WELCH
by Gardner Denver

Operation Manual (EN)
Translation of the german original manual

Aspiration Systems



Models:

- ► biovac 106
  with 2 L Bottle
- ► biovac 106
  with 4 L Bottle



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EC Declaration of Conformity

1 Important Information

1.1 General information

The **biovac 106 Aspiration Systems** conforms to the:

2006 / 42 / EC	Machinery Directive
2014 / 30 / EU	Electromagnetic Compatibility Directive

The CE sign is located on the rating plate. Observe the binding national and local regulations when fitting the system 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 the biovac aspiration systems. 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 biovac aspiration systems.

The operating and maintaining personnel of the biovac aspiration systems 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 biovac aspiration systems.
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 biovac aspiration systems must be appropriate for the conditions of use. The user bears the sole responsibility for this.
- The biovac aspiration systems may only be operated under the conditions stated
  - in the "Technical Data" section,
  - on the rating plate, and
  - in the technical specification for the order concerned.
- The biovac aspiration systems have an integrated, highly chemical-resistant diaphragm pump. It is used in chemical and biological applications to extract non-explosive liquid residues safely and precisely.

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:

- operating mode S1 (with grounding connector)
- integrated fuse in the vacuum pump
- closed housing
- intact collecting tank
- insertion of a particle filter suitable for the work task

1.6 Meaning of the Warning notes

Take note of the warning notes. 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 biovac 106 Aspiration Systems fulfils the following product standards:

DIN EN ISO 12100:2011-03	Safety of machinery - General principles for design - Risk assessment and risk reduction
DIN EN ISO 13857:2008-06	Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs
DIN EN 1012-2:2011-12	Compressors and vacuum pumps - Safety requirements - Part 2: Vacuum pumps
DIN EN ISO 2151:2009-01	Acoustics - Noise test code for compressors and vacuum pumps - Engineering method (grade 2)
DIN EN 60204-1:2014-10	Safety of machinery - Electrical equipment of machines - Part 1: General requirements
DIN EN 61000-6-2:2011-06 **DIN EN 61000-6-4:2011-09**	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments Part 6-4: Generic standards - Emission standard for industrial environments
DIN EN 61010-1/A1:2015-04	Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements
DIN EN 50110-1:2014-02	Operation of electrical installations
Directive 2012/19/EU	Electrical and electronics - old devices (WEEE)
Directive 2011/65/EU	Dangerous materials in electrical and electronics devices (RoHS II)
China - RoHS II	Environment protection law - China 2016-01

The following additional safety regulations apply in the FR Germany:

DGUV Regulation 1	Accident prevention regulations, principles of prevention
DGUV Regulation 3	Safety and testing of electrical equipment and equipment
DGUV Rule 100-500	Operation of work equipment
DGUV Information 213-850	Safe working in laboratories

Observe the standards and regulations applying in your country when you use the aspiration systems.

2 Basic Safety Instructions

2.1 General information

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

The **biovac 106 Aspiration Systems** must be operated by personnel who can detect impending dangers and take action to prevent them from materialising.

The manufacturer or authorized workshops will only service or maintain the aspiration systems 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 system are legally binding parts of the contract.

Contaminated aspiration systems 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 **biovac 106 Aspiration Systems** are supplied for operating mode S1. Please note that the testing must be repeated in accordance with DIN EN 0105, DIN EN 0702 and DGUV Regulation 3 in case of portable devices.

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 IEC 60364-4-41.
- The protective connector must not have any breaks.
- The connecting cable must not be damaged.

2.3 Mechanical System

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

- Only operate the biovac aspiration systems with hoses of the specified dimensions.
- Solid particles in the pumping medium impair the pumping action and can lead to damage. Prevent their penetrating into the pump.
- 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 system. Only use a flexible laboratory hose for connecting the aspiration system.
- The overpressure generated at the pressure port must not exceed 1 bar.
- The pump must not be used to pump liquids.
- Set the biovac aspiration systems on a flat and horizontal surface.
- Do not close the space beyond the bottom of the device in order to enable the pump to cool.

2.4 Hazardous Substances

The responsibility for using the biovac aspiration systems rests with the operator.
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.

Explosive gases
The aspiration system is not certified according to ATEX guidelines 2014/34/EU.
The system operator is obliged to comply with the ATEX 137 guidelines 1999/92/EC when us-ing the pump within and for danger areas.

Aggressive gases
An MP series diaphragm pump is used for extracting vapours and aggressive gases.
The warranty shall lapse if the biovac aspiration systems are used with diaphragm pumps from other manufacturers.

Poisonous gases
Use a suitable 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.
The diaphragm pump, control valves and hose lines can be damaged by poisonous or aggressive gases.
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 2016/1179/EU
  (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
- + 40 °C for the medium to be pumped.

