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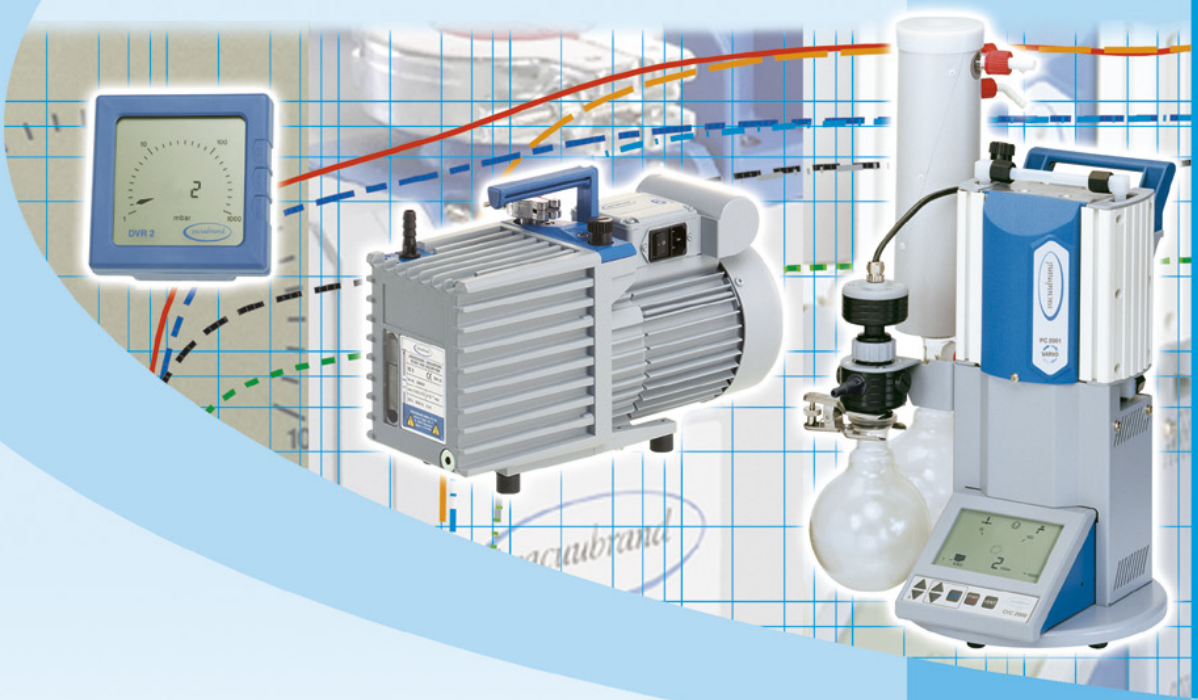
Technology for Vacuum Systems

TECHNOLOGY FOR VACUUM SYSTEMS

2005/2006



DIAPHRAGM PUMPS

Diaphragm pumps are totally oil-free mechanical vacuum pumps. They do not use any water and don't generate waste water nor waste oil. There is no need for regular oil changes; therefore they offer easy handling. Diaphragm pumps can be used for a wide range of vacuum applications or for the transfer of gases in chemistry and physics laboratories.

ONE, TWO, THREE, FOUR STAGES: HIGH PUMPING SPEED – LOW ULTIMATE VACUUM

One-Stage Diaphragm Pump ME 2

Three-Stage Diaphragm Pump MD 1

Four-Stage Diaphragm Pump MV 2

SPECIAL ADVANTAGES

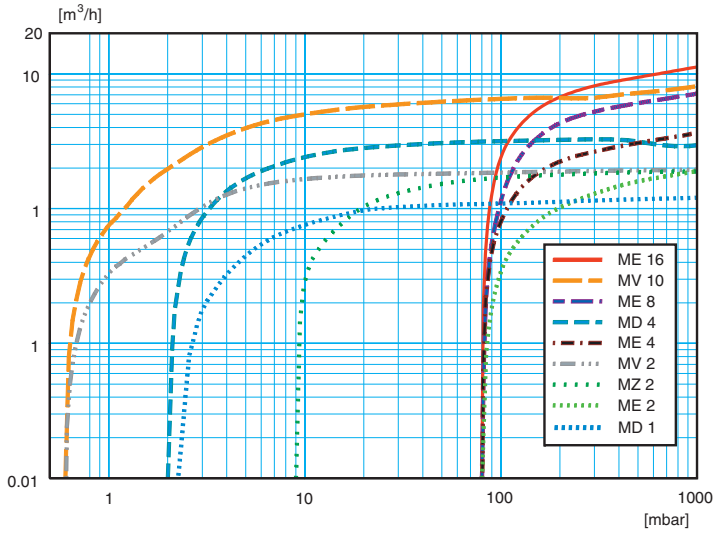
- **Wide choice of ultimate vacuum and pumping speed**
  high pumping speed even at low pressure (1–12 m³/h; 80–0.3 mbar); vacuum performance data according to DIN 28432 (ISO/DIS 21360)
- **Maintenance-free drive system, easy to maintain**
  easy change of diaphragms and valves
- **Precisely guided planar diaphragms**
  superior pumping speed also at low pressure, long lifetime
- **Low noise and vibration**
  whisper-quiet operation

USE OF DIAPHRAGM PUMPS

Diaphragm pumps typically offer the best possible vacuum technology in the vacuum range from atmospheric pressure down to 0.3 mbar within the laboratory and as backing pumps for modern wide-range turbo pumps. For use with chemicals, the gas-contacting parts are made of corrosion-resistant materials (chemistry diaphragm pump). No waste oil or waste water will be generated. There is no need for oil changes, and thus they offer ease of handling compared to oil-sealed rotary-vane pumps. VACUUBRAND diaphragm pumps are available for an ultimate vacuum from < 80 mbar to 0.3 mbar and pumping speeds from approx. 1 to 12 m³/h, depending on configuration.

Specifications of ultimate vacuum always refer to pumps at operating temperature.

PUMPING SPEED: DIAPHRAGM PUMPS



Pumping speed and pump-down time only for information. Ultimate vacuum specification: see Technical Data.

MODEL	PUMPING SPEED* 50/60 Hz m³/h // cfm**	ULTIMATE VACUUM (total) mbar // Torr	PAGE
Diaphragm Pumps and Chemistry Diaphragm Pumps (C)			
ME 2	1.9/2.2 // 1.3	< 80 // < 60	30/31
ME 2C	1.9/2.2 // 1.3	< 80 // < 60	30/31
ME 4	3.6/4.0 // 2.4	< 80 // < 60	32/33
ME 4C	3.6/4.0 // 2.4	< 80 // < 60	32/33
ME 4R	3.6/4.0 // 2.4	< 100 // < 75 and 4 bar	34/35
ME 8	7.2/7.8 // 4.6	< 80 // < 60	36/37
ME 8C	2 x 3.6/4.0 // 2 x 2.4	< 80 // < 60	36/37
ME 16	12.0/12.9 // 7.6	< 80 // < 60	38/39
ME 16C	10.1/11.6 // 6.8	< 80 // < 60	38/39
MZ 2	1.9/2.2 // 1.3	9 // 6.8	40/41
MZ 2C	1.9/2.1 // 1.2	9 // 6.8	40/41
MZ 2D	2.2/2.4 // 1.4	4 // 3	42/43
MD 1	1.2/1.4 // 0.82	1.5 // 1.1	44/45
MD 1C	1.3/1.5 // 0.88	2 // 1.5	44/45
MD 4	3.3/3.8 // 2.2	2 // 1.5	46/47
MD 4C	3.0/3.5 // 2.1	2 // 1.5	46/47
MD 12	9.6/10.4 // 6.1	2 // 1.5	48/49
MD 12C	8.3/8.9 // 5.2	2 // 1.5	48/49
MV 2	1.9/2.2 // 1.3	0.6 // 0.45	50/51
MV 10	8.1/8.8 // 5.2	0.6 // 0.45	52/53
MV 10C	7.0/7.5 // 4.4	0.9 // 0.68	52/53

* DIN 28432 (ISO/DIS 21360), referring to max. pumping speed on some models
** Pumping speed in cfm at 60 Hz

Three-Stage Chemistry Diaphragm Pump MD 4C

One-Stage Chemistry Diaphragm Pump ME 16C

DIAPHRAGM PUMPS

There are two basic types of diaphragm pumps: "Aluminium" and "Chemistry". The choice depends on the application. For "clean" applications, "Aluminium" gives the best performance. For use with chemicals, "Chemistry" diaphragm pumps are recommended. The gas-contacting parts of these pumps are made of corrosion-resistant materials. Typically, chemistry diaphragm pumps can be used for a wide range of applications in chemistry laboratories requiring the pumping or transfer of chemically active gases, e.g. rotary evaporation, vacuum ovens, concentrators and gel drying.

TWO DESIGNS: ALUMINIUM AND CHEMISTRY

One-Stage Chemistry Diaphragm Pump ME 2C

Two-Stage Chemistry Diaphragm Pump MZ 2C

Three-Stage Chemistry Diaphragm Pump MD 1C

SPECIAL ADVANTAGES

- **Totally oil-free**
  continuous, oil-free operation
- **Wide choice of ultimate vacuum and pumping speeds**
  high pumping speeds even at low vacuum levels (1–12 m³/h; 80–0.3 mbar); vacuum performance data according to DIN 28432 (ISO/DIS 21360)
- **Precise mechanics**
  low noise level, quiet operation, high performance
- **Maintenance-free drive system**
  easy replacement of diaphragms and valves

"Aluminium" (FPM)

- **Optimised, high-flexibility fabric-reinforced double diaphragm made of FPM**
  high reliability and long lifetime of diaphragms

"Chemistry" (fluoroplastics)

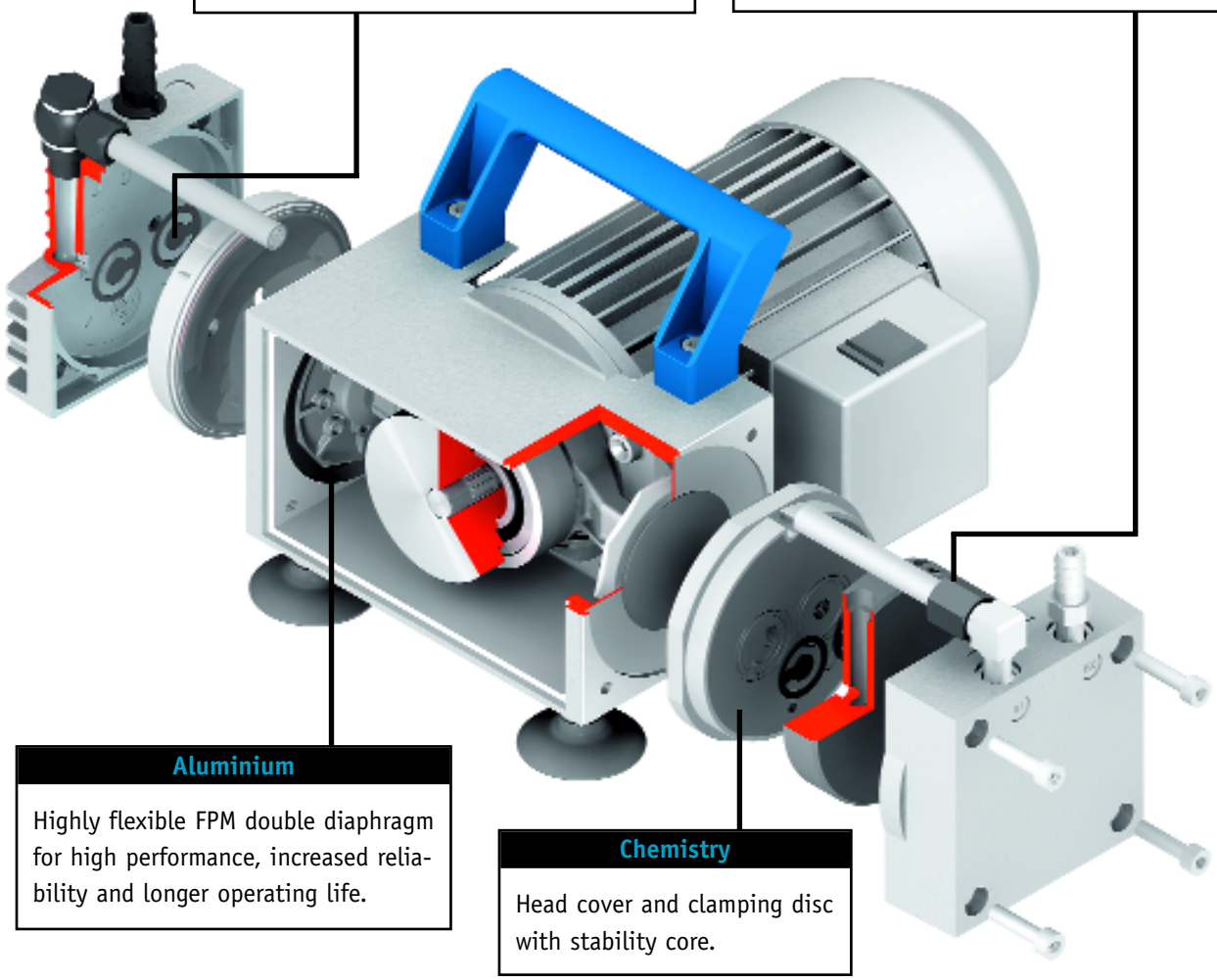
- **Clamping disc and head cover made of fluoroplastics, injection-moulded around stability cores**
  hard, high-density surface made of chemically resistant material; stability core for long-term dimensional stability
- **Metal-encased cylinders**
  to prevent "creeping" of PTFE components; consistently good ultimate vacuum even after servicing, without need for readjustment
- **PTFE sandwich diaphragm and perfluoroelastomer or PTFE valves**
  highly resistant, long-lasting, easy to replace

Aluminium

FPM valves with outstanding lifetime.
High performance due to large swept volume combined with minimal dead space.

