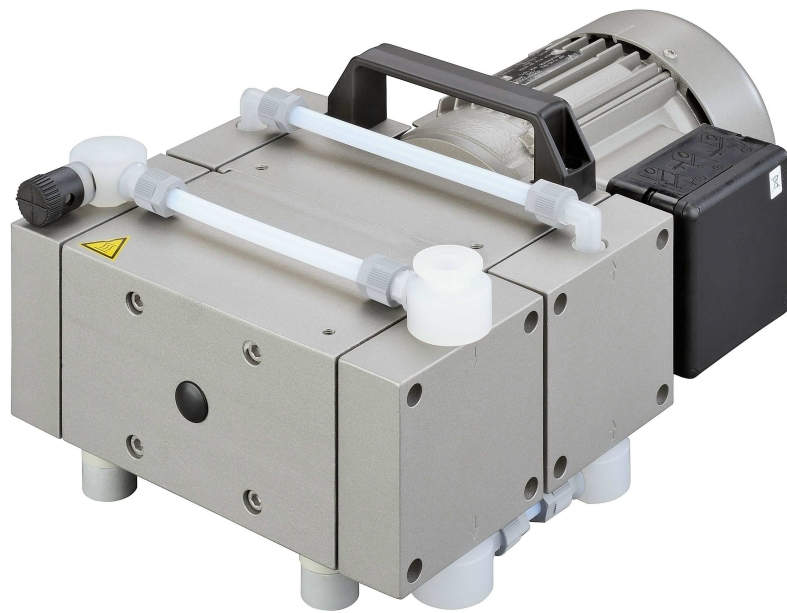


Operation Manual (en)



Translation of the german original manual



Diaphragm pumps 4-headed

Models 2054, 2052

We are constantly working on the further development of all our product types.
Reprinting or reproduction of this manual, including extracts, is not allowed without the prior written permission of Co. WELCH-ILMVAC.
All rights under the copyright laws are expressly reserved by Co. WELCH-ILMVAC.
We reserve the right to make changes and amendments.

WELCH-ILMVAC

Thomas Division, Gardner Denver Inc.

ILMVAC GmbH

Am Vogelherd 20

D-98693 Ilmenau / Germany

Phone: +49 3677 604-0

Fax: +49 3677 604-110

E-Mail: welch-ilmvac.de@gardnerdenver.com

Internet: <http://www.welch-ilmvac.com>

Customer service - Phone: +49 3677 604-154

For USA, Canada and other Americas

Welch-Ilmvac

5621 W. Howard St.

Niles, IL 60714

USA

Phone: 1-847-676-8800

Fax: 1-847-677-8606

E-Mail: welch-ilmvac.us@gardnerdenver.com

Contents

1	Important Information	4
1.1	General Information	4
1.2	Target Groups	4
1.3	Intended Use.....	4
1.4	Use for an Unauthorized Purpose	4
1.5	Safety Devices	5
1.6	Meaning of the Warning notes	5
1.7	Product Standards, Safety Regulations	5
2	Basic Safety Instructions	6
2.1	General Information	6
2.2	Electricity.....	6
2.3	Mechanical Systems	6
2.4	Hazardous Substances.....	7
2.5	High Temperatures	7
3	Description	8
3.1	Design	8
3.2	Principle of Operation	8
3.3	Gas ballast	8
3.4	Areas of Application	8
3.5	Pump head circuitry	9
3.6	Materials of the medium-affecting pump parts.....	9
3.7	Scope of Delivery	9
3.8	Accessories.....	9
3.8.1	Connection variants A – K	10
4	Technical Data	11
4.1	Dimensions	11
4.2	Device Data.....	11
5	Installation and Operation	12
5.1	Unpacking	12
5.2	Installation and Connection.....	12
5.3	Operation	12
5.4	Storage.....	12
5.5	Scrap Disposal	12
6	Maintenance and Servicing	13
6.1	General Requirements.....	13
6.2	Maintenance Performed by the User	13
6.2.1	Disassembly.....	14
6.2.2	Assembly.....	14
6.2.3	Test	15
6.3	Maintenance by the Manufacturer	15
6.4	Damage Report.....	15
7	Troubleshooting	16
8	Spare Parts Overview	17
8.1	Service kit.....	17
8.2	Spare parts view	18
8.2.1	Spare parts list - Diaphragm pumps - Models 2052	19
8.2.2	Spare parts list - Diaphragm pumps - Models 2054	20

EC Declaration of Conformity

Important Information

1 Important Information

1.1 General Information

The Diaphragm Pumps conform to the following directives:

2006/95/EC	Low Voltage Directive
2006/42/EC	Machinery Directive
2004/108/EC	Electromagnetic Compatibility Directive

The CE sign is located on the rating plate. Observe the binding national and local regulations when fitting the pump into installations!

Our products are sold worldwide and can therefore be equipped with the typical national plugs and for the various voltages. You will find more information about the available pump designs on our web page in the internet.

1.2 Target Groups

This Operating Manual is intended for the personnel planning, operating and maintaining Diaphragm Pumps.

This group of people includes:

- Designers and fitters of vacuum apparatus,
- Employees working on commercial laboratory and industrial vacuum technology applications and
- Service personnel for diaphragm pumps

The personnel operating and maintaining the diaphragm pumps must have the technical competence required to perform the work that has to be done.

The user must authorize the operating personnel to do the work that has to be done.

The personnel must have read and understood the complete Operating Manual before using the diaphragm pumps.

The Operating Manual must be kept at the place of use and be available to the personnel when required.

1.3 Intended Use


- The layout of the diaphragm pump must be appropriate for the conditions of use. The user bears the sole responsibility for this.
- The diaphragm pump may only be operated under the conditions stated
 - in the "Technical Data" section,
 - on the type plate, and
 - in the technical specification for the order concerned.
- Diaphragm pumps are approved for extracting, pumping and compressing gases and vapours. If these gases and vapours are toxic or explosive, then the user must observe the currently valid safety regulations for this application. Special types of diaphragm pumps are available for aggressive and explosive gas mixtures.

1.4 Use for an Unauthorized Purpose

It is forbidden to use the pump for applications deviating from the technical data stated on the type plate or the conditions stated in the supply contract, or to operate it with missing or defective protective devices.

