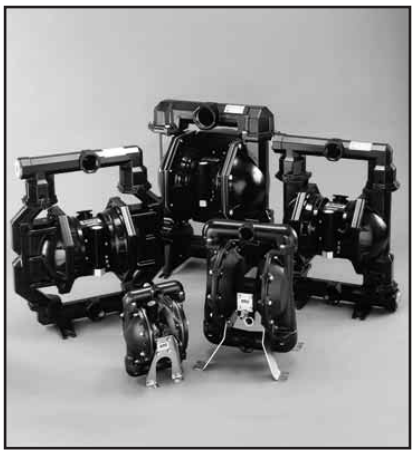
Aro's Pump design and manufacturing operations have demonstrated compliance with the quality process, health and safety, technical file and multi-lingual standards set forth by the FEM (Federation Europeene de la Manutention) for the European Union (Communitie Economique).

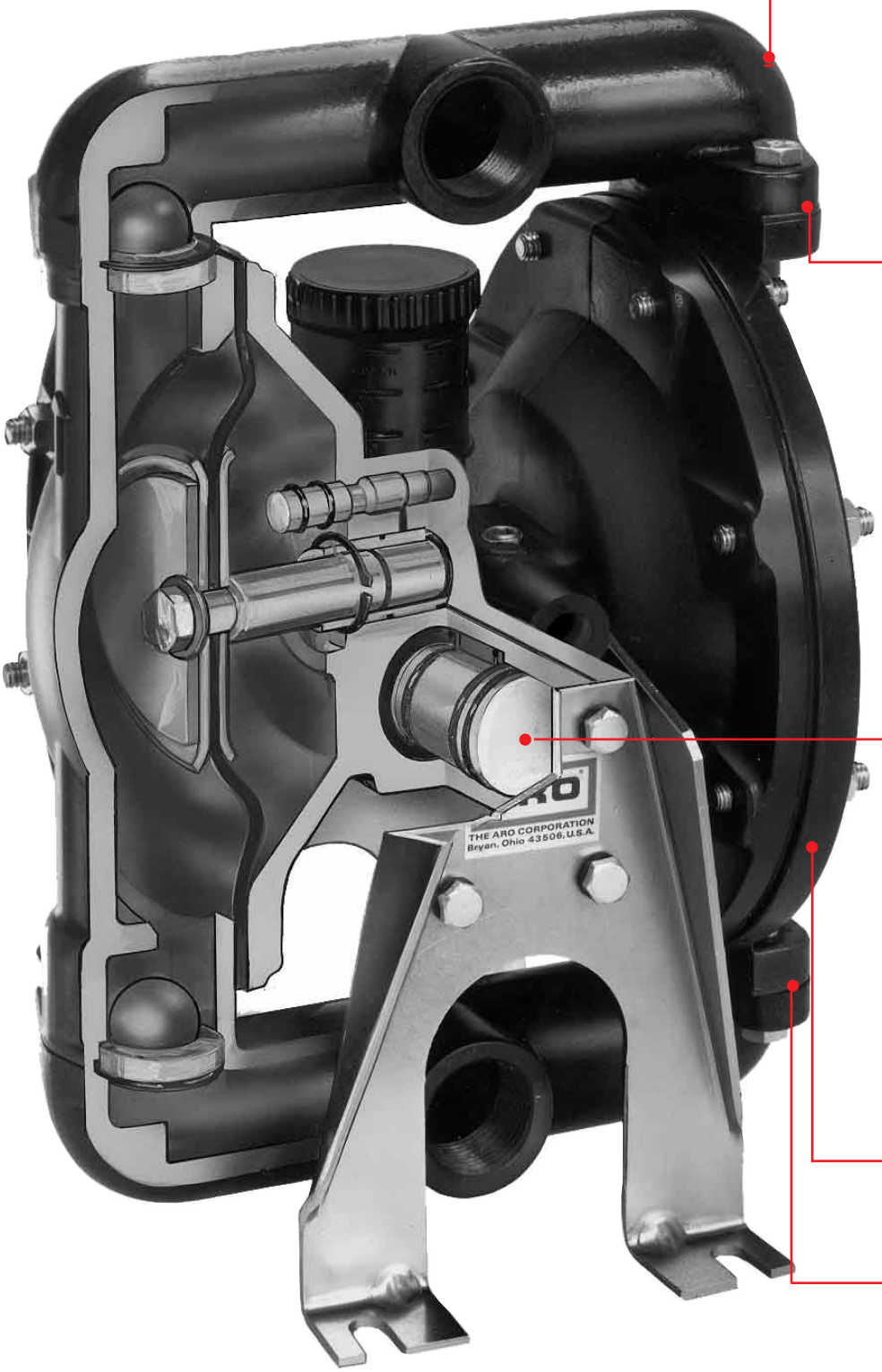
Member of Hydraulic INSTITUTE

YEAR 5 WARRANTY

ARO®
Diaphragm Pumps

Design Features





ARO® Diaphragm Pumps

Ideal For Abrasion And Solids Handling

Because it does not use rotating, sliding seals, like rotary/centrifugal pumps, more process engineers look to Aro diaphragm pumps for handling tough abrasion applications.

From Top to Bottom, Aro's "Flap" Valve Pump is Your Best High Solids - Handling Choice

The ARO 2" Flap Valve Pump uses a top-suction porting design. Top suction porting is ideal for pumping abrasives and large particles because it uses gravity to assist in draining solids from the pump. Conventional high-solids pump designs use bottom suction; forcing the pump to fight (and lose against) gravity, allowing sediment and solids to accumulate , ultimately "packing out" the pump. See page 17.

Bolted Construction For Safe Reliability and Ease of Assembly:

All Aro diaphragm pumps use bolted construction that process professionals demand. And, Aro Non Metallic Diaphragm Pumps utilize fasteners that are constructed of 300 series stainless steel for maximum chemical resistance.

Bolted is Safer - bolted construction reduces the risk of spills, environmental contamination and the attendant, mandatory reports to regulatory agencies that spills can create.

Bolted is Reliable - Bolted construction withstands the heavy loading that diaphragm pumps are subjected to, without concerns of breakage or loosening.

Bolted is Easier to Assemble - Aro's bolted design allows for easy positioning and alignment of parts during reassembly. This is a significant advantage over band-clamp style pump fasteners, which are difficult to align and hold together during reassembly.

Bolted is Less Expensive - Aro's design uses standard bolts which cost significantly less to replace. Non standard fastening devices (such as band clamps) are considered "wear parts" and are more expensive to replace.

Aro's Patented "Unbalanced" Air Valve

Aro's "Unbalanced" air valve design makes this, and all of Aro's Diaphragm Pumps "Unstallable". Because the unbalanced valve cannot settle in a neutral position when the pump is shut down, it can't become stuck, requiring the operator to hammer on the pump in order to start pumping again.

- **Eliminates Shifting/Freezing Problems**
- **Does Not Require Lubrication**
- **Uses Significantly Less Power Than Competition**
- **Forgiving In Dirty Air**

"Unstallable" Air Motor Design Expanded: Introducing Simul-Shift™

ARO Diaphragm Pumps are known throughout industry as "The Unstallables", thanks in large part to their patented "unbalanced" air valve design, which eliminates air valve stalling, sticking and centering. With the new 2" and 3" Pumps, Aro design engineers have expanded on this capability by introducing exclusive Simul-Shift™ valve technology. Simul-Shift's unique design applies constant air pressure to both the pilot and major shift valves to further enhance pump performance and significantly reduce pulsation.

"Quick-Dump™" Anti-Freeze Valve Design

Aro's "Quick-Dump" exhaust valve, eliminates air motor icing, the second most prevalent problem with conventional air motor designs by diverting cold wet exhaust air away from the critical air valve passages. Not only has Simul-Shift with Quick-Dump removed the Diaphragm Pump's stall-out stumbling block, it is, by far, the most energy efficient air valve on the market. Quick Dump is going to help reduce your energy costs.

Broad Material Selection

Aro offers a wide selection of materials, allowing your choice of the best possible wetted and non-wetted materials suited to your application.

Positive Priming Provides Instant Start-Ups

Check valves are located close to the diaphragm chambers, ensuring a positive prime first time every time.

Model Overview

1/4" Ports
Non-Metallic

1/2" Ports
Non-Metallic

NEW!

1/2" Stainless
Steel

1" Ports
Non-Metallic

1" Ports
Metallic

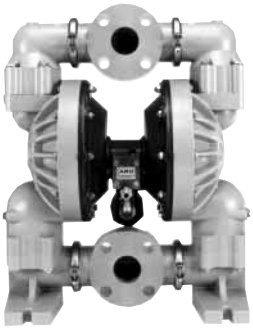
1" Ports
Stainless
(3:1 Ratio)

MODEL	1/4" (Non-Met.)	1/2" (Non-Met.)	1/2" (Met.)	1" (Non-Met.)	1" (Met.)	1", 3:1 (Met.)
Maximum Flow GPM (LPM)	4.6 (17.4)	13 (49)	13 (49)	47 (178)	35 (133)	24 (90.7)
Maximum Discharge Presssure PSI (BAR)	100 (6.8)	100 (6.8)	100 (6.8)	120 (8.3)	120 (8.3)	300 (20.7)
Fluid Ports Inlet/Outlet (BSP Available)	3/8" (F) - In 1/4" (F) - Out (NPT Only)	1/2" (F) - In/Out (NPT Only)	1/2" (F) - In/Out (NPT Only)	1" Flange In/Out	1" (F) - In/Out	1" (F) - In/Out
Materials of Construction	Polypropylene Groundable Acetal	Polypropylene Groundable Acetal Kynar® (PVDF)	Stainless Steel	Polypropylene Kynar (PVDF)	Aluminum Stainless Steel Cast Iron	Stainless Steel
Pump Weight Lbs. (Kg.)	4.1 (1.85) Poly 4.6 (2.10) Acetal	8.8 (4.0) Acetal 7.2 (3.3) Poly 9.5 (4.3) Kynar	14.6 (6.6)	*20.3 (9.2) Poly *28.5 (12.9) Kynar	*19 (8.6) Alum *36 (16.3) S. S. *31 (14.1) Cast Iron	*90 (40.7) S.S.
Maximum Solids Inches (mm)	1/32 (.79)	3/32 (2.4)	3/32 (2.4)	1/8 (3.2)	1/8 (3.2)	1/8 (3.2)
Best Selling Models	PD02P-APS-PTA PD02P-APS-PTT PD02P-ADS-DTT	66605J-388 66605J-3EB 66605J-344 66605H-644 66605K-444	PD05P-ASS-SAA PD05P-ASS-STT	6661A3-3EB-C 6661A3-344-C 6661B3-344-C 6661A4-444-C	666100-322-C 666100-344-C 666101-344-C 666101-3EB-C 666111-244-C	6661M1-2A4-C
See Page	6	9	8	11	12	19

* Weights listed are for aluminum air motor models

Model Overview

1-1/2" Ports Non-Metallic

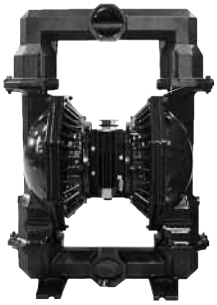


2" Ports Non-Metallic

2" Ports "Flap" Valve

1-1/2" Ports Metallic

2" Ports Ball Valve



3" Ports Metallic

MODEL	1-1/2" (Non-Met.)	1-1/2" (Met.)	2" (Non-Met.)	2" Ball (Met.)	2" Flap (Met.)	3" (Met.)
Maximum Flow GPM (Liters)	100 (379)	100 (379)	145 (548)	170 (644)	170 (644)	275 (1,041)
Maximum Operating Presssure PSI (BAR)	120 (8.3)	120 (8.3)	120 (8.3)	120 (8.3)	120 (8.3)	120 (8.3)
Fluid Ports (BSP Available)	1-1/2" Flange In/Out	1-1/2" (F) - In/Out	2" Flange In/Out	2" (F) - In/Out 2" Flange (2" SST Model uses Flange with pipe tap, patent applied for)	2" (F) - In/Out 2" Flange (2" SST Model uses Flange with pipe tap, patent applied for)	3" (F) - In/Out
Materials of Construction	Polypropylene Kynar® (PVDF)	Aluminum Stainless Steel Cast Iron	Polypropylene Kynar (PVDF)	Aluminum Stainless Steel Cast Iron	Aluminum Stainless Steel Cast Iron	Alum., Stn Stl. Cast Iron Hastelloy-C
Pump Weight* Lbs. (Kg.)	*62 (28) Poly *92 (42) Kynar	*51 (23.1) Alum *79 (35.8) Cast Iron 84(38.1) S. S.	*62 (28) Poly *92 (42) Kynar	*64 (29) Alum *154 (70) S. S. *133 (60) Cast Iron	*74 (34) Alum *188 (85) S. S. *161 (73) Cast Iron	*110 (50) Alum *195 (88) S. S. *190 (86) Cast Iron *195 (88) Hastelloy-C
Maximum Solids Inches (mm)	1/4 (6.4)	1/4 (6.4)	1/4 (6.4)	1/4 (6.4)	2 Semi (50) Solid	3/8 (9.5)
Best Selling Models	6661T3-3EB-C 6661T3-344-C 6661U3-344-C 6661U4-444-C	666150-322-C 666150-344-C 666152-3EB-C 666151-344-C 666151-3EB-C 666161-244-C	6662A3-3EB-C 6662A3-344-C 6662B3-344-C 6662B4-444-C	PD20A-AAP-GGG PD20A-AAP-KTT PD20A-ACP-AAA PD20A-ASP-AAA PD20A-ASP-KTT PD20C-ASS-KTT	PF20A-AAP-SAA PF20A-ACP-SAA PF20A-ASS-SAA PF20C-ASS-SAA	PD30A-AAP-GGG-B PD30A-AAP-KTT-B PD30A-ACS-AAA-B PD30A-ASS-AAA-B PD30A-ASP-KTT-B PD30S-ASS-KTT-B
See Page	**13**	**14**	**15**	**16**	**17**	**18**

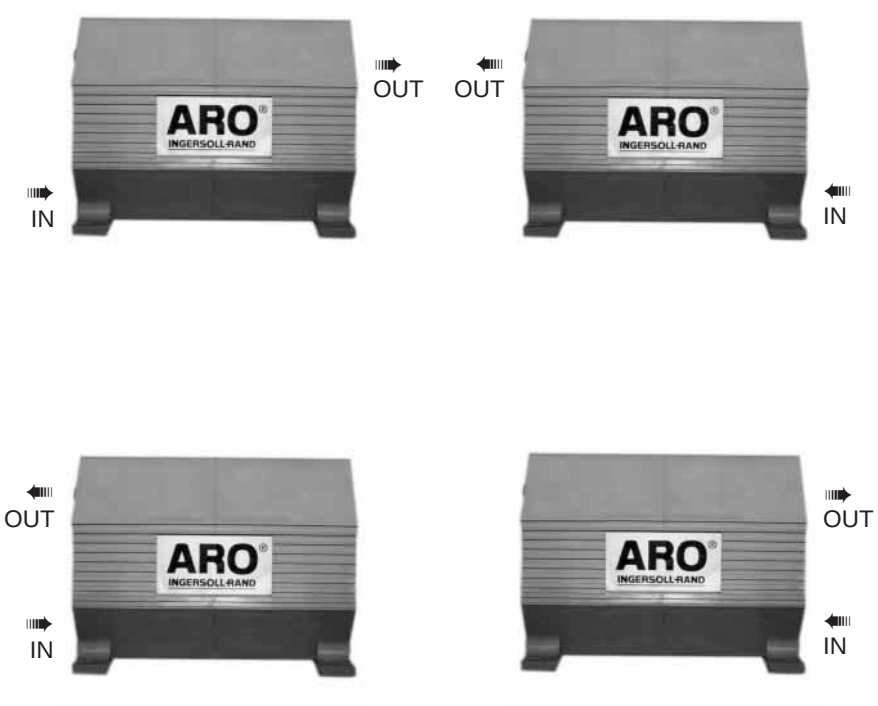
* weights listed are for aluminum air motor models

4.6 GPM
1/4 - Inch Ports

Plumbing

Because not all applications are alike, pump specifiers need to have a little flexibility in how and where a pump is to be plumbed and located. Until the Aro 1/4" pump, that is exactly what you got: "a little flexibility"...very little. The 1/4" pump opens new ports to plumbing possibilities with 4 separate fluid inlet/outlet configurations.