Chemistry

High chemical resistance: All major parts in contact with pumped media are made from fluoroplastics; PTFE sandwich diaphragms and perfluoroelastomer or PTFE valves.



Aluminium

Highly flexible FPM double diaphragm for high performance, increased reliability and longer operating life.

Chemistry

Head cover and clamping disc with stability core.

Vacuum Gauge DVR 2
for use with diaphragm pumps;
DVR 3, DVR 4 with ATEX certification

Fine Vacuum Gauge DVR 5
for use with diaphragm pumps
and rotary-vane pumps

VARIO Chemistry Diaphragm Pump MD 4C VARIO
with Vacuum Controller CVC 2000^{II}

"Aluminium" The gas-contacting parts are made of e.g. aluminium, FPM, PE and PBT, designed for a wide variety of vacuum applications without corrosive media in laboratories and process plants.

Chemistry All gas and vapour contacting parts are made from chemically resistant fluoroplastics like ETFE and PTFE. Typical applications include the pumping of chemical vapours (distillation, evaporation, drying, etc.).

DIAPHRAGM PUMPS
ME 2 AND ME 2C

ME 2 one-stage

.....**1.9** m³/h
.....**1.3** cfm
.....**37** l/min

.....**< 80** mbar
.....**< 60** Torr

ME 2C one-stage

.....**1.9** m³/h
.....**1.3** cfm
.....**37** l/min

.....**< 80** mbar
.....**< 60** Torr

ME 2

The one-stage diaphragm pumps ME 2 and ME 2C are totally oil-free mechanical vacuum pumps. The precise geometry of pumping chamber and head space provides a low ultimate vacuum around 80 mbar and a high pumping speed of approx. 2 m³/h. Optimised kinetics for minimum wear of the diaphragm result in high reliability, low scuffing, long life and low noise level. In a wide range of applications, they are the modern alternative to water jet pumps for evacuation, and for the pumping of gases in chemistry and physics laboratories.

ME 2C

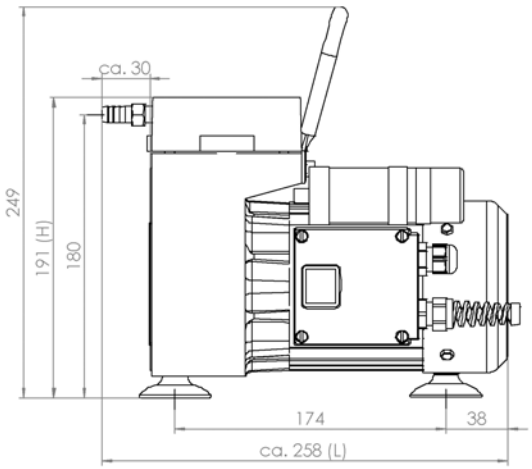
SPECIAL ADVANTAGES

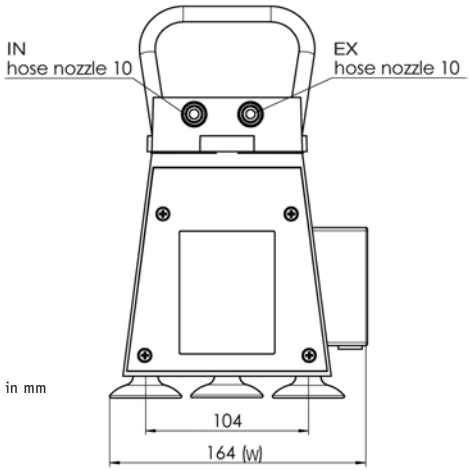
- Continuous, oil-free pumping of gases and vapours
- Selected chemically resistant materials (ME 2C)
- No water consumption, no waste water
- Long lifetime, easy-to-change diaphragms and valves
- Very low noise level
- Compact design

The choice between the two basic designs depends on the application:

ME 2 “Aluminium”
Gas-contacting parts made of e.g. aluminium, FPM and PBT. Designed for a multitude of applications in laboratories and process plants, such as gas transfer for non-aggressive solvents, vacuum filtration, vacuum degassing and vacuum impregnation.

ME 2C “Chemistry”
All parts coming into contact with gases and vapours are made of chemically resistant fluoroplastics, e.g. PTFE and ETFE. Typical applications are vacuum drying chambers, distillation, gel drying and transfer of aggressive gases and vapours.

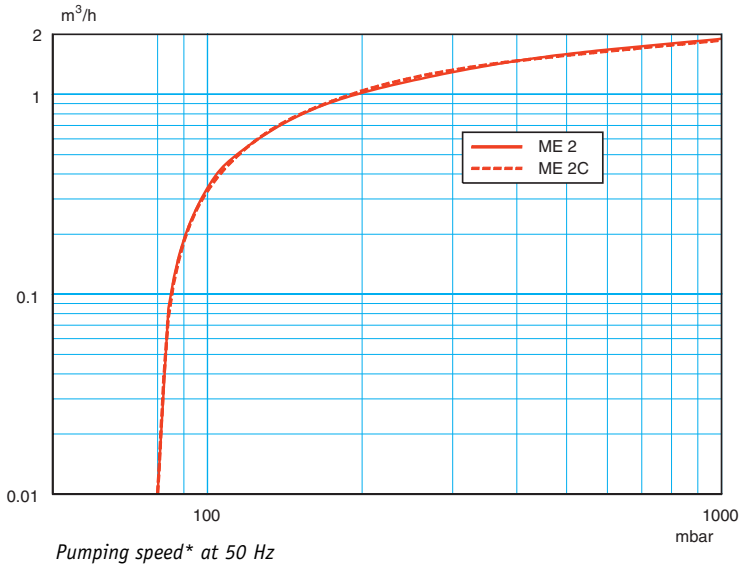




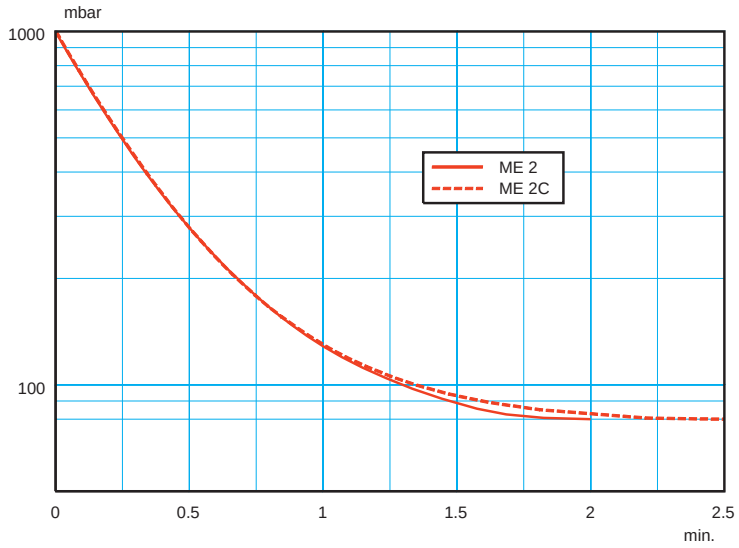
Dimensions in mm

ME 2C

DIAPHRAGM PUMPS
ME 2 AND ME 2C



Pumping speed at 50 Hz*



Pump-down time for 10 l volume*

TECHNICAL DATA		ME 2	ME 2C
Number of stages		1	1
Max. pumping speed (DIN 28432) 50/60 Hz	m³/h//cfm	1.9/2.2//1.3	1.9/2.2//1.3
No. of cylinders		1	1
Ultimate vacuum (total)	mbar//Torr	< 80//< 60	< 80//< 60
Max. outlet pressure (total)	bar	2	2
Inlet connection (IN) Outlet connection (EX)		hose nozzle NW 10 silencer	hose nozzle NW 10 hose nozzle NW 10
Motor power (nominal)	kW	0.12	0.12
Motor rpm (nominal) 50/60 Hz	min⁻¹	1500/1800	1500/1800
Protection class*		IP 54*	IP 54*
Dimensions (L x W x H)	mm	275 x 164 x 188	258 x 164 x 191
Mass	kg	6.8	7.1

* only 230 V/plug CEE. Other versions: IP 40 (removable cable).

Items supplied: Diaphragm pump with on/off switch, cable, plug and instructions for use.

ORDERING INFORMATION		ME 2	ME 2C
230 V ~ 50–60 Hz	plug CEE	69 61 20	69 61 21
230 V ~ 50–60 Hz	plug UK	69 61 26	69 61 32
100–120 V ~ 50–60 Hz	plug US	69 61 23	69 61 24

ME 2 one-stage

1.9 m³/h
1.3 cfm
37 l/min

< 80 mbar
< 60 Torr

ME 2C one-stage

1.9 m³/h
1.3 cfm
37 l/min

< 80 mbar
< 60 Torr

* Pumping speeds and pump-down times are only for information. Ultimate vacuum specification: see Technical Data.

DIAPHRAGM PUMPS
ME 4 AND ME 4C

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ME 4 one-stage

.....3.6 m³/h
.....2.4 cfm
.....67 l/min

.....< 80 mbar
.....< 60 Torr

ME 4C one-stage

.....3.6 m³/h
.....2.4 cfm
.....67 l/min

.....< 80 mbar
.....< 60 Torr

The ME 4 and ME 4C are one-stage diaphragm pumps. They have a higher pumping speed than the ME 2 and ME 2C respectively and therefore offer a wider field of applications. Optimised kinetics for minimum wear of the diaphragm result in high reliability, low scuffing, long life and low noise levels.

ME 4C

SPECIAL ADVANTAGES

- Continuous, oil-free pumping of gases and vapours
- Selected chemically resistant materials (ME 4C)
- No water consumption, no waste water
- Long lifetime, easy-to-change diaphragms and valves
- Low noise level
- Compact design

The choice between the two basic designs depends on the application:

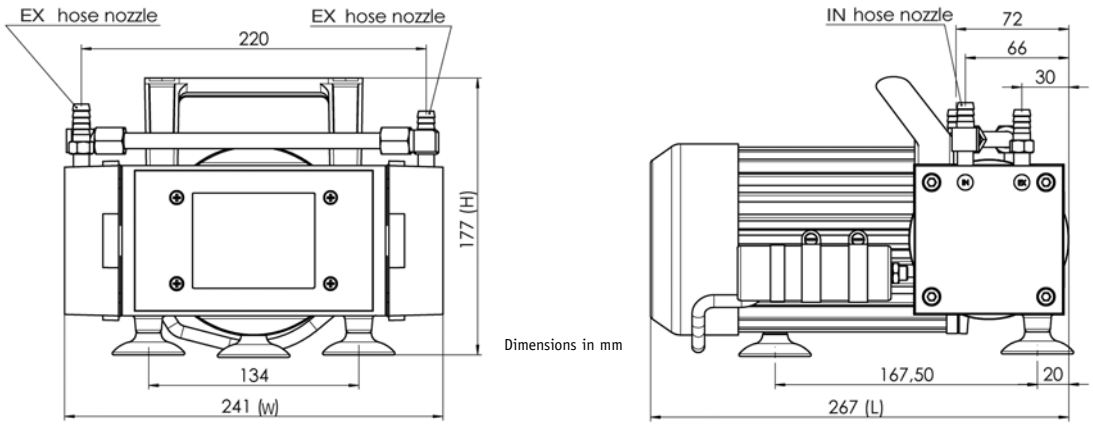
ME 4 "Aluminium"

Gas-contacting parts made of e.g. aluminium, FPM and PE. Designed for a multitude of applications involving non-aggressive gases in laboratories and process plants, like vacuum filtration, vacuum degassing and vacuum impregnation.