1.5 Safety Devices


Measures such as the following are for the safety of the operating personnel:

- electrical connection with a protective conductor (operating mode S1) and an earthing plug,
- Motor protection switch (thermal) and
- "Hot Surface" label on the pump body - warning notice 

The diaphragm pump must not be operated without these elements.

1.6 Meaning of the Warning notes

Take note of the warning notices. They are in the following box:

	CAUTION ! / WARNING !
Hazard which may lead to serious injuries or material damage.	

1.7 Product Standards, Safety Regulations

The Diaphragm Pumps meet the following product standards:

DIN EN ISO 12100-1:2004	Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology
DIN EN ISO 12100-2:2004	Safety of machinery - Basic concepts, general principles for design - Part 2: Technical principles
DIN EN ISO 13857:2008-06	Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs
DIN EN 1012-2	Compressors and vacuum pumps - Safety requirements - Part 2: Vacuum pumps
DIN EN ISO 2151	Acoustics - Noise test code for compressors and vacuum pumps - Engineering method (grade 2)
DIN EN 60204-1	Safety of machinery - Electrical equipment of machines - Part 1: General requirements
DIN EN 61000-6-2	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
DIN EN 61000-6-4	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments
DIN EN 61010-1	Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements
DIN EN 50110-1	Operation of electrical installations
Directive 2012/19/CE	Electrical and electronics - old devices (WEEE)
Directive 2011/65/CE	Dangerous materials in electrical and electronics devices (RoHS)
China - RoHS	Environment protection law - China 2007-03

The following additional safety regulations apply in the FR Germany:

BGV A3	Electrical equipment and operating materials
VBG 5	Power-driven machines
BGR 120	Guidelines for laboratories
BGI 798	Hazard assessment in the laboratory
BGG 919 (VBG 16)	Accident prevention regulations for "compressors"
BGR 189 (BGR 195;192;197)	Use of protective working clothes

Observe the standards and regulations applying in your country when you use the diaphragm pumps.

2 Basic Safety Instructions

2.1 General Information

Warning notices must be observed. Disregarding them may lead to damage to health and property.

The diaphragm pumps must be operated by personnel who can detect impending dangers and take action to prevent them from materialising.

The manufacturer or authorized authorised workshops will only service or maintain the diaphragm pump if it is accompanied by a fully completed damage report. Precise information about the contamination (also negative information if necessary) and thorough cleaning of the diaphragm pump are legally binding parts of the contract.

Contaminated diaphragm pumps and their individual parts must be disposed of in accordance with the legal regulations.

The local regulations apply in foreign countries.

2.2 Electricity

The diaphragm pumps of operation mode S1 are supplied. When the location of operation mode S1 devices is changed, please note that the testing must be repeated in accordance with DIN EN 0105, DIN EN 0702 and BGV A2.

The local regulations apply in foreign countries.


Please note the following when connecting to the electrical power supply system:

- The electrical power supply system must have a protective connector according to DIN VDE 0100-410 (IEC 60364-4-41).
- The protective connector must not have any breaks.
- The connecting cable must not be damaged.

2.3 Mechanical Systems

Improper use can lead to injuries or material damage. Observe the following instructions:

- Only operate the diaphragm pumps with hoses of the specified dimensions.
- The maximum permissible pressure of 1 bar at the suction connection must not be exceeded.
- Hazardous substances must be separated out as far as this is technically possible before they reach the pump.
- External mechanical stresses and vibrations must not be transmitted to the pump. Only use flexible laboratory hoses for connecting diaphragm pumps.
- The overpressure generated at the pressure port must not exceed 1 bar.
- The pump must not be used to suck up fluids. Lay the exhaust pipe so that it slopes downwards, so allowing condensate to flow out of the pump. Collect the condensate and dispose of it in an environmentally compatible manner.
- Prevent dyes exuding.
- Maintain a space of least 20 cm between the pump and adjacent parts in order to enable the pump to cool.

	CAUTION !
Solid particles in the pumping medium impair the pumping action and can lead to damage. Prevent solid particles penetrating into the pump.	

2.4 Hazardous Substances

The operating company bears the responsibility for the use of the diaphragm pump.

Hazardous substances in the gases to be pumped can cause personal injuries and property damage. Pay attention to the warning notices for handling hazardous substances.

The local regulations apply in foreign countries.

Combustible Gases

Examine before switching on whether that can form gas combustible gas/air mixtures which can be promoted! Consider the regulations of the guideline 1999/92/EC.

Explosive gases

The diaphragm pumps are not certified according to ATEX guidelines 94/9/EC.

Aggressive gases

The **Models 2054** and **2052** are designed for extracting contaminated gases!

Especially aggressive gases have to be explicitly checked for material resistance as described (see *chapter 3.6*) and, if necessary, modified.

Poisonous gases

Use a separator when pumping poisonous or harmful gases. Prevent such substances from leaking out of the appliance or pump. Treat these substances according to the applicable environmental protection regulations.

Test the strength and leak-tightness of the connecting lines and the connected apparatus. Prevent environmental poisons, e.g. mercury, getting into the diaphragm pumps.

Fulfil the requirements, for example:

- German Hazardous Substances Regulation (GefStoffV) of 01. December 2010
- Regulations 2006/121/EC (classification, packaging and identification of hazardous substances),
- Manufacturer's safety data sheets on hazardous substances.

2.5 High Temperatures

The diaphragm pump may heat up as a result of the temperature of the gas being pumped and through compression heat.

Prevent the following maximum permissible temperatures from being exceeded.

- + 40 °C for the environment, and
- + 60 °C for the gas to be pumped.

The motor for single phase alternating current is protected against overload by an integrated motor protection switch.

Description

3 Description

3.1 Design

The diaphragm pump consists of a pump casing and a drive motor. The pump casing contains the drive unit and two four pump heads. Each pump head contains a diaphragm and the work valves. Two pairs of pump heads are arranged opposite each other. The pump heads are driven via an eccentric shaft with a connecting rod. Two and three stage pumps are supplied, depending upon the circuitry of the pump heads.