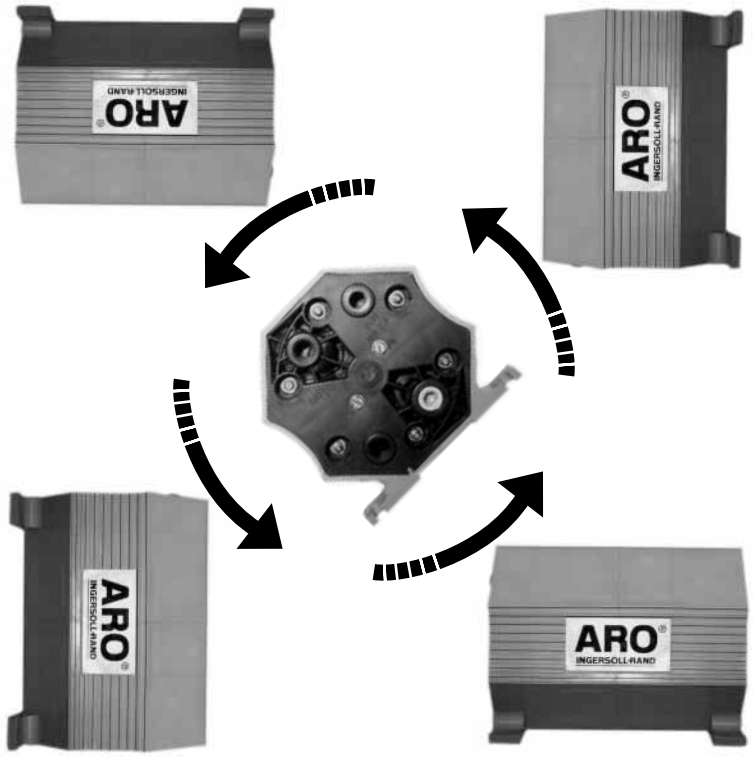
Plumb the 1/4" Any of Four Different Ways!



Mounting

With Aro's 1/4" pump, you work the pump around your plan, not your plan around a pump. This remarkable fluid handling device defies the strange-yet-conventional rule that most pump manufacturers seem determined to enforce: "it only mounts one way". The 1/4" mounts and pumps upside-down, sideways, right-side-up, and on any of it's 360 degree axis. (Can the pump you've been using do this?)

Mount the 1/4" Anywhere, Anyway You Want!



Award Winning Design!

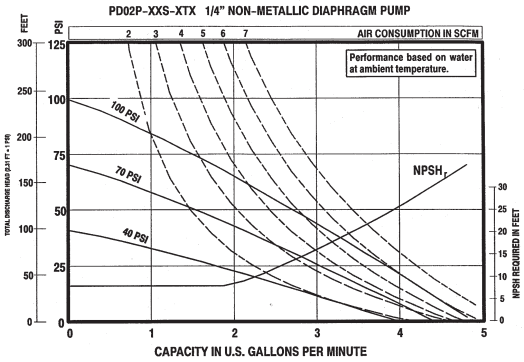
4.6 GPM 1/4 - Inch Ports

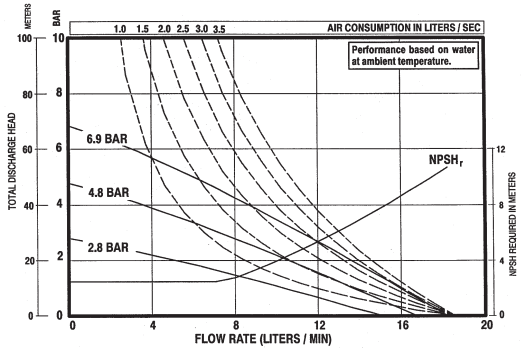
Performance Specifications

RATIO: 1:1
MAXIMUM G.P.M. (Liters): 4.6 (17.4)
DISPLACEMENT GALLONS (Liters) PER CYCLE: .014 (.053)
AIR INLET: 1/4" (F)
FLUID INLET: 3/8" (F)
FLUID OUTLET: 1/4" (F)
MAX. DRY SUCTION LIFT: 20 ft.

MAX. OP. PRESSURE PSI (bar): 100 (6.8)
PASS SOLIDS MAX. DIA. IN. (mm): 1/32" (.79)
WEIGHT - LBS. (KGS): 4.1 (1.85) Polypropylene; 4.6 (2.10) Acetal

PERFORMANCE CURVES





Dimensional Data*

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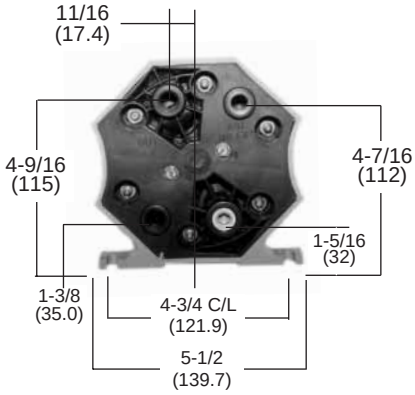
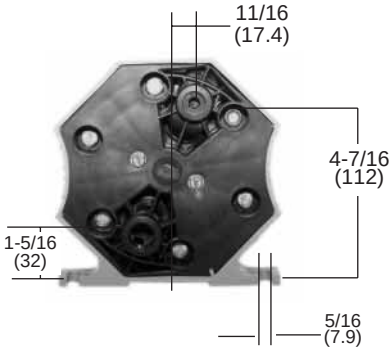




Model/Material Selection

For recommended key models, refer to the ARO diaphragm pump price book (Form 2240-2). If the specific model you seek is not in the price book, consult the factory for further selection assistance.

PD02 P - X X X - X XX

Base Model	Center Section	Thread	Wet End	Hardware		Seat Material	Check / Diaphragm
PD02 -1/4" AOD	P Polypropylene	A NPT, Single Inlet/Single Outlet D NPT, Single Inlet/Dual Outlet E NPT, Dual Inlet/Single Outlet H NPT, Dual Inlet/Dual Outlet	D Acetal (Delrin) P Polypropylene	S Stainless Steel		D Acetal (Delrin) P Polypropylene	TA Teflon/ Santoprene® TT Teflon®/ Teflon®

Best Selling Models
PD02P-APS-PTA
PD02P-APS-PTT
PD02P-ADS-DTT

Teflon® is a registered trademark of DuPont Company.

Santoprene® is a registered trademark of Monsanto Company, licensed to Advanced Elastomer Systems, L.P.

13 GPM
1/2-inch ports

Metallic Diaphragm Pump

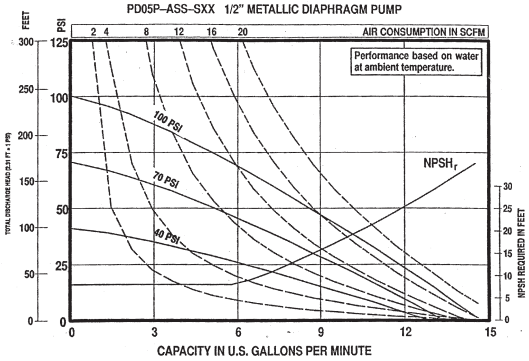
NEW!

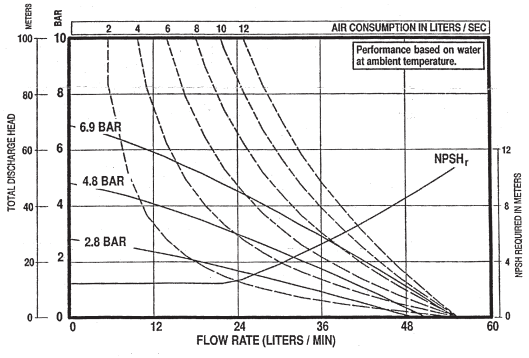
Performance Specifications

RATIO:	1:1
MAXIMUM G.P.M. (Liters):	13 (49.2)
DISPLACEMENT GALLONS (Liters) PER CYCLE:	.040 (.15)
AIR INLET:	1/4-inch NPT (F)
FLUID INLET:	1/2-inch NPT (F)
FLUID OUTLET:	1/2-inch NPT (F)
MAX. OPERATING PRESSURE PSI (bar):	100 psi (6.9 bar)
SUSPENDED SOLIDS MAX. DIA. IN. (mm):	3/32" (2.4mm)
WEIGHT - LBS. (Kg):	14.6 lbs (6.6 kgs)
MAX DRY SUCTION LIFT:	10 ft. (Teflon fitted)

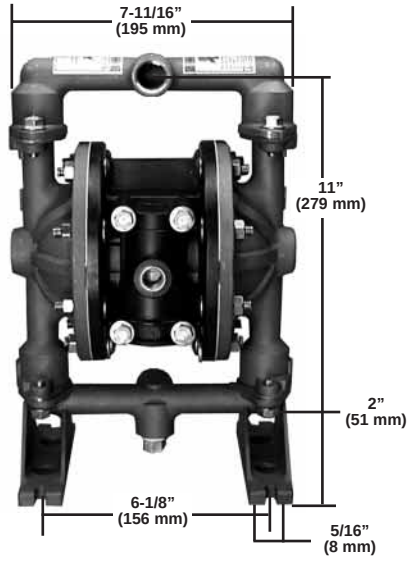
PERFORMANCE CURVES

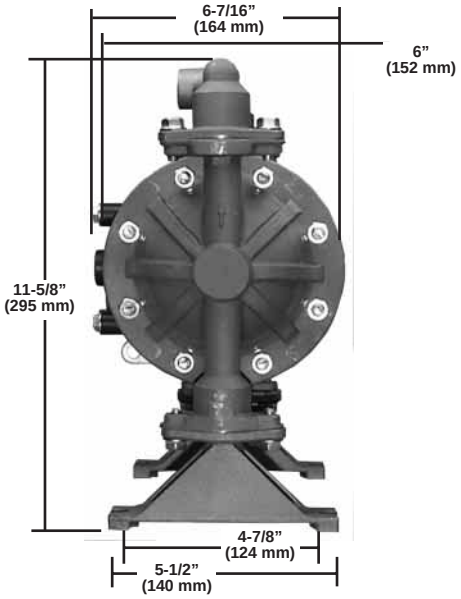
PD05P–ASS–SXX 1/2" METALLIC DIAPHRAGM PUMP





Dimensional Data





Model / Material Selection

PD05 P - A S S - S XX

Base Model	Center Section	Port	Wet End	Hardware	-	Seat Material	Ball Check / Diaphragm
	P	X	X	X		X	XX
1/2" BALL	P Polypropylene	A NPT	S 316 Stainless St.	S Stainless Steel		S 300 Series	AA Santoprene/Santoprene GG Nitrile/Nitrile ST Stainless/Teflon TT Teflon/Teflon®

Best Selling Models
PD05P-ASS-SAA
PD05P-ASS-STT

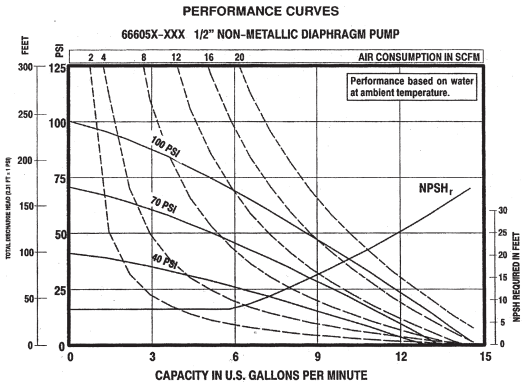
Non-Metallic Diaphragm Pump

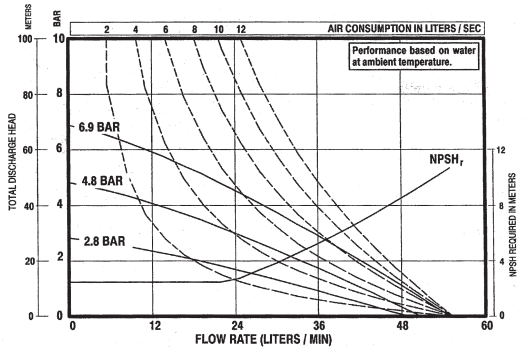
Award Winning Design!

13 GPM
1/2-inch ports

Performance Specifications

RATIO:	1:1
MAXIMUM G.P.M. (Liters):	13 (49) Ball 10 (37.9) Duckbill Check
DISPLACEMENT GALLONS (Liters) PER CYCLE:	.04 (.15) Ball .032 (.12) Duckbill Check
AIR INLET:	1/4-inch NPT(F)
FLUID INLET:	1/2-inch NPT(F)
FLUID OUTLET:	1/2-inch NPT(F)
MAX. OPERATING PRESSURE PSI (bar):	100 (6.9)
SUSPENDED SOLIDS MAX. DIA. IN. (mm):	3/32-inch (2.4) Duckbill Check- Fibers
WEIGHT - LBS. (Kg):	7.2 (3.3) Polypropylene 8.8 (4) Acetal 9.5 (4.3) Kynar(PVDF)
MAX. DRY SUCTION LIFT:	10 ft. (Teflon fitted)





Dimensional Data

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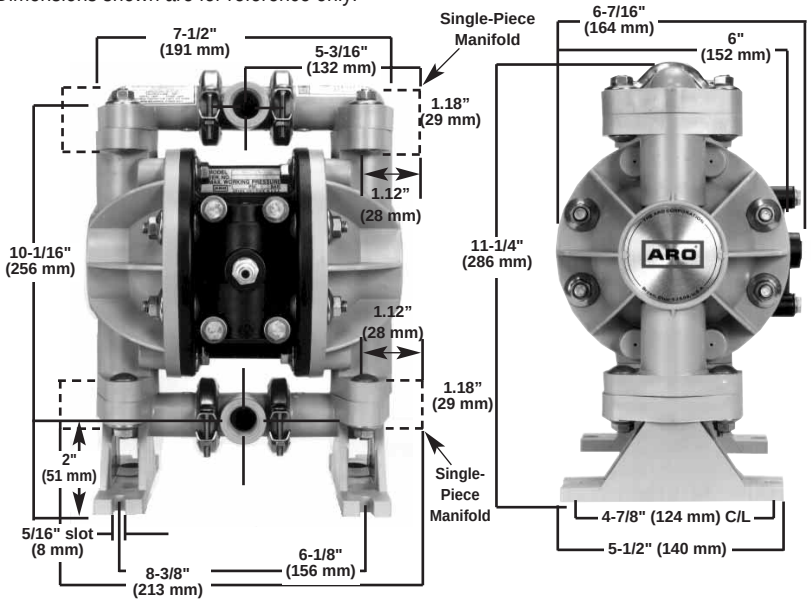


Single-Piece Manifold Model

Model / Material Selection

For recommended key models, refer to the ARO diaphragm pump price book (Form 2240-2). If the specific model you seek is not in the price book, consult the factory for further selection assistance.

