

AIR OPERATED PUMPS FOR OTHER SERVICE FLUIDS

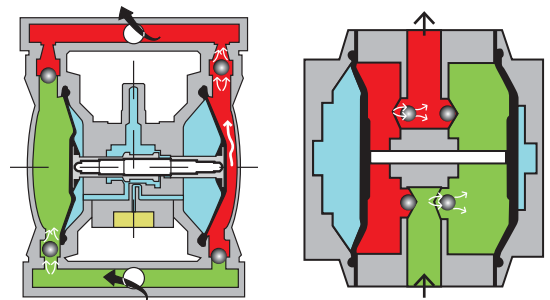
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AIR OPERATED DOUBLE DIAPHRAGM PUMP

directflo®

Air operated double diaphragm pumps are air-powered, reciprocating positive displacement pumps with two pumping chambers. Two diaphragms, centrally located in the chambers, separate the compressed air (dry side) from the fluid being pumped (wet side). A shaft transmits the reciprocating motion of one diaphragm to the other. A valve (air motor) alternatively distributes the air from one chamber to the other; thus a reciprocating movement of the diaphragms is created. With each stroke fluid is discharged by one of the diaphragms whilst the opposite diaphragms sucks new fluid into the expanding chamber. Check valves, two on the discharge side and two on the suction side, control and direct the fluid flow.



■ Compressed Air ■ Fluid out ■ Fluid in

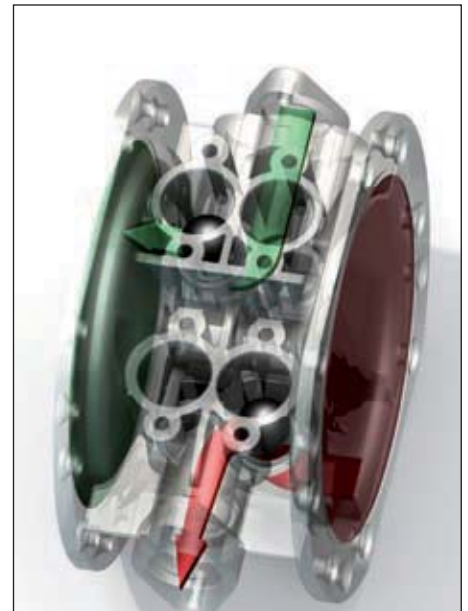
MAIN DirectFlo® PUMP FEATURES

In most conventional design diaphragm pumps, the wet side of each diaphragm is on the outside and the dry side is on the inside. This means that manifolds, which create added friction and pressure loss, are required for collecting the fluid into the pump and for its delivery. Traditional diaphragm pump designs result in negative consequences such as high air consumption, highly pulsating flow, complicated maintenance, etc. DirectFlo® pumps work differently. The pumped fluid follows a straight and direct flow path, through the interior of the pump body. This way, DirectFlo® pumps avoid using manifolds. As consequence of their innovative design, DirectFlo® pump present the following advantages when compared with traditional external flow pumps:

- Compact design.
- Reduced air consumption.
- Reduced flow pulsation.
- Superior performance against back pressure.
- Improved suction capacity.
- Increased diaphragm and shaft life.
- Reduced number of components.
- Lubricant free air motor.
- Extremely easy maintenance.
- In-line installation.

High value innovations for the market

DirectFlo® pumps are designed to be used as both transfer and system pumps. As system pumps, they can work on demand, for example starting immediately once a delivery valve is opened and stopping once it is closed. In the stalled condition the pump has no air leaks, a common issue with conventional diaphragm pumps.



In addition to the central ball-valves fluid path technique DirectFlo® pumps feature two significant innovations: the Flexible Diaphragm Suspension (FDS) and the Frictionless Pivoting Air Valve (FPV).