ME 4C "Chemistry"

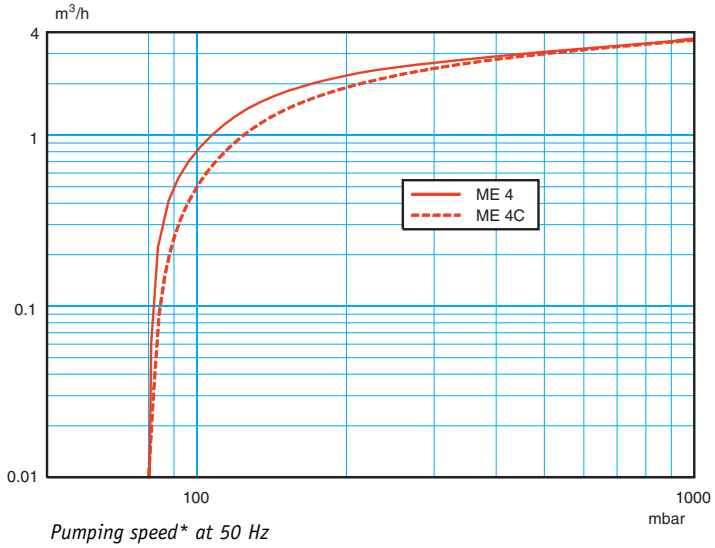
All parts coming into contact with gases and vapours are made of chemically resistant fluoroplastics, e.g. PTFE and ETFE. Typical applications are the transfer of aggressive gases and vapours, rotary evaporation, gel drying, etc.

ME 4

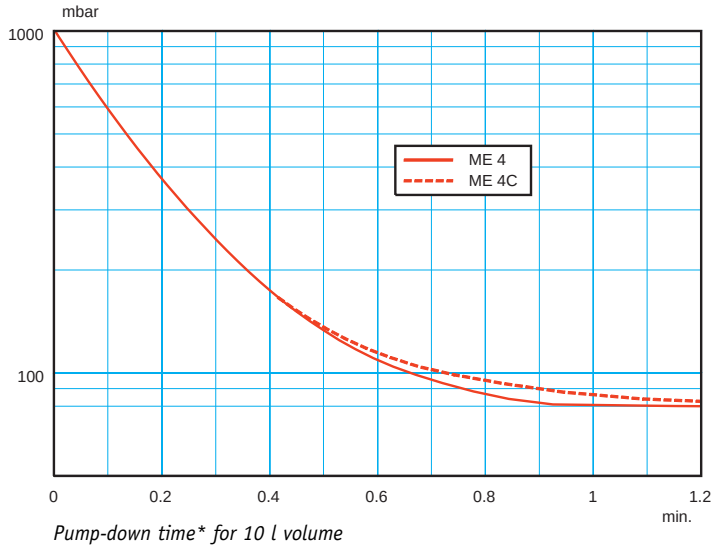


ME 4C

DIAPHRAGM PUMPS
ME 4 AND ME 4C



Pumping speed at 50 Hz*



Pump-down time for 10 l volume*

ME 4 one-stage

.....**3.6** m³/h
.....**2.4** cfm
.....**67** l/min

.....**< 80** mbar
.....**< 60** Torr

ME 4C one-stage

.....**3.6** m³/h
.....**2.4** cfm
.....**67** l/min

.....**< 80** mbar
.....**< 60** Torr

TECHNICAL DATA		ME 4	ME 4C
Number of stages		1	1
Max. pumping speed (DIN 28432) 50/60 Hz	m³/h//cfm	3.6/4.0//2.4	3.6/4.0//2.4
No. of cylinders		2	2
Ultimate vacuum (total)	mbar//Torr	< 80//< 60	< 80//< 60
Max. outlet pressure (total)	bar	4	2
Inlet connection (IN) Outlet connection (EX)		hose nozzle NW 10 2 x silencer	hose nozzle NW 10 2 x hose nozzle NW 10
Motor power	kW	0.18	0.18
Motor rpm (nominal) 50/60 Hz	min⁻¹	1500/1800	1500/1800
Protection class		IP 54	IP 54
Dimensions (L x W x H)	mm	264 x 235 x 180	267 x 241 x 177
Mass	kg	10.3	10.5

Items supplied: Diaphragm pump with on/off switch, cable, plug and instructions for use.

ORDERING INFORMATION		ME 4	ME 4C
230 V ~ 50–60 Hz	plug CEE	69 61 40	69 61 41
230 V ~ 50–60 Hz	plug UK	69 61 46	69 61 49
120 V ~ 60 Hz	plug US	69 61 43	69 61 44

* Pumping speeds and pump-down times are only for information. Ultimate vacuum specification: see Technical Data.

DIAPHRAGM PUMP ME 4R WITH MANUAL VACUUM AND PRESSURE CONTROL

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ME 4R one-stage

.....3.6 m³/h
..... 2.4 cfm
.....67 l/min

...< 100 mbar
.....< 75 Torr

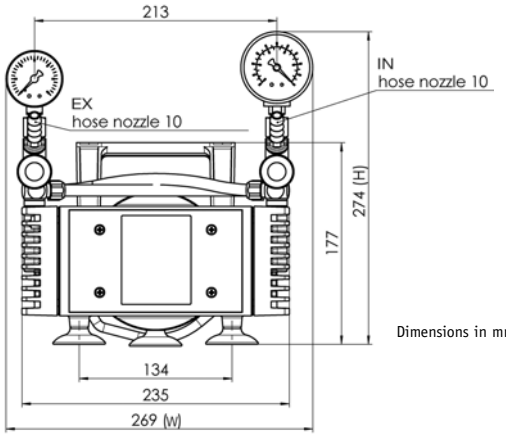
Max. outlet pressure
.....< 4 bar

The vacuum/compressor pump ME 4R is a two-cylinder one-stage diaphragm pump. Gas-contacting parts are primarily made of aluminium and FPM. The inlet and outlet connections are equipped with a vacuum/pressure regulator valve. Thus, both vacuum and pressure levels can be controlled (vacuum control through air bleed). The user has to make sure that the maximum permissible outlet pressure of 4 bar is not exceeded (e.g. by means of a pressure relief valve).

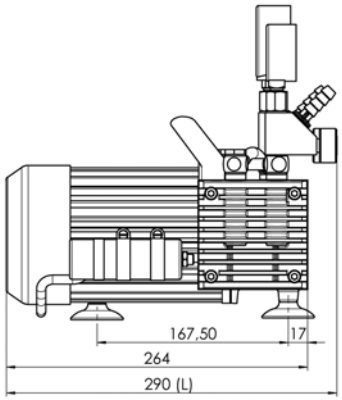
ME 4R

SPECIAL ADVANTAGES

- Continuous, oil-free pumping of vapour and gases
- Optimised lifetime, easy change of diaphragms and valves
- Low noise level
- Compact design



Dimensions in mm

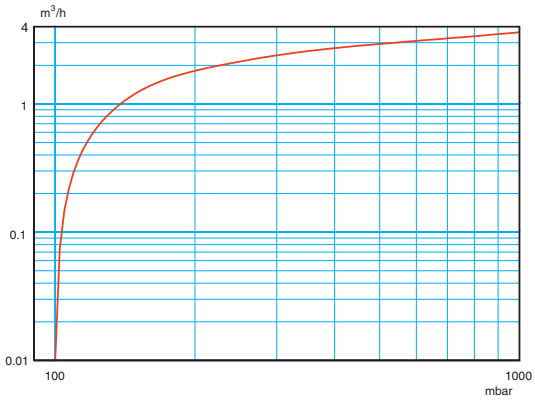


TECHNICAL DATA		ME 4R
Number of stages		1
Max. pumping speed (DIN 28432) 50/60 Hz	m³/h//cfm	3.6/4.0//2.4
No. of cylinders		2
Ultimate vacuum (total)	mbar//Torr	< 100//< 75
Max. inlet pressure	bar	2
Max. outlet pressure (total)	bar	4
Inlet connection (IN) Outlet connection (EX)		hose nozzle NW 10 hose nozzle NW 10
Motor power	kW	0.18
Motor rpm (nominal) 50/60 Hz	min⁻¹	1500/1800
Protection class		IP 54
Dimensions (L x W x H)	mm	290 x 269 x 274
Mass	kg	10.8

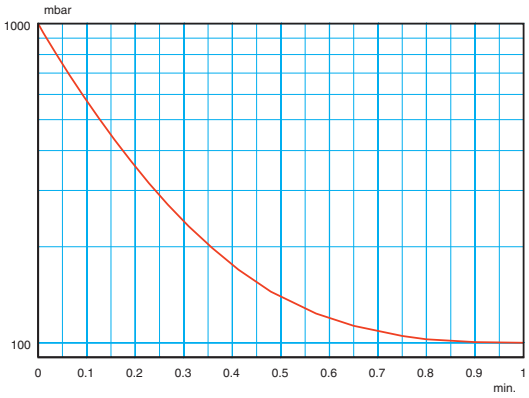
Items supplied: Diaphragm pump, on/off switch, cable, plug and instructions for use. The inlet and outlet sides of the ME 4R are equipped with air regulator valves for pressure and vacuum. Pressure as well as vacuum can be regulated.

ORDERING INFORMATION		ME 4R
230 V ~ 50–60 Hz	plug CEE	69 61 52
230 V ~ 50–60 Hz	plug UK	69 61 58

DIAPHRAGM PUMP ME 4R WITH MANUAL VACUUM AND PRESSURE CONTROL



Pumping speed at 50 Hz*
(against atmospheric pressure at outlet)



Pump-down time for 10 l volume*

ME 4R one-stage

3.6	m³/h
2.4	cfm
67	l/min
< 100	mbar
< 75	Torr

Max. outlet pressure

< 4	bar

Regulator valves for compression and vacuum

The regulator valve for compression allows the adjustment of the outlet pressure. The vacuum regulator valve allows control of the vacuum level.

These regulator valves can be used in connection with all "Aluminium" VACUUBRAND diaphragm pumps (but not with "Chemistry").

Regulator valve for compression

Regulator valve for vacuum

Important information for use of regulator valves for vacuum and compression:

When using the **regulator valve for vacuum,** it must be ensured that the intake of bleed air will at no time result in the formation of reactive, explosive or dangerous mixtures. Danger of serious injury or danger to life and a risk of damage to the equipment and/or the environment may result from the formation of dangerous and/or explosive mixtures, or as result of a reaction between the air and pumped substances inside the pump or at the outlet.

When using the **regulator valve for pressure,** it must be ensured that the maximum permissible outlet pressure of the pump is never exceeded, and that the connected equipment is sufficiently pressure-resistant.

ORDERING INFORMATION

Regulator valve for vacuum (with vacuum gauge)	69 68 40
Regulator valve for compression (with pressure gauge)	69 68 41

* Pumping speeds and pump-down times are only for information. Ultimate vacuum specification: see Technical Data.

DIAPHRAGM PUMPS
ME 8 AND ME 8C

ME 8 one-stage

7.2 m³/h
4.6 cfm
130 l/min

< 80 mbar
< 60 Torr

ME 8C one-stage

2 x 3.6 m³/h
2 x 2.4 cfm
2 x 67 l/min

< 80 mbar
< 60 Torr

ME 8

The one-stage diaphragm pumps ME 8 and ME 8C are highly compact high-performance pumps. The four-head design results in very smooth and quiet operation. They can be used for transfer of gases and vapours in a wide range of chemistry and physics laboratories. For applications with elevated intake and process pressures, these diaphragm pumps can often be used instead of rotary-vane pumps.

ME 8C

SPECIAL ADVANTAGES

- Continuous, oil-free pumping of gases and vapours
- High pumping speed
- Ultimate vacuum suitable for many applications like aspiration or filtration
- No water consumption, no waste water
- Long lifetime, easy-to-change diaphragms and valves
- Low noise level
- Compact design

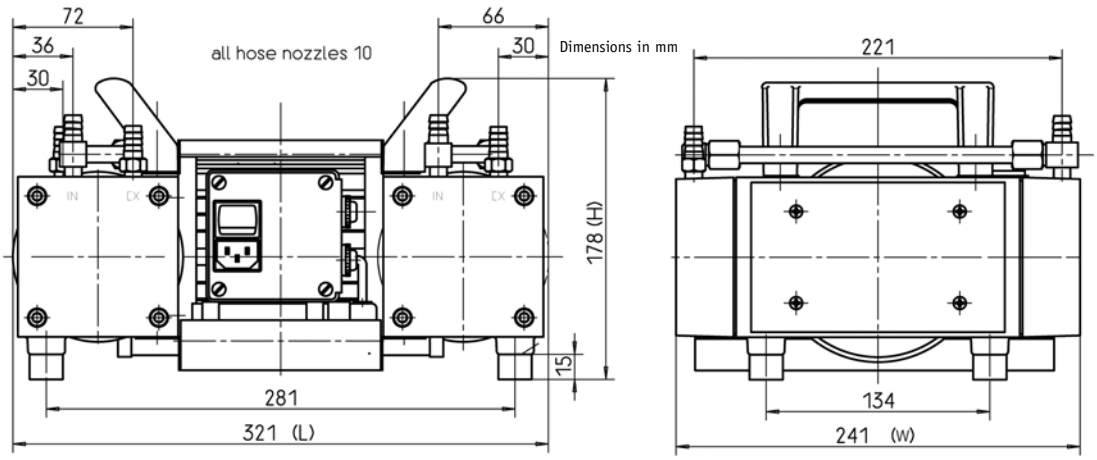
The choice between the two basic designs depends on the application:

ME 8 “Aluminium”

Gas-contacting parts made of e.g. aluminium, FPM and PE. Designed for a multitude of applications of vacuum generation in laboratories and process plants for non-aggressive gases like vacuum filtration, vacuum degassing and vacuum impregnation.