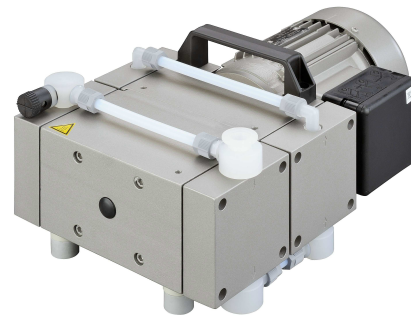


Fig. 1 Diaphragm pump Model 2052

3.2 Principle of Operation

Motor, eccentric shaft and connecting rod set the diaphragms in stroke movement. This changes the size of the space between the diaphragms and pump head (pump chamber). Increasing the size of the pump chamber opens the inlet valve while the outlet valve is closed (intake process).

Decreasing the size of the pump chamber ejects the gas through the outlet valve. The valves are actuated by the gas being pumped. A large proportion of fluid in the diaphragm pump minimizes the pumping efficiency.

3.3 Gas ballast

When condensable vapours are pumped, they may be compressed above the saturated vapour pressure and condense.

Opening the gas ballast valve (1) in the suction line of the last pump stage allows air to flow into the pump chamber. This prevents condensation and flushes the pump clear. Operation leads to increasing the ultimate pressure and the operating temperature.

The gas ballast valve is provided as standard for 2052 and 2054 models diaphragm pumps.

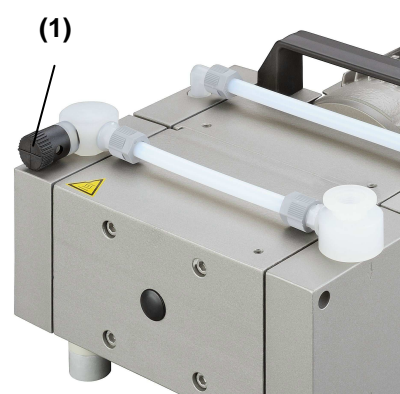


Fig. 2 Gas ballast valve

3.4 Areas of Application

The Diaphragm Pumps are intended to:

- Pumping and compressing neutral and aggressive gases and vapours.
- Generating a vacuum down to an ultimate pressure 2 mbar.
- Use in physical and chemical laboratories in trade and industry.
- Use for vacuum filtration, vacuum distillation and vacuum drying, and other vacuum technology applications.

3.5 Pump head circuitry

Two-stage:	Three pump heads are in parallel, the fourth in series.
Ultimate pressure:	8 mbar (6 Torr)
Model:	2054

Three stage:	Two pump heads are in parallel, the other two in series.
Ultimate pressure:	2 mbar (1.5 Torr)
Model:	2052

Special designs:

- Special diaphragm pumps can be supplied after consultation with the manufacturer or for a corresponding supply contract.
- Explosion protection motors.
- Motors for different voltages.

3.6 Materials of the medium-affecting pump parts

Component	Materials <i>(resistant to aggressive gases)</i>
Seal	EPDM
Screw fitting / Connecting element	PP, PVDF
Valve	PEEK
Diaphragm	Elastomer + PTFE layer
Vacuum hose	PTFE
Connection head / Pump head	PTFE with carbon-fibre reinforcing ^{*)}

^{*)} electrically conductive (with manufacturer's certificate of electrical conductivity)
Material resistance to aggressive media see: Publisher Hoppenstedt Publishing (18. September 2007)

3.7 Scope of Delivery

The scope of delivery is specified in the supply contract.