6660 X X-X X X

Base Model	Air Motor	Wetted Parts	Check Valve Seats	Ball Check / Diaphragm
6660 1/2" Ball-Duckbill	5 All air motor housings are Polypropylene	J* Polypropylene H* Acetal Groundable K* Kynar(PVDF) 3 Polypropylene 6 Acetal Groundable 7 Kynar (PVDF)	2 Stainless Steel 3 Polypropylene 4 Kynar (PVDF) 6 Acetal - - - - - - - - - - - - 0 Duckbill	22 Nitrile/Nitrile 44 Teflon/Teflon 88 Polyurethane/Polyurethane EB Santoprene/Santoprene - - - - - - - - - - - - D2 Nitrile/Nitrile

Best Selling Models

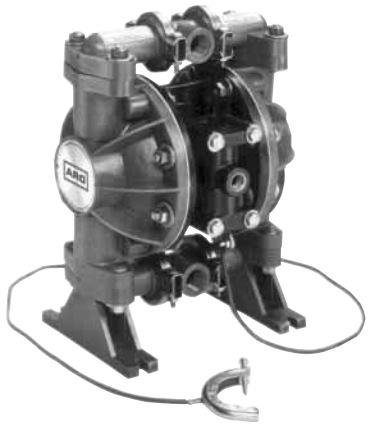
66605J-388	66605J-344
66605J-3EB	66605K-444

* Lower Priced Single Piece Manifold Design

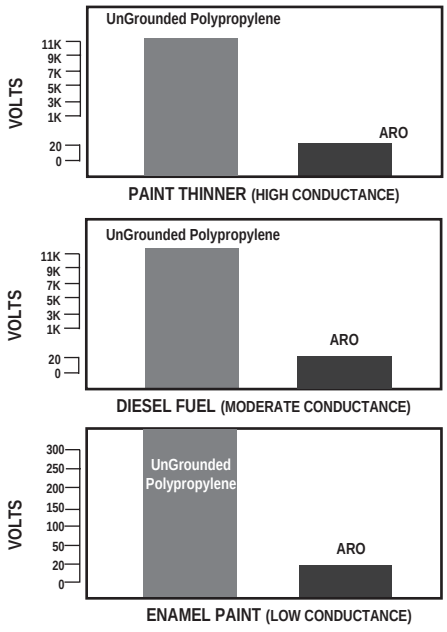
13 GPM
1/2-inch ports

Non-Metallic Groundable* Diaphragm Pumps

The ARO® Groundable Diaphragm Pump is constructed from a patented material blend that serves to route electrostatic buildup to a single bleed-off point, ensuring safe operation. This exclusive body composition, also provides superior compatibility with harsh industrial solvents and other volatile materials



UNRESTRICTED FLOW TESTS
This test involved readings taken with a electro-static field strength meter during free-flow operation of the three pumps. Readings were taken at each pump's metallic clamps and fasteners, traditional electro-static "hot-spots."



Non-Metallic Diaphragm Pump

Performance Specifications

RATIO:	1:1
MAXIMUM G.P.M. (Liters):	13 (49)
DISPLACEMENT GALLONS (Liters) PER CYCLE:	.04 (.15)
AIR INLET:	1/4-inch NPT(F)
FLUID INLET:	1/2- inch NPT(F)
FLUID OUTLET:	1/2 inch NPT(F)
MAX. OPERATING PRESSURE PSI (bar):	100 (6.9)
SUSPENDED SOLIDS MAX. DIA. IN. (mm):	3/32-inch (2.3)
WEIGHT - LBS. (Kg):	8.8 (4.0)
MAX. DRY SUCTION LIFT:	10 ft. (Teflon fitted)

Dimensional / Flow Data

See 1/2-inch (ports) non-metallic pump dimensional and flow data on page 9.

Model / Material Selection

MODEL	WETTED PARTS	CENTER BODY	CHECK	DIAPHRAGM
66605H-2A4•	Groundable Acetal	Polypropylene	Stainless Steel	Teflon
66605H-6A4•	Groundable Acetal	Polypropylene	Acetal (Seat) Stainless Steel (Ball)	Teflon
666056-2A4	Groundable Acetal	Polypropylene	Stainless Steel	Teflon
666056-6A4	Groundable Acetal	Polypropylene	Acetal (Seat) Stainless Steel (Ball)	Teflon

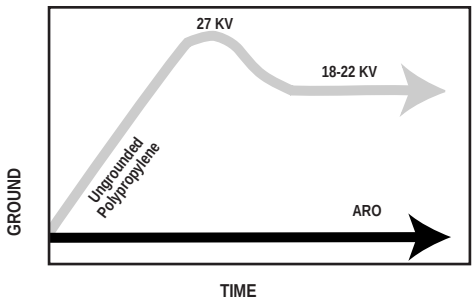
* A groundable pump is defined as one which is not able to accumulate a charge of sufficient energy to ignite flammable vapors. Be sure that every component in your system is properly grounded.
• Lower priced single-piece manifold model.

Independent Laboratory Test Results

An independent lab test showed that the Aro Groundable pump, pumping materials such as paint thinner, diesel fuel and enamel paint under high flow conditions, accumulated a maximum of .0032 millijoules of energy. The report concluded that energies of this magnitude are not sufficient to ignite flammable vapors. Reported minimum ignition energies of several flammable fluids are as follows:

Methyl Ethyl Ketone: 0.53 millijoules
Isopropyl Alcohol: 0.65 millijoules
Acetone: 1.15 millijoules
Hydrogen: 0.02 millijoules

VAN deGRAAF GENERATOR TEST
Diaphragm pumps were charged with a vigorous 50,000 volts. Once charged the ungrounded polypropylene pump never came back to earth ground. The ARO pump starts at ground zero - and stays there.



Non-Metallic Diaphragm Pump

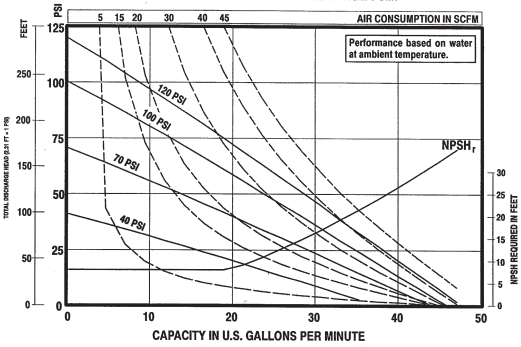
47 GPM
1-inch ports

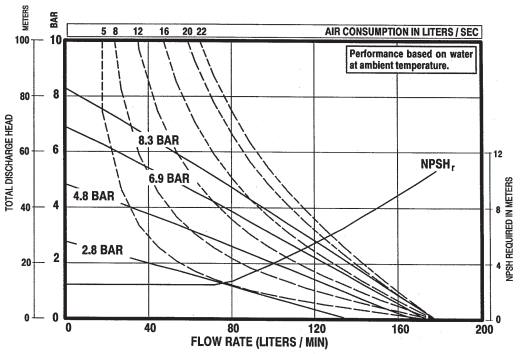
Performance Specifications

RATIO:	1:1
MAXIMUM G.P.M. (Liters):	47 (178)
DISPLACEMENT GALLONS (Liters) PER CYCLE:	.170 (.64)
AIR INLET:	1/4-inch NPT(F)
FLUID INLET:	ANSI Class 150, 1-inch Pipe Flange
FLUID OUTLET:	ANSI Class 150, 1-inch Pipe Flange
MAX. OPERATING PRESSURE PSI (bar):	120 (8.3)
SUSPENDED SOLIDS MAX. DIA. IN. (mm):	1/8-inch (3.2)
WEIGHT - LBS. (Kg):	20.2 (9.2) Polypropylene 28.5 (12.9) Kynar(PVDF) 28.8 (13.0) Polypropylene w/ Cast Iron Air Motor 37 (16.8) Kynar(PVDF) w/ Cast Iron Air Motor
MAX. DRY SUCTION LIFT:	15 ft. (Rubber fitted)

PERFORMANCE CURVES

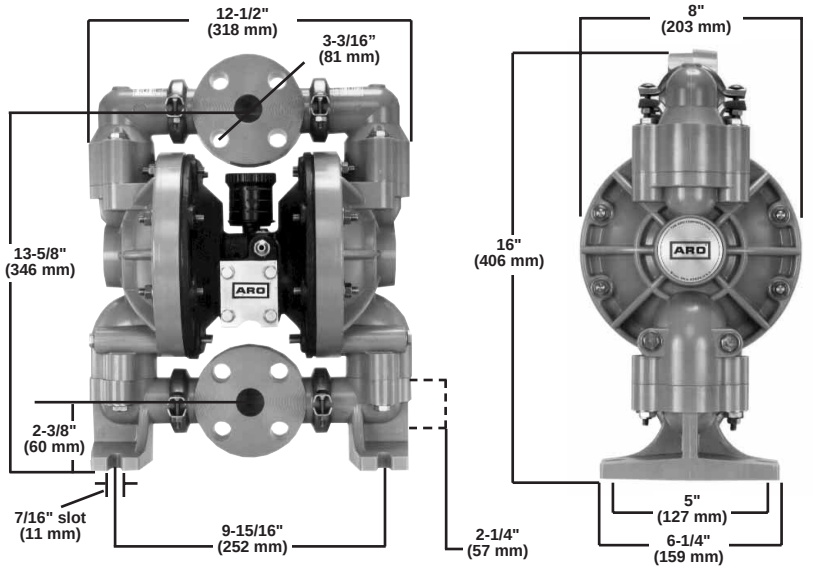
6661XX-XXX-C 1" NON-METALLIC DIAPHRAGM PUMP





Dimensional Data

Dimensions shown are for reference only.



Model / Material Selection

For recommended key models, refer to the ARO diaphragm pump price book (Form 2240-2). If the specific model you seek is not in the price book, consult the factory for further selection assistance.

6661 X X-X X X - C

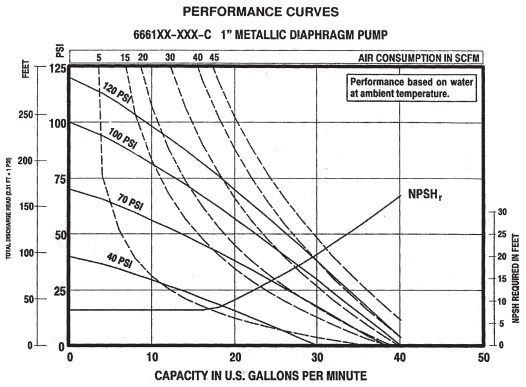
Base Model	X Air Motor	X Wetted Parts	-	X Check Valve Seats	X X Ball Check / Diaphragm
6661 1" Ball	A Aluminum B Cast Iron	3 Polypropylene 4 Kynar (PVDF)		3 Polypropylene 4 Kynar (PVDF) 8 SS (400, Hardened)	22 Nitrile/Nitrile 44 Teflon/Teflon EB Santoprene/Santoprene

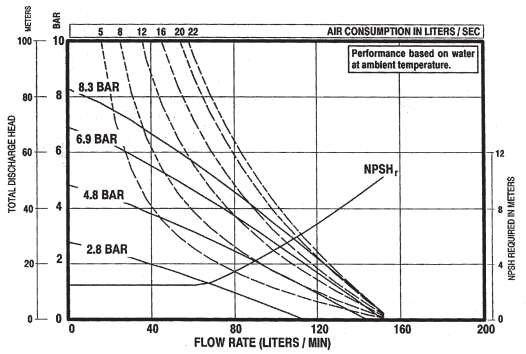
Best Selling Models

6661A3-3EB-C 6661B3-344-C
6661A3-344-C 6661B4-444-C

35 GPM
1-inch ports

Metallic Diaphragm Pump





New Cast Iron Models!

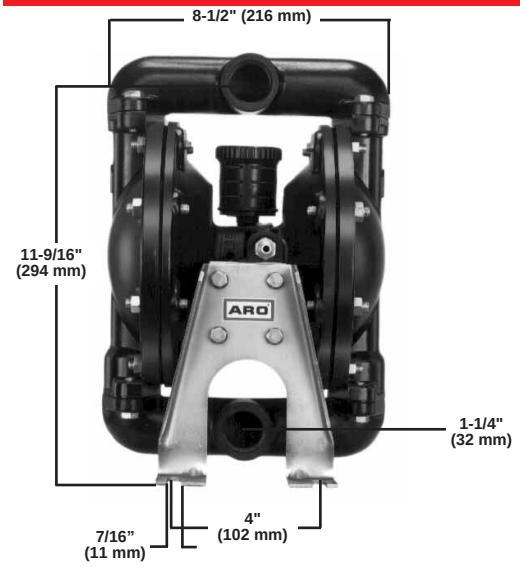
For low-flow applications where abrasive fluids are the medium, then Aro's 1" Cast Iron Pump is the model made for you.

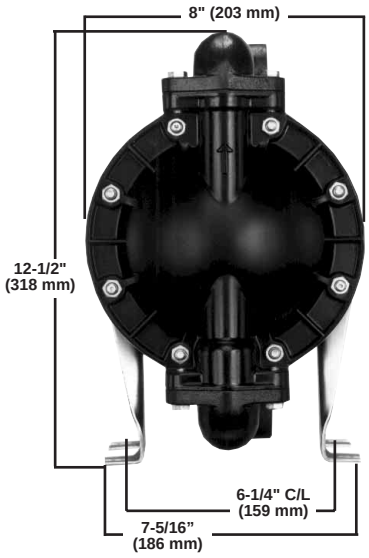
NEW!

Performance Specifications

RATIO:	1:1
MAXIMUM G.P.M. (Liters):	35 (132)
DISPLACEMENT GALLONS (Liters) PER CYCLE:	.16 (.60)
AIR INLET:	1/4-inch NPT(F)
FLUID INLET:	1-inch NPT(F) or BSP(F)
FLUID OUTLET:	1-inch NPT(F) or BSP(F)
MAX. OPERATING PRESSURE PSI (bar):	120 (8.3)
SUSPENDED SOLIDS MAX. DIA. IN. (mm):	1/8-inch (3.2)
WEIGHT - LBS. (Kg):	19 (8.6) Aluminum 36 (16.3) Stainless Steel 31 (14.1) Cast Iron For Cast Iron center section models, add 8.5 lbs. (3.81 kg.)
MAX. DRY SUCTION LIFT:	20 ft. (Rubber fitted)

Dimensional Data





Model / Material Selection

For recommended key models, refer to the ARO diaphragm pump price book (Form 2240-2). If the specific model you seek is not in the price book, consult the factory for further selection assistance.