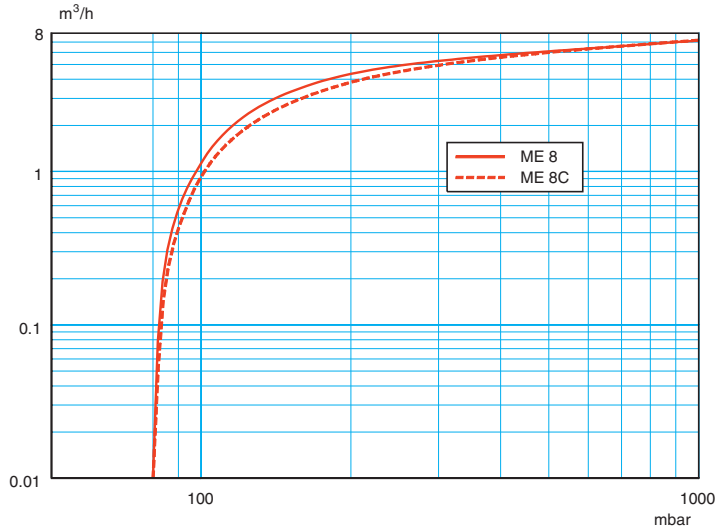
ME 8C “Chemistry”

All parts coming into contact with gases and vapours are made of chemically resistant fluoroplastics, e.g. PTFE and ETFE. Typical applications are the transfer of aggressive gases and vapours, rotary evaporation, gel drying, concentrators, etc.

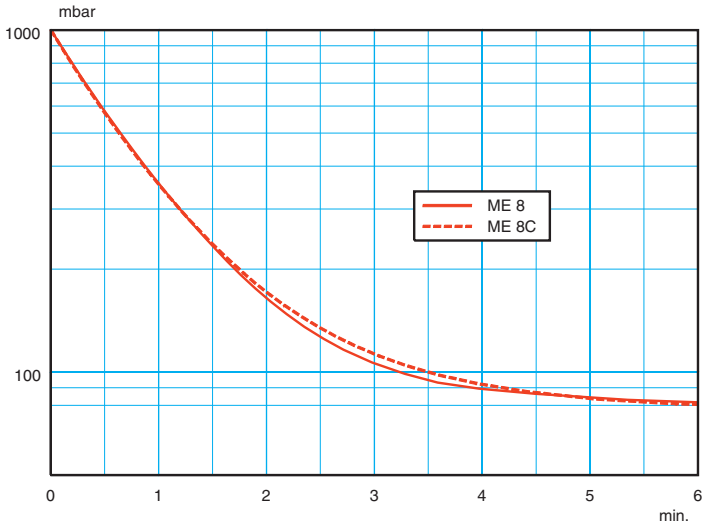


ME 8C

DIAPHRAGM PUMPS
ME 8 AND ME 8C



Pumping speed at 50 Hz*



Pump-down time for 100 l volume*

ME 8 one-stage

.....7.2 m³/h
.....4.6 cfm
.....130 l/min

.....< 80 mbar
.....< 60 Torr

ME 8C one-stage

.2 x 3.6 m³/h
.2 x 2.4 cfm
..2 x 67 l/min

.....< 80 mbar
.....< 60 Torr

TECHNICAL DATA		ME 8	ME 8C
Number of stages		1	1
Max. pumping speed (DIN 28432) 50/60 Hz	m³/h//cfm	7.2/7.8//4.6	2 x 3.6/2 x 4.0//2 x 2.4
No. of cylinders		4	4
Ultimate vacuum (total)	mbar//Torr	< 80//< 60	< 80//< 60
Max. outlet pressure (total)	bar	2	2
Inlet connection (IN) Outlet connenction (EX)		hose nozzle NW 10 4 x silencer	2 x hose nozzle NW 10 4 x hose nozzle NW 10
Motor power	kW	0.2	0.2
Motor rpm (nominal) 50/60 Hz	min⁻¹	1500/1800	1500/1800
Protection class		IP 20	IP 20
Dimensions (L x W x H)	mm	315 x 235 x 203	321 x 241 x 178
Mass	kg	15.8	16.2

Items supplied: Diaphragm pump with on/off switch, cable, plug and instructions for use.

ORDERING INFORMATION		ME 8	ME 8C
230 V ~ 50–60 Hz	plug CEE	69 61 80	69 61 81
230 V ~ 50–60 Hz	plug CH	69 61 79	69 61 85
230 V ~ 50–60 Hz	plug UK	69 61 76	69 61 82
120 V ~ 60 Hz	plug US	69 61 83	69 61 84

* Pumping speeds and pump-down times are only for information. Ultimate vacuum specification: see Technical Data.

DIAPHRAGM PUMPS
ME 16 AND ME 16C

ME 16 one-stage

..... 12.0 m³/h
.....7.6 cfm
.....215 l/min

.....< 80 mbar
.....< 60 Torr

ME 16C one-stage

.....10.1 m³/h
.....6.8 cfm
.....193 l/min

.....< 80 mbar
.....< 60 Torr

The diaphragm pumps ME 16 and ME 16C are radial pumps with 2 x 4 heads. The one-stage configuration of heads provides outstanding pumping speed and very smooth operation, even at elevated inlet pressures. They can be used for the transfer of gases and vapours in a wide range of chemistry and physics laboratories, e.g. as a central vacuum supply for several small systems, or for larger vacuum installations.

ME 16C

SPECIAL ADVANTAGES

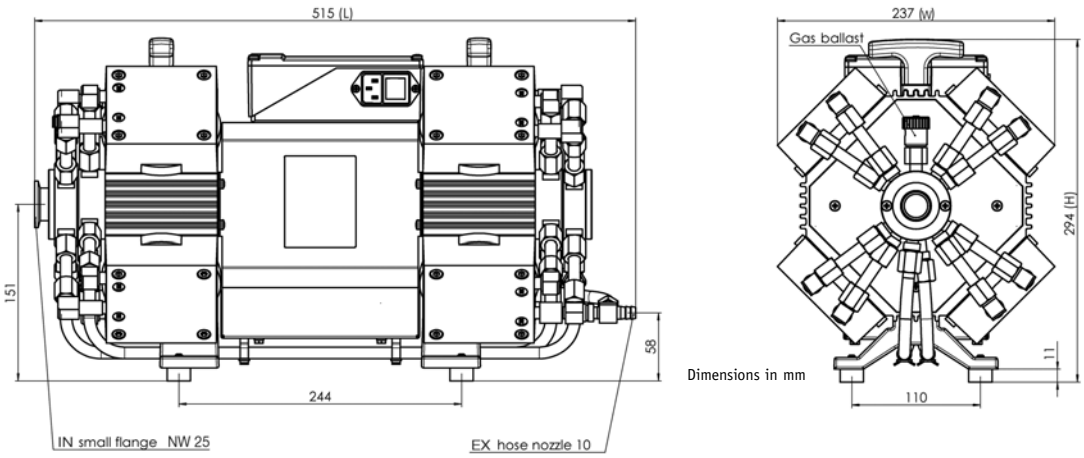
- Continuous, oil-free pumping of gases and vapours
- Selected chemically resistant materials (ME 16C)
- Gas ballast valve for working with condensates (ME 16C) as standard
- High pumping speed
- No water consumption, no waste water
- Long lifetime, easy-to-change diaphragms and valves
- Low noise level
- Compact design

The choice between the two basic designs depends on the application:

ME 16 “Aluminium”
Gas-contacting parts made of e.g. aluminium, FPM and PE. Designed for a multitude of applications involving non-aggressive gases in laboratories and process plants, such as degassing.

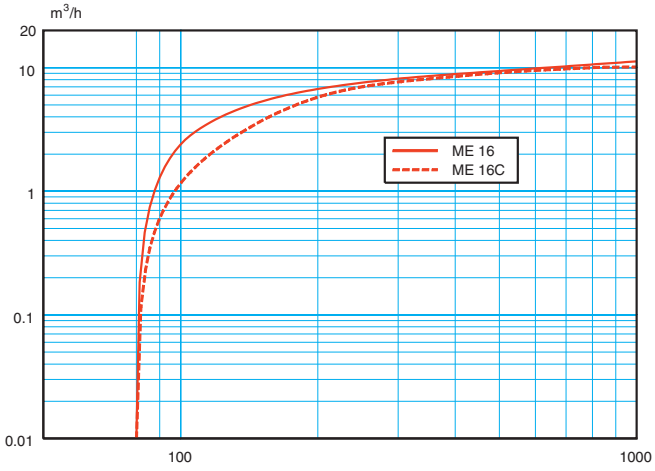
ME 16C “Chemistry”
All parts coming into contact with gases and vapours are made of chemically resistant fluoroplastics, e.g. PTFE and ETFE. Typical applications are the transfer of aggressive gases and vapours, rotary evaporation, concentrators, laboratory vacuum networks, etc.

ME 16

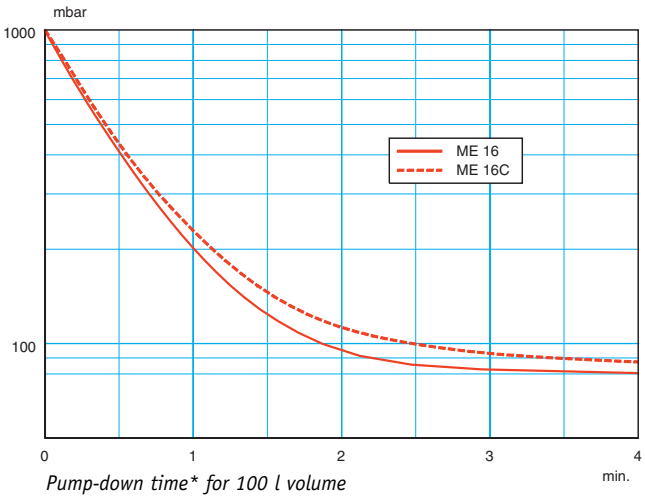


ME 16C

DIAPHRAGM PUMPS
ME 16 AND ME 16C



Pumping speed at 50 Hz*



Pump-down time for 100 l volume*

ME 16 one-stage

..... **12.0** m³/h
..... **7.6** cfm
..... **215** l/min

..... **< 80** mbar
..... **< 60** Torr

ME 16C one-stage

..... **10.1** m³/h
..... **6.8** cfm
..... **193** l/min

..... **< 80** mbar
..... **< 60** Torr

TECHNICAL DATA		ME 16	ME 16C
Number of stages		1	1
Max. pumping speed (DIN 28432) 50/60 Hz	m³/h//cfm	12.0/12.9//7.6	10.1/11.6//6.8
No. of cylinders		8	8
Ultimate vacuum (total)	mbar//Torr	< 80//< 60	< 80//< 60
Ultimate vacuum with gas ballast	mbar//Torr	-	< 150//< 112
Max. outlet pressure (total)	bar	1.1	1.1
Inlet connection (IN) Outlet connection (EX)		small flange NW 25 hose nozzle NW 10/silencer	small flange NW 25 hose nozzle NW 10
Motor power	kW	0.39	0.39
Motor rpm (nominal) 50/60 Hz	min^{-1}	1500/1800	1500/1800
Protection class		IP 20	IP 20
Dimensions (L x W x H)	mm	470 x 227 x 294	515 x 237 x 294
Mass	kg	24	25

Items supplied: Diaphragm pump with on/off switch, cable, plug and instructions for use.

ORDERING INFORMATION		ME 16	ME 16C
230 V ~ 50–60 Hz	plug CEE	69 64 27	69 64 67
230 V ~ 50–60 Hz	plug CH	69 64 35	69 65 12
230 V ~ 50–60 Hz	plug UK	69 64 34	69 65 11
120 V ~ 60 Hz	plug US	69 64 26	69 64 66
100 V ~ 50–60 Hz	plug US	69 64 32	69 64 72
400 V, 3 ~ 50 Hz; 3-ph.	plug CEE	69 64 28	69 64 68

ACCESSORIES		
Base module for chemistry pumping unit PC 8 (without pump) for ME 16 (C)		69 99 49
Separator AK PC 8, NW 25 for ME 16 (C)		69 99 80
PTFE vacuum tubing with small flange NW 25	see page 117	

* Pumping speeds and pump-down times are only for information. Ultimate vacuum specification: see Technical Data.

DIAPHRAGM PUMPS
MZ 2 AND MZ 2C

MZ 2 two-stage

1.9 m³/h
1.3 cfm
37 l/min

9 mbar
6.8 Torr

MZ 2C two-stage

1.9 m³/h
1.2 cfm
35 l/min

9 mbar
6.8 Torr

MZ 2

The two-stage MZ 2 and MZ 2C are well-proven diaphragm pumps. The two-stage configuration provides a favourable combination of high pumping speed and low ultimate vacuum down to 9 mbar. The well-proven design of motor, drive system and pump cylinders provides reliable performance and longevity. The MZ 2C is utilized in many chemistry pumping units (see pages 70–93) and can be customised step by step for different applications through supplementary modules (see page 93).