FLEXIBLE DIAPHRAGM SUSPENSION

One of the innovations behind the pump's smooth operation is the patented FDS technology (Flexible Diaphragm Suspension). The diaphragms are not fixed to the shaft and they can move independently of each other and work with soft, overlapping movements. This minimizes pulsations, increases time between services and enables a central flow.

Flexible Diaphragm Suspension reduces fatigue on the diaphragms, contributing to extend their service life. Also, shaft life is significantly increased especially with heavy suction delivery loads, since the diaphragm only pushes the shaft and does not transmit any non-axial loads.

FRICTIONLESS PIVOTING AIR VALVE

The FDS principle is complemented with the use of short stroke diaphragms that reciprocate very quickly thanks to a unique and patented pivoting air mechanism concept. Short strokes dramatically reduces the fatigue on the diaphragms and this contributes to extend their life. A traditional sliding air valve could not be used as the friction in this kind of air valves is too high to allow the extremely fast reversing action required. Therefore a new friction free air valve, the Frictionless Pivoting Air Valve, was developed.

This air valve is the heart of the drive system and ensures very high operational reliability. The air motor, including the power valve module, the end of stroke signal valve sensors and the castings, is self-cleaning and withstands oily, dry, humid or dirty compressed air.

This patented pivot type air valve switches faster than any other diaphragm pump air valve. Switching time is about 3 to 4 milliseconds, whilst a conventional air valve requires at least 20 times longer switching time.

SIMPLE RELIABILITY, REDUCED TO THE MAX

DirectFlo® pumps are extremely simple. The number of internal components is very small, resulting in a very reliable pump with minimum maintenance requirements. Thanks to its central flow design with no manifolds, the pump can be fully serviced without the need to dismount it from the fluid distribution line. Thanks to its simplicity, regular service and maintenance (air motor service, cleaning or replacing valves, replacing worn diaphragms, etc.) can be performed faster and without errors even by untrained personnel.

DIRECTFLO® PUMP INSTALLATION

Like any other air operated pump, DirectFlo® diaphragm pumps should be installed appropriately to ensure a long and dependable operation life.

**Air supply**

Compressed air should be clean and dry. The use of a combined air filter and pressure regulator (1) or an air pressure regulator is recommended. Always install an air shut-off valve (2) for isolating the pump for eventual maintenance purposes. Always use a flexible hose for connecting the pump to the air supply with a quick air coupler at the hose end. At the pump air inlet always fasten an air nipple.

Suction side

DirectFlo® pumps can be installed flooded, submerged and with negative suction head. When the pump is installed submerged, the air outlet must be vented outside the fluid. Use the shortest possible suction line. Never exceed pump maximum suction head. Use the suction hose or tube with the largest possible diameter. When using a suction tube, always use a hose (3) to connect the tube to the pump fluid inlet. Install a shut-off valve (4) for isolating the pump from the suction line for eventual maintenance purposes.

Delivery side

Like air operated piston pumps, DirectFlo® pumps stall against back pressure. The pump operation can be controlled by simply opening and closing the fluid dispensing valve. When the pump is installed in fluid distribution systems, please observe the following recommendations: Always use a flexible hose for connecting the pump outlet to the fluid distribution line (5). Always install a shut off valve close to the pump outlet to isolate it for eventual to instale it maintenance purposes .