6661 X X-X X X - C

Base Model	Air Motor (X)	Wetted Parts (X)	Check Valve Seats (X)	Ball Check / Diaphragm (XX)
6661 1" Ball	0 Aluminum 1 Cast Iron 2 BSP Aluminum 3 BSP Cast Iron	0 Aluminum 1 316 SS (Stainless Steel) 2 Cast Iron A Alu w/SS Hardware B 316 SS w/SS Hardware C Cast Iron w/SS Hardware	2 316 Stainless Steel 3 Polypropylene 4 Kynar(PVDF) 8 400 SS (400, Hardened)	22 Nitrile/Nitrile 44 Teflon/Teflon EB Santoprene/Santoprene

NOTE: Dual inlet/outlet available - Consult Factory

Best Selling Models

666100-322-C	666101-3EB-C	666111-244-C
666100-344-C	666101-344-C	

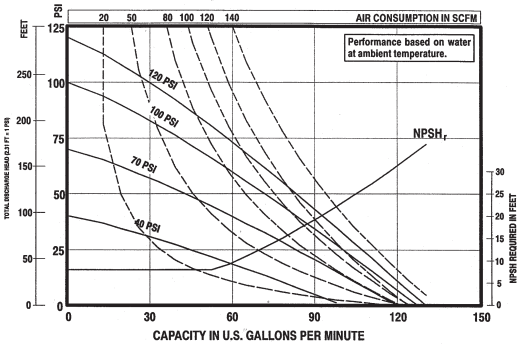
Non-Metallic Diaphragm Pump

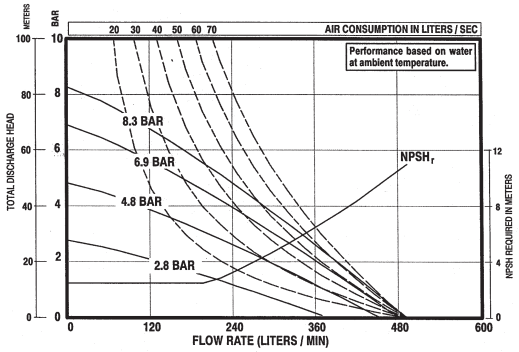
Performance Specifications

RATIO:	1:1
MAXIMUM G.P.M. (Liters):	100 (379)
DISPLACEMENT GALLONS (Liters) PER CYCLE:	.72 (2.7)
AIR INLET:	1/2-inch NPT (F)
FLUID INLET:	ANSI Class 150, 1-1/2-inch Pipe Flange
FLUID OUTLET:	ANSI Class 150, 1-1/2-inch Pipe Flange
MAX. OPERATING PRESSURE PSI (bar):	120 (8.3)
SUSPENDED SOLIDS MAX. DIA. IN. (mm):	1/4-inch (6.4)
WEIGHT - LBS. (Kg):	62 (28) Polypropylene 92 (42) Kynar(PVDF) For Cast Iron center section add 23 lbs. (10.4 kg)
MAX. DRY SUCTION LIFT:	14 ft. (Rubber fitted)

PERFORMANCE CURVES

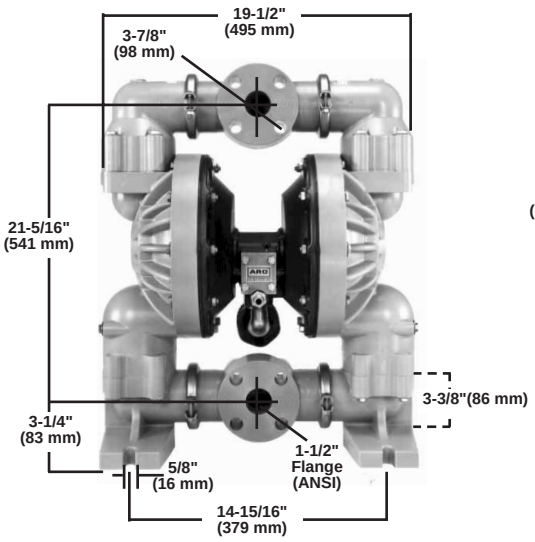
6661XX-XXX-C 1-1/2" NON-METALLIC DIAPHRAGM PUMP

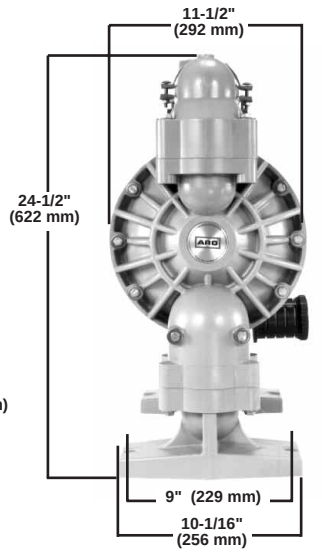




Dimensional Data

Dimensions shown are for reference only.





Model / Material Selection

For recommended key models, refer to the ARO diaphragm pump price book (Form 2240-2). If the specific model you seek is not in the price book, consult the factory for further selection assistance.

6661 X X-X X X - C

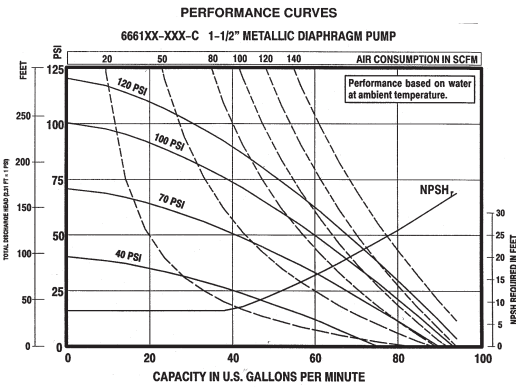
Base Model	Air Motor	Wetted Parts	Check Valve Seats	Ball Check / Diaphragm
6661 1-1/2" Ball	T Aluminum U Cast Iron	3 Polypropylene 4 Kynar(PVDF)	3 Polypropylene 4 Kynar(PVDF) 8 SS (400, Hardened)	22 Nitrile/Nitrile 44 Teflon/Teflon EB Santoprene/Santoprene

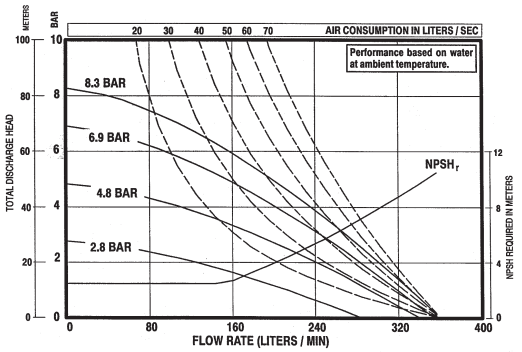
Best Selling Models

6661T3-3EB-C 6661U3-344-C
6661T3-344-C 6661U4-444-C

100 GPM
1-1/2 -inch ports

Metallic Diaphragm Pumps





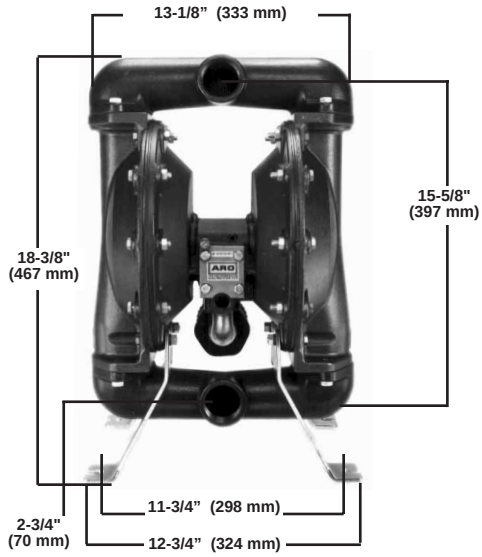
Screened Inlet Kits Available. See Page 25

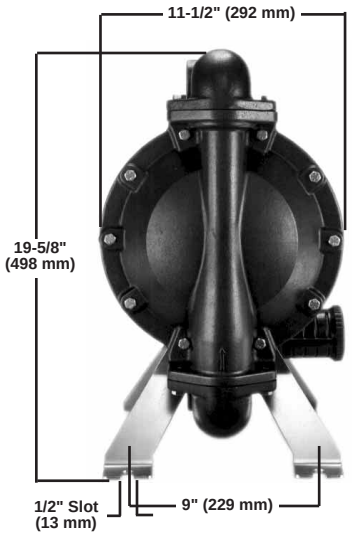
NEW!

Performance Specifications

RATIO: 1:1
MAXIMUM G.P.M. (Liters): 100 (379)
DISPLACEMENT GALLONS (Liters) PER CYCLE: .73 (2.76)
AIR INLET: 1/2-inch NPT(F)
FLUID INLET: 1-1/2-inch NPT(F) or BSP(F)
FLUID OUTLET: 1-1/2-inch NPT(F) or BSP(F)
MAX. OPERATING PRESSURE PSI (bar): 120 (8.3)
SUSPENDED SOLIDS MAX. DIA. IN. (mm): 1/4-inch (6.4)
WEIGHT - LBS. (Kg): 51 (23.1) Aluminum
84 (38.1) Stainless Steel
79 (35.8) Cast Iron
For Cast Iron center section models, add 23 lbs. (10.4 kg.)
MAX. DRY SUCTION LIFT: 19 ft. (Rubber fitted)

Dimensional Data





Model / Material Selection

For recommended key models, refer to the ARO diaphragm pump price book (Form 2240-2). If the specific model you seek is not in the price book, consult the factory for further selection assistance.

6661 X X-X X X - C

Base Model	X Air Motor	X Wetted Parts	-	X Check Valve Seats	X X Ball Check / Diaphragm
6661 1-1/2" Ball	5 Aluminum 6 Cast Iron 7 BSP Aluminum 8 BSP Cast Iron	0 Aluminum 1 316 Stainless Steel 2 Cast Iron A Alu w/SS Hardware B 316 SS w/SS Hardware C CI w/SS Hardware		2 Stainless Steel 3 Polypropylene 4 Kynar (PVDF) 8 400 SS (Hardened)	22 Nitrile/Nitrile 44 Teflon/Teflon EB Santoprene/Santoprene

Best Selling Models

666150-322-C	666152-3EB-C	666151-344-C
666150-344-C	666151-3EB-C	666161-244-C

1-1/2" Screened Inlet Order Number: PS15A-AAS-PAA

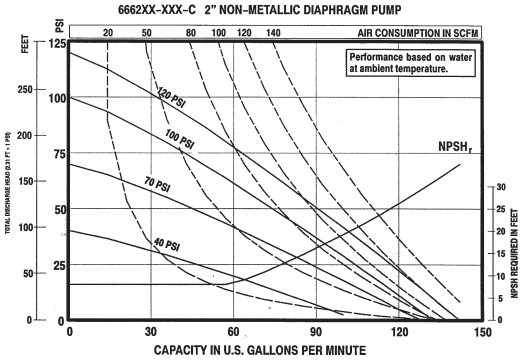
Non-Metallic Diaphragm Pump

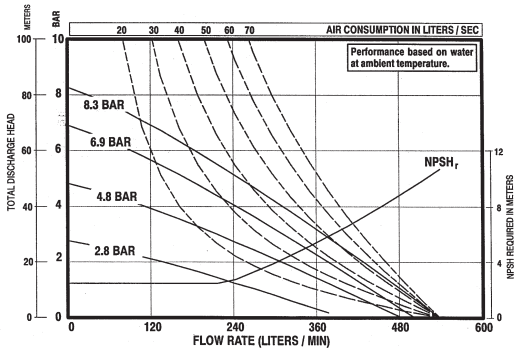
145 GPM
2-inch ports

Performance Specifications

RATIO: 1:1
MAXIMUM G.P.M. (Liters): 145 (548)
DISPLACEMENT GALLONS (Liters) PER CYCLE: .72 (2.7)
AIR INLET: 1/2-inch, NPT (F)
FLUID INLET: ANSI Class 150, 2-inch Pipe Flange
FLUID OUTLET: ANSI Class 150, 2-inch Pipe Flange
MAX. OPERATING PRESSURE PSI (bar): 120 (8.3)
SUSPENDED SOLIDS MAX. DIA. IN. (mm): 1/4-inch (6.4)
WEIGHT - LBS. (Kg): 62 (28) Polypropylene, 92 (42) Kynar(PVDF)
For Cast Iron center section models, add 23 lbs. (10.4 kg.)
MAX. DRY SUCTION LIFT: 14 ft. (Rubber fitted)

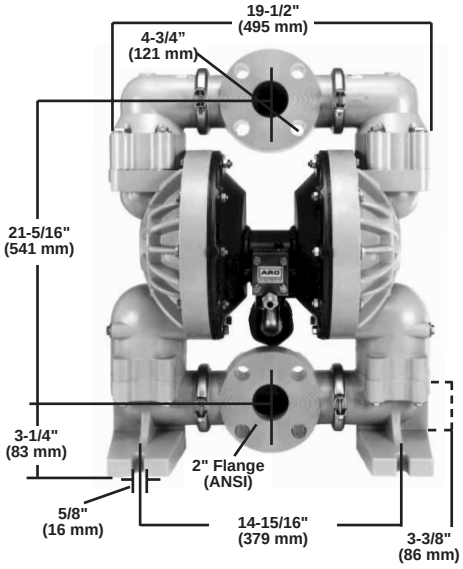
PERFORMANCE CURVES
6662XX-XXX-C 2" NON-METALLIC DIAPHRAGM PUMP

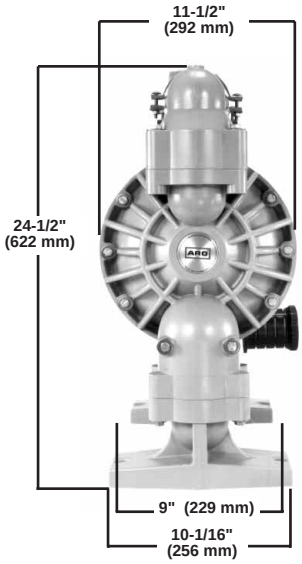




Dimensional Data

Dimensions shown are for reference only.





Model / Material Selection

For recommended key models, refer to the ARO diaphragm pump price book (Form 2240-2). If the specific model you seek is not in the price book, consult the factory for further selection assistance.