The motor for single phase alternating current is protected against overload by a fine-wire fuse and integrated motor-protective switch.

3 Description

3.1 Design

►Aspiration System biovac 106 with secretion glass bottle 2 liters

A filter holder for a PTFE filter is located between the secretion glass bottle **(1)** and the diaphragm pump **(2)**. Filters down to a minimum pore size of 0.22 µm may be inserted in this holder. According to the filter fineness used, it is possible to achieve different types of filtration, enabling, among other uses, the handling of bacteria and viruses.
The cap **(3)** of the secretion glass bottle consists of a plastic cap with a seal.

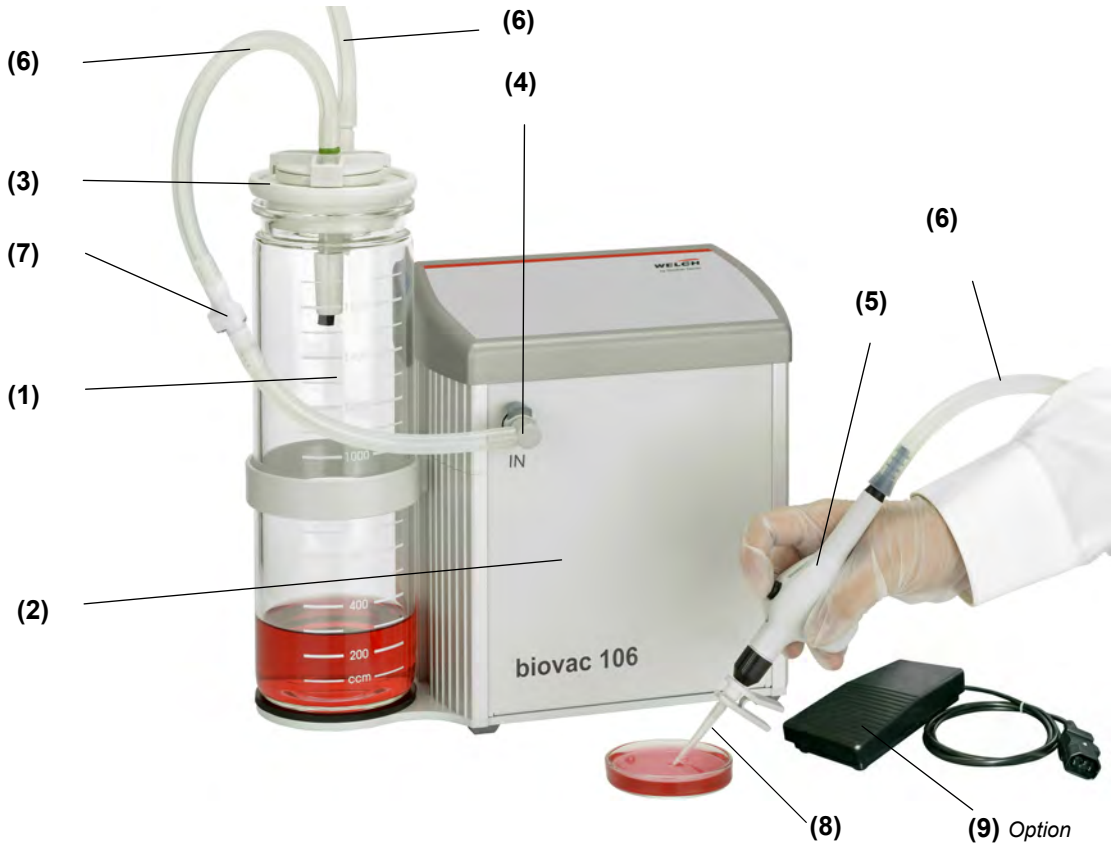


Fig. 1a Aspiration-System biovac 106 with secretion glass bottle 2 liters

A quick coupling **(4)** is used for the connection to the diaphragm pump **(2)**. It is provided with a stop valve.
The used-resistant diaphragm pump **(2)** used has a long useful life.
Secretion bottle **(1)** and handvac **(5)** are connected with a hose **(6)**. After disconnecting the unions **(7)**, the two flexible tube ends at the bottle may be connected to one another to ensure safe transport.
The Aspiration System is switched on and off directly at the device switch or the optionally available foot switch **(9)**.
The user appropriate pipette tips **(8)** can be used in the respective adapter of the handvac **(5)**. All hoses **(6)** located outside of the Aspiration System are made of silicone.

►Aspiration System biovac 106 with secretion PP - bottle 4 liters

Between secretion - PP bottle **(1)** and membrane pump **(2)** is a inline filter **(10)** with a pore size of 0.22 microns to protect the membrane pump against pollution caused by fine solid particles and aerosols.

