

DIAPHRAGM



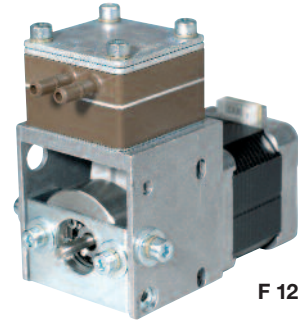
Diaphragm Liquid Pumps

MODELS

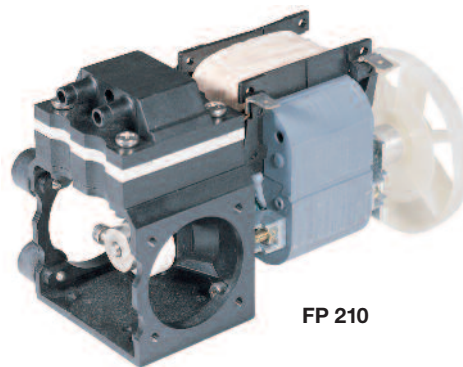
5002 F
F 120
FP 210



5002 F



F 120



FP 210

FEATURES

- Self priming
- Dry running
- Oil-less, non lubricated
- Suitable for continuous operation
- Chemical resistant pump materials for aggressive media
- Drive available for all required voltages in AC and DC

TYPICAL APPLICATIONS

- Chemical industry
- Medical devices
- Laboratory and analysis
- Industrial applications
- Hygiene

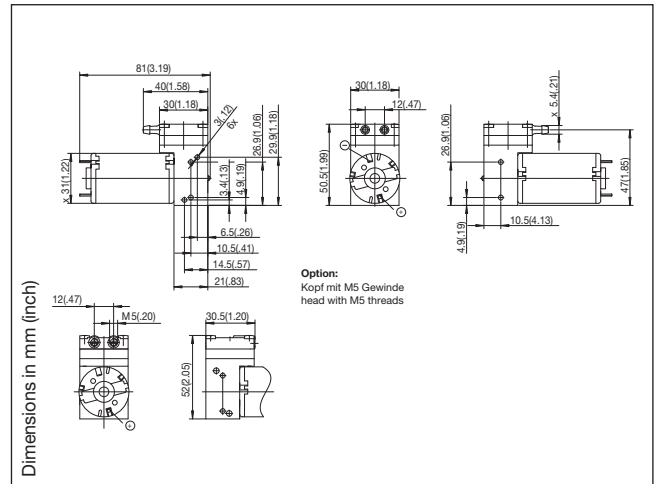
Consult factory for customized solutions



THOMAS
A Gardner Denver Product

Diaphragm Liquid Pump 5002F

Flow	400 ml/min
Pressure range	up to 40 m H₂O
Suction height	6 m H₂O



Hydraulic Data

Description	PA/EPDM	PPS/FPM	Carbon/PTFE
Part number	53001002	53001005	53001008
	53001003	53001006	53001009
Max. flow	400 ml/min	400 ml/min	400 ml/min
Max. intermittent pressure height	40 m H ₂ O	40 m H ₂ O	40 m H ₂ O
Max. cont. pressure height	up to 15 m H ₂ O	up to 15 m H ₂ O	up to 10 m H ₂ O
Max. suction height	6 m H ₂ O	6 m H ₂ O	5 m H ₂ O

Electrical Data

Motor type	Permanent magnet	Permanent magnet	Permanent magnet
Nominal speed	3000 rpm	3000 rpm	3000 rpm
Nominal voltage	12/24 V DC	12/24 V DC	12/24 V DC
Max. power consumption @ 10 m H ₂ O	5 W	7 W	7 W
Motor insulation class	A	A	A
Protection class	IP20	IP20	IP20
EMC protection	Basic EMC filter (2L)	Basic EMC filter (2L)	Basic EMC filter (2L)

General Data

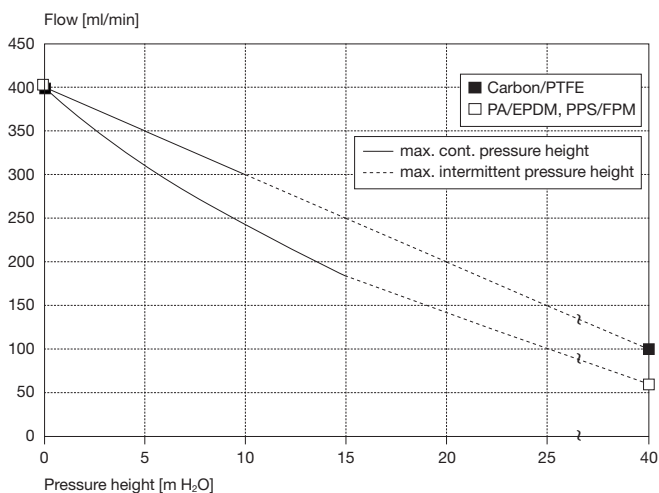
Ambient temperature	0 to 40 °C	15 to 40 °C	15 to 40 °C
Media temperature	0 to 70 °C	15 to 70 °C	15 to 70 °C
Weight	0,19 kg	0,19 kg	0,19 kg

Wetted Parts

Pump head	PA	PPS	Carbon
Diaphragm	EPDM	FPM	PTFE
Valves	EPDM	FPM	FFPM

The technical data is based on the use of PVC measuring tubing, 4 x 1,5 mm (ID x wall thickness), 1 m length, 65° shore hardness. The use of a different tubing will change the flow.