6662 X X-X X X - C

Base Model	Air Motor	Wetted Parts	Check Valve Seats	Ball Check Diaphragm
6662 2" Ball	A Aluminum B Cast Iron	3 Polypropylene 4 Kynar (PVDF)	3 Polypropylene 4 Kynar (PVDF) 8 400 SS (Hardened)	22 Nitrile/Nitrile 44 Teflon/Teflon EB Santoprene/Santoprene

Best Selling Models

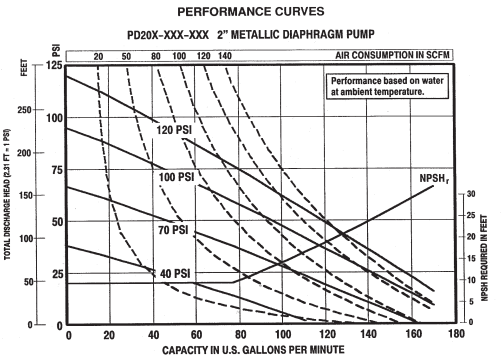
6662A3-3EB-C	6662B3-344-C
6662A3-344-C	6662B4-444-C

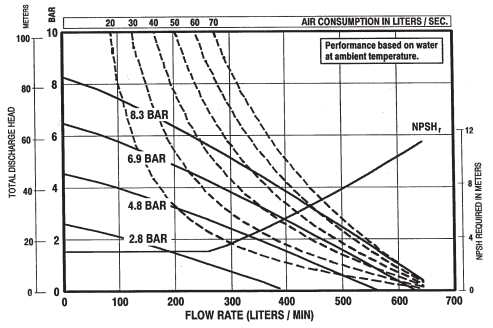
170 GPM
2-inch ports

Metallic Diaphragm Pump

Performance Specifications

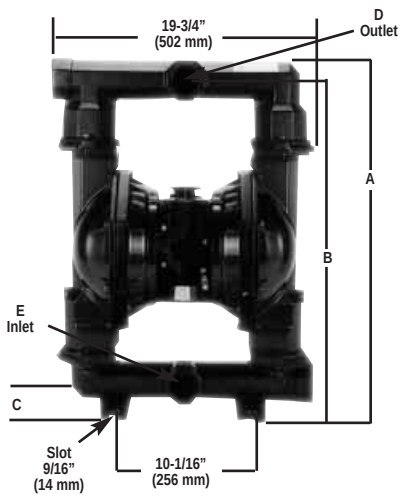
RATIO: 1:1
MAX. G.P.M. (Liters): 170 (644)
DISPLACEMENT GALLONS (Liters) PER CYCLE: 1.4 (5.3)
AIR INLET: 3/4-in. NPT (F)
AIR EXHAUST: 1-1/2" NPT (F)
FLUID INLET: 2" NPT (F) or BSP (F)
FLUID OUTLET: 2" NPT (F) or BSP (F)
MAX. OP. PRESSURE PSI (bar): 120 (8.3)
PASS SOLIDS MAX. DIA. IN. (mm): 1/4 (6.4)
WEIGHT LBS. (Kgs.): 64 (29) Aluminum
133 (60) Cast Iron
154 (70) Stainless Steel
(Note: add 34 lbs. (15 kg) for Stainless or Cast Iron Motor)
MAX. DRY SUCTION LIFT: 19 ft. (Rubber fitted)



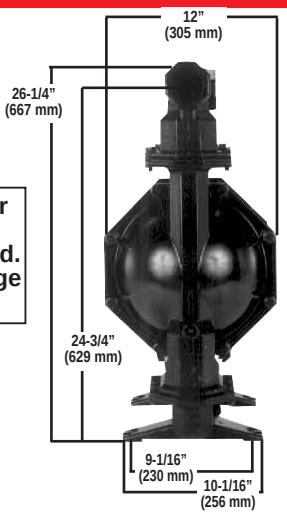


Item	Stainless	Aluminum or Cast Iron
A	28-5/8" (727mm)	26-1/4" (667mm)
B	25-5/8 (651 mm)	24-3/4 (624mm)
C	3-3/8 (86mm)	1-7/8 (48mm)
"D"-"E"	2"- ANSI Flange with 2" NPT or 2" DIN Flange with 2" BSP thread	2" - NPT or 2" - BSP

Dimensional Data



Muffler Not Included. See Page 25



Model / Material Selection

For recommended key models, refer to the ARO diaphragm pump price book (Form 2240-2). If the specific model you seek is not in the price book, consult the factory for further selection assistance.

PD20 X-X X X - X X X

Base Model	Center Section	Ports	Wetted Parts	Hardware	Seat	Ball Check / Diaphragm
2" Ball	A Aluminum C Cast Iron S 316 SS	A NPT B BSP	A Aluminum C Cast Iron S 316 SS	P Plated Steel S Stainless Steel	A Santoprene® G Nitrile H 440 SS Hardened K Kynar (PVDF) S 316 SS	AA Santoprene/Santoprene GG Nitrile/Nitrile TT Teflon/Teflon

NOTE: Side Port option not available on Stainless Steel Models

Best Selling Models

PD20A-AAP-GGG	PD020A-ACP-AAA	PD20A-ASP-KTT
PD20A-AAP-KTT	PD20A-ASP-AAA	PD20C-ASS-KTT

2" Screened Inlet Order Number:
PS20A-AAS-AAA

Screened Inlet Kits Available. See Page 25

Metallic Diaphragm Pump

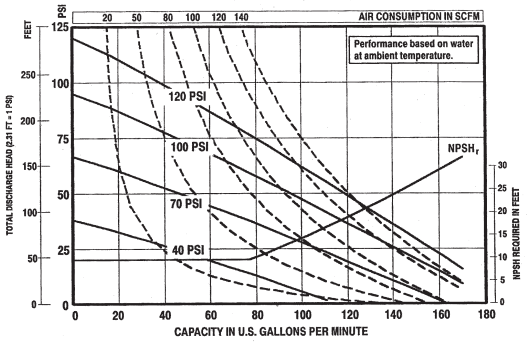
170 GPM
2-inch ports “Flap Checks”

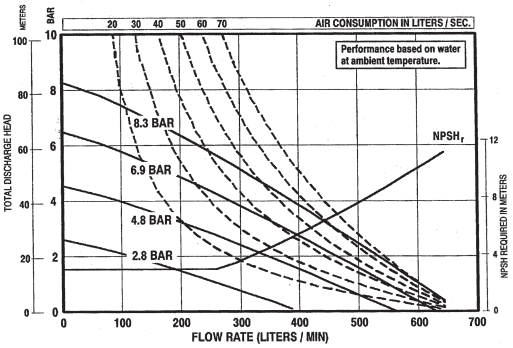
Performance Specifications

RATIO:	1:1
MAX. G.P.M. (Liters):	170 (644)
DISPLACEMENT GALLONS (Liters) PER CYCLE:	1.4 (5.3)
AIR INLET:	3/4-in. NPT (F)
AIR EXHAUST:	1-1/2” NPT (F)
FLUID INLET:	2” NPT (F) or BSP (F)
FLUID OUTLET:	2” NPT (F) or BSP (F)
MAX. OP. PRESSURE PSI (bar):	120 (8.3)
PASS SOLIDS MAX. DIA. IN. (mm):	2” (50mm) Semi Solids
WEIGHT LBS. (Kgs.):	74 (34) Aluminum 161 (73) Cast Iron 188 (85) Stainless Steel (Note: add 34 lbs.(15 kg) for Stainless or Cast Iron Air Motor)
MAX. DRY SUCTION LIFT:	19 ft. (Rubber fitted)

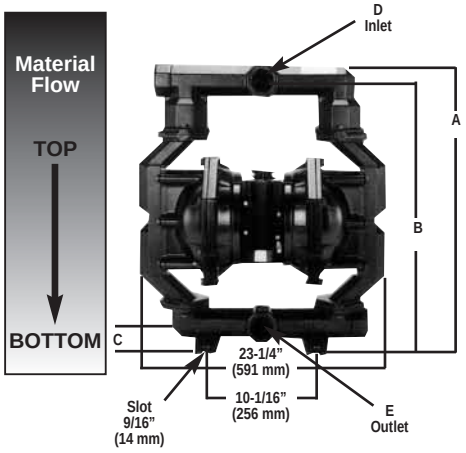
PERFORMANCE CURVES

PF20X-XXX-XXX 2” METALLIC FLAP VALVE DIAPHRAGM PUMP

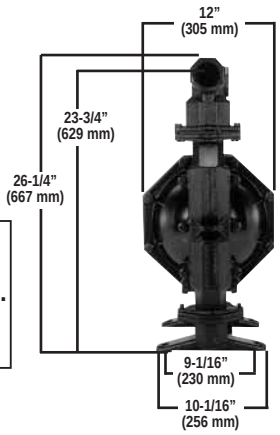




Dimensional Data



Muffler Not Included. See Page 25



Item	Stainless	Aluminum or Cast Iron
A	28-5/8” (727mm)	26-1/4” (667mm)
B	25-5/8 (651 mm)	24-3/4 (624mm)
C	3-3/8 (86mm)	1-7/8 (48mm)
“D”-“E”	2”- ANSI Flange with 2” NPT or 2” DIN Flange with 2” BSP	2” - NPT or 2” - BSP

Model / Material Selection

For recommended key models, refer to the ARO diaphragm pump price book (Form 2240-2). If the specific model you seek is not in the price book, consult the factory for further selection assistance.

PF20 X - X X X - X X X

Base Model	Center Section	Ports	Wetted Parts	Hardware	Valve Seat	Flap / Diaphragm
2” FLAP	A Aluminum C Cast Iron S 316 SS	A NPT B BSP	A Aluminum C Cast Iron S 316 SS	P Plated Steel S Stainless Steel	S 316 Stainless Steel	AA EPR/Santoprene GG Nitrile/Nitrile UA Polyurethane/Santoprene VT Viton/Teflon

NOTE: Side Port option not available on Stainless Steel Models

Best Selling Models

PF20A-AAP-SAA	PF20A-ASS-SAA
PF20A-AAP-SUA	PF20C-ASS-SAA
PF20A-ACP-SAA	PF20C-ASS-SVT

275 GPM
3-inch Ports

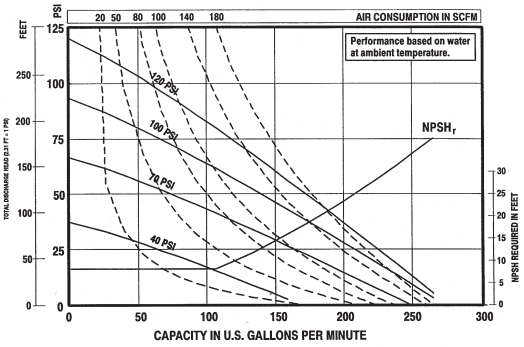
NEW!

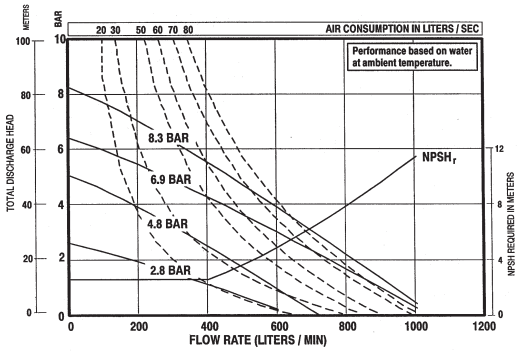
Performance Specifications

RATIO:	1:1
MAX. G.P.M. (Liters):	275 (1,041)
DISPLACEMENT GALLONS (Liters) PER CYCLE:	2.8 (10.6)
AIR INLET:	3/4-in. NPT (F)
AIR EXHAUST:	1-1/2" NPT (F)
FLUID INLET:	3" NPT (F), BSP (F)
FLUID OUTLET:	3" NPT (F), BSP (F)
MAX. OP. PRESSURE PSI (bar):	120 (8.3)
PASS SOLIDS MAX.	
DIA. IN. (mm):	3/8 (9.5)
WEIGHT LBS. (Kgs.):	113 (51.3) Aluminum 197 (89.4) Cast Iron 203 (92.1) Hastelloy-C 203 (92.1) Stainless Steel (Note: add 40 lbs.(18 kg) for Stainless Air Motor)
MAX. DRY SUCTION LIFT:	19 ft. (Rubber fitted)

PERFORMANCE CURVES

PD30X-XXX-XXX 3" METALLIC DIAPHRAGM PUMP

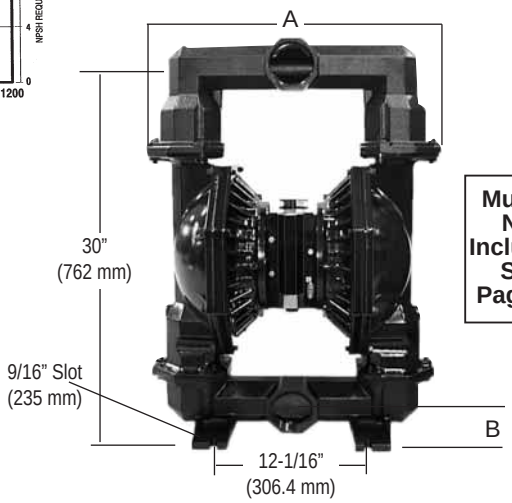




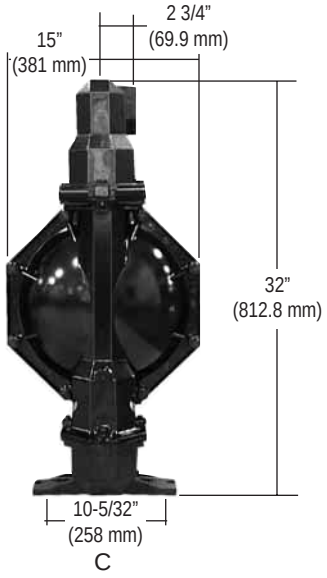
Screened Inlet Kits Available. See Page 25

Item	SS/Hastelloy-C	Aluminum or Cast Iron
A	23-5/8" (587.4 mm)	23-5/8" (600.1 mm)
B	2-3/4 (69.9 mm)	2-3/8 (60.3 mm)
C	11-11/16 (296.9 mm)	11 (279.4 mm)

Dimensional Data



Muffler Not Included. See Page 25



Model / Material

For recommended key models, refer to the ARO diaphragm pump price book (Form 2240-2). If the specific model you seek is not in the price book, consult the factory for further selection assistance.

PD30 X - X X X - X XX - B

Base Model	Center Section	Ports	Wetted Parts	Hardware	Check Valve Seats	Ball Check/ Diaphragm
3" BALL	**A** Aluminum **S** 316 SS	**A** NPT **B** BSP	**A** Aluminum **C** Cast Iron **S** 316 SS **H** Hastelloy-C	**P** Plated Steel **S** Stainless Steel	**A** Santoprene® **G** Nitrile **H** 440 SS (Hard) **K** Kynar (PVDF) **L** Hastelloy-C **S** 316 SS	**AA** Santoprene/Santoprene **GG** Nitrile/Nitrile **TT** Teflon/Teflon

3" Screened Inlet Order Number: PS30A-AAS-AAA-B

Best Selling Models

PD30A-AAP-GGG-B	PD30A-ASS-AAA-B
PD30A-AAP-AAA-B	PD30A-ASS-KTT-B
PD30A-ACS-AAA-B	PD30S-ASS-STT-B

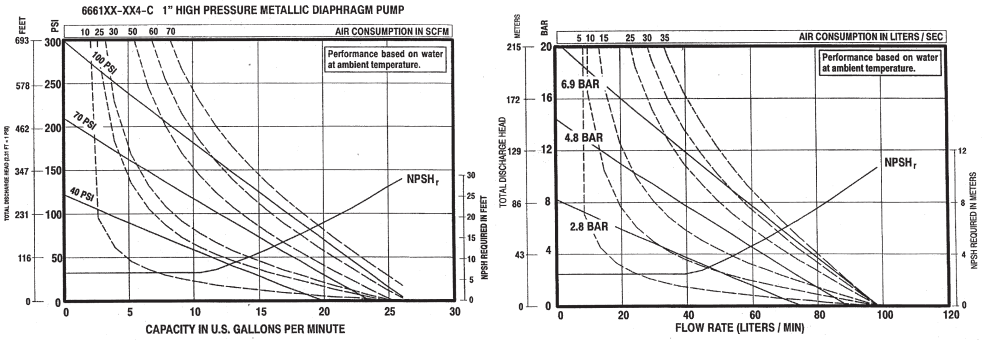
Award Winning Design!