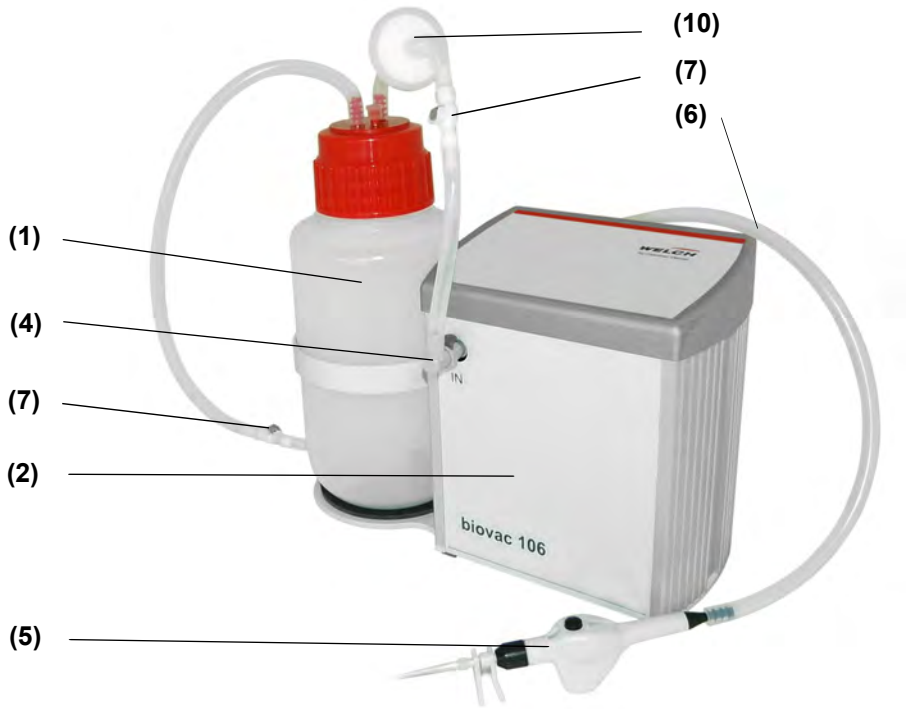


Fig. 1b Aspiration-System biovac 106 with secretion PP - bottle 4 liters

3.2 Function

The biovac Aspiration Systems with an integrated resistant diaphragm pump is used for the safe and precise aspiration of non-flammable chemical and biological liquids.

The fluids can be removed easily and very precisely from slides, Petri dishes, cell culture containers etc., by using different pipets or glass tips which are inserted into the handvac.

The integrated secretion bottle has a built-in float valve. This valve shuts the suction line automatically as soon as the maximum fill level is reached.

A hydrophobic PTFE filter with a suitable filtration grade is inserted in order to provide additional safety. The scope of supply includes a filter with a filtration grade of 1 µm.

3.3 Materials of the medium-affecting pump parts

Component	Materials
Seal	EPDM
Screw fitting / Connecting element	PVDF, PP
Valve	PEEK
Formed 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)

3.4 Areas of Application

The biovac 106 Aspiration Systems are intended for:

- the safe and precise extraction and catching of liquid and non-explosive excess fluids
- use in the chemical, biological and medical areas
- generating a vacuum down to an ultimate pressure < 100 mbar

3.5 Possible Accessories

Designation		Order numbers for biovac 106:	
		112037	112037-04
Seal	for cover of secretion glass bottle	828840-4	-
PTFE filter 1 µm	for cover of secretion glass bottle	828840-2	-
Inline filter 0.22 µm hydrophobic (10 pack)		112555-04	-
Foot switch		112529	
Mains connection cable IEC with plug type12 (CH)		825877	

3.6 Scope of Delivery

The scope of delivery is specified in the supply contract.