Pump control

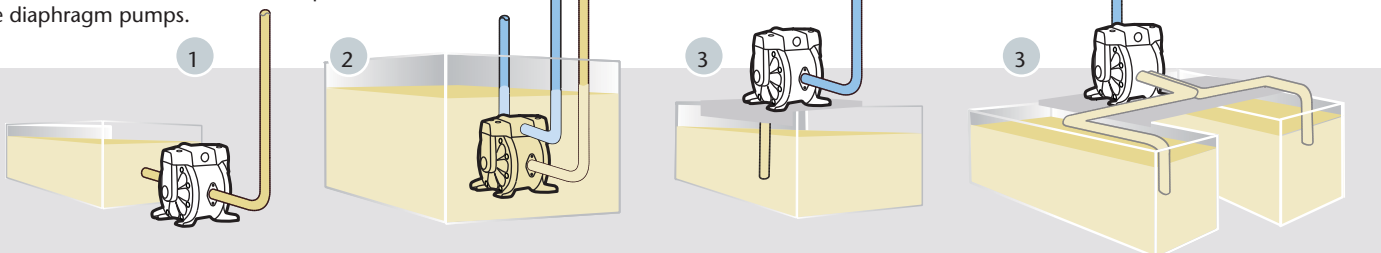
The pump can be controlled using the Advanced Monitoring, Tank Management or Tank Alert Systems. When connected to an air solenoid valve in the air supply, the Tank Management or the Tank Alert System (6) can prevent the pump from running dry as the system can be programmed to close the solenoid valve once the tank level has reached a minimum value. This way pump life can be increased and there is no possibility of air entering into the fluid line. The Advanced Monitoring System (7) can be used as a powerful batch and dosing system. It offers multiple control options and helps to keep deliveries under control. Through the IFDM module, the system can work with a variety of meters and solenoid valves compatible with the fluid used. Please refer to pages 63 to 67 for more information about monitoring and control systems.

PUMP MOUNTING ACCESSORIES

Please refer to pages 23 and 24 for installation accessories. Check material compatibility of suction accessories before using them.

360 100 Pump bracket

Pump bracket for DF50 and DF100 air operated double diaphragm pumps.



- 1 Flooded mounting
- 2 Submerged mounting
- 3 Negative suction head mounting

AIR OPERATED DIAPHRAGM PUMPS

DF50 METALLIC PUMPS

552 010

For fluid transfer and distribution systems. 50 l/min., 14 US gpm 1/2" fluid port.
Very robust construction, the pump is fully enclosed in an aluminum shield.

MODELS AND APPLICATIONS

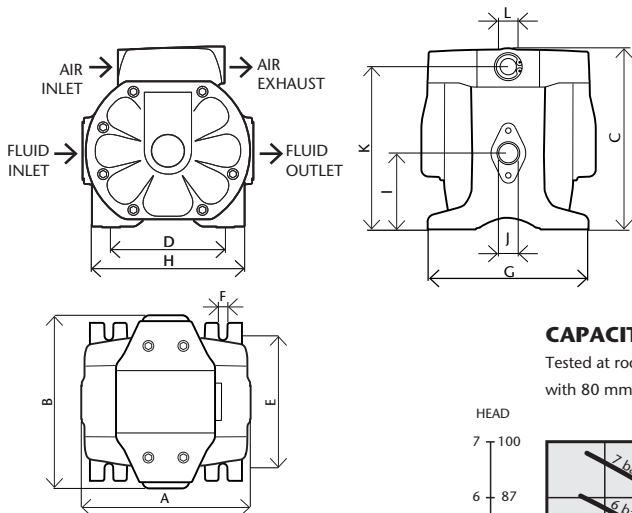
APPLICATION	WETTED MATERIAL	CHECK BALLS	DIAPHRAGMS	PART No.
Lubricants, waste oil, antifreeze, water.	Aluminium	NBR	Hytrel®	552 010
Lubricants, waste oil, antifreeze, water, windshield wash, brake fluid.	Nickel coated aluminium	Acetal	Hytrel®	552 011

TECHNICAL DATA

Pressure ratio	1:1
Maximum free delivery (1)	50 l/min. (14 US gpm)
Delivery per stroke aprox. (1)	0.1 litres (0.026 US gallons)
Air pressure operating range	3 to 7 bar (45 to 100 psi)
Solids in suspension max size	3 mm (1/8")
Max dry suction head (1)	6 m (20')
Max wet suction head (1)	8 m (26')
Weight	3.5 Kg (9.4 lb)
Fluid inlet	1/2" BSP (F) and flange
Fluid outlet	1/2" BSP (F) and flange
Air inlet	3/8" BSP (F)
Wetted part materials	See Models and Applications



(1) Data measured with water, air inlet pressure 7 bar, 20 °C.