Flow curve



Options

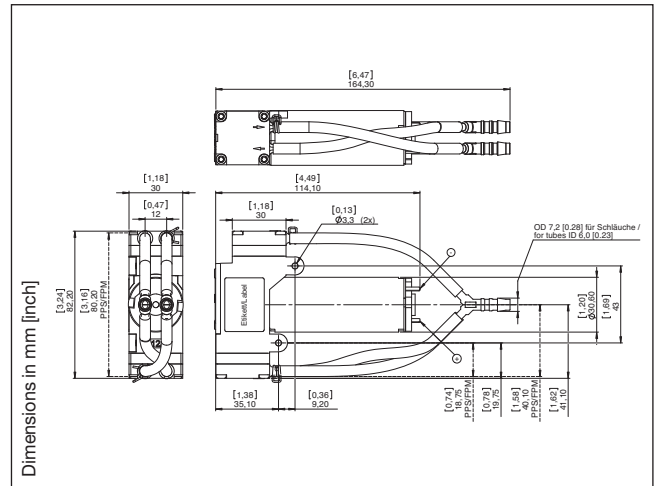
- Pump head with M5 female thread (PA, PPS)
- Pulsation damper

5300... Stock programme

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Diaphragm Liquid Pump 5002F Twin DC

Flow	1100 ml/min
Pressure height	up to 25 m H₂O
Suction height	4,5 m H₂O



Hydraulic Data

Description	5002F Twin DC Carbon/EPDM	5002F Twin DC PPS/FPM
Part number	53200001	53200051
12 V	53200002	53200052
24 V		
Max. flow (parallel config.)	1000 ml/min	1100 ml/min
Max. intermittent pressure height	25 m H ₂ O	25 m H ₂ O
Max. cont. pressure height	10 m H ₂ O	10 m H ₂ O
Max. suction height	4,5 m H ₂ O	4,5 m H ₂ O

Electrical Data

Motor type	Permanent Magnet	Permanent Magnet
Nominal speed	2700 rpm	2500 rpm
Nominal voltage	12/24 V DC	12/24 V DC
Max. power consumption @ 10 m H ₂ O	6,5 W	8,2 W
Motor insulation class	E	E
Protection class	IP00	IP00
EMC protection	Yes	Yes

General Data

Ambient temperature	0 to 40 °C	0 to 40 °C
Media temperature	0 to 70 °C	0 to 70 °C
Weight	0,34 kg	0,33 kg

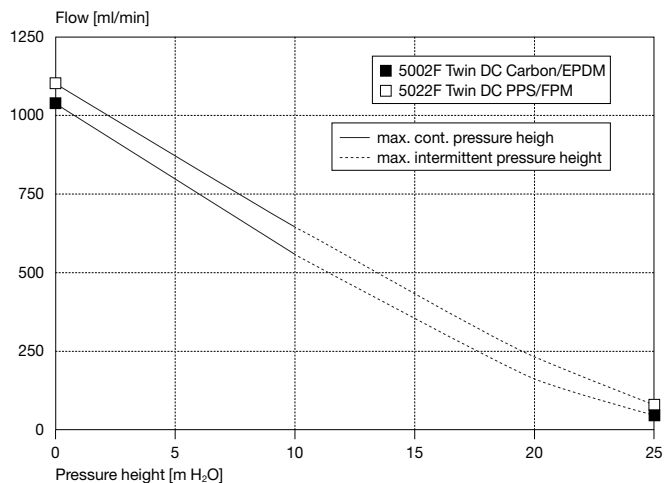
Wetted Parts

Pump head	Carbon	PPS
Diaphragm	EPDM	FPM
Valves	EPDM	FPM
Tubing	PUR	PUR

The technical data is based on the use of PVC measuring tubing, 6 x 2 mm (ID x wall thickness), 1 m length, 75° shore hardness. The use of a different tubing will change the flow.

Flow curve

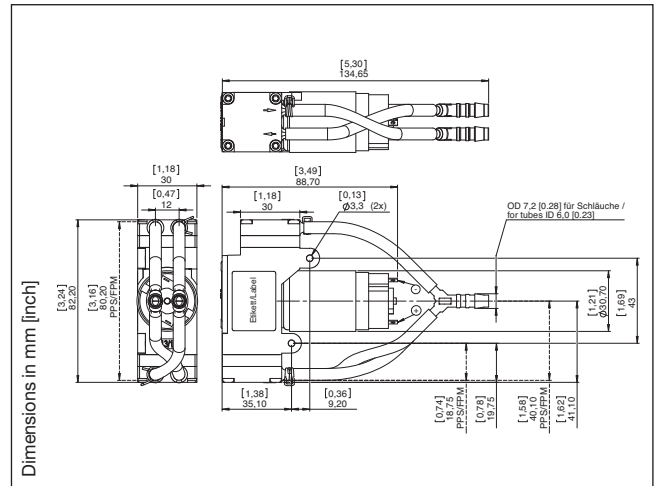
5320... Stock programme



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Diaphragm Liquid Pump 5002F Twin LC