3:1 Ratio, High Pressure Diaphragm Pumps

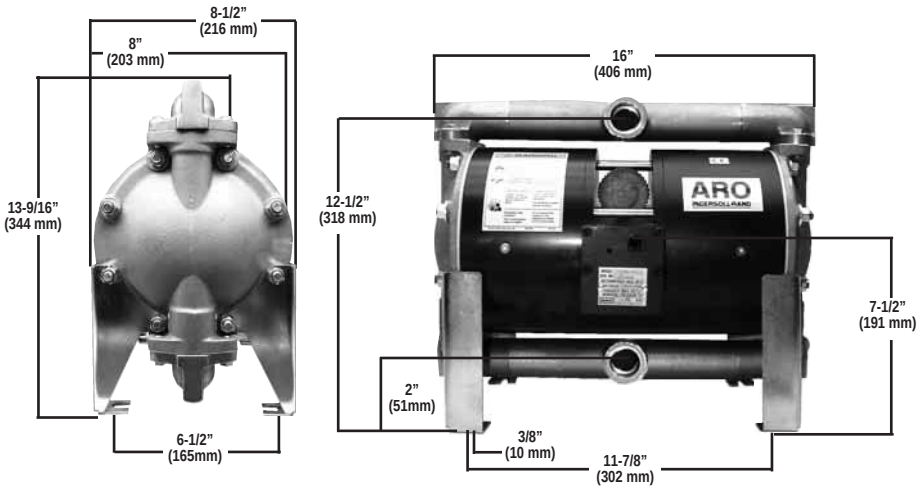
Performance Specifications

RATIO: 3:1
MAXIMUM G.P.M. (Liters): 24 (90.7) Free Flow (12 GPM at 125 psi back pressure)
DISPLACEMENT GALLONS (Liters) PER GALLON: .09 (.341)
AIR INLET: 3/8-inch NPT(F) Short
FLUID INLET: 1 inch NPT(F) or BSP
FLUID OUTLET: 1 inch NPT(F) or BSP
MAX. OPERATING PRESSURE PSI (bar): 300 (20.4)
PASS SOLIDS MAX. DIA. IN. (mm): 1/8-inch (3.2)
WEIGHT - LBS. (Kg): 90 (40.7) Stainless Steel

Performance Curves



Dimensional Data



Model / Material Selection

MODEL	WETTED PARTS	CHECK VALVE SEATS	BALL CHECK	DIAPHRAGM
Stainless Steel Construction/ NPT Inlet/Outlet				
6661M1-2A4-C	Stls.Stl.**	316 SS**	316 SS**	Teflon
Stainless Steel Construction/ BSP Inlet/Outlet				
6661N1-2A4-C	Stls.Stl.**	316 SS**	316 SS**	Teflon

** All Stainless Steel is electro-polished/passivated.

A Triumph Of Design Innovation

Aro's design team has succeeded in cross-engineering a pump that combines the very best features of the ARO® Diaphragm Pump with the higher outlet pressures that, until now, could only be produced by expensive, high-maintenance gear, rotary or other reciprocating-type pumps. Think of it: a diaphragm pump that *doesn't stall*, that can generate nearly *300 psi on standard 100 psi shop air*, is *easy to maintain*, offers *exceptional material compatibility* and arrives with a *5-year warranty*

Use the Aro High pressure pump in these and other applications:

- Paint recirculation and high solids coatings
- Systems with long piping runs and friction losses
- Inks
- Adhesives
- Filled materials
- Drilling Grout
- Caulking
- Solvent Reclamation
- Resins

Its time to tune-in...

Yes, it's time to tune-in to a line of pump controls that are easy to understand, install and operate, *and* they won't send your capital equipment budget into the stratosphere. But beyond all of this, Aro's new ARO® TRON Pump Controls transmit a new, far-reaching wavelength of accuracy and repeatability that will put you in control of your pump operation like never before.

Designed and manufactured by Aro, these controls are the ideal means to transform your ARO® Diaphragm Pump from a simple transfer and supply pump into a true production/preventive maintenance component with capabilities equal to any task.

Whether you're building the machines, operating the machines or taking care of the machines; the need for reliable fluid handling components is something that has not changed. What *has* changed is the need for *smart* fluid handling components, especially in those "zero tolerance" situations, where every energy dollar and micro-second of production counts.

As a world-class manufacturer of fluid handling pumps, Ingersoll-Rand /ARO has always taken care to integrate your design, production, and maintenance requirements with every piece of equipment we make. With ARO® TRON, this same integrity applies with every control component we design and build.

- Easy To Understand
- Exceptionally Economical
- Simple to Install and Operate
- Unrivaled Accuracy and Repeatability

ARO® Diaphragm Pump Displacement Information

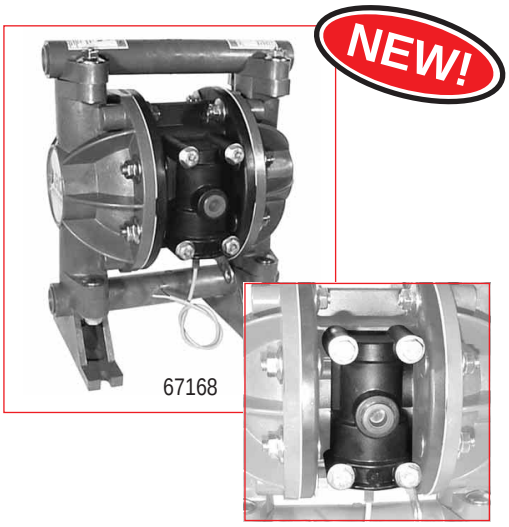
Displacement Per Cycle

	Specific Gravity = 1						
	Gallons	**Ounces**	**in.^{3}**	**cc**	**Liters**	**Grams**	**Kg**
1/4" Non-Metallic	0.014	1.792	3.234	53	0.053	53	0.053
1/2" Non-Metallic	0.040	5.120	9.240	151	0.151	151	0.151
1" Non-Metallic	0.170	21.760	39.270	644	0.643	644	0.644
1" Metallic	0.160	20.480	39.960	606	0.606	606	0.606
1-1/2" Non-Metallic	0.720	92.160	166.320	2725	2.725	2725	2.725
1-1/2" Metallic	0.730	93.440	168.630	2763	2.763	2763	2.763
2" Non-Metallic	0.720	92.160	166.320	2725	2.725	2725	2.725
2"Metallic Ball Valve	1.400	179.200	323.400	5300	5.299	5300	5.300
2" Metallic Flap Valve	1.400	179.200	323.400	5300	5.299	5300	5.300
3" Metallic	2.800	358.400	646.800	10,599	10.598	10,599	10.599

Refer to these displacement values when applying any of the following ARO ®Tron Pump Controls

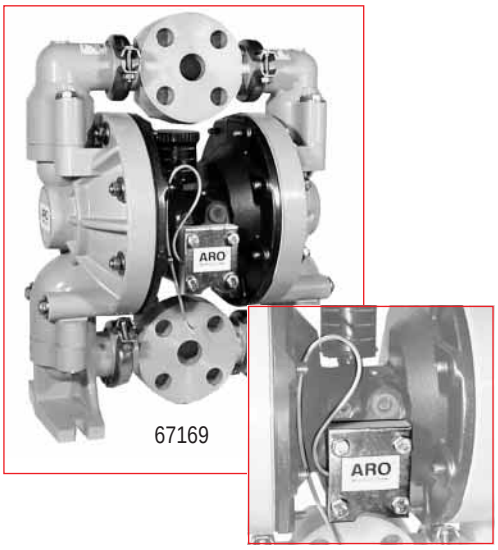
ARO® TRON
Pump Control Components

Aro's new Cycle Sensor Kit provides continuous, real-time monitoring of your Diaphragm Pump's cycle rate. What's the advantage? By knowing your pump's actual operational cycle rate, not only can you adjust to achieve a more precise material flow, but you can also begin to track and measure your pump's performance and parts wear cycle. With this data now in hand, you'll be better prepared for your pump's service and replacement needs - as opposed to unanticipated pump failure and the frantic downtime emergencies that send you or your maintenance people scrambling .



❑ **Simple Installation** - The ARO Cycle Sensor Switch Kit installs in minutes to provide years of reliable pump cycle intelligence.

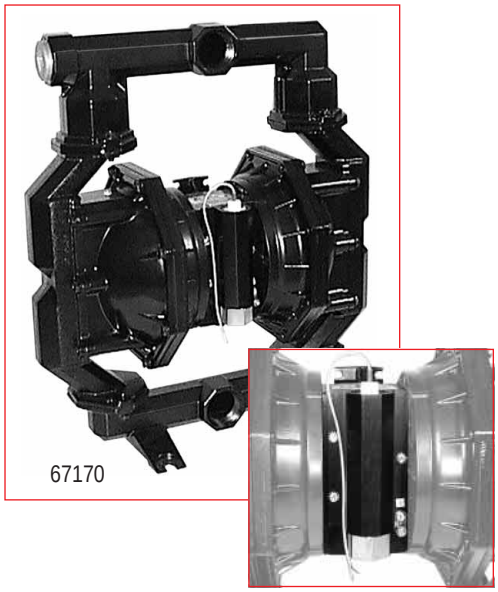
❑ **Simple Operation** - Once connected to your PLC, an ARO Mini-Batch Controller (see reverse for more information), or simple LED read-out meter, the closed-contact magnetic sensor switch provides failsafe accuracy and dependability.



❑ **Avoids Diaphragm Failure Mess and Downtime** - By providing critical pump cycle data, you can begin to take charge of your pump's service and replacement schedule instead of pump failure and its attendant mess taking charge of you.

Ordering Information

Kit Model	For Diaphragm Pump Model
67168	1/2" Ports / Non-Metallic
67169	1", 1 1/2", 2" Ports / Non-Metallic & 1", 1 1/2" / Metallic
67170	2", 3" Ports / Metallic



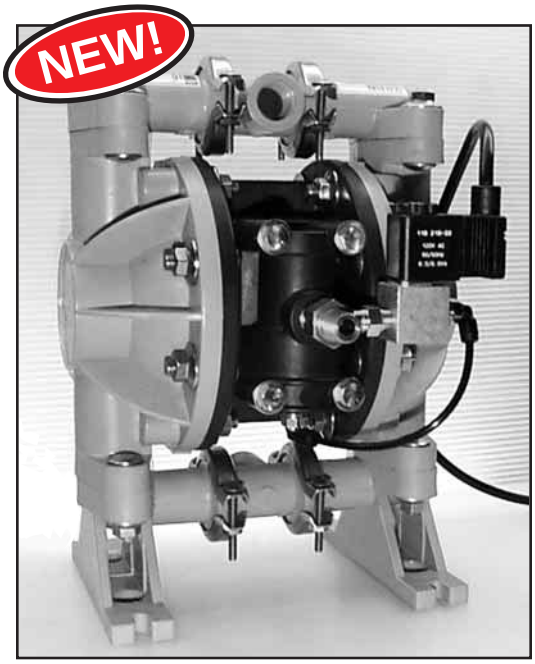
Cycle Sensor Power Specifications

Maximum Operating Voltage - 240 V A. C.
Switching Current - .5 Amps

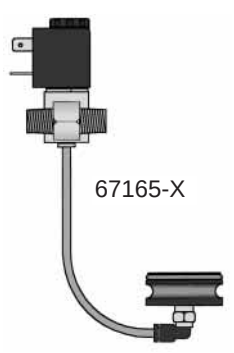
Application Data

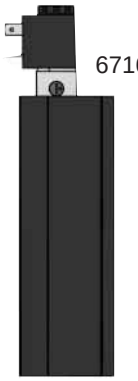
For Pump Displacement Information, see chart on page 20.

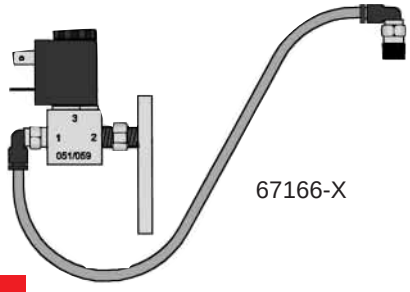
Solenoid Actuated Pump Kits



Aro's new ARO®TRON Solenoid Actuation Kits allow the cycle rate of an ARO Diaphragm Pump to be remote-controlled with an electrical signal from PLC's, pH or Pressure Sensors, or even simple Line Switches. By alternately supplying and removing power to the solenoid, the pump's air chambers are alternately pressurized and de-pressurized much like a standard diaphragm pump. The distinct difference and advantage is that you can program this pressure/release pattern to precisely correlate with your specific fluid introduction needs.







ARO®TRON Pump Control Components

- Replaces standard pump operation with total electronic control.
- Significantly broadens pump application latitude.
- Converts your standard diaphragm pump into a low-cost, simple metering component.
- Economical: utilizes existing air valving, as opposed to competitive designs that can require either a complete new air valve, or an *entirely new pump*.
- Kits are available for pump (port) sizes 1/2" thru 3". (1/4" port pumps can also be adapted.)
- Simple installation: remove the air valve housing's 4 bolts , insert the kit, replace the 4 bolts and you're ready to take control.
- Available for AC or DC applications

MODEL	DESCRIPTION

Ordering Information

67165-1	24 VDC Kit adapts to 1/2" (ported) pumps (metallic/ non-metallic)
67165-2	120 VAC Kit adapts to 1/2" (ported) pumps (metallic/non-metallic)
67165-3	No Coil* Kit adapts to 1/2" (ported) pumps (metallic/non-metallic) For 1/4" (ported) pump solenoid actuation, use any of the above three 67165-X (24 VDC, 120 VAC, No Coil) kits with any of the following specially outfitted 1/4" pumps: 650771-1-B (PD02P-APS-PTT) 650771-2-B (PD02P-APS-PTA) 650771-3-B (PD02P-ADS-DTT)
67166-1	24 VDC Kit adapts to 1", 1-1/2" metallic and 1", 1-1/2" and 2" (ported) non-metallic pumps (except 3:1 AODs)
67166-2	120 VAC Kit adapts to 1", 1-1/2" metallic and 1", 1-1/2" and 2" (ported) non-metallic pumps (except 3:1 AODs)
67166-3	No Coil* Kit adapts to 1", 1-1/2" metallic and 1", 1-1/2" and 2" (ported) non-metallic pumps (except 3:1 AODs)
67167-1**	24 VDC Kit adapts to 2" and 3" (ported) metallic pumps
67167-2**	120 VAC Kit adapts to 2" and 3" (ported) metallic pumps
67167-3**	No Coil* Kit adapts to 2" and 3" (ported) metallic pumps

*NOTE: Extra coils (assorted voltage ratings) are available for non-24 VDC or 120 VAC applications. Contact Aro Customer Service for information.
**NOTE: Valve Block available in aluminum only.

Important Note:

To achieve optimum pump performance, be sure to provide a balanced ("time-on" equals "time-off") input signal from your electronic device.

For Important Pump Displacement Information, see chart on page 20.

ARO®TRON
Pump Control Components

Mini-Batcher

NEW!

67161-2

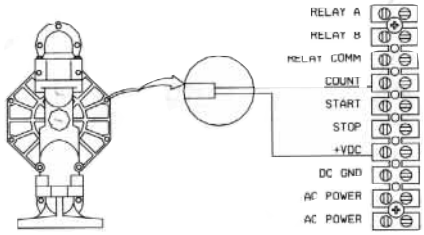
For simple batching operations, the ARO®TRON Mini-Batcher is the perfect choice. Featuring simple programming, "friendly" prompting screen, modular design and large "on-off" buttons, the Mini-Batcher is the fast, friendly, economical path to clean, consistant batching.

Specifications

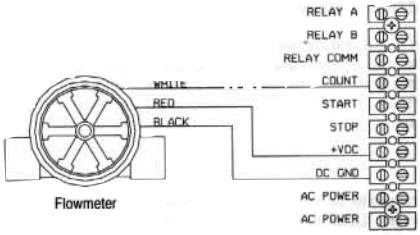
MODEL NUMBER:	67161-1	Standard
	67161-2	Front Panel Pushbuttons
INPUT POWER:		110 VAC @ 6.5 VA
	or	12 - 15 VDC @3.75W
OUTPUT POWER:		12 VDC @ 50 mA
INPUT LEVELS:	ON:	4 - 30 VDC
	OFF:	0 -1 VDC
RELAYS:		(2) Normally Open
		10 A @ 240 VAC
DISPLAY:		6 Digit, .55" LED
OPERATING TEMPERATURE:		32° - 130° F (0° - 54° C)
MAX HUMIDITY:		90% Noncondensing

Typical Input Applications

Diaphragm Pump With Cycle Counter

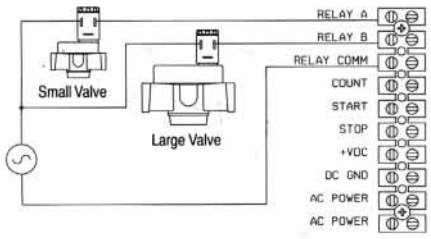


3-Wire Devices (Flowmeters, Etc.)