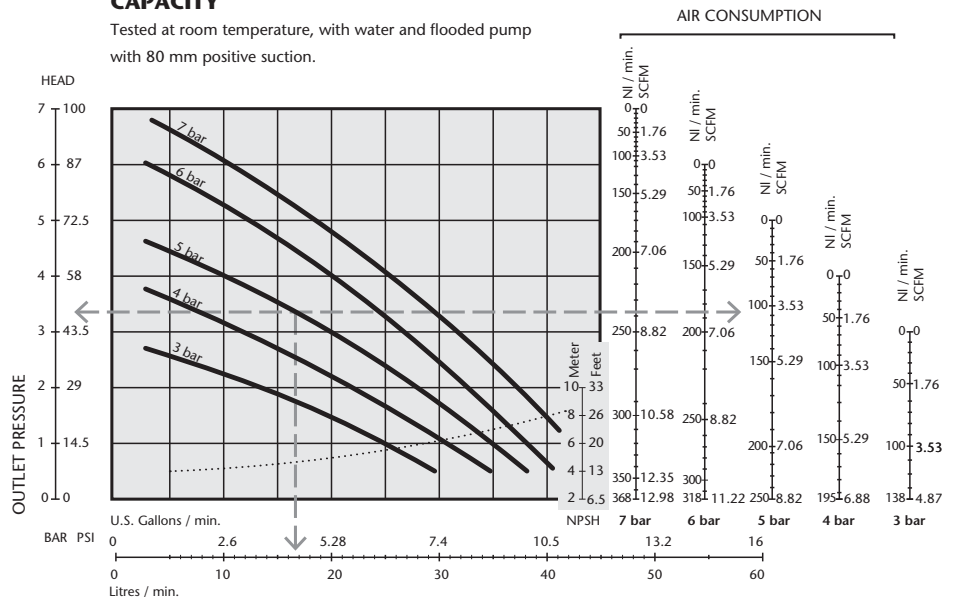


DIMENSIONS (mm)

A	B	C	D	E	F
156	160	167	105	122	8
G	H	I	J	K	L
146	140	70	1/2" (F)	150	3/8" (F)

CAPACITY

Tested at room temperature, with water and flooded pump with 80 mm positive suction.



552 021 - 552 026

DF50 MIXING PUMPS

Metallic and non-metallic pumps for 1:1 mixing of fluids (water/antifreeze, water/windshield washer fluid). 50% proportioning of each fluid is fixed and can not be changed. Very robust construction, the pump is fully enclosed in a shield and has corrosion proof wetted materials.

50 l/min. - 14 US gpm; 2 x 3/8" fluid inlet and 1/2" fluid outlet ports.

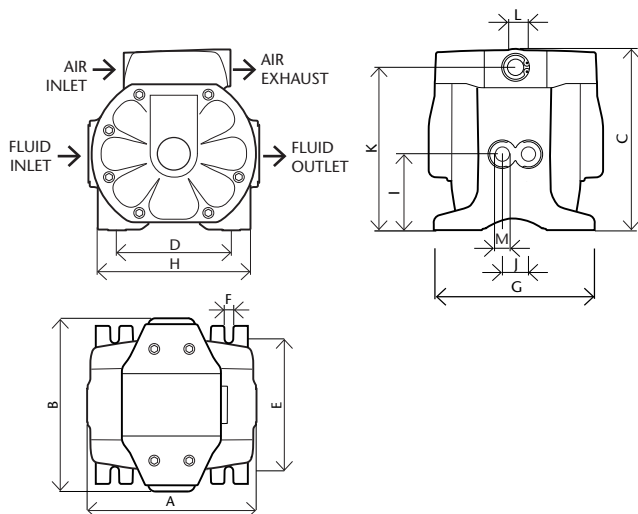


MODELS AND APPLICATIONS

APPLICATION	WETTED MATERIAL	CHECK BALLS	DIAPHRAGMS	PART No.
1:1 solutions of water/antifreeze, windshield wash/water.	Nickel coated aluminum	Acetal	Hytrel®	552 021
1:1 solutions of water/antifreeze, windshield wash/water.	Acetal	Acetal	Hytrel®	552 026