MZ 2C

SPECIAL ADVANTAGES

- Continuous, oil-free pumping of gases and vapours
- Selected chemically resistant materials (MZ 2C)
- Gas ballast valve for working with condensates (MZ 2C) as standard
- High pumping speed
- No water consumption, no waste water
- Long lifetime, easy-to-change diaphragms and valves
- Low noise level
- Compact design

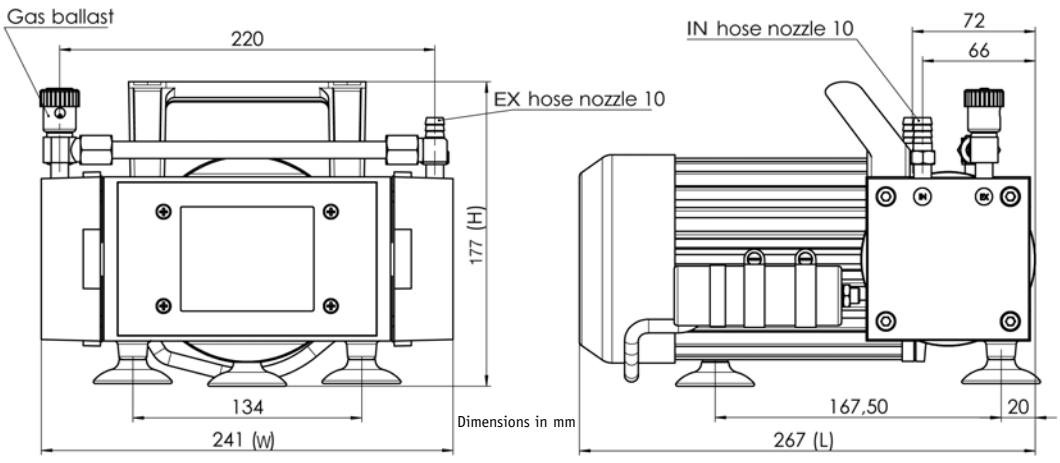
The choice between the two basic designs depends on the application:

MZ 2 “Aluminium”

Gas-contacting parts made of e.g. aluminium, FPM and PE. Designed for a multitude of applications involving non-aggressive gases in laboratories and process plants, like vacuum filtration, vacuum degassing and vacuum impregnation.

MZ 2C “Chemistry”

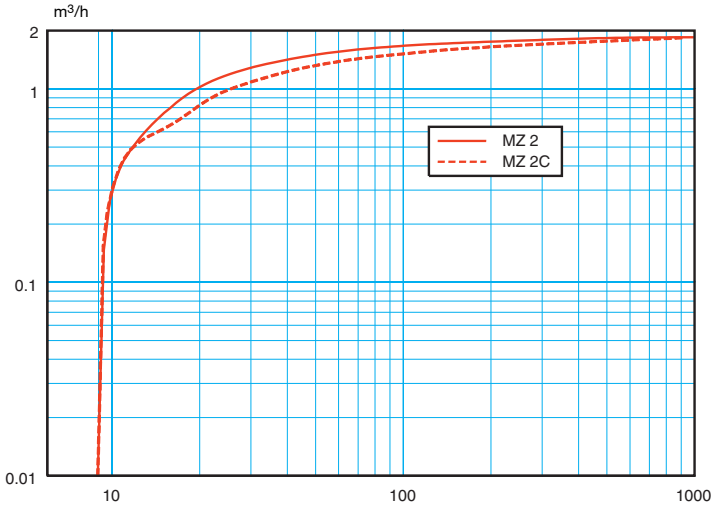
All parts coming into contact with gases and vapours are made of chemically resistant fluoroplastics, e.g. PTFE and ETFE. Typical applications are the transfer of aggressive gases and vapours, rotary evaporation, gel drying, concentrators, etc.



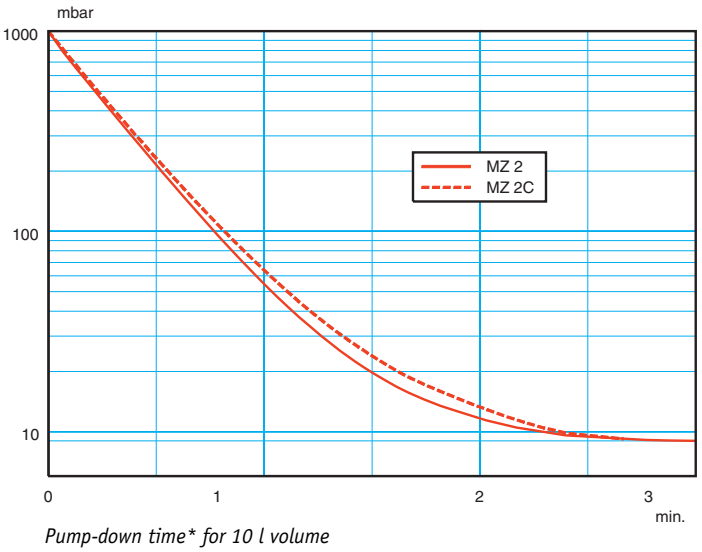
MZ 2C

Chemistry Diaphragm Pump MZ 2C VARIO and Chemistry Pumping Unit PC 2002 VARIO with vacuum control by rpm variation and higher pumping speed:
see pages 58-59 and page 97

vacuubrand



Pumping speed at 50 Hz*



Pump-down time for 10 l volume*

MZ 2 two-stage

1.9 m³/h
1.3 cfm
37 l/min

9 mbar
6.8 Torr

MZ 2C two-stage

1.9 m³/h
1.2 cfm
35 l/min

9 mbar
6.8 Torr

TECHNICAL DATA		MZ 2	MZ 2C
Number of stages		2	2
Pumping speed (DIN 28432) 50/60 Hz	m³/h//cfm	1.9/2.2//1.3	1.9/2.1//1.2
No. of cylinders		2	2
Ultimate vacuum (total)	mbar//Torr	9//6.8	9//6.8
Ultimate vacuum with gas ballast	mbar//Torr	-	15//11
Max. outlet pressure (total)	bar	2	2
Inlet connection (IN) Outlet connection (EX)		hose nozzle NW 10 silencer	hose nozzle NW 10 hose nozzle NW 10
Motor power	kW	0.18	0.18
Motor rpm (nominal) 50/60 Hz	min^{-1}	1500/1800	1500/1800
Protection class		IP 54	IP 54
Dimensions (L x W x H)	mm	264 x 235 x 177	267 x 241 x 177
Mass	kg	10.4	10.6

Items supplied: Diaphragm pump with on/off switch, cable, plug and instructions for use.

ORDERING INFORMATION		MZ 2	MZ 2C
230 V ~ 50–60 Hz	plug CEE	69 62 40	69 62 41
230 V ~ 50–60 Hz	plug UK	69 62 47	69 62 65
120 V ~ 60 Hz	plug US	69 62 43	69 62 44
100 V ~ 50–60 Hz	plug US	-	69 62 54

* Pumping speeds and pump-down times are only for information. Ultimate vacuum specification: see Technical Data.

DIAPHRAGM PUMP
MZ 2D

MZ 2D two-stage

2.2 m³/h
1.4 cfm
40 l/min

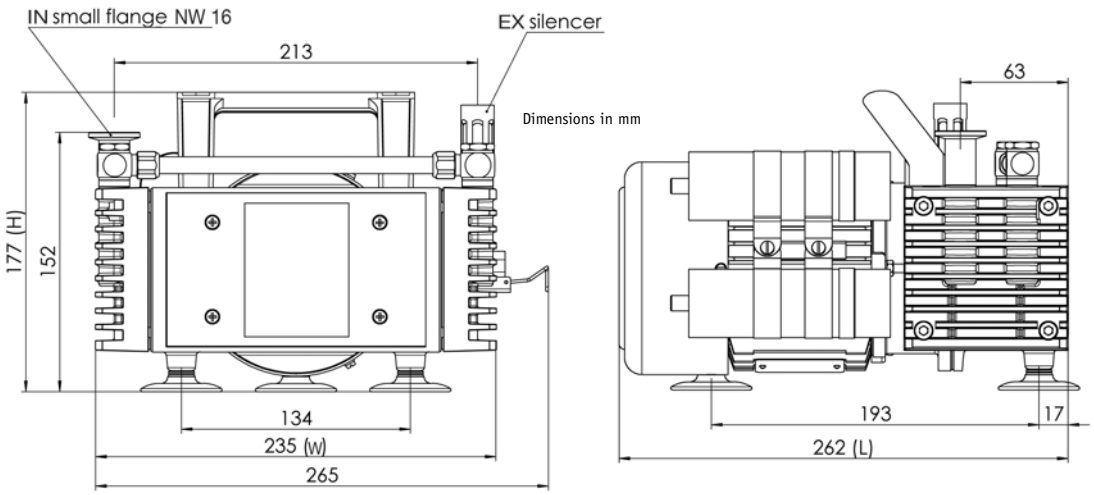
4 mbar
3 Torr

The MZ 2D is a two-stage diaphragm pump with optimised performance regarding pumping speed and ultimate vacuum. The gas contacting parts are made of e.g. aluminium, FPM and PE. Typical applications are e.g. as backing pump for wide-range turbo-molecular pumps, or pumping helium in cryotechnology, etc.

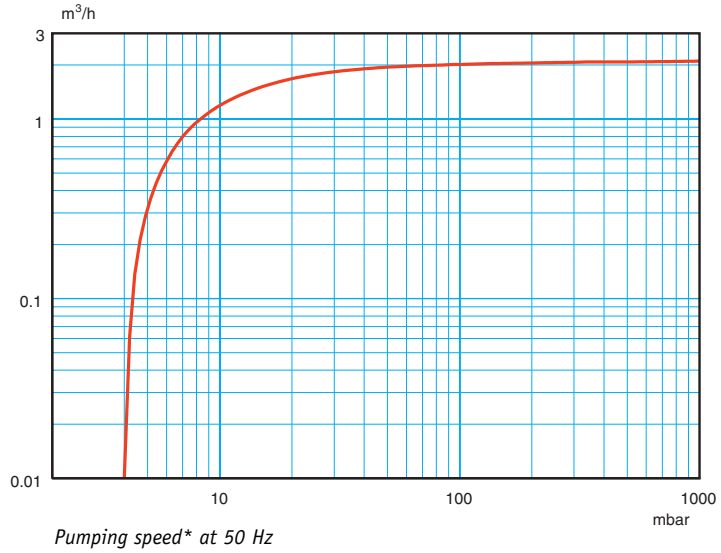
MZ 2D

SPECIAL ADVANTAGES

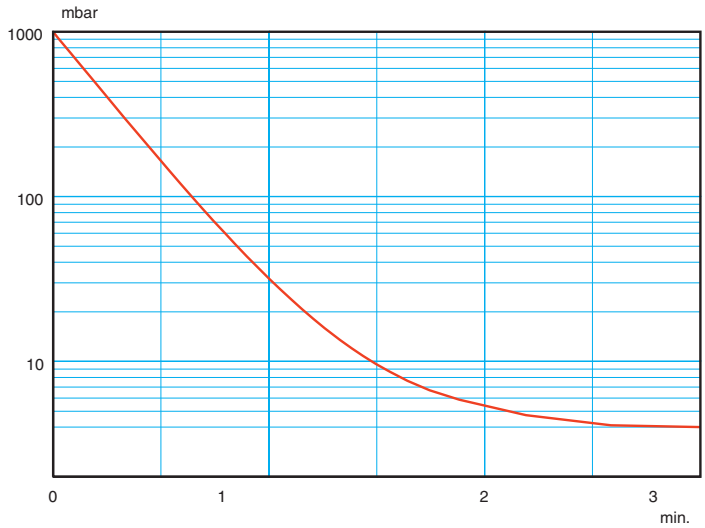
- Optimised pumping speed and ultimate vacuum
- Continuous, oil-free pumping of gases and vapours
- No water consumption, no waste water
- Long lifetime, easy-to-change diaphragms and valves
- Low noise level
- Compact design



DIAPHRAGM PUMP
MZ 2D



Pumping speed at 50 Hz*



Pump-down time for 10 l volume*

MZ 2D two-stage

2.2 m³/h
1.4 cfm
40 l/min

4 mbar
3 Torr

TECHNICAL DATA		MZ 2D
Number of stages		2
Pumping speed (DIN 28432) 50/60 Hz	m³/h//cfm	2.2/2.4//1.4
No. of cylinders		2
Ultimate vacuum (total)	mbar//Torr	4//3
Max. outlet pressure (total)	bar	1.1
Inlet connection (IN) Outlet connection (EX)		small flange NW 16 silencer
Motor power	kW	0.18
Motor rpm (nominal) 50/60 Hz	min^{-1}	1500/1800
Protection class (Position: horizontal)		IP 54
Dimensions (L x W x H)	mm	262 x 235 x 177
Mass (approx.)	kg	10.4

Items supplied: Diaphragm pump with on/off switch, cable, plug and instructions for use.