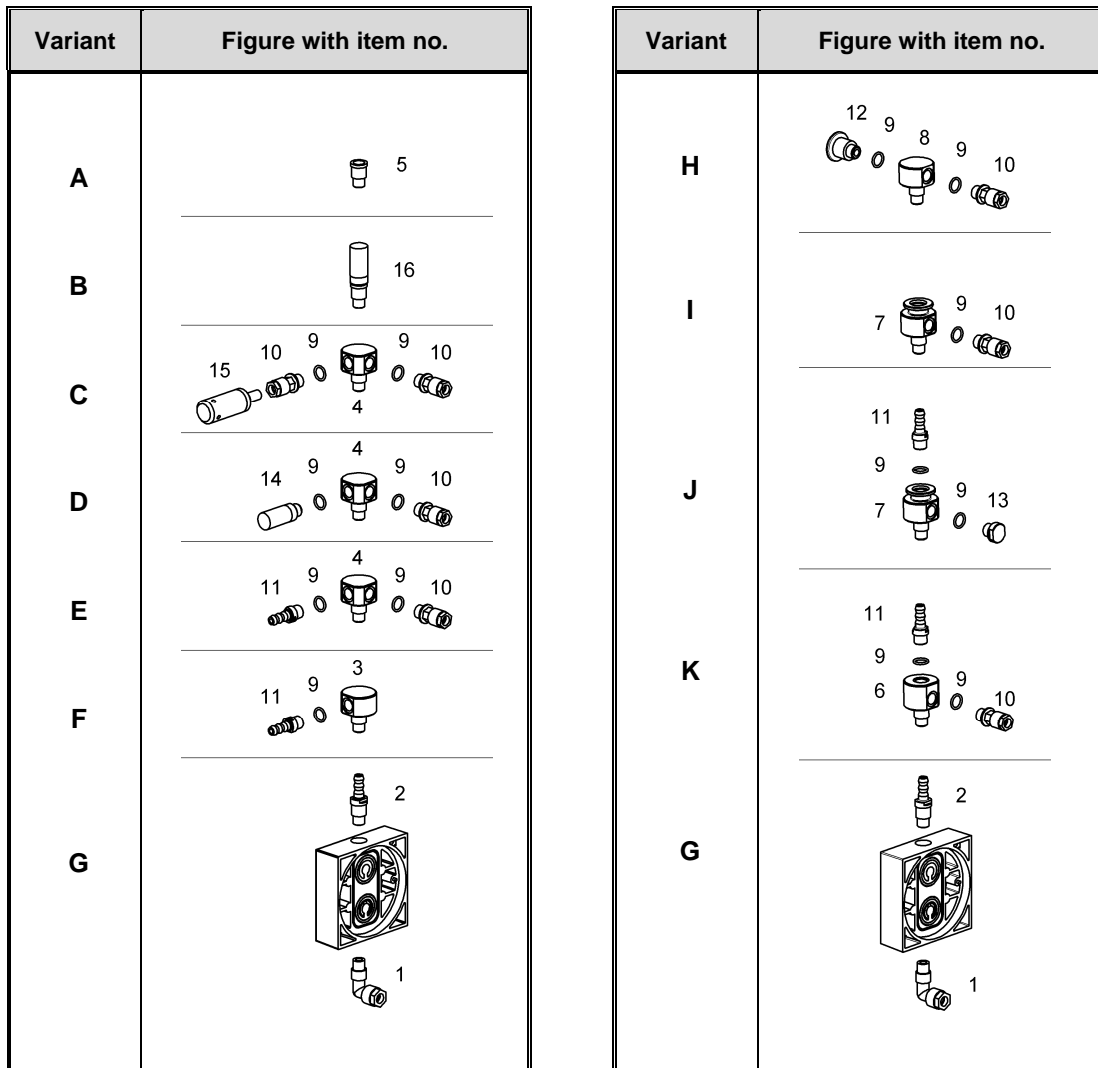
3.8 Accessories

Designation	Usage	Order no.
Vacuum Control Box VCB 521 cv	for measuring and regulation of vacuum	600053
Vacuum Regulator with dial gauge DBR-A	for intake allows the adjustment of the ultimate pressure	700458
Gas ballast valve	manually operated	400599-02

Description

3.8.1 Connection variants A – K

Into the connection head with PTFE-insert one can screw only parts with extension $\varnothing 15 - 12$ long and for thread in M12x1. To all distributors only screw connections with G1/4 are screwed. Into the small flange DN16KF additionally e.g. a hose nozzle with connection G 1/4" can be screwed in.



Item no.	Order no.	Designation	Material	Dimensions	Fig. in Variant:
1	829972	Threaded elbow joint	PP	M12 x 1; 10	G
2	710798-04	Hose nozzle	PP	M12 x 1; DN 8	G
3	400905	Manifold 1	PP	M12 x 1; 1x G 1/4 inch	F
4	400903	Manifold 2	PP	M12 x 1; 2x G 1/4 inch; L	C, D, E
5	710957	Adapter	PP	M12 x 1; G 1/4 inch	A
6	400933	Manifold 8	PP	M12 x 1; 2x G 1/4 inch; L upward	K
7	400917-01	Manifold 5	PP	M12 x 1; 1x G 1/4 inch; DN 16 KF	I, J
8	400911	Manifold 4	PP	M12 x 1; 2x G 1/4 inch; l	H
9	829217-3	O-ring	EPDM	$\varnothing 12 \times 2$	all
10	829931	Straight threaded joint with seal edge	PVDF	10 - 1/4 inch	C, D, E, H, I, K
11	710798	Hose nozzle	PP	G 1/4 inch; DN 8	E, F, J, K
12	710116	Threaded flange	PP	G 1/4 inch; DN 16 KF	H
13	400568	Blind plug	PP	G 1/4 inch	J
14	829901	Exhaust silencer	PA	G 1/4 inch	D,
15	400941	Exhaust silencer	PP / PA	A - 10	C
16	400596	Exhaust silencer	PA	M12 x 1 male thread	B

4 Technical Data

4.1 Dimensions

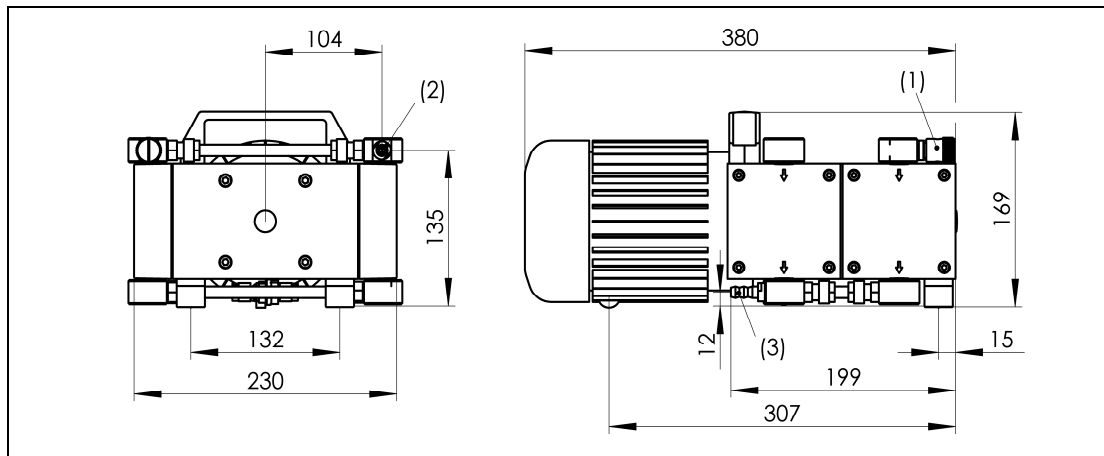


Fig. 3 Dimensions (Model 2052)

4.2 Device Data

Parameter	Unit	Diaphragm pump - models	
		2054 (two-stage)	2052 (three-stage)
Free Air Displacement @ 60 Hz	CFM	3.5	2.3
	L / min	100	65
Ultimate pressure	mbar (Torr)	8 (6)	2 (1.5)
Ultimate pressure with gas ballast valve (1)		18	9
Max. inlet pressure	bar	1	
Max. outlet pressure		1	
IN - Intake connection (2)	standard	Small flange DN 16 KF	
	optional	Hose nozzle DN 8 for hose inside diameter 8 mm (enclosed)	
EX - Exhaust connection (3)	standard	Hose nozzle DN 8 for hose inside diameter 8 mm	
Ambient temperature	°C	+ 10 to + 40	
Max. operating gas temperature		+ 60	
Bearing	-	maintenance-free	
Reference surface sound pressure level DIN 45635 part 13	dB (A)	< 44	
Voltage	V	230; 115 (generally with motor protection switch, switch and cable)	
Frequency	Hz	50/60	
Power	W	370	
Operating mode	-	S 1	
Type of protection DIN EN 60529	-	IP 54	
Motor / Class of insulation DIN EN 600034-1	-	F (160°C)	
Weight	kg	18.3	
Dimensions (W/D/H) (without connections)	mm	230 / 380 / 169	
Order numbers for Diaphragm pumps inclusive mains connection cables IEC with:	-		
- 230 V Schuko and UK plug	-	2054C-02	2052C-02
- 115 V American plug	-	2054B-01	2052B-01

The information presented in this material is based on technical data and test results of nominal units. It is believed to be accurate and reliable and is offered as an aid to help in the selection of Welch-Ilmvac products. It is the responsibility of the user to determine the suitability of the product for the intended use and the user assumes all risk and liability whatsoever in connection therewith. Welch-Ilmvac does not warrant, guarantee or assume any obligation or liability in connection with this information.