TECHNICAL DATA

Pressure ratio	1:1
Maximum free delivery	50 l/min. (14 US gpm)
Delivery per stroke	0.1 litres (0.026 US gallons)
Air pressure operating range	3 to 7 bar (45 to 100 psi)
Solids in suspension max size	3 mm (1/8")
Max dry suction head	6 m (20')
Max wet suction head	8 m (26')
Weight	3.5 Kg (9.4 lb)
Fluid inlet	2 x 3/8" BSP
Fluid outlet	1/2" BSP and flange
Air inlet	3/8" BSP
Wetted part materials	See Models and Applications



DIMENSIONS (mm)

A	B	C	D	E	F	
156	160	167	105	122	8	
G	H	I	J	K	L	M
146	140	70	24	150	3/8"	3/8"

Pump capacity curve same as DF50 metallic (PN 552 021) and non metallic (PN 552 026) pumps.

AIR OPERATED DIAPHRAGM PUMPS

DF50 NON METALLIC PUMPS

552 016

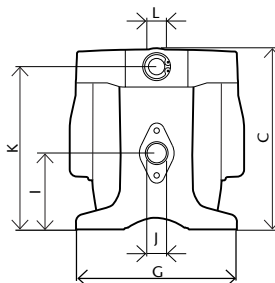
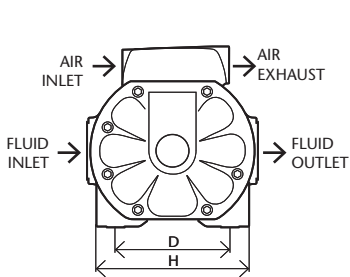
For fluid transfer and distribution systems.
Very robust construction. The pump is fully enclosed in a shield and has non-metallic wetted parts.

MODELS AND APPLICATIONS

APPLICATION	WETTED MATERIAL	CHECK BALLS	DIAPHRAGMS	PART No.
Lubricants, waste oil, antifreeze, transmission fluid, windshield wash, solvents	Acetal	Acetal	Hytrel®	552 016
Lubricants, waste oil, antifreeze, transmission fluid, windshield wash, detergents	Polypropylene	Polypropylene	Hytrel®	552 015
AdBlue (DEF)	Acetal	Acetal	Teflon	552 014

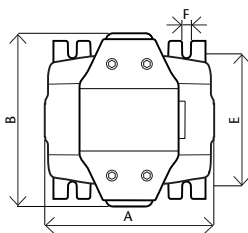
TECHNICAL DATA

Pressure ratio	1:1
Maximum free delivery	50 l/min. (14 US gpm)
Delivery per stroke	0.1 l (0.026 US gallons)
Air pressure operating range	3 to 7 bar (45 to 100 psi)
Solids in suspension max size	3 mm (1/8")
Max dry suction head	6 m (20')
Max wet suction head	8 m (26')
Weight	3.5 Kg (9.4 lb)
Fluid inlet	1/2" BSP (F) and flange
Fluid outlet	1/2" BSP (F) and flange
Air inlet	3/8" BSP (F)
Wetted part materials	See Models and Applications