ORDERING INFORMATION		MZ 2D
230 V ~ 50–60 Hz	plug CEE	69 62 58
230 V ~ 50–60 Hz	plug UK	69 62 68
120 V ~ 60 Hz	plug US	69 62 60
100-230 V ~ 50–60 Hz (switchable)	IEC socket without cable Protection class IP 40	69 62 73

* Pumping speeds and pump-down times are only for information. Ultimate vacuum specification: see Technical Data.

DIAPHRAGM PUMPS
MD 1 AND MD 1C

MD 1 three-stage

1.2 m³/h
0.82 cfm
23 l/min

1.5 mbar
1.1 Torr

MD 1C three-stage

1.3 m³/h
0.88 cfm
25 l/min

2 mbar
1.5 Torr

MD 1

The three-stage diaphragm pumps MD 1 and MD 1C with their precisely guided planar diaphragms provide – in comparison to two-stage diaphragm pumps – superior pumping speed even at low pressures. They are outstanding as regards noise level and long diaphragm lifetime. They can be used in a wide range of applications, like the transfer of gases and vapours in chemistry and physics laboratories, often as alternative to rotary-vane pumps.

MD 1C

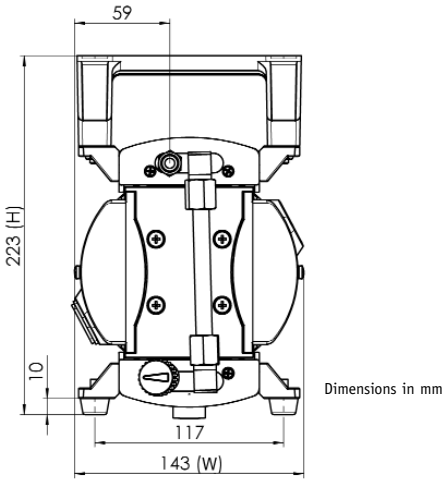
SPECIAL ADVANTAGES

- Continuous, oil-free pumping of gases and vapours
- Selected chemically resistant materials (MD 1C)
- High pumping speed even at low pressures
- Gas ballast valve as standard (MD 1C)
- No water consumption, no waste water
- Long lifetime, easy-to-change diaphragms and valves
- Low noise level and vibration
- Very compact

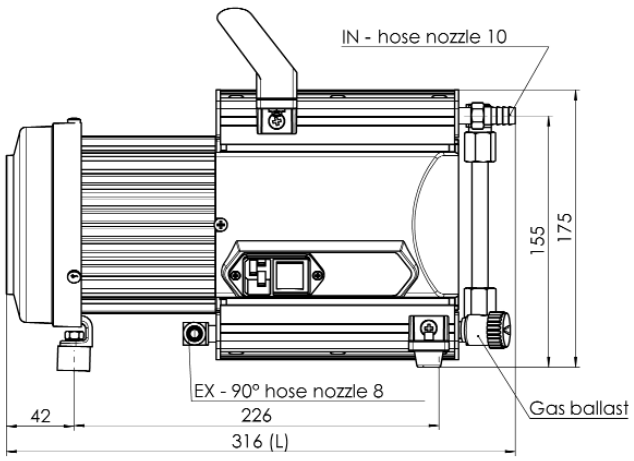
The choice between the two basic designs depends on the application:

MD 1 “Aluminium”
Gas-contacting parts made of e.g. aluminium, FPM and PE. Designed for a multitude of applications involving non-aggressive gases in laboratories, e.g. vacuum filtration, vacuum degassing and vacuum impregnation, or as a backing pump for high-vacuum pumps.

MD 1C “Chemistry”
All parts coming into contact with gases and vapours are made of chemically resistant fluoroplastics, e.g. PTFE and ETFE. Typical applications are the transfer of aggressive gases and vapours, rotary evaporation, gel drying, etc.



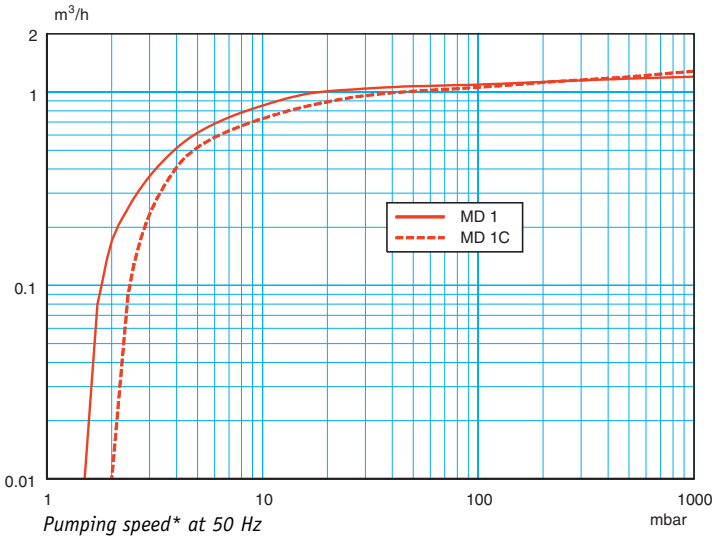
Dimensions in mm



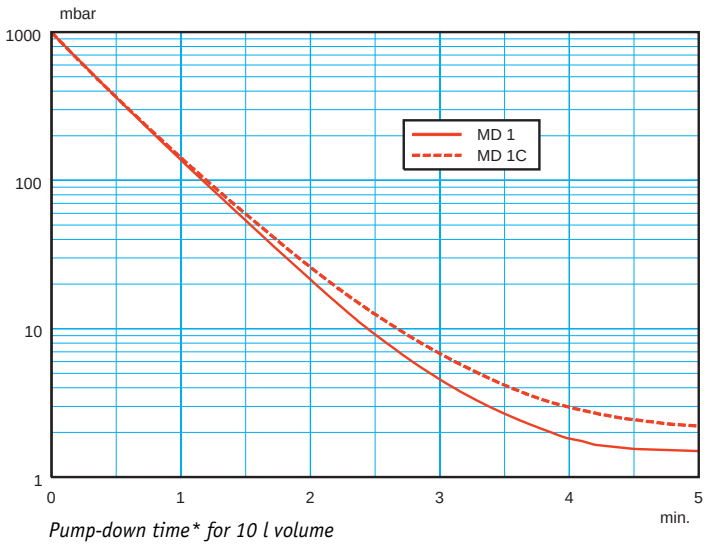
MD 1C

VARIO-SP Diaphragm Pumps MD 1 VARIO-SP and MD 1C VARIO-SP as well as VARIO Chemistry Pumping Unit PC 2001 VARIO: see pages 62-63 and page 96

DIAPHRAGM PUMPS
MD 1 AND MD 1C



Pumping speed at 50 Hz*



Pump-down time for 10 l volume*

MD 1 three-stage

1.2 m³/h
0.82 cfm
23 l/min

1.5 mbar
1.1 Torr

MD 1C three-stage

1.3 m³/h
0.88 cfm
25 l/min

2 mbar
1.5 Torr

TECHNICAL DATA		MD 1	MD 1C
Number of stages		3	3
Pumping speed (DIN 28432) 50/60 Hz	m³/h//cfm	1.2/1.4//0.82	1.3/1.5//0.88
Ultimate vacuum (total)	mbar//Torr	1.5//1.1	2//1.5
Ultimate vacuum with gas ballast	mbar//Torr	-	4//3
Max. outlet pressure (total)	bar	1.1	1.1
Inlet connection (IN) Outlet connection (EX)		hose nozzle NW 6 silencer	hose nozzle NW 10 hose nozzle NW 8
Motor power	kW	0.08	0.08
Motor rpm (nominal) 50/60 Hz	min⁻¹	1500/1800	1500/1800
Protection class		IP 44	IP 44
Dimensions (L x W x H)	mm	303 x 143 x 215	316 x 143 x 223
Mass	kg	6.7	6.9

Items supplied: Diaphragm pump with on/off switch, cable, plug and instructions for use.

ORDERING INFORMATION		MD 1	MD 1C
200-230 V ~ 50–60 Hz	plug CEE	69 60 80	69 66 00
200-230 V ~ 50–60 Hz	plug CH	69 60 81	69 66 01
200-230 V ~ 50–60 Hz	plug UK	69 60 82	69 66 02
100-120 V ~ 50–60 Hz	plug US	69 60 83	69 66 03
120 V ~ 60 Hz*	plug US	69 60 73	69 66 13
100-230 V ~ 50–60 Hz (switchable)	IEC socket without cable	69 60 87	–

* With NRTL certification for Canada and USA

* Pumping speeds and pump-down times are only for information. Ultimate vacuum specification: see Technical Data.

DIAPHRAGM PUMPS
MD 4 AND MD 4C

vacuubrand

MD 4 three-stage

3.3	m³/h
2.2	cfm
63	l/min
2	mbar
1.5	Torr

MD 4C three-stage

3.0	m³/h
2.1	cfm
58	l/min
2	mbar
1.5	Torr

MD 4

The three-stage diaphragm pumps MD 4 and MD 4C are versatile and flexible. Their three-stage design provides an advantageous combination of elevated pumping speed and good ultimate vacuum. They can be used in a wide range of applications, e.g. the pumping of air and inert gases, the backing of wide-range turbo pumps (MD 4), or the transfer of solvent vapours and aggressive gases (MD 4C). The MD 4C is the core of a multitude of chemistry pumping units (see pages 75 and 79–83).

MD 4C

SPECIAL ADVANTAGES

- Continuous, oil-free pumping of gases and vapours
- Selected chemically resistant materials (MD 4C)
- Gas ballast valve for working with condensates (MD 4C) as standard
- High pumping speed
- No water consumption, no waste water
- Long lifetime, easy-to-change diaphragms and valves
- Low noise level
- Compact design

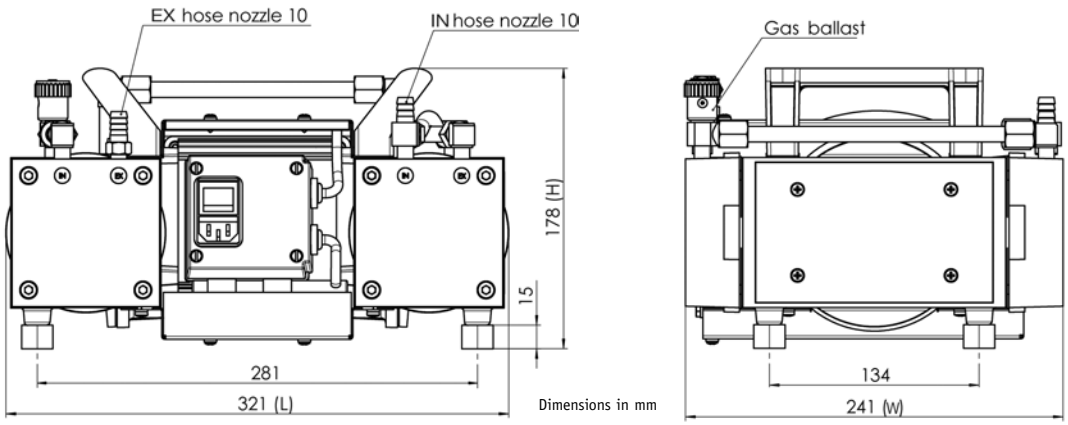
The choice between the two basic designs depends on the application:

MD 4 “Aluminium”

Gas-contacting parts made of e.g. aluminium, FPM and PE. Designed for a multitude of applications involving non-aggressive gases in laboratories and process plants, like vacuum filtration, vacuum degassing and vacuum impregnation. The MD 4 is a high-performance, oil-free backing pump with high pumping speed even at low pressures for turbo-molecular pumps with high backing pressure tolerance, and for the regeneration of cryopumps.

MD 4C “Chemistry”

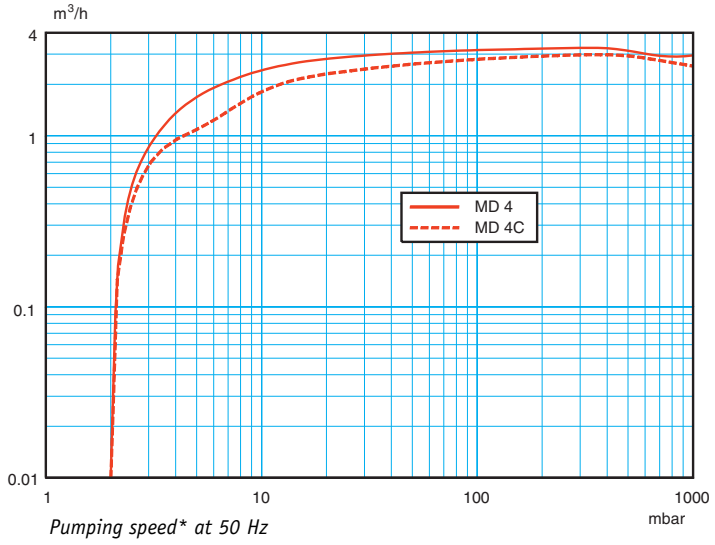
All parts coming into contact with gases and vapours are made of chemically resistant fluoroplastics, e.g. PTFE and ETFE. Typical applications are the transfer of aggressive gases and vapours, rotary evaporation, gel drying, etc.