Installation and Operation

5 Installation and Operation

5.1 Unpacking

Carefully unpack the diaphragm pump. Check the pump for:

- Transport damage,
- Conformity with the specifications of the supply contract (type, electrical supply data),
- Completeness of the delivery.

Please inform us without delay if there are discrepancies between the delivery and the contractually agreed scope of delivery, or if damage is detected.

Please take note of the general terms of business of the manufacturing firm.

In case of a claim under warranty, the device must be returned in packaging that is suitable for protecting it during transport.

5.2 Installation and Connection

1. Set the diaphragm pump on a flat and horizontal surface.
2. Remove the protective caps on the intake and exhaust ports.
3. Prepare the connections.
4. Connect the vacuum connector to the intake port.
5. Connect the exhaust pipe to the pressure connection.
6. Connect the diaphragm pump to the electrical supply.

5.3 Operation

Observe the basic safety instructions when using the pump.

The diaphragm pump is switched on and off at the operating switch.


The operating company must install a main switch for pumps with terminal boxes.

5.4 Storage

The pumps are to be stored in a low-dust, interior room within the temperature range from + 5 to + 40 °C and at a relative air humidity < 90% .

Leave the protective elements on the suction and pressure ports. Another equally good protection may be used.

5.5 Scrap Disposal


	CAUTION !
The diaphragm pumps must be disposed of in accordance with the 2002/96/EC guideline and the specific national regulations. Contaminated diaphragm pumps must be decontaminated according to the laws.	

6 Maintenance and Servicing

6.1 General Requirements


- Check the pump daily for unusual running noises and heat building up on the surface of the pump.
- We recommend changing the diaphragm after 10,000 operating hours. The user may specify that the exchange be made earlier, depending upon the application process.
- Check the electrical and vacuum connections daily.

6.2 Maintenance Performed by the User

	WARNING !
<p>Only perform the work that is described here, and that which is permitted to be done by the user. All other maintenance and service work may only be performed by the manufacturer or a dealer authorized by him. Beware of the pump parts being possibly contaminated by hazardous substances. Wear protective clothing if there is contamination.</p>	

Scope of permissible work:

- Loosen and remove the hoses
- Open and remove the pump heads
- Inspect the pump chambers, diaphragms and valves
- Deposits in the inside of the pump must be cleaned out
- Change the diaphragms, valves and seals

	WARNING !
<p>Before opening the pump unplug it from the mains.</p>	

Tools required:

Tool kit: Order no. 402106, consists of:

- Order no. 826801 Pin type face wrench, adjustable, size 3,
- Order no. 826801-6 Allan key, size 4,
- Order no. 826801-5 Open spanner, size 17.

Maintenance and Servicing

6.2.1 Disassembly

1. Disconnect the power supply and ensure that it cannot be switched on again.
2. Open the screw clamps **(9)** of the hoses **(10)** on the pump body with the size 17 open spanner.
3. Remove four machine screws **(1)** from each connection head with an Allan key, size 4.
4. Lift off the connection head **(2)** and the pump head **(5)**. The valves **(3)**, o-rings **(4)** and diaphragm **(7)** are now freely exposed.
5. Loosen the diaphragm **(7)** at the strain washer **(6)** by turning the size 3 pin type face wrench anticlockwise.
6. Clean the valves **(3)**, the pump head **(5)** and the diaphragm **(7)** with a soft cloth and acetone.
7. Check that the drive is in good working order.

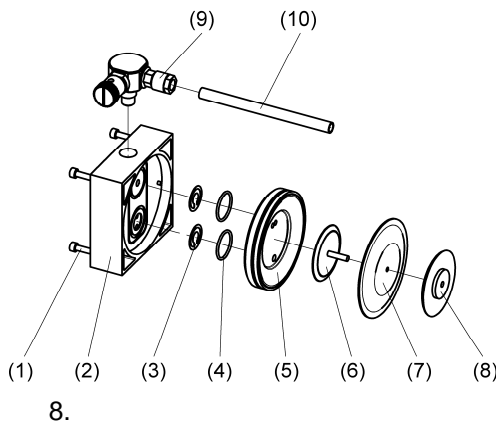



Fig. 4 Disassembly, assembly

	WARNING !
<p>Renew defective parts, if necessary! Wear protective gloves! Parts must be renewed at the intervals stated in this Operating Manual or as specified by the user internally! Do not clean with compressed air!</p>	

6.2.2 Assembly (see fig. 4)


1. Place the pump so that the diaphragm is lying in a horizontal position.
2. Use the size 3 pin-type face wrench to tighten the pressure disc **(8)**, the diaphragm **(7)** and the strain washer **(6)** with the correct torque of 2 - 4 Nm.
3. Bring the connecting rod (see fig. 5) and the diaphragm **(7)** into the central position.
4. Replace the pump head **(5)**.
5. Insert the valves **(3)** and the o-rings **(4)**.
Ensure that they are lying completely flat. Do not insert the burred side facing the sealing surface. Align the connection head flush with the pin.
6. Tighten the four machine screws **(1)** symmetrically with a torque of 3 to 4 Nm.
7. Reattach the hose connections **(10)** with clamping ring screw fittings **(9)**.