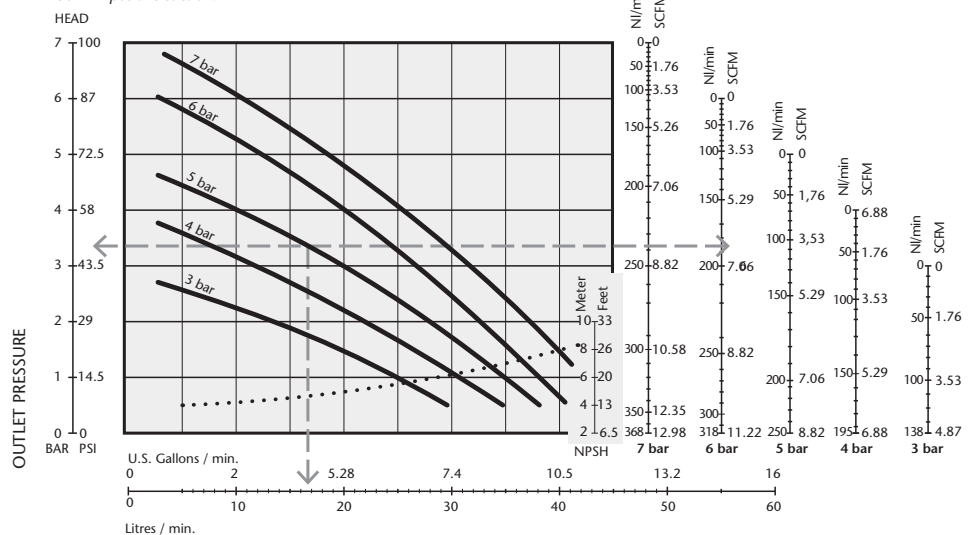
DIMENSIONS (mm)

A	B	C	D	E	F
156	160	167	105	122	8
G	H	I	J	K	L
146	140	70	1/2"	150	3/8"



CAPACITY

Tested at room temperature, with water and flooded pump with 80 mm positive suction.



For fluid transfer, evacuation and distribution systems. 100 l/min. - 28 US gpm 1" fluid port.
Very robust construction, the pump is fully enclosed in an aluminum shield.

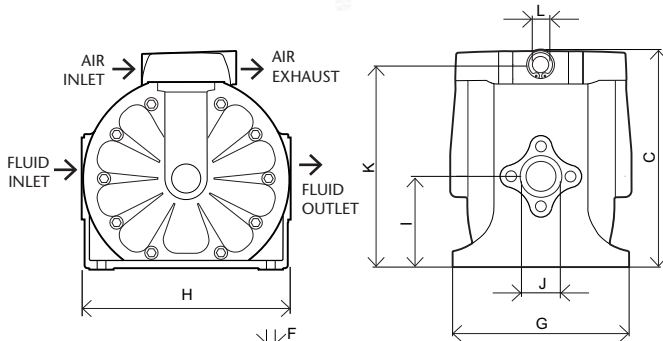
MODELS AND APPLICATIONS

APPLICATION	WETTED MATERIAL	CHECK BALLS	DIAPHRAGMS	PART No.
Lubricants, waste oil, antifreeze, transmission fluid, water	Aluminium	Hytrel®	Hytrel®	551 010



TECHNICAL DATA

Pressure Ratio	1:1
Maximum free delivery	100 l/min. (28 US gpm)
Delivery per stroke	0.35 l (0.09 US gallons)
Air pressure operating range	3 to 7 bar (45 to 100 psi)
Solids in suspension max size	4 mm (3/16")
Max dry suction head	4.5 m (15')
Max wet suction head	7 m (23')
Weight	7.2 Kg (19.3 lb)
Fluid inlet	1" BSP and flange
Fluid outlet	1" BSP and flange
Air inlet	3/8" BSP
Wetted part materials	See Models and Applications