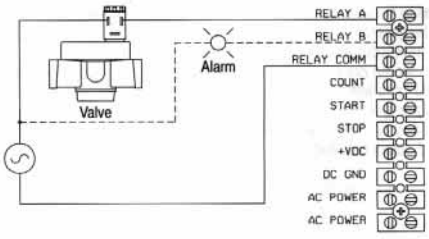


Typical Output Applications

2-Stage Flow



Standard Flow With Optional Alarm



Features

- Ideal for Simple Batching Operations.
- Easy to Program.
- Special "Lock-Out" Programming Prevents Unauthorized Tampering.
- Can Be Powered By 110 VAC or 10-15 VDC.
- Pre-Scale Feature Translates Input Signals Working Units, i.e. Ounces, Liters, Gallons.

For Important Pump Displacement Information, see chart on page 20.

U.L. Listed Fuel Transfer Pumps

These Aro Diaphragm Pumps have been designed specifically for dispensing petroleum-based fuel. These pumps meet UL-79 specification, code and are compatible with:

- **GASOLINE**
- **AVIATION FUEL**
- **DIESEL FUEL**
- **FUEL OIL**
- **KEROSENE**
- **UNLEADED FUEL**

Used for high-volume transfer, bulk-unloading or fueling applications. To meet UL-79 specification, a pressure relief valve opens and bleeds off excess pressure. The relief valve can be plumbed to return the bleed-off fuel to the storage container.

1-inch

Air Connectors shown are not included.

1-1/2 -inch

2-inch

Performance Specifications

	1-inch	1-1/2-inch	2-inch
RATIO:	1:1	1:1	1:1
MAXIMUM G.P.M. (Liters):	29 (110)	75 (284)	105 (284)
AIR INLET:	1/4-inch NPT(F)	1/2-inch NPT(F)	1/2-inch NPT(F)
PORT SIZE:	1-inch NPT(F)	1-1/2-inch NPT(F)	2-inch NPT(F)
MAX. OPERATING PRESSURE PSI (bar):	50 (3.4)	50 (3.4)	50 (3.4)
SUSPENDED SOLIDS MAX. DIA. IN. (mm):	1/8-inch (3.2)	1/4-inch (6.4)	1/4-inch (6.4)
WEIGHT - LBS. (Kg):	19 (8.6)	51 (23.1)	54 (24.5)

Dimensional Data

See pg. 12 for 1" Metallic Pump dimensional data. See pg. 14 for 1-1/2" Metallic Pump dimensional data. The dimensions for the 1-1/2" Metallic Pump are the same for the 2" U.L. Fuel Pump.

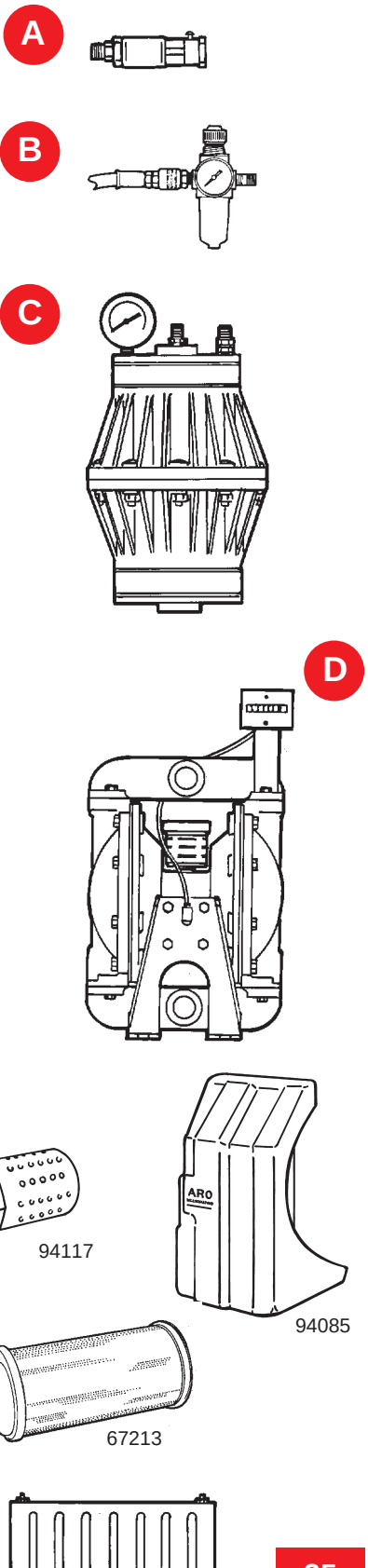
Model / Material Selection

MODEL	FLUID INLET/OUTLET PORT SIZE	SEAT	BALL	DIAPHRAGM
Aluminum Construction				
650709-C	1-inch NPT	Kynar® PVDF	Acetal	Nitrile
Unleaded 650717-C	1-inch NPT	Kynar PVDF	Acetal	Viton®
650710-C	1-1/2-inch NPT	Kynar PVDF	Acetal	Nitrile
Unleaded 650718-C	1-1/2-inch NPT	Kynar PVDF	Acetal	Viton
650711-C	2-inch NPT	Kynar PVDF	Acetal	Nitrile
Unleaded 650719-C	2-inch NPT	Kynar PVDF	Acetal	Viton

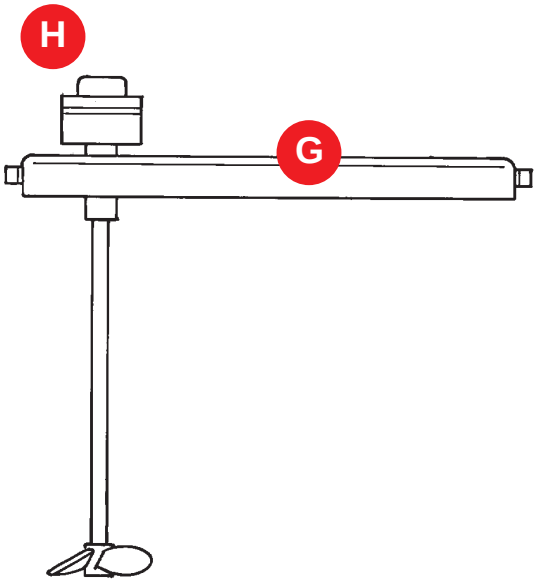
Viton Diaphragms are recommended for use with unleaded fuels.

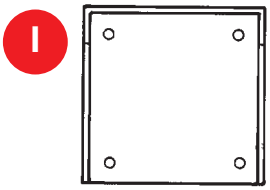
Typical Pump System

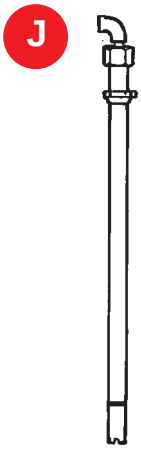
ITEM	DESCRIPTION	USED WITH	ORDER MODEL
A	**ARO-STOP® VALVE** - Pump overrun control shuts off air to pump when material container is empty or line is broken. Quick set and reset feature included.	1/2" & 1" Pumps 1-1/2" & 2" Pumps 3" Pumps	635040 23644-400 635043
B	**Air Line Connection Kit** - Kit includes Piggyback Filter/Regulator with gauge, pipe nipple, and 5-foot section of air hose.	1/4", 1/2" (12 SCFM Max Flow) 1/2", 1" 1-1/2" (Metallic), 1-1/2", 2" (Non-Met) 2" Met. (Ball & Flap) 3"	66073-1 66073-2 66084-1 66312 66109
C	**Shock Blocker™ Pulsation Dampener** - Patented dampener design permits either manual or automatic pulsation dampening with the same unit. Up to 97% pulsation reduction can be achieved. See page 28.	1/4" - 1" Ports (100 psi max.)	66700X-XXX See page 28
D	**Cycle Counter Kit** - Easy to install cycle counter records up to 999,999 cycles. Kit comes complete with all necessary hardware for instant pump installation. Excellent for fluid inventory, preventive maintenance, and fluid metering.	1/2", 1", 1-1/2" 2" and 3" Pumps (See Pages 20-23 for new ARO®Tron Pump Controls.)	 66975
E	**High Flow Pump Air Motor Mufflers** - Muffler helps reduce pump sound levels and assures ice-free operation. Model #94085 or #67213 is recommended in continuous duty operations. Model #94117 is used in intermittent duty operations.	2", 3" Metallic Pumps (All other pump sizes, muffler included standard.)	94085 (Cont. Duty) 94117 (Interm. Duty) 67213 (With Elbow)
NEW! F	**Screened Inlet Adapter Kits** - Carbon steel, E-Coated screen prevents unwanted solids from entering pump. Kit includes hardware for easy, quick attachment to pump.	1-1/2" Ports Aluminum Pump 2" Ports Aluminum Pump 3" Ports Aluminum Pump	67174-15 67174-20 67174-30

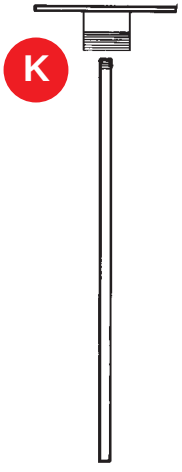


Pump System Accessories









ITEM	DESCRIPTION	USED WITH	ORDER MODEL
Pumping Accessories			
G	**Drum Covers** - Available in either carbon (CS) or stainless Steel (SS), durable drum covers will accommodate both diaphragm pump and agitator, where needed.	1/4" Pump 5-Gal. Cont. 1/2" Pump 5-Gal. Cont. 5-Gal. Cont.	 67055 (SS) 66815-1-(CS) 66971 (SS)
H	**Material Agitators** - Agitators available for both 5- and 55-gallon containers. Air-operated agitator motors generate between 500-1,000 RPM (5 gal. model), and 300-3,000 RPM (55 gal. model. Agitator shaft and propellers are constructed of corrosion-resistant 316 Stainless Steel.	5-Gallon Cont. 55-Gallon Cont.	651100 651103
I	**Wall Mount Brackets** - Sturdy wall mount brackets provide a convenient means of mounting pumps for centralized transfer operations. Mounts are constructed of heavy-gauge, coated steel and include mounting hardware.	1/4" Pump 1/2" Pump 1" Pump (Metallic Only) 1-1/2" Pump (Metallic Only) 1", 3;1 Pump	67054 76763 (doesn't include mounting hardware) 66100 62133 67142
J	**Siphon Tubes** - For use when pumping from a 55-gallon container, siphon tubes are available in plastic (PVC, PP, Teflon), carbon steel (CS), or 316 stainless steel (SS). 1-inch siphon tubes come with foot valve for positive priming. Both 1/2-inch and 1-inch models include bung adapters.	1/4" Pump 1/2" (Non-Met.) Pump (55 Gal. Cont.) 1" Pump (55 Gal. Cont.)	67059-1 (Teflon) , straight 67059-4 (PP), straight 67059-2 (PP), w/90° 67059-3 (Teflon), w/90° 61409(PVC) 90° NPT(F) 61412(PVC), straight NPT(M) 65109 (CS) NPT(F) 66568 (SS) NPT(F) 66779(PVC) NPT(F)
K	**Drum Pump Adapter Kit** - Easy to install adapter kit permits drum mounting of pump in minutes. Kit includes 304 stainless steel mounting plate and siphon tube. Mounting hardware included.	1" Pump For Bulk (275 Gal.) Tank use 1/4" Pump 1/2" (Non-Metallic and Metallic)	66779-2(PVC) NPT(F) 49"L 66779-3(PVC) NPT(F) 61"L 65031 (includes 67059-1) 65938

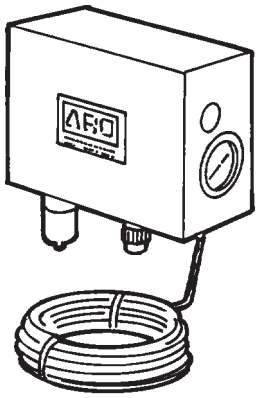
ITEM	DESCRIPTION	USED WITH	ORDER MODEL

Pumping Accessories

L **All Pneumatic Liquid Level Sensors** - This device senses the backpressure (59916-1 high level) or lack of backpressure (59916-2 low level) on the end of tubing that is located in tank or sump. The tubing is strategically placed at a desired level or levels. When an input occurs the pneumatic output signal from this device is used actuate an air valve. Contact ARO Customer Service for help in selecting proper air valve.

Any Style Pump — 59916-1, 59916-2

L



M **Intake Filters** - Filter assemblies strain unwanted particles and matter before they enter the pump. Filters attach directly to bottom of siphon tube.

1/2" Pump — 651830
1" Pump — 640039

M

Other Pumping Accessories

Pressure Relief Valve - Refief valve is preset to 125 psi (±10psi). To be used in systems where thermal expansion or excess backpressure can develop in the fluid lines. Valve should be installed in a piping tee located near the outlet of the pump. Tubing or hose will be required to return bleed-offto fluid container. Valve is 1/4-18(M) inlet/outlet threaded.

Any Pump — 93368-1

Grounding Strap - 25-foot grounding strap is used to ground pumps. Strap is 14-gage, heavy-duty sheathed wire and includes wire end attachments. Must be ordered separately.

Any Pump — 66885-1

Service Kits, Air Filter/Regulator Units

Complete Air Line Connection Kits available.
See item "B" on page 25.

SERVICE KITS			AIR KITS	
Pump Port Size	Air Valve Kit	Fluid Section Kit (Diaphragm Material)	Recommended Air Line Filter/Regulator Units	Air Line Kit
1/4"	637276	637313-PT (Teflon) 637313-PA (Santoprene)	129121-400	66073-1
1/2"	637141	637140-XX*	129121-400 P29221-610	66073-1 66073-2
1" Non-Metallic	637118-C	637161-XX*-C	P29221-610	66073-2
1" Metallic	637118-C	637119-XX*-C	P29221-610	66073-2
1-1/2" Non-Metallic	637118-C	637165-XX*	P29241-610	66084-1
1-1/2" Metallic	637118-C	637124-XX*	P29241-610	66084-1
2" Non-Metallic	637118-C	637165-XX*	P29241-610	66084-1
2" Metallic	637302	637309-XX*	P29241-610	66312
2" Flap	637302	637310-XX*	P29241-610	66312
3" Metallic	637302	637303-XX*	F25451-120 (Filter) 27354-000 (Regulator)	66109

*NOTE: To receive the correct ball and diaphragm materials - replace the XX with the last 2 digits of your pump model number.

Shock Blocker™ Pulsation Dampeners

For the reduction of unwanted material foaming, pulsation, splashing and hydraulic shock caused by fluctuations in pump outlet pressures.

667003-XXX
Polypropylene

667007-XXX
Pure Kynar

667006-XXX
Conductive Acetal

Air Tamer
66911-1

Mounting Pedestal
66108

Grounding Kit
66885-1

Features / Benefits

Up To 97% Pulsation Reduction
Gallon after gallon, the Shock Blocker reduces pulsation in your fluid system while supplying consistent, reliable performance – day after day.