Flow	1100 ml/min
Pressure height	up to 25 m H₂O
Suction height	4,5 m H₂O



Hydraulic Data

Description	5002F Twin LC Carbon/EPDM	5002F Twin LC PPS/FPM
Part number	53200003	53200053
12 V	53200004	53200054
24 V		
Max. flow (parallel config.)	1000 ml/min	1100 ml/min
Max. intermittent pressure height	25 m H ₂ O	25 m H ₂ O
Max. cont. pressure height	10 m H ₂ O	10 m H ₂ O
Max. suction height	4,5 m H ₂ O	4,5 m H ₂ O

Electrical Data

Motor type	Permanent Magnet	Permanent Magnet
Nominal speed	2600 rpm	2200 rpm
Nominal voltage	12/24 V DC	12/24 V DC
Max. power consumption @ 10 m H ₂ O	7,2 W	10,0 W
Motor insulation class	F	F
Protection class	IP00	IP00
EMC protection	Yes	Yes

General Data

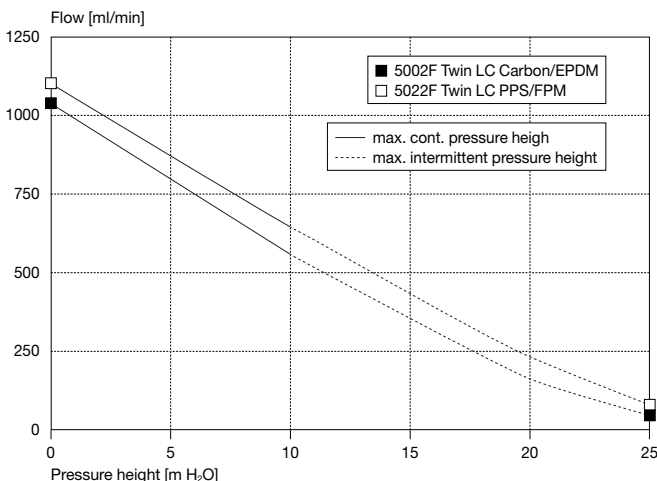
Ambient temperature	0 to 40 °C	0 to 40 °C ¹⁾
Media temperature	0 to 70 °C	0 to 70 °C
Weight	0,24 kg	0,23 kg

Wetted Parts

Pump head	Carbon	PPS
Diaphragm	EPDM	FPM
Valves	EPDM	FPM
Tubing	PUR	PUR

The technical data is based on the use of PVC measuring tubing, 6 x 2 mm (ID x wall thickness), 1 m length, 75° shore hardness. The use of a different tubing will change the flow. ¹⁾Motor housing temperature must not exceed 65°C

Flow curve

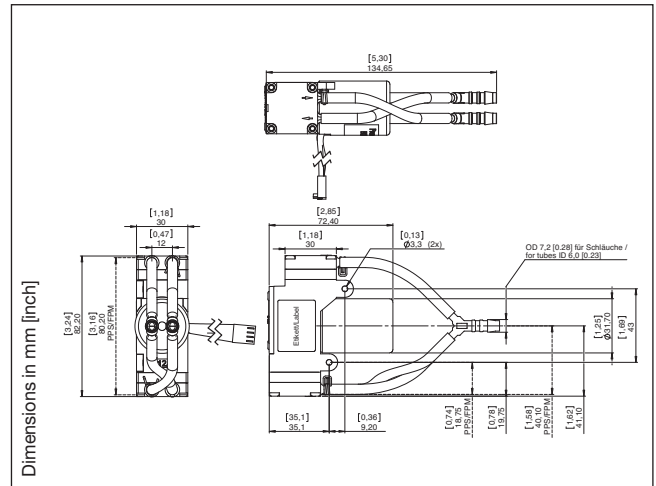


5320... Stock programme

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Diaphragm Liquid Pump 5002F Twin BLDC

Flow	1100 ml/min
Pressure height	up to 25 m H₂O
Suction height	4,5 m H₂O



Hydraulic Data			
Description		5002F Twin BLDC Carbon/EPDM	5002F Twin BLDC PPS/FPM
Part number	12 V DC	53200005	53200055
	24 V DC	53200006	53200056
Max. flow (parallel config.)		1100 ml/min @ 3 V DC control voltage	1100 ml/min @ 3 V DC control voltage
Max. intermittent pressure height		25 m H ₂ O	25 m H ₂ O
Max. cont. pressure height		10 m H ₂ O	10 m H ₂ O
Max. suction height		4,5 m H ₂ O	4,5 m H ₂ O