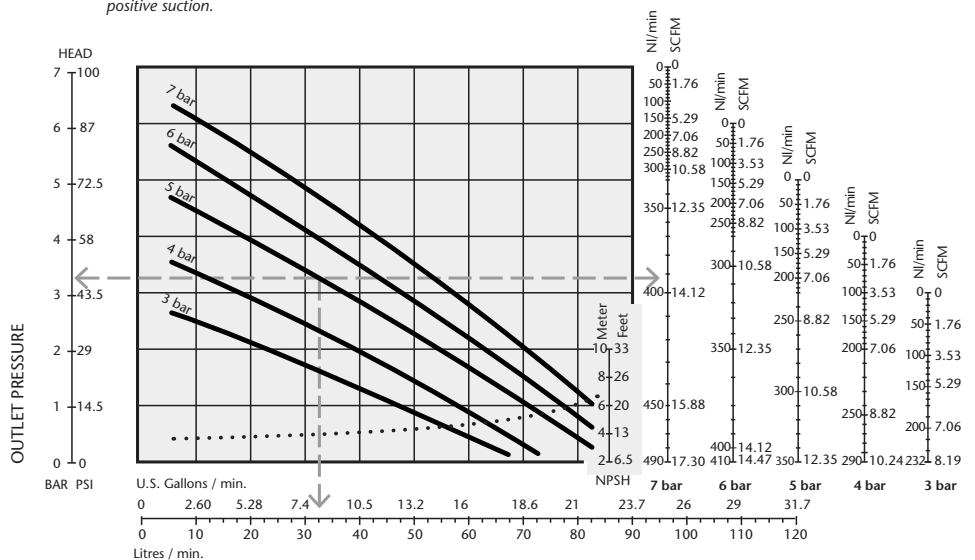
DIMENSIONS (mm)

A	B	C	D	E	F
216	189	227	175	154	9
G	H	I	J	K	L
184	210	94.5	1"	210	3/8"

CAPACITY

Tested at room temperature, with water and flooded pump with 80 mm positive suction.

AIR CONSUMPTION



AIR OPERATED PISTON PUMP FOR OTHER FLUIDS AND SUCTION PUMP
PUMPMASTER 1 FLUID TRANSFER PUMP

330 100

Small but very versatile air operated transfer pump compatible with a wide range of slightly corrosive fluids such as detergents, windshield wash, light inks, water based paint, ink and varnish, etc. Includes air needle valve at the air inlet for adjusting the pump speed. Mounting thread 3/4" BSP (M).

TECHNICAL DATA

PART No.	330 100
Pressure ratio	1:1
Air pressure operating range	2 - 8 bar (30 - 115 psi)
Air consumption (1)	240 NI/min. - (8.5 cfm)
Maximum fluid outlet pressure	8 bar - (115 psi)
Air motor piston diameter	36 mm (1 1/2")
Air motor effective diameter	20 mm (0.8 ")
Air motor piston stroke	80 mm (3")
Number of cycles per litre	10,5 (40 cycles per gallon)
Maximum free flow delivery (2)	15 l/min. (4 US gpm)
Air inlet	1/4" BSP (F)
Fluid inlet	3/8" BSP (F) and 1/2" hose adaptor
Fluid outlet	3/8" BSP (M)
Wetted and seals materials	Aluminium / stainless steel / chromium steel / PTFE / Viton
Noise level (3)	86 dB


PUMPMASTER 2 SUCTION PUMP

351 121

1:1 pressure ratio, double acting air operated pump for non-corrosive liquids, waste oil, etc. For wall, floor or drum trolley installation. This special pump is designed to create maximum vacuum and will not race when there is no liquid in the suction side. Recommended when you cannot control the pumping process or when using suction wands.

TECHNICAL DATA

PART No.	351 121
Pressure ratio	1:1
Air pressure operating range	3 - 10 bar (42 - 140 psi)
Air consumption (1)	335 NI/min. - (11.8 cfm)
Maximum fluid outlet pressure	10 bar - (140 psi)
Air motor piston diameter	51 mm (2")
Air motor effective diameter	35 mm (1.4")
Air motor piston stroke	75 mm (3")
Number of cycles per litre	7.4 (28 US cpg)
Maximum free flow delivery (4)	20 l/min. (5.3 US gpm)
Air inlet	1/4" BSP (F)
Fluid inlet	1" BSP (F)
Fluid outlet	3/4" BSP (F)
Wetted and seals materials	Nikel coated aluminum / stainless steel / acetal / NBR / polyurethane
Noise level (3)	91.5 dB



(1) Maximum air consumption with 7 bar air inlet pressure and free delivery.