Patented Modular Design
Shock Blocker vessels can be easily plumbed in series for improved pulse reduction

Field Upgradable, Manual-to-Automatic Air Adjust
No vessel disassembly required. Simply remove Shock Blocker's original precharge air valve and replace it with the patented **Air Tamer** automatic air adjust, and you're back on line in minutes with self-regulating pulsation control!

Works with Any 100 PSI Pump
Shock Blocker can be used with any style pump with 100 psi or less outlet pressure.

Matched Air Side/Fluid Side Materials
In the event of bladder failure, fluid material contact with the air side presents no threat to vessel integrity. An important feature if hazardous or caustic materials are being handled.

Model / Material Selection

MODEL	BODY MATERIAL	BLADDER MATERIAL	MODEL	BODY MATERIAL	BLADDER MATERIAL
667003-014	Polypropylene	Teflon	667006-014	Conductive Acetal	Teflon
667003-018	Polypropylene	Polyurethane	667007-014	Pure Kynar	Teflon
667003-019	Polypropylene	Hytrel	667007-019	Pure Kynar	Hytrel
667003-01B	Polypropylene	Santoprene	667007-01B	Pure Kynar	Santoprene

Shock Blocker Accessories

MODEL	DESCRIPTION
66911-1	**Air Tamer Automatic Air Adjust** - Replaces Shock Blocker's manual air adjust with automatic, self-regulating air pressure control. Conversion can be accomplished in minutes. Air Tamer features steel construction and Buna N seals.
66108	**Mounting Pedestal** - One mounting pedestal comes standard with the Shock Blocker. An extra #66108 is required for plumbing the Shock Blocker to 1-inch NPT (and larger) pipe.
66885-1	**Grounding Wire Kit** - For use with the Shock Blocker groundable models #667006-XXX. Kit includes clamp bracket, 25 feet of 14 gauge heavy-duty sheathed wire and wire end attachments.

1/2" PUMP % Reduction In Pulsation

Fluid Pressure PSI Back Pressure	1	2	3	4	5	10	12
20	94		81			70	65
40	92		83			70	
60	91		85				

Flow (GPM)

1" PUMP % Reduction In Pulsation

Fluid Pressure PSI Back Pressure	1	5	10	15	20	25	30
20	90	80	70				60
40	92		75			70	
60	85		80		75		
80	85			80			

Flow (GPM)

Compatibility with ARO Materials

Rank	Chemical Name	Carbon Steel	Hardened Carbon Steel	301/302/303/304 Stainless	316 Stainless	400 Stainless	400 Hardened Stainless	Aluminum	Polypropylene	PVDF Kynar	Acetal	Nitrile / Geolast®	EPR / Santoprene®	Neoprene	Nylon	Polyurethane	Teflon	Viton	Hytrel
35	Acetic Acid, Ethanoic Acid, Glacial Acetic Acid, Vinegar				•				•	•							•		•
43	Acetone, Propanoe	•	•	•	•	•	•	•	•				•		•		•		•
37	Acrylonitrile, Propenonitrile	•	•	•	•				•	•	•			•			•		
48	Adipic Acid, 1-, 6-Hexadioic Acid	•	•	•	•	•	•	•	•	•		•					•	•	
38	Aluminum Sulfate, Filter Aluminum								•	•		•	•	•			•	•	•
5	Ammonia, Ammonium Hydroxide			•	•	•	•		•	•	•	•	•	•	•	•	•	•	•
17	Ammonium Nitrate			•	•	•	•		•	•	•	•	•		•		•	•	
30	Ammonium Sulfate								•	•	•	•	•	•		•	•	•	•
19	Benzene	•	•	•	•	•	•	•			•				•		•	•	•
36	Butadiene, 1-, 3-Butadiene	•	•	•	•	•	•	•		•	•				•		•	•	
40	Calcium Chloride (salt substitute)								•	•		•	•	•		•	•	•	•
7	Calcium Hydroxide, Milk of Lime			•	•	•	•		•	•		•	•				•	•	•
6	Calcium Oxide, Lime, Quicklime	•	•	•	•			•	•	•		•	•	•			•		
33	Carbon Black																		
12	Chlorine									•							•	•	
32	Cumene, Isopropylbenzene										•						•	•	
39	Cyclohexane, Hexahydrobenzene									•						•	•	•	•
20	Ethyl Benzene	•	•	•	•	•	•	•					•		•		•	•	
18	Ethylene Dichloride (EDC)			•	•					•					•		•	•	
8	Ethylene, Ethene	•	•	•	•	•	•	•				•					•	•	
29	Ethylene Glycol, Glycol, Antifreeze	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•
25	Ethylene Oxide			•	•	•	•	•		•	•				•		•		
27	Formaldehyde, methanal	•	•	•	•	•	•	•	•	•				•			•		•
26	Hydrochloric Acid, Muriatic Acid Aqueous Hydrogen Chloride								•	•			•				•	•	
3	Hydrogen Gas			•	•	•	•	•	•	•		•	•	•		•	•	•	•
50	Isopropyl Alcohol, Rubbing Alcohol, Isopropanol. 2-propanol	•	•	•	•			•	•	•	•		•		•		•	•	•
47	Methyl-tert-butyl ether (MTBE)																		
14	Nitric Acid (called fuming 80%)									•							•	•	
4	Nitrogen Gas								•	•	•	•	•	•		•	•	•	
9	Oxygen Gas									•							•		•
34	Phenol, Carbolic Acid	•	•	•	•			•		•							•	•	
11	Phosphoric Acid, Orthophosphoric Acid								•	•						•	•	•	
31	Potassium Carbonate, Potassium Sulfate, Potassium Hydroxide, Potassium Nitrate, Potassium Chloride, Potassium Salts & Oxides									•	•	•		•	•	•	•	•	
42	Propylene Oxide			•	•	•	•			•							•		
15	Propylene, Propene	•	•	•	•	•	•	•			•						•	•	
13	Sodium Carbonate, Soda Ash							•	•	•		•	•	•	•	•	•	•	•
10	Sodium Hydroxide, Caustic Soda								•	•			•				•		•
46	Sodium Silicate, Silica Gel								•	•	•	•	•	•	•	•	•	•	
44	Sodium Sulfate, Salt Cake, Glaubers Salt			•	•					•	•	•	•	•	•		•	•	
49	Sodium Tripolyphosphate (STPP), Sodium Triphosphate			•	•				•	•	•	•			•		•		
21	Styrene, Vinyl Benzene, Phenylethene	•	•	•	•	•	•	•	•	•	•				•		•	•	
2	Sulfuric Acid			•	•	•	•		•	•							•	•	
24	Teraephthalic Acid (TA, TPA, PTA), Dimethylterephthalate (DMT)									•							•		
45	Titanium Dioxide (white pigment)																		
28	Toluene, Toluol	•	•	•	•	•	•	•	•	•					•		•	•	•
16	Urea								•	•							•	•	
41	Vinyl Acetate									•							•		
22	Vinyl Chloride, (Chloroethylene)				•	•	•			•								•	•
1	Water			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
23	Xylene, Xylols (ortho, meta, para)							•		•	•				•		•	•	•

Santoprene® is a registered trademark of Monsanto Company licensed to Advanced Elastomer Systems, L.P.
Geolast® is a registered trademark of Advanced Elastomer Systems.

Viscosity Conversion Chart, Pump Airborne Noise Emissions

ARO Diaphragm Pumps

The pump sound pressure levels published below have been updated to an Equivalent Continuous Sound Level (L_{Aeq}) to meet the intent of ANSI S1.13-1971. CAGI-PNEUROP S5.1 using four microphone locations.

PUMP PORT SIZE (INCHES)	AIR OPERATING PRESSURE (PSI)	CYCLES/ MIN	SOUND PRESSURE (L_{Aeq})
Diaphragm Pumps			
1/4	70	60	59.8 db(A)
1/2	70	60	71.1 db(A)
1	70	60	64.5 db(A)
1-1/2	70	60	77.7 db(A)
2	70	60	*85.0 db(A)
3	70	50	*83.0 db(A)
3:1	70	60	84.5 db(A)

* Tested with 94085 Muffler

Centi Poise	Poise	Saybolt Universal (SSU)	Saybolt Furol	Ford No. 3	Ford No. 4	Zahn No. 1	Zahn No. 2	Zahn No. 3
1	.01	31						
2	.02	34						
4	.04	38						
7	.07	47		8				
10	.10	60		9	5	30	16	
15	.15	80	13	10	8	34	17	
20	.20	100	15	12	10	37	18	
25	.24	130	17	15	12	41	19	
30	.30	160	19	19	14	44	20	
40	.40	210	24	25	18	52	22	
50	.50	260	29	29	22	60	24	
60	.60	320	34	33	25	68	27	
70	.70	370	39	36	28	72	30	
80	.80	430	42	41	31	81	34	
90	.90	480	49	45	32	88	37	10
100	1.0	530	54	50	34		41	12
120	1.2	580	59	58	41		49	14
140	1.4	690	70	66	45		58	16
160	1.6	790	79	72	50		66	18
180	1.8	900	91	81	54		74	20
200	2.0	1000	100	90	58		82	23
220	2.2	1100	110	98	62		88	25
240	2.4	1200	120	106	65			27
260	2.6	1280	128	115	68			30
280	2.8	1380	138	122	70			32
300	3.0	1475	148	130	74			34
320	3.2	1530	153	136	89			36
340	3.4	1630	163	142	95			39
360	3.6	1730	173	150	100			41
380	3.8	1850	185	160	106			43
400	4.0	1950	195	170	112			46
420	4.2	2050	205	180	118			48
440	4.4	2160	216	188	124			50
460	4.6	2270	227	200	130			52
480	4.8	2380	238	210	137			54
500	5.0	2480	248	218	143			58
550	5.5	2660	266	230	153			64
600	6.0	2900	290	250	170			68
700	7.0	3380	338	295	194			76
800	8.0	3880	388	340	223			
900	9.0	4300	430	365	247			
1000	10.0	4600	460	390	264			
1100	11	5200	520	445	299			
1200	12	5620	562	480	323			
1300	13	6100	610	520	350			
1400	14	6480	648	550	372			
1500	15	7000	700	595	400			
1600	16	7500	750	635	430			
1700	17	8000	800	680	460			
1800	18	8500	850	720	490			
1900	19	9000	900	760	520			
2000	20	9400	940	800	540			
2100	21	9850	985	835	565			
2200	22	10300	1030	875	592			
2300	23	10750	1075	910	617			
2400	24	11200	1120	950	645			
2500	25	11600	1160	985	676			
3000	30	14500	1450	1230	833			
3500	35	16500	1650	1400	950			
4000	40	18500	1850	1570	1060			
4500	45	21000	2100	1780	1175			
5000	50	23500	2350		1350			
5500	55	26000	2600		1495			
6000	60	28000	2800		1605			
6500	65	30000	3000		1720			
7000	70	32500	3250		1870			
7500	75	35000	3500		2010			
8000	80	37000	3700		2120			
8500	85	39500	3950		2270			
9000	90	41000	4100		2360			
9500	95	43000	4350		2470			
10000	100	46500	4650		2670			
15000	150	69400	6940					
20000	200	92500	9250					
30000	300	138600	13860					
40000	400	185000	18500					
50000	500	231000	23100					
60000	600	277500	27750					
70000	700	323500	32350					
80000	800	370000	37000					
90000	900	415500	41550					
100000	1000	462000	46200					
125000	1250	578000	57800					
150000	1500	694000	69400					
175000	1750	810000	81000					
200000	2000	925000	92500					

Material Service Guidelines

ARO Diaphragm Pumps

		Scale 1 - 5	(5 is best)	
	Temp Limit F (C)	**Chemical**	**Abrasion**	**Flex Life***
Acetal	180 (91)	3	3	-
Aluminum	-	1	3	-
Buna N (Nitrile)	180 (82)	2	2	3
Cast Iron	-	3	4	-
EDPM	280 (138)	3	2	3
Geolast (Nitrile Based)	180 (82)	2	2	3
Hytrel	150 (66)	2	4	4
Kynar (PVDF)	200 (107)	5	2	-
Neoprene	200 (93)	2	2	3
Polypropylene	150 (79)	4	2	-
Polyurethane	150 (66)	1	4	4
Santoprene	225 (107)	4	4	5
Stainless Steel (300 Series)	-	4	4	-
Stainless Steel (400 Series)	-	3	5	-
Teflon	220 (104)	5	2	4
Viton	220 (104)	4	2	1

***** Applies to diaphragms only.

*** Note: These are guidelines only. Consult the manufacturer of pumped fluid for exact compatibility and temperature requirements. ***

Warranty Information

5-Year Diaphragm Pump Warranty

All ARO Diaphragm Pumps are backed up by our famous 5-year warranty, as a measure of the confidence we place in the quality of these products. A confidence that you can share.

DIAPHRAGM PUMP FIVE-YEAR WARRANTY

The Ingersoll-Rand Fluid Products ("IR-FP") warrants to the original use purchaser of IR-FP manufactured diaphragm pumps that IR-FP will repair or replace, free of charges, including return shipping costs within the Continental United States of America, any such product which under normal use and service proves defective in material or workmanship, as determined by IR-FP Inspection, within FIVE YEARS from date of shipment from IR-FP, provided the claimed defective product, or part thereof, is promptly returned to the IR-FP factory or IR-FP authorized warranty repair center with transportation prepaid.

This warranty does not cover failure of parts or components due to normal wear or damage, which in the judgment of IR-FP, arises from misuse, abrasion, corrosion, negligence, accident, substitution of non-IR-FP parts, faulty installation or tampering.

If IR-FP Inspection discloses no defect in material or workmanship, repair or replacement and return will be made at customary charges.

This warranty covers IR-FP manufactured diaphragm pumps shipped on or after July 4, 1988.

Equipment not covered by IR-FP warranty: accessories or components of equipment sold by IR-FP that are not manufactured by IR-FP (such as switches, hoses, gasoline engines, etc.) are subject to the warranty, if any, of their manufacturer. IR-FP will provide the purchaser with reasonable assistance in making such claims.

The foregoing warranty supersedes, voids and is in lieu of all or any other warranties, express or implied, and no warranty or merchantability or fitness for particular purpose is intended or made. IR-FP's sole obligation and the original use purchaser's sole remedy is as stated above and in no event shall IR-FP be liable for any special, direct, indirect, incidental, consequential or other damages, or expenses of any nature including, without limitation, loss of profits or production time incurred by the original use purchaser or any other party.

Aro's Worldwide Commitment to Customer Service

NORTH AMERICA

United States
Ingersoll-Rand Fluid Products
P.O. Box 151
One Aro Center
Bryan, Ohio 43506
PHONE: 1 (419) 636-4242
FAX: 1 (419) 633-1674

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Production Equipment Group
Ingersoll-Rand Canada Inc.
51 Worcester Road
Rexdale, Ontario M9W 4K2
PHONE: 1 (416) 213-4500
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LATIN AMERICA

Latin America Headquarters
Ingersoll-Rand PEG Aro Division
730 N.W. 107 Avenue, Suite 300
Miami, FL 33172-3107
PHONE: (305) 222-0812/559-0500
FAX: (305) 222-0864/559-7505

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FAX: (55-11) 866-4985

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Las Condes
Santiago, Chile
PHONE: (562) 339-7939
FAX: (562) 339-7940

Mexico
Ingersoll-Rand de Mexico S.A. de C.V.
Blvd. Centro Industrial #11
Fracc. Industrial Puente de Vigas 54090
Tianepantia, Edo. De Mexico, Mexico
PHONE: (525) 565-3061
FAX: (525) 390-4031

LATIN AMERICA (Cont.)

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Ingersoll-Rand Company
Centro Profesional Eurobuilding
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