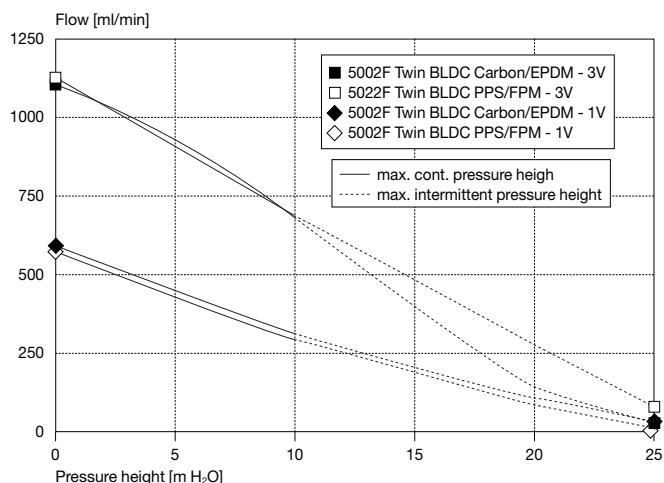
Electrical Data			
Motor type		Brushless DC	Brushless DC
Nominal speed		2600 rpm @ 3 V DC speed voltage	2500 rpm @ 3 V DC speed voltage
Nominal voltage		12/24 V DC	12/24 V DC
Max. power consumption @ 10 m H ₂ O		6,3 W	8,1 W
Motor insulation class		B	B
Protection class		IP20	IP20
EMC protection		Yes	Yes
Connector	Housing	Molex KK 22-01-2045	Molex KK 22-01-2045
	Terminal	Molex KK 08-50-0031	Molex KK 08-50-0031

General Data			
Ambient temperature		0 to 40 °C	0 to 40 °C
Media temperature		0 to 70 °C	0 to 70 °C
Weight		0,22 kg	0,21 kg

Wetted Parts			
Pump head		Carbon	PPS
Diaphragm		EPDM	FPM
Valves		EPDM	FPM
Tubing		PUR	PUR

The technical data is based on the use of PVC measuring tubing, 6 x 2 mm (ID x wall thickness), 1 m length, 75° shore hardness. The use of a different tubing will change the flow.

Flow curve



Options

Adapter for 2-wire duty incl. potentiometer for speed adjustment
29011930 (12 V DC), 29011931 (24 V DC)

5320... Stock programme

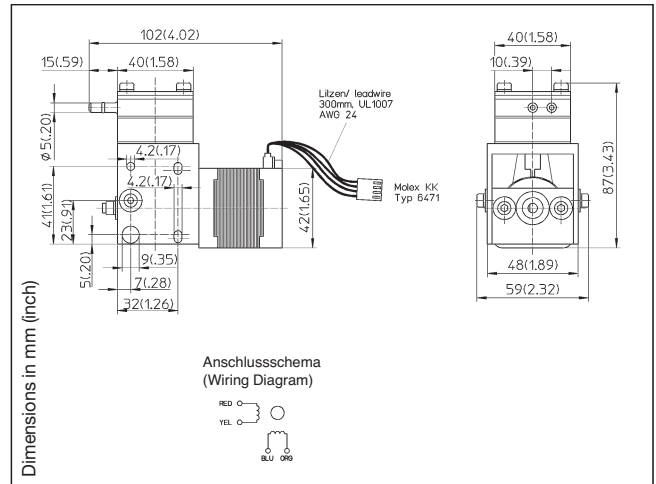
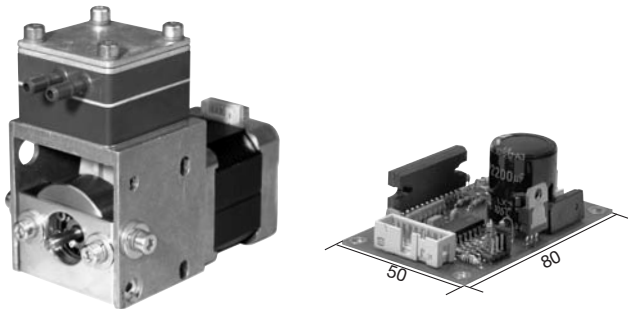
Wiring diagram:

Pin	Function	Colour	Control
Pin 1	V Supply	Red	12 V DC (max. voltage range: 10..18 V DC) 24 V DC (max. voltage range: 14..28 V DC)
Pin 2	Ground	Black	Ground for V Supply (Pin 1) and Speed control (Pin 3)
Pin 3	Speed Control	White	analog: 0..5 V DC (max. 28V) PWM: 6..20 kHz – 14..96% Speed voltage input threshold: 0,2 V
Pin 4	Tacho out	Green	18 pulses per revolution Pulse time "LOW": 195 µs Output level "LOW": 0 / max. 0,5 V Output level "HIGH": min. 4 V / max. 5 V

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Diaphragm Liquid Pump F120-Stepper

Flow	260 ml/min
Pressure range	up to 50 m H₂O
Suction height	4 m H₂O



Hydraulic Data					
Description		F120-28			
Part number	24 V DC without circuit board	71200246			
	24 V DC with circuit board	71200242			
Control range		n1	n2	n3	n4
Max. flow		1 - 9 ml/min	1 - 40 ml/min	2,5 - 140 ml/min	5 - 260 ml/min
Max. intermittent pressure height		60 m H ₂ O	60 m H ₂ O	50 m H ₂ O	40 m H ₂ O
Max. cont. pressure height		up to 50 m H ₂ O	up to 50 m H ₂ O	up to 40 m H ₂ O	up to 30 m H ₂ O
Max. suction height		4 m H ₂ O	4 m H ₂ O	4 m H ₂ O	4 m H ₂ O

Electrical Data	
Motor type	Stepper, bipolar
Speed range	0,2 - 300 rpm
Stepping angle	1,8°
Nominal voltage	24 V DC or 20 V AC*
Max. power consumption @ 10 m H ₂ O	9 W
Motor insulation class	B
Protection class	IP00
EMC protection	n/a