6.2.3 Test

- Connect a vacuum measuring device to the suction connector and measure the ultimate pressure.
If the device is working properly, then the figure stated in the technical data must be attained within a maximum of one minute.
- The pump must not make any abnormal noises.
- Moving parts must not touch each other.

6.3 Maintenance by the Manufacturer


Repairs and maintenance going beyond the extent of the work described *in chapter 6.2* or reconditioning or modification may only be performed by the manufacturer or authorized workshops.

	WARNING !
The user shall be liable for the consequences of an incorrect damage report or a contaminated pump. The statements in the damage report are legally binding.	

6.4 Damage Report

You find the form of the damage report to the Download on our web page in the menu "service" and "Downloads". www.welchvacuum.com

If you should not have an entrance to the Internet, you can request the form also gladly with us, under phone +49 3677 604-0.

	WARNING !
Incomplete or incorrectly completed damage reports may endanger the service personnel! Give full information in the damage report, in particular regarding a possible contaminating.	

Troubleshooting

7 Troubleshooting


During the warranty period, intervention in the diaphragm pumps and accessory components may only be made by manufacturing firm.

Trouble	Cause	Action
Diaphragm pump does not start	No power supply	Electrical system to be checked by a qualified electrician.
	Motor defective	Exchange by service shop.
	Pump body defective	Exchange or repair by service shop.
Diaphragm pump does not generate a vacuum or only an inadequate one	Connected apparatus leaks, connecting elements leak	Identify and seal the leak, replace the seals and hoses if necessary.
	Diaphragm pump leaks (pipes or hoses)	Check the hose connections between the pump heads, replace the hoses and screwed clamping rings if necessary.
	Pump head leaks	Repair by service shop.
	Diaphragm defective	Repair by the service workshop or the user.
	Valves defective	Replace valves Repair by the service workshop or the user.
	Valves are dirty	Clean condensates and foreign objects out of the valves. Cleaning by the service workshop or the user.
	Diaphragm pump is dirty	Cleaning by the service workshop or the user.

8 Spare Parts Overview

The spare parts lists contain all the spare parts and all the information necessary for ordering.

When ordering, please quote the description, quantity, serial number and order number!

	CAUTION !
<p>We are not liable for any damage caused by the installation of any parts not supplied by the manufacturer.</p>	

8.1 Service kit

Designation	Order no.
Service kit for models 2052	402042
Service kit for models 2054	402042-01

The Service kit consists of:

Designation	Kit - Order no. 402042		Kit - Order no. 402042-01	
	for Models 2052		for Models 2054	
	Piece	Order no.	Piece	Order no.
O-ring EPDM ø 12 x 2	9	829217-3	9	829217-3
O-ring EPDM ø 25 x 2	8	829250-1	8	829250-1
Valve	8	400656	6	400656
Valve with hole	-	-	2	400656-4
Diaphragm	4	400732	4	400732

Caution, the number of supplied construction units in the service set corresponds to the maximum need of the series!

Spare Parts Overview

8.2 Spare parts view

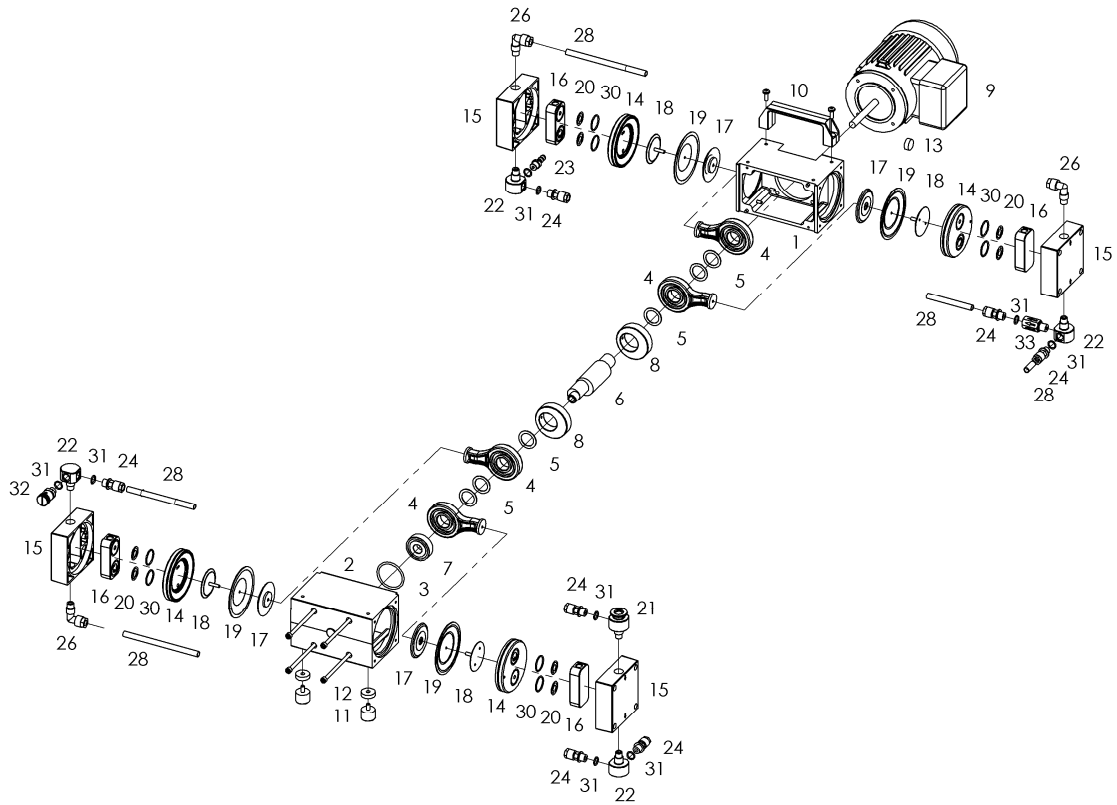


Fig. 5 Exploded view (2052)