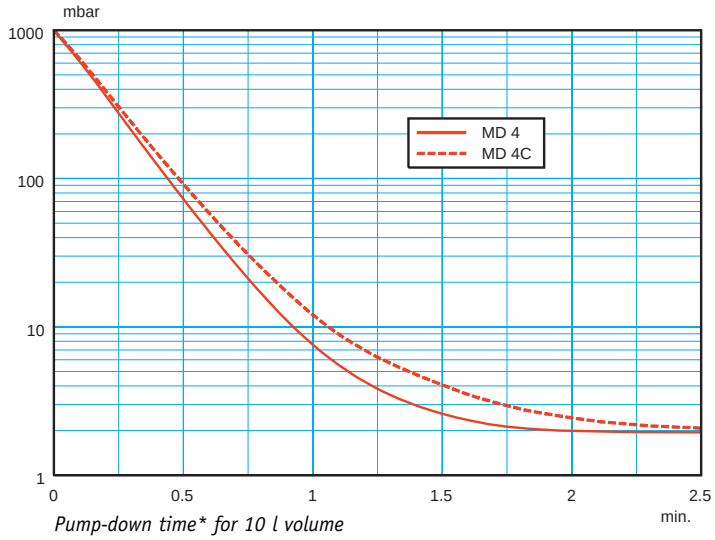
MD 4C

! Diaphragm Pumps MD 4 VARIO-SP, MD 4 VARIO and MD 4C VARIO as well as Chemistry Pumping Unit PC 2004 VARIO with vacuum control by rpm variation and even lower ultimate vacuum: see pages 54-65 and 99

DIAPHRAGM PUMPS
MD 4 AND MD 4C



Pumping speed at 50 Hz*



Pump-down time for 10 l volume*

MD 4 three-stage

3.3 m³/h
2.2 cfm
63 l/min

2 mbar
1.5 Torr

MD 4C three-stage

3.0 m³/h
2.1 cfm
58 l/min

2 mbar
1.5 Torr

TECHNICAL DATA		MD 4	MD 4C
Number of stages		3	3
Pumping speed (DIN 28432) 50/60 Hz	m³/h//cfm	3.3/3.8//2.2	3.0/3.5//2.1
No. of cylinders		4	4
Ultimate vacuum (total)	mbar//Torr	2//1.5	2//1.5
Ultimate vacuum with gas ballast	mbar//Torr	-	4//3
Max. outlet pressure (total)	bar	1.1	1.1
Inlet connection (IN) Outlet connection (EX)		small flange NW 16 silencer	hose nozzle NW 10 hose nozzle NW 10
Motor power	kW	0.2	0.2
Motor rpm (nominal) 50/60 Hz	min^{-1}	1500/1800	1500/1800
Protection class		IP 20	IP 20
Dimensions (L x W x H)	mm	315 x 235 x 179	321 x 241 x 178
Mass	kg	15.6	16.2

Items supplied: Diaphragm pump with on/off switch, cable, plug and instructions for use.

ORDERING INFORMATION		MD 4	MD 4C
230 V ~ 50–60 Hz	plug CEE	69 62 90	69 62 92
230 V ~ 50–60 Hz	plug CH	69 63 75	69 63 79
230 V ~ 50–60 Hz	plug UK	69 63 74	69 63 78
120 V ~ 60 Hz	plug US	69 62 91	69 62 93
100 V ~ 50–60 Hz	plug US	69 62 95	69 62 94
200-208 V ~ 50–60 Hz	plug US (NEMA 6-15P)	69 63 30	69 63 35

* Pumping speeds and pump-down times are only for information. Ultimate vacuum specification: see Technical Data.

DIAPHRAGM PUMPS
MD 12 AND MD 12C

MD 12 three-stage

9.6	m³/h
6.1	cfm
173	l/min
2	mbar
1.5	Torr

MD 12C
three-stage

8.3	m³/h
5.2	cfm
148	l/min
2	mbar
1.5	Torr

MD 12

The MD 12 and MD 12C are the most powerful pumps of the three-stage diaphragm pump family, offering a pumping speed up to approx. 10 m³/h. They can be used in a wide range of applications, e.g. the pumping of air and inert gases, the backing of wide-range turbo pumps (MD 12) or the transfer of solvent vapours and aggressive gases (MD 12C). Their high pumping speed can lead to a significant improvement in process times, or allow the efficient simultaneous operation of processes in a vacuum network.

MD 12C

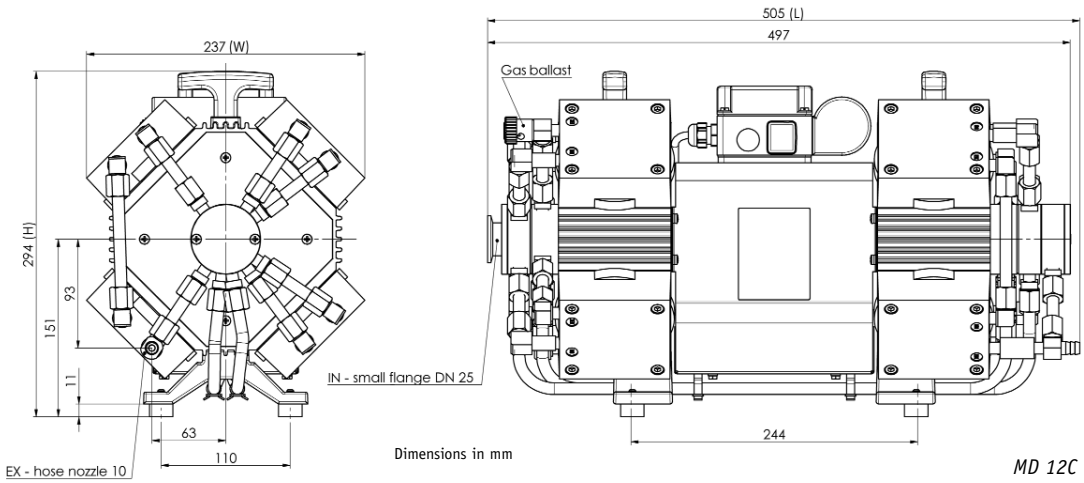
SPECIAL ADVANTAGES

- Outstanding pumping speed even at low pressures due to precisely guided planar diaphragm
- Three-stage design for higher performance compared to two-stage pumps
- Selected chemically resistant materials (MD 12C)
- Continuous, oil-free pumping of gases and vapours
- Gas ballast valve for working with condensates as standard (MD 12C)
- Optimised lifetime of diaphragms and valves of approx. 10,000 h under appropriate conditions
- No water consumption, no waste water
- Easy-to-change diaphragms and valves
- Low noise level and vibration
- Compact design

The choice between the two basic designs depends on the application:

MD 12 “Aluminium”
Gas-contacting parts made of e.g. aluminium, FPM and PE. Designed for a multitude of applications involving non-aggressive gases in laboratories and process plants, e.g. vacuum drying, vacuum impregnation, backing of cryo and wide-range turbo pumps.

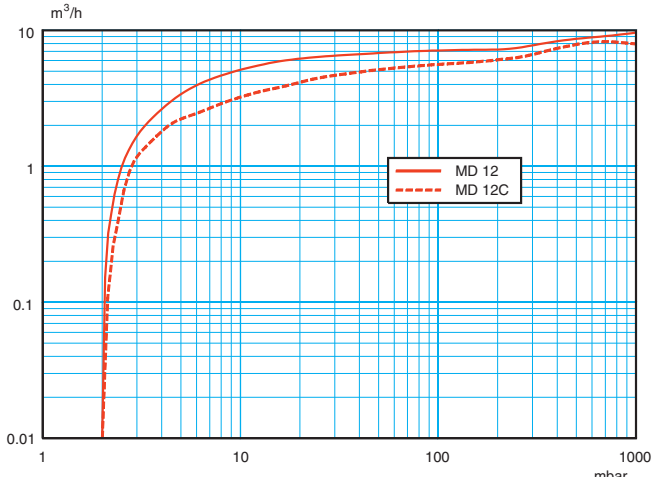
MD 12C “Chemistry”
All parts coming into contact with gases and vapours are made of chemically resistant fluoroplastics, e.g. PTFE and ETFE. Typical applications are the transfer of aggressive gases and vapours, large rotary evaporators, drying chambers, local-area vacuum networks (VACUU·LAN®), etc.



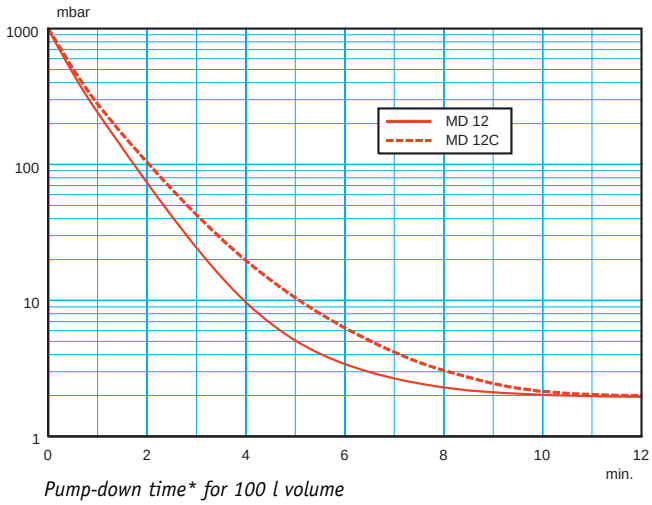
MD 12C

VARIO Chemistry Pumping Unit PC 2012 VARIO: see page 101

DIAPHRAGM PUMPS
MD 12 AND MD 12C



Pumping speed at 50 Hz*



Pump-down time for 100 l volume*

MD 12 three-stage

9.6 m³/h
6.1 cfm
173 l/min

2 mbar
1.5 Torr

MD 12C three-stage

8.3 m³/h
5.2 cfm
148 l/min

2 mbar
1.5 Torr

TECHNICAL DATA		MD 12	MD 12C
Number of stages		3	3
Max. pumping speed (DIN 28432) 50/60 Hz	m³/h//cfm	9.6/10.4//6.1	8.3/8.9//5.2
No. of cylinders		8	8
Ultimate vacuum (total)	mbar//Torr	2//1.5	2//1.5
Ultimate vacuum with gas ballast	mbar//Torr	-	9//6.8
Max. outlet pressure (total)	bar	1.1	1.1
Inlet connection (IN) Outlet connection (EX)		small flange NW 25 hose nozzle NW 10/silencer	small flange NW 25 hose nozzle NW 10
Motor power	kW	0.39	0.39
Motor rpm (nominal) 50/60 Hz	min^{-1}	1500/1800	1500/1800
Protection class		IP 20	IP 20
Dimensions (L x W x H)	mm	486 x 227 x 294	505 x 237 x 294
Mass	kg	24	25

Items supplied: Diaphragm pump with on/off switch, cable, plug and instructions for use.

ORDERING INFORMATION		MD 12	MD 12C
230 V ~ 50–60 Hz	plug CEE	71 00 00	71 01 50
230 V ~ 50–60 Hz	plug CH	71 00 01	71 01 51
230 V ~ 50–60 Hz	plug UK	71 00 02	71 01 52
120 V ~ 60 Hz	plug US	71 00 03	71 01 53

ACCESSORIES

Base module for chemistry pumping unit PC 8 (without pump) for MD 12 (C)		69 99 49
Separator inlet side AK PC 8, NW 25 for MD 12 (C)		69 99 80
PTFE vacuum tubing with small flange NW 25	see page 117	

PTFE Vacuum Tubing

* Pumping speeds and pump-down times are only for information. Ultimate vacuum specification: see Technical Data.

DIAPHRAGM PUMP
MV 2

vacuubrand

MV 2 four-stage

.....**1.9** m³/h
.....**1.3** cfm
.....**37** l/min

.....**0.6** mbar
.....**0.45** Torr

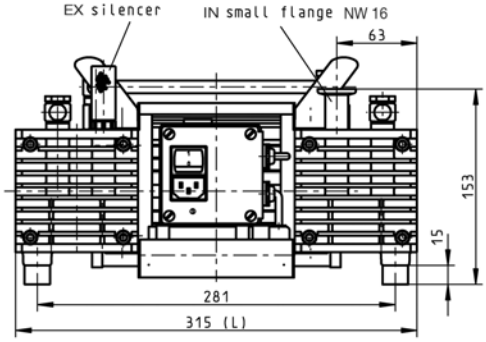
The four-stage diaphragm pump MV 2 is designed for the lowest ultimate vacuum. The MV 2 has an outstandingly high lifetime of diaphragms and low noise. Gas-contacting parts are made of e.g. aluminium, FPM and PE. The MV 2 is used for many demanding vacuum applications in the laboratory, for example, as backing pump for wide-range turbomolecular pumps. The MV 2 provides a vacuum performance close to a rotary-vane pump, but generates, in addition, a hydrocarbon-free vacuum and allows the contamination-free transfer of gases.