General Data	
Ambient temperature	0 to 40 °C
Media temperature	0 to 70 °C
Weight	0,63 kg

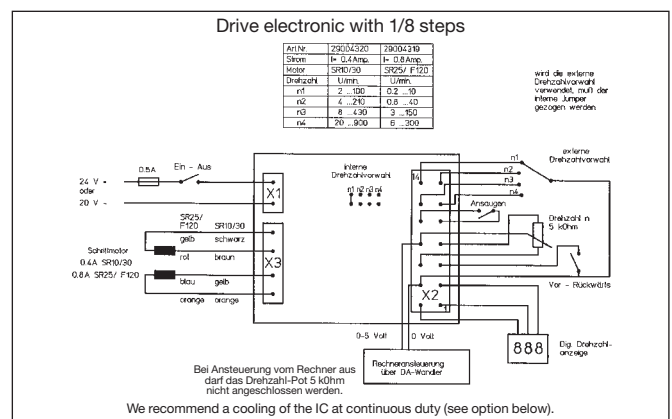
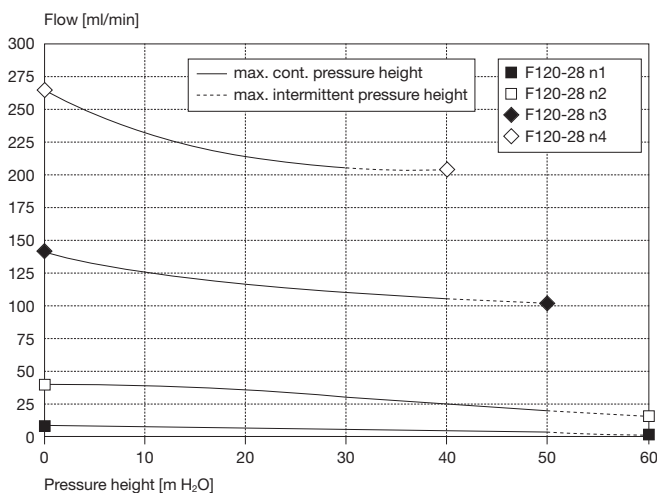
Wetted Parts	
Pump head	PPS
Diaphragm, valves	FPM
Fixing disk	1.4571 (AISI 316 Ti)

The technical data is based on the use of PVC measuring tubing, 4 x 1,5 mm (ID x wall thickness), 1 m length, 65° shore hardness.

The use of a different tubing will change the flow.

* Use a time-lag fuse.

Flow curve



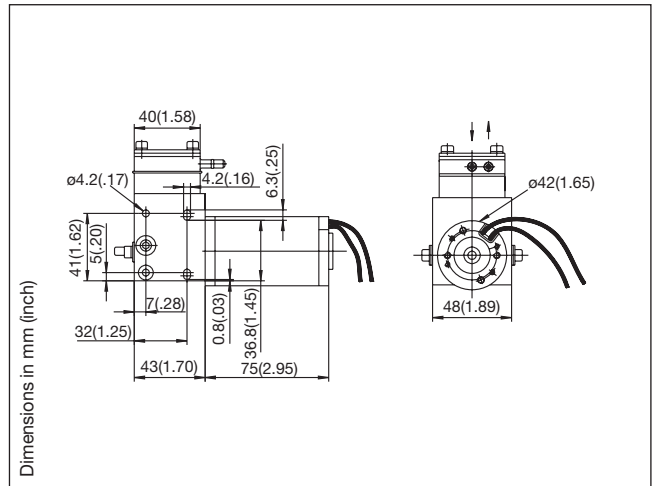
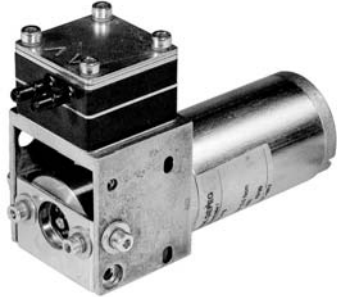
Options

- Cooling bar 29 x 11,5 x 37,5 mm, part no. 29008915
- Connector cable with plug, 200 mm 14-pole, rocker switch for clockwise and lefthanded running, potentiometer and speed-push-button, part no. 29000702
- Pulsation damper (UVS 100)

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Diaphragm Liquid Pump F120G

Flow	900 ml/min (only for intermittent duty)
Pressure range	up to 50 m H₂O
Suction height	4 m H₂O



Hydraulic Data

Description	F120G	
Part number	12 V DC	71200017
	24 V DC	71200025
Max. flow	900 ml/min	
Max. intermittent pressure height	50 m H ₂ O	
Max. cont. pressure height	up to 20 m H ₂ O	
Max. suction height	4 m H ₂ O	

Electrical Data

Motor type	Permanent magnet	
Nominal speed	3000 rpm	
Nominal voltage	12/24 V DC	
Max. power consumption @ 10 m H ₂ O	24 W	
Motor insulation class	E	
Protection class	IP50	
EMC protection	Basic EMC filter (2L + 1C)*	