8.2.1 Spare parts list - Diaphragm pumps - Models 2052

Item no.	Designation	Piece	2052C-02	2052B-01
			230 V	115 V
			Order no.	Order no.
- *)	Basic pump complete <i>(consisting of position: 1 – 9)</i>	1	410403	410403-01
1	- Pump casing 1	1	410430-01	410430-01
2	- Pump casing 2	1	410430-3	410430-3
3	- O-ring \varnothing 47.22 x 3.53	1	829269	829269
-	- Drive complete <i>(consisting of position: 4 – 8)</i>	1	400844	400844
4	- Piston rod with ball bearing	4	400647-01	400647-01
5	- Close tolerance spacer 25 x 35 x 1	6	824957-1	824957-1
6	- Eccentric shaft	1	400742-1	400742-1
7	- Ball bearing	1	824949-3	824949-3
8	- Mass balance	2	400678-1	400678-1
9	- Alternating-current motor	1	826390-1	826446-1
10	Handle	1	828634	828634
11	Rubber metal-pad	2	829141-2	829141-2
12	Spacer distance PP, Foot	2	400784-01	400784-01
13	Rubber pad	1	400785-1	400785-1
14	Pump head	4	400705-02	400705-02
15	Connection head	4	410432	410432
16	PTFE insert	4	400902	400902
17	Pressure washer	4	400680	400680
18	Tightening washer	4	400707	400707
19	Diaphragm	4	400732	400732
20	Valve	8	400656	400656
21	Manifold 5	1	400917-01	400917-01
22	Manifold 2	4	400903	400903
23	Hose nozzle PP, DN 8 – ¼" <i>(1x enclosed)</i>	2	710798	710798
	Hose nozzle PP, DN 12 – ¼" <i>(1x enclosed)</i>	1	720331	720331
24	Straight threaded joint with seal edge PVDF, 10 – ¼"	7	829931	829931
25	T - screw connection PP, 10-10-10	-	-	-
26	Threaded elbow joint 10, PP, M12 x 1	3	829972	829972
27	Threaded elbow joint PVDF, 10 – ¼"	-	-	-
28	Vacuum hose PTFE, 10 / 8 x 1 mm	0.6 m	828332	828332
29	Threaded elbow joint with attitude taps PVDF, 10 – A10	-	-	-
30	O-ring EPDM, \varnothing 25 x 2	8	829250-1	829250-1
31	O-ring EPDM, \varnothing 12 x 2	9	829217-3	829217-3
32	Gas ballast valve	1	400599-01	400599-01
33	Check valve	1	829909	829909
-	Mains connection cable IEC with plug CEE (D)	1	825885	-
	Cable extension for non-heating apparatus	1	825908	-
	Mains connection cable IEC with plug NEMA5-15 (US)	1	-	825903

*) The "basic pump" module (items 1 – 9) can only be supplied complete under order numbers 410403 or 410403-01.

Spare Parts Overview

8.2.2 Spare parts list - Diaphragm pumps - Models 2054

Item no.	Designation	Piece	2054C-02	2054B-01
			230 V	115 V
			Order no.	Order no.
- *)	Basic pump complete <i>(consisting of position: 1 – 9)</i>	1	410403	410403-01
1	- Pump casing 1	1	410430-01	410430-01
2	- Pump casing 2	1	410430-3	410430-3
3	- O-ring \varnothing 47.22 x 3.53	1	829269	829269
-	- Drive complete <i>(consisting of position: 4 – 8)</i>	1	400844	400844
4	- Piston rod with ball bearing	4	400647-01	400647-01
5	- Close tolerance spacer 25 x 35 x 1	6	824957-1	824957-1
6	- Eccentric shaft	1	400742-1	400742-1
7	- Ball bearing	1	824949-3	824949-3
8	- Mass balance	2	400678-1	400678-1
9	- Alternating-current motor	1	826390-1	826446-1
10	Handle	1	828634	828634
11	Rubber metal-pad	2	829141-2	829141-2
12	Spacer distance PP, Foot	2	400784-01	400784-01
13	Rubber pad	1	400785-1	400785-1
14	Pump head	4	400705-02	400705-02
15	Connection head	4	410432	410432
16	PTFE insert	4	400902	400902
17	Pressure washer	4	400680	400680
18	Tightening washer	4	400707	400707
19	Diaphragm	4	400732	400732
20	Valve	8	400656	400656
	Valve with hole	2	400656-4	400656-4
21	Manifold 5	2	400917-01	400917-01
22	Manifold 2	2	400903	400903
	Manifold 4	1	400911	400911
23	Hose nozzle PP, DN 8 – ¼" <i>(2x enclosed)</i>	2	710798	710798
24	Straight threaded joint with seal edge PVDF, 10 – ¼"	6	829931	829931
25	T - screw connection PP, 10-10-10	2	829930-02	829930-02
26	Threaded elbow joint 10, PP, M12 x 1	3	829972	829972
27	Threaded elbow joint PVDF, 8 – ¼"	1	829984	829984
28	Vacuum hose PTFE, 10 / 8 x 1 mm	0.7 m	828332	828332
29	Threaded elbow joint with attitude taps PVDF, 10 – A10	1	829913-1	829913-1
30	O-ring EPDM, \varnothing 25 x 2	8	829250-1	829250-1
31	O-ring EPDM, \varnothing 12 x 2	8	829217-3	829217-3
32	Gas ballast valve	1	400599-01	400599-01
33	Check valve	1	829909	829909
-	Mains connection cable IEC with plug CEE (D)	1	825885	-
	Mains connection cable IEC with plug NEMA5-15 (US)	1	-	825903

*) The "basic pump" module (items 1 – 9) can only be supplied complete under order numbers 410403 or 410403-01.



EG - Konformitätserklärung

EC Declaration of Conformity / CE Déclaration de Conformité

DIN EN ISO / IEC 17050

(DE)

Hiermit erklären wir

WELCH-ILMVAC

Thomas Division, Gardner Denver Inc.

ILMVAC GmbH Am Vogelherd 20 D-98693 Ilmenau / Germany

E-Mail: welch-ilmvac.de@gardnerdenver.com Internet: www.welch-ilmvac.com

unter eigener Verantwortung, dass nachstehendes Produkt aufgrund seiner Konzipierung und Bauart sowie in den von uns in Verkehr gebrachten Unterlagen den nachfolgend aufgeführten EG-Richtlinien und Normen entspricht. Bei einer nicht mit uns abgestimmten Änderung des Produkts verliert diese Erklärung ihre Gültigkeit.