(2) Free delivery at 7 bar air inlet pressure, using water. Continuous duty flow rate: 6.5 l/min. (1.7 US gpm).

(3) Maximum noise level measured 1 m from the pump, 7 bar air pressure and free delivery

(4) Free delivery at 7 bar air inlet pressure, using SAE 20 oil at 20 °C room temperature.

601 202

PUMPMASTER 2/1:1 PRESSURE RATIO NICKEL COATED LIQUID PUMP

**PUMPMASTER 2 Liquid pump 1:1 pressure ratio nickel coated pump**

1:1 pressure ratio PUMPMASTER 2 pump with corrosion protected wetted parts. It can be used with all types of lubricants and glycol or windshield washer water based solutions.

TECHNICAL DATA

PART No.	601 202
Pressure ratio	1:1
Air pressure operating range	3 - 10 bar (42 - 140 psi)
Air consumption (1)	335 NI/min. - (11.8 cfm)
Maximum fluid outlet pressure	10 bar - (140 psi)
Air motor piston diameter	51 mm (2")
Air motor effective diameter	35 mm (1.4 ")
Air motor piston stroke	75 mm (3")
Number of cycles per litre	7.4 (28 cycles per US gallon)
Maximum free flow delivery (2)	55 l/min. (14.53 US gpm)
Air inlet	1/4" BSP (F)
Fluid inlet	1" BSP (F)
Fluid outlet	3/4" BSP (F)
Wetted and seals materials	Nickel coated aluminum / steel / stainless steel / acetal / polyurethane
Noise level (3)	91.5 dB

Accessories:

331 110.002 PVC suction tube for 220 litre drums.

331 120 - 333 120

PUMPMASTER 2 AND PUMPMASTER 4 STAINLESS STEEL PISTON PUMPS



PUMPMASTER 2 and PUMPMASTER 4 air motors with AISI 316 stainless steel divorced pumps. Pumps can be used with a wide variety of fluids such as paint solvents, cleaning fluids, anti-freeze and wind shield washer fluids, detergents, anticorrosion fluids, light inks, etc.

TECHNICAL DATA

PART No.	331 120	333 120
Pressure ratio	1:1	3:1
Air pressure operating range	3 - 10 bar	3 - 10 bar
Air consumption (1)	195 NI/min. (6.86 cfm)	720 NI/min. (25.36 cfm)
Maximum fluid outlet pressure	10 bar (140 psi)	30 bar (420 psi)
Air motor piston diameter	51 mm (2")	88 mm (3.5")
Air motor effective diameter	35 mm (1.4")	60 mm (2.4")
Air motor piston stroke	75 mm (3")	100 mm (4")
Number of cycles per litre	4 (15 cycles per US gallon)	3.5 (13 cycles per US gallon)
Maximum free flow delivery (2)	38 lpm (10 US gpm)	45 lpm (11.9 US gpm)
Air inlet	1/4" BSP (F)	3/8" BSP
Fluid inlet	1" BSP (F)	1" BSP
Fluid outlet	3/4" BSP (F)	3/4" BSP
Wetted and seal materials	PTFE / Viton / s. steel	PTFE / Viton / s. steel
Noise level (3)	86 dB	93 dB

Accessories:

733 218 PVC suction tube for 220 l drums.

(1) Maximum air consumption with 7 bar air inlet pressure and free delivery.

(2) Maximum free delivery at 7 bar air inlet pressure, using water.

(3) Maximum noise level measured 1 m from the pump, 7 bar air pressure and free delivery.