General Data

Ambient temperature	0 to 40 °C	
Media temperature	0 to 70 °C	
Weight	0,7 kg	

Wetted Parts

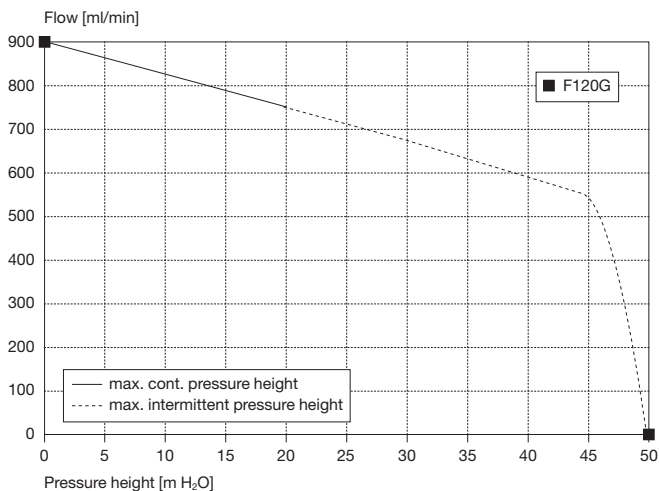
Pump head	PPS	
Diaphragm, valves	FPM	
Fixing disk	1.4571 (AISI 316 Ti)	

The technical data is based on the use of PVC measuring tubing, 4 x 1,5 mm (ID x wall thickness), 1 m length, 65° shore hardness.

The use of a different tubing will change the flow.

* with 24 V DC: 2L only

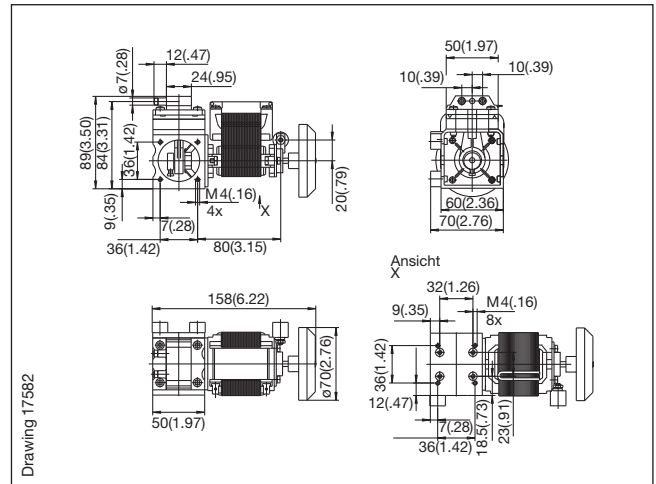
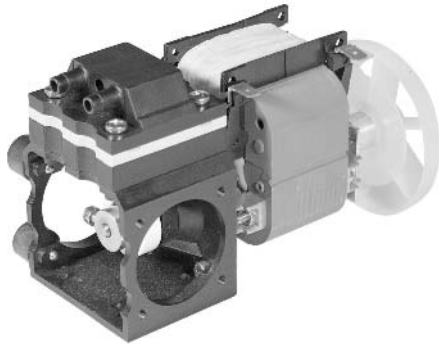
Flow curve



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Diaphragm Liquid Pump FP210

Flow	900 ml/min
Working range	up to 20 m H₂O
Suction height	1,5 m H₂O



Hydraulic Data

Type		FP 210
Part number	230 V/50 Hz	72100041
Free flow at U _n		900 ml/min
Max. pressure height at U _n		30 m H ₂ O
Working range		up to 20 m H ₂ O
Suction height (dry)		1,5 m H ₂ O

Electrical Data

Motor		Shaded pole
Nominal voltage		230 V/50 Hz
Nominal speed		2600 rpm
Nominal current		0,6 A
Starting current		0,7 A
Power consumption max.		60 W
Insulation class		B
Protection class		IP00
EMC protection		EN 55011

General Data

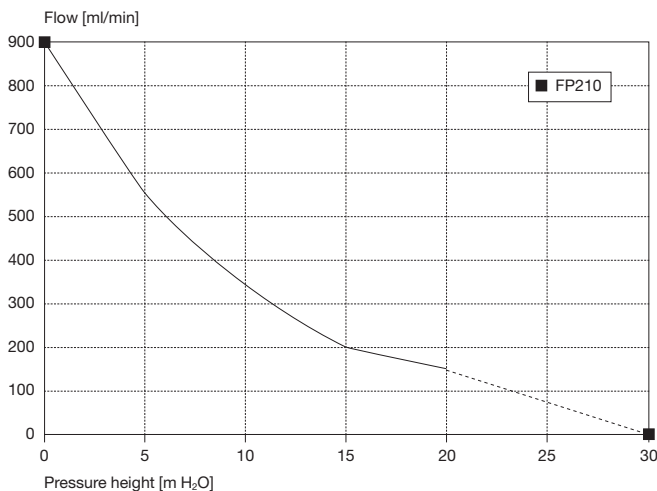
Ambient temperature		0 to 40 °C
Temperature range - medium		0 to 70 °C
Weight		0,7 kg

Wetted Parts

Pump head		PA, PP
Diaphragm		EPDM
Gasket, valves		Chlorbutadiene – rubber
Spring		1.4571 (AISI 316 Ti)

The technical data are based using a PVC-tubing, Ø 4 x 1,5 mm, 1 m length, 65° Sh.
The use of a different tubing will change the flow.