(EN)

We (ILMVAC GmbH) herewith declare under our sole responsibility that the product described below is in accordance with the following Directives standards and other technical specifications regarding design and version when delivered from our factory.

This declaration becomes invalid whenever the product has been modified without our consent.

(FR)

Nous (ILMVAC GmbH) certifions par la présente, que le produit décrit ci-après est conforme, tant dans sa conception que dans sa réalisation, aux normes de sécurité et d'hygiène exigées par les standards de la CE. En cas de modification du produit sans notre accord, cette déclaration devient caduque.

Bezeichnung des Produkts (Pumpen / Pumpstände)

Description of product (pumps / pump systems)

Description du produit (pompes / pompe systèmes)

Artikel-Nr. / Fabrication No. / No. de fabrication

Baujahr / Year of manufacture / Année de fabrication

Membranpumpen / diaphragm pumps / pompes à membrane Models : 2054, 2052
2054B-01, 2054C-02, 2052B-01, 2052C-02
2013

Das Produkt entspricht folgenden Richtlinien und Normen:

The product is in conformity with the following Directives and standards: / *Le produit est conforme aux directives et standards suivants:*

- Richtlinie 2006/42/EG Maschinenrichtlinie / EC machinery directive / directive CE sur les machines** (17.05.2006)
- Richtlinie 2006/95/EG Niederspannungsrichtlinie / EC low voltage directive / Directive CE de basse tension** (12.12.2006)
- Richtlinie 2004/108/EG Elektromagnetische Verträglichkeit / EC Electromagnetic Compatibility Directive / Directive CE relative à la compatibilité électromagnétique** (15.12.2004)
- Richtlinie 2002/95/EG Gefährliche Stoffe in Elektro- und Elektronikgeräten (RoHS) / Dangerous materials in electrical and electronics devices (RoHS) / Substances dangereuses dans les appareils électriques et électroniques (RoHS)**
- Richtlinie 2002/96/EG Elektro- und Elektronik - Altgeräte (WEEE) / Electrical and electronics - old devices (WEEE) / Electro et électronique - appareils de contraito (WEEE)**
- China – RoHS Umweltschutzgesetz – China 2007-03 / Environment protection law / Loi sur la protection de environnement**

Angewandte harmonisierte Normen: / applied harmonized standards: / standards appliques et harmonises:

- DIN EN ISO 12100-1:2004 Sicherheit von Maschinen - Grundbegriffe, Teil 1: Grundsätzliche Terminologie, Methodologie / Safety of machinery - Basic concepts, part 1: Basic terminology, methodology / Sécurité des machines - Notions fondamentales, partie 1: Terminologie de base, méthodologie**
- DIN EN ISO 12100-2: 2004 Sicherheit von Maschinen - Grundbegriffe, Teil 2: Technische Leitsätze / Safety of machinery - Basic concepts, part 2: Technical principles / Sécurité des machines - Notions fondamentales, partie 1: Taux de référence technique**
- DIN EN ISO 13857:2008 Sicherheit von Maschinen - Sicherheitsabstände gegen das Erreichen von Gefährdungsbereichen mit den oberen und unteren Gliedmaßen / Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs / Sécurité des machines - Distances de sécurité empêchant les membres supérieurs et inférieurs d'atteindre les zones dangereuses**
- DIN EN 1012-2:1996 Kompressoren und Vakuumpumpen - Sicherheitsanforderungen - Teil 2: Vakuumpumpen / Compressors and vacuum pumps - Safety requirements - part 2: Vacuum pumps / Compresseurs et pompes à vide - Exigences de sécurité - partie 2: pompes à vide**
- DIN EN ISO 2151:2008 Akustik - Geräuschmessnorm für Kompressoren und Vakuumpumpen - Verfahren der Genauigkeitsklasse 2 / Acoustics - Noise test code for compressors and vacuum pumps – Engineering method (grade 2) / Acoustique - norme de mesure des émissions pour les compresseurs et les pompes à vide - Procédé de classe de précision 2**
- DIN EN 60204-1:2006 Sicherheit von Maschinen - Elektrische Ausrüstung von Maschinen - Teil 1: Allgemeine Anforderungen / Safety of machinery - Electrical equipment of machines - part 1: General requirements / Sécurité des machines - Equipement électrique des machines - partie 1: Prescriptions générales**
- EN 61000-6-2:2005 Elektromagnetische Verträglichkeit (EMV) - Teil 6-2: Fachgrundnormen - Störfestigkeit für Industriebereiche / Electromagnetic compatibility (EMC) - part 6-2: Generic standards - Immunity for industrial environments / Compatibilité électromagnétique (EMV) - partie 6-2: Normes génériques - Immunité pour les environnements industriels**
- EN 61000-6-4:2007 Elektromagnetische Verträglichkeit (EMV) - Teil 6-4: Fachgrundnormen - Störaussendung für Industriebereiche / Electromagnetic compatibility (EMC) - part 6-4: Generic standards - Emission standard for industrial environments environments / Compatibilité électromagnétique - partie 6-4: Normes génériques - Emissions de parasites pour les activités industrielles**
- DIN EN 50110-1 Betrieb von elektrischen Anlagen / Operation of electrical installations / Fonctionnement des installations électriques**
- DIN EN 61010-1 Sicherheitsbestimmungen für elektrische Mess-, Steuer-, Regel- und Laborgeräte - Teil 1: Allgemeine Anforderungen / Safety requirements for electrical equipment for measurement, control and laboratory use - part 1: General requirements / Consignes de sécurité pour les appareils électriques de mesure, de commande, de régulation ou de laboratoire - partie 1: Prescriptions générales**

	Datum / Date	27.02. 2013
Qualitätsbeauftragter Quality representative / Délégué de qualité	Name / Name / Nom Gerd Reinhardt	
Produktmanager Product manager / Directeur de produit	Name / Name / Nom Wilfried Stephan	

WELCH-ILMVAC
Thomas Division, Gardner Denver Inc.

ILMVAC GmbH
Am Vogelherd 20
D-98693 Ilmenau / Germany

Phone +49 3677 604-0

Fax +49 3677 604-110