MV 2

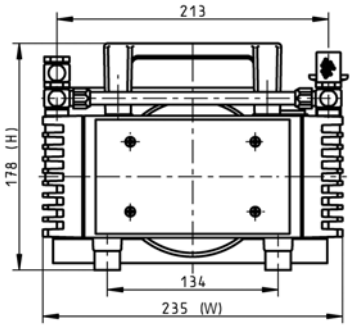
MV 2 VARIO

SPECIAL ADVANTAGES

- Very low ultimate vacuum
- Continuous, oil-free pumping of gases and vapours
- Long lifetime, easy-to-change diaphragms and valves
- Low noise level
- Compact design



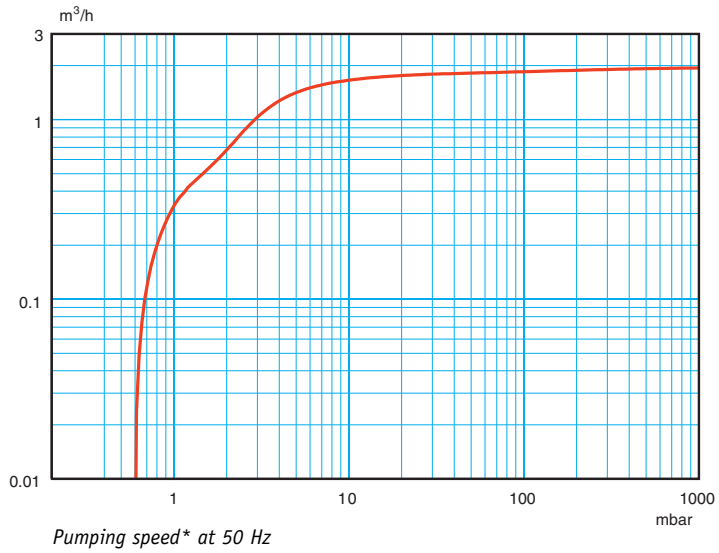
Dimensions in mm



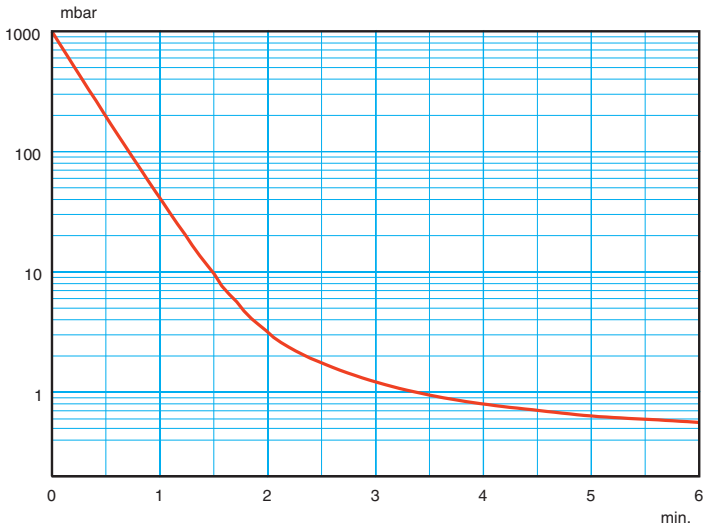
Diaphragm Pump MV 2 VARIO with vacuum control by rpm variation and 0.3 mbar ultimate vacuum: see pages 56-57

DIAPHRAGM PUMP
MV 2

vacuubrand



Pumping speed at 50 Hz*



Pump-down time for 10 l volume*

MV 2 four-stage

1.9	m³/h
1.3	cfm
37	l/min
0.6	mbar
0.45	Torr

TECHNICAL DATA		MV 2
Number of stages		4
Pumping speed (DIN 28432) 50/60 Hz	m³/h//cfm	1.9/2.2//1.3
No. of cylinders		4
Ultimate vacuum (total)	mbar//Torr	0.6//0.45
Max. outlet pressure (total)	bar	1.1
Inlet connection (IN) Outlet connection (EX)		small flange NW 16 silencer
Motor power	kW	0.2
Motor rpm (nominal) 50/60 Hz	min⁻¹	1500/1800
Protection class		IP 20
Dimensions (L x W x H)	mm	315 x 235 x 178
Mass	kg	15.8

Items supplied: Diaphragm pump with on/off switch, cable, plug and instructions for use.

ORDERING INFORMATION		MV 2
230 V ~ 50–60 Hz	plug CEE	69 63 50
230 V ~ 50–60 Hz	plug CH	69 63 52
230 V ~ 50–60 Hz	plug UK	69 63 49
120 V ~ 60 Hz	plug US	69 63 51

* Pumping speeds and pump-down times are only for information. Ultimate vacuum specification: see Technical Data.

DIAPHRAGM PUMPS
MV 10 AND MV 10C

vacuubrand

MV 10 four-stage

8.1 m³/h
5.2 cfm
147 l/min

0.6 mbar
0.45 Torr

MV 10C four-stage

7.0 m³/h
4.4 cfm
125 l/min

0.9 mbar
0.68 Torr

MV 10

The four-stage diaphragm pumps MV 10 and MV 10C provide an unrivaled combination of high pumping speed and low ultimate vacuum. The pump design and configuration provide smooth and low-noise operation. They can be used in a wide range of applications, such as in chemistry and physics laboratories, up to pilot and small production plants.

MV 10C

SPECIAL ADVANTAGES

- Outstanding pumping speed even at low pressures due to precisely guided planar diaphragm
- Four-stage configuration for very low ultimate vacuum
- Selected chemically resistant materials (MV 10C)
- Continuous, oil-free pumping of gases and vapours
- Gas ballast valve for working with condensates as standard (MV 10C)
- Optimised lifetime of diaphragms and valves of approx. 10,000 h
- No water consumption, no waste water
- Easy-to-change diaphragms and valves
- Low noise level and vibration
- Compact design

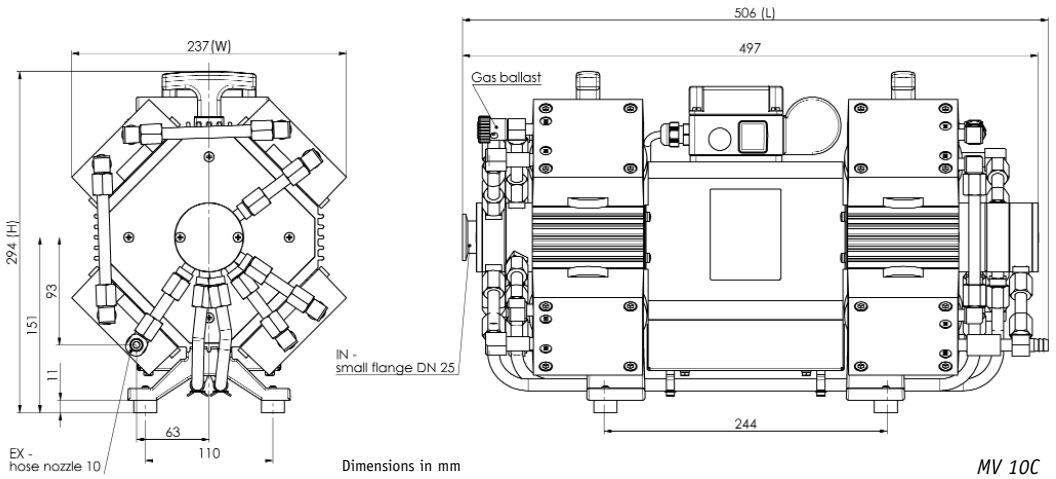
The choice between the two basic designs depends on the application:

MV 10 “Aluminium”

Gas-contacting parts made of e.g. aluminium, FPM and PE. Designed for a multitude of applications involving non-aggressive gases in laboratories and process plants, e.g. vacuum drying, vacuum impregnation, backing of cryo and large wide-range turbo pumps.

MV 10C “Chemistry”

All parts coming into contact with gases and vapours are made of chemically resistant fluoroplastics, e.g. PTFE and ETFE. Typical applications are the transfer of aggressive gases and vapours, large rotary evaporation, drying chambers, etc.

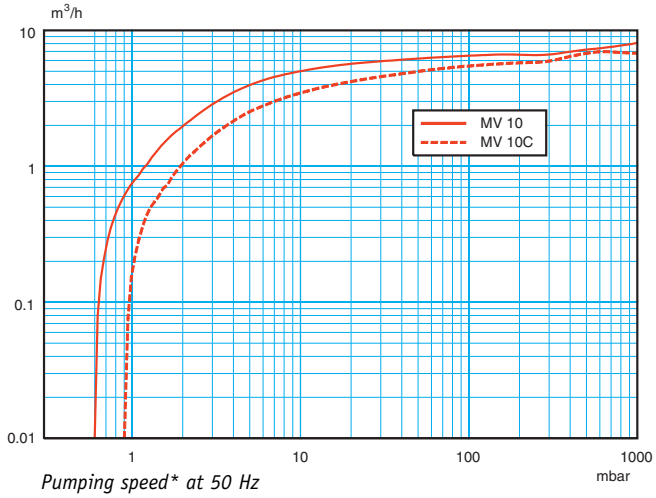


Dimensions in mm

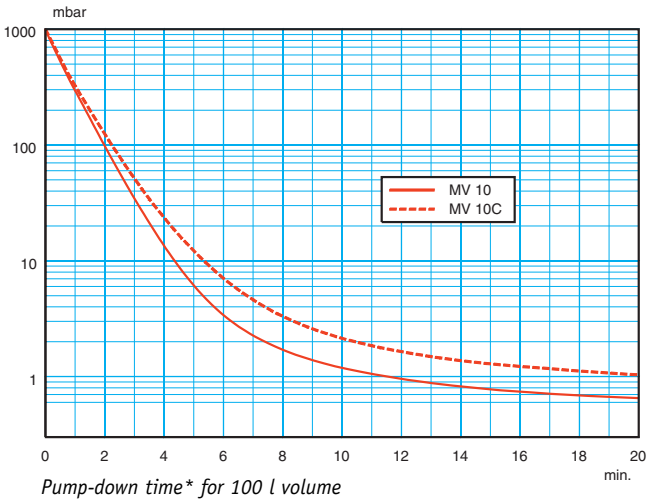
MV 10C

! **VARIO Chemistry Pumping Unit PC 2010 VARIO: see page 100**

DIAPHRAGM PUMPS
MV 10 AND MV 10C



Pumping speed at 50 Hz*



Pump-down time for 100 l volume*

MV 10 four-stage

8.1 m³/h
5.2 cfm
147 l/min

0.6 mbar
0.45 Torr

MV 10C four-stage

7.0 m³/h
4.4 cfm
125 l/min

0.9 mbar
0.68 Torr

TECHNICAL DATA		MV 10	MV 10C
Number of stages		4	4
Max. pumping speed (DIN 28432) 50/60 Hz	m³/h//cfm	8.1/8.8//5.2	7.0/7.5//4.4
No. of cylinders		8	8
Ultimate vacuum (total)	mbar//Torr	0.6//0.45	0.9//0.68
Ultimate vacuum with gas ballast	mbar//Torr	-	9//6.8
Max. outlet pressure (total)	bar	1.1	1.1
Inlet connection (IN) Outlet connection (EX)		small flange NW 25 hose nozzle NW 10/silencer	small flange NW 25 hose nozzle NW 10
Motor power	kW	0.39	0.39
Motor rpm (nominal) 50/60 Hz	min⁻¹	1500/1800	1500/1800
Protection class		IP 20	IP 20
Dimensions (L x W x H)	mm	486 x 227 x 294	505 x 237 x 294
Mass	kg	24	25

Items supplied: Diaphragm pump with on/off switch, cable, plug and instructions for use.

ORDERING INFORMATION		MV 10	MV 10C
230 V ~ 50–60 Hz	plug CEE	71 00 50	71 02 00
230 V ~ 50–60 Hz	plug CH	71 00 51	71 02 01
230 V ~ 50–60 Hz	plug UK	71 00 52	71 02 02
120 V ~ 60 Hz	plug US	71 00 53	71 02 03
100 V ~ 50–60 Hz	plug US	71 00 55	-

ACCESSORIES

Base module for chemistry pumping unit PC 8 (without pump) for MV 10 (C)		69 99 49
Separator inlet side AK PC 8, NW 25 for MV 10 (C)		69 99 80
PTFE vacuum tubing with small flange NW 25	see page 117	

PTFE Vacuum Tubing

* Pumping speeds and pump-down times are only for information. Ultimate vacuum specification: see Technical Data.