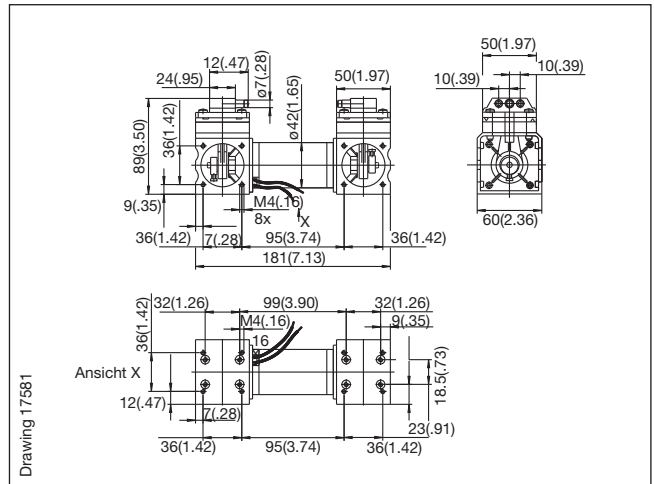
Flow curve



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Diaphragm Liquid Pump FP210Z

Flow	2,2 l/min
Working range	up to 20 m H₂O
Suction height	1,5 m H₂O



Hydraulic Data

Type	FP210Z	
Part number	12 V DC	72100151
	24 V DC	72100152
Free flow at U _n	2,2 l/min	
Max. pressure height at U _n	35 m H ₂ O	
Working range	up to 20 m H ₂ O	
Suction height (dry)	1,5 m H ₂ O	

Electrical Data

Motor	Permanent magnet	
Nominal voltage	12/24 V DC	
Nominal speed	3600/3900 rpm	
Nominal current	2,1/1,1 A	
Starting current	7,6/5,3 A	
Power consumption max.	26 W	
Insulation class	E	
Protection class	IP50	
EMC protection	Basic EMC filter (2L)*	

General Data

Ambient temperature	0 to 40 °C	
Temperature range - medium	0 to 70 °C	
Weight	0,7 kg	
Configuration	Parallel	

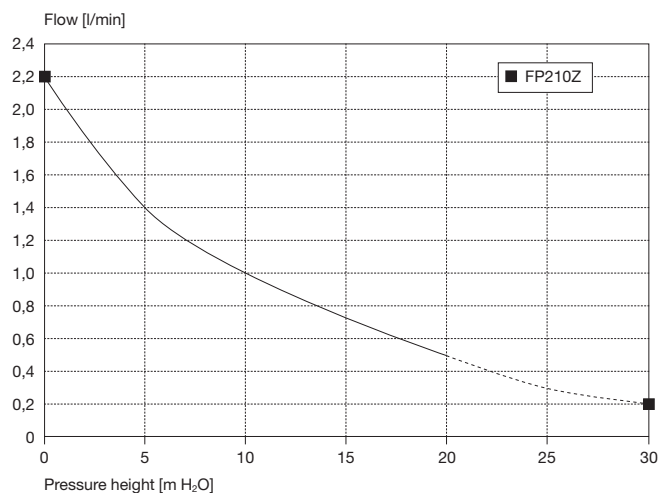
Wetted Parts

Pump head	PA, PP	
Diaphragm	EPDM	
Gasket, valves	Chlorbutadiene – rubber	
Spring	1.4571 (AISI 316 Ti)	

The technical data are based using a PVC-tubing, Ø 4 x 1,5 mm, 1 m length, 65° Sh. The use of a different tubing will change the flow.

* 2L + 2C at 12 V DC

Flow curve



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Chemical Resistance Chart

	Thermoplastics				Elastomers						Thermoplastics				Elastomers				
	PP	PVC	PA	PPS	Carbon	Stainless steel (AISI316)	PTFE	FPM	EPDM		PP	PVC	PA	PPS	Carbon	Stainless steel (AISI316)	PTFE	FPM	EPDM
Acetaldehyde	A	C	A	A	A	A	A	C	A	Urea	A	A	A	A	A	A	A	A	A
Acetate	C	C	A	A	A	A	A	C	A	Uric Acid	A	A	A	A	A	A	A	A	A
Acetone	A	C	A	A	A	A	A	C	A	Isopropyl alcohol	A	A	B	-	A	A	A	A	A
Aluminium chloride	A	A	C	A	A	C	A	A	A	Jodine	C	C	C	C	A	C	A	A	B
Aluminium sulfate	A	A	C	A	A	B	A	A	A	Kaliumhydroxyde	A	B	A	A	A	A	A	A	C
Formic acid	A	A	C	A	A	C	A	C	A	Potassium salts	A	A	A	A	A	B	A	A	A
Ammonia	A	A	B	A	A	A	A	C	A	Ketones	C	B	A	A	A	A	A	C	C
Amyl acetate	B	C	C	A	A	A	A	C	A	Aqua regia	B	C	C	C	C	C	A	B	C
Amyl alcohol	B	A	A	A	A	A	A	A	A	Oil, linseed	A	A	A	B	A	A	A	A	C
Amyl chloride	C	C	C	A	A	A	A	B	C	Magnesium chloride solution	A	A	A	A	A	A	A	A	A
Aniline	C	C	C	A	A	B	A	C	B	Methanol	A	A	C	A	A	A	A	C	A
Arsenic acid	A	A	C	A	A	A	A	A	A	Methyl ethyl ketone	A	C	A	A	A	A	A	C	A
Ether	C	C	A	A	A	B	A	C	C	Lactic acid	A	B	C	A	A	B	A	A	A
Ethyl alcohol	B	C	A	A	-	A	A	C	C	Sodium chloride	A	A	A	A	A	C	A	A	A
Barium hydroxide	B	A	A	A	A	B	A	A	A	Sodium hydroxide 40 %	A	A	A	A	A	C	A	C	A
Benzaldehyde	A	C	C	A	A	B	A	C	A	Sodium hypochlorite <5%	B	A	A	A	B	C	A	A	B
Petrol	C	A	A	A	A	A	A	A	C	Sodium hypochlorite 12 %	B	C	A	A	C	C	A	A	B
Benzoic acid	C	A	C	A	C	B	A	A	C	Sodium carbonate	A	A	A	A	A	A	A	A	A
Benzene	A	C	C	A	-	A	A	A	B	Sodium salt	A	A	A	A	A	-	A	A	A
Benzylalcohol	A	C	C	A	-	A	A	A	B	Oil, hydraulic	C	A	A	C	B	A	A	A	C
Hydrocyanic acid	A	A	C	B	A	B	A	B	A	Oil, mineral	C	A	A	A	A	A	A	A	C
Bleaching agent	A	A	C	C	A	C	A	A	A	Oil, vegetable	A	C	A	-	A	A	A	A	B
Boric acid	A	A	B	A	A	A	A	A	A	Oil, animal	-	-	-	-	A	A	A	A	B
Break liquid	A	A	C	-	-	-	A	C	A	Oleic acid	B	C	B	A	A	B	A	B	B
Bromine	C	C	C	C	C	C	A	A	C	Oxalic acid	A	A	B	A	A	B	A	A	A
Butane	C	C	A	A	A	A	A	A	C	Paraffins	A	A	A	A	A	A	A	B	C
Butanol	A	B	B	A	A	A	A	A	B	Perchloroethylene	C	C	C	A	A	A	A	B	C
Calcium hypochlorite	A	B	C	A	A	B	A	A	B	Perchloric acid	-	-	C	A	-	B	A	A	B
Carbon disulphide	C	C	A	A	-	B	-	B	C	Phenol	B	C	C	A	A	B	A	A	B
Chlorine, liquid	C	A	C	C	A	C	A	A	C	Phosphoric acid, 25 %	A	-	C	A	-	C	A	A	B
Chlorobenzene	C	C	B	A	A	B	B	C	C	Phtalic acid, 9 %	C	C	-	-	A	A	A	A	A
Chloroacetic acid	C	B	C	A	A	A	A	C	B	Pyridine	A	C	B	A	A	A	A	C	B
Chloroform	C	C	C	A	A	A	A	B	C	Mercury salts	A	A	-	A	C	C	A	A	A
Chromium salts	C	C	A	-	-	B	A	A	C	Nitrous acid 10 %	A	A	-	-	A	A	A	A	A
Chromic acid 50 %	B	C	C	A	A	B	A	A	B	Hydrochloric acid	B	B	C	A	A	C	A	B	C
Cyclohexane	C	C	A	A	A	A	A	B	C	Sulphurdioxide, wet gas	A	A	A	A	A	A	A	A	A
Diesel fuel	A	A	A	A	A	A	A	A	C	Sulphuric acid, 30 %	A	A	C	A	A	C	A	A	B
Ferric sulfate	A	A	A	A	A	A	A	A	A	Sulphuric acid, 75-100%	C	C	C	A	C	C	A	A	B
Photographic solutions	A	A	A	-	A	A	A	A	B	Sulphurtrioxide	C	A	C	-	C	A	A	A	B
Acetic acid	B	C	A	A	A	A	A	C	B	Hydrogen sulphide	A	B	C	A	A	C	A	C	A
Acetic anhydride	B	C	C	A	A	A	A	C	A	Soap solution	A	A	A	A	A	A	A	B	A
Ethanol	B	C	A	A	A	A	A	C	B	Stearic acid, 5 %	A	B	A	-	A	A	A	A	B
Ethyl chloride	A	C	A	-	-	A	A	B	A	Turpentine	B	B	A	A	A	A	A	A	C
Ethylene glycol	A	A	B	A	A	A	A	A	A	Tetrahydrofurane	C	C	C	A	A	A	A	C	B
Fluoroboric acid, 48 %	A	A	C	A	A	B	A	A	A	Toluole	C	C	C	A	A	A	A	A	C
Fluor silicium acid	A	A	C	A	A	C	A	A	A	Trichloroethylene	B	C	C	A	B	B	A	B	C
Formaldehyde	C	A	C	B	-	A	A	C	A	Hydrogen peroxide	B	A	C	C	C	A	A	A	B
Formamide	A	A	-	-	-	-	A	C	A	Xylene	C	C	C	A	A	A	A	A	C
Furfural	C	C	B	A	A	B	A	C	B	Zinc chloride	A	A	A	A	A	C	A	A	A
Tannic acid	A	B	A	A	A	A	A	B	B	Citric acid	A	B	A	A	A	A	A	A	A

A = small or no effect
 B = minor or moderate effect
 C = severe effect

The material resistance is influenced by temperature and concentration of the medium.
 The data has to be seen as indication and does not guarantee the material properties.