4 Technical Data

4.1 Dimensions

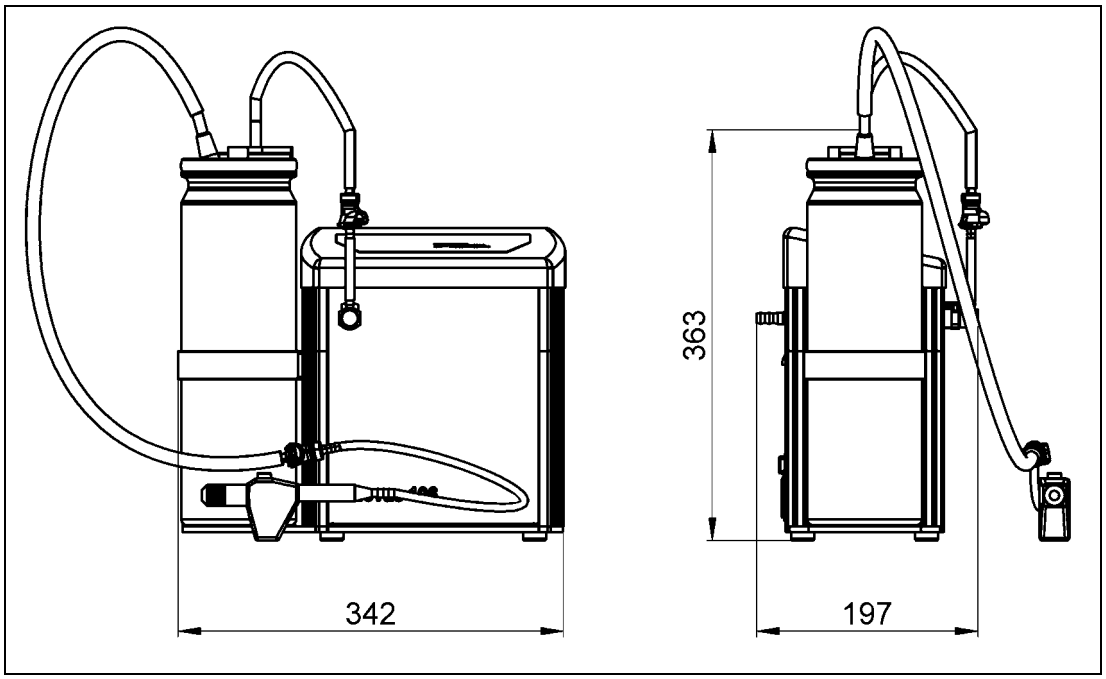


Fig. 2 Dimension - biovac 106 with secretion glass bottle 2 liters

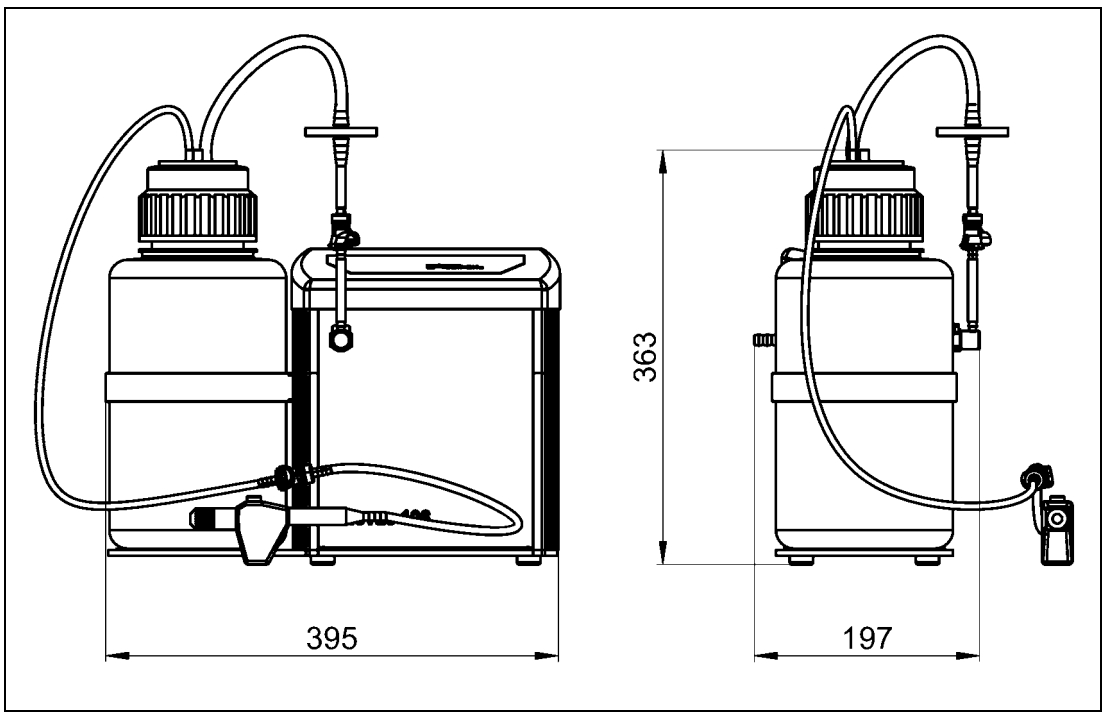


Fig. 3 Dimension - biovac 106 with secretion PP - bottle 4 liters

4.2 Device Data

Parameter	Unit	biovac 106 with glass bottle 2 L	biovac 106 with PP bottle 4 L
Pumping speed (50/60 Hz) DIN 28432 with speed of 1500 rpm	m^3/h (l/min)	0.72 (12/16)	
Ultimate pressure	mbar	< 100	
Maximum inlet - / outlet pressure	bar	1	
Intake connection	-	handvac (Pipettor)	
Exhaust connection		Hose nozzle DN 8 for hose inside diameter 8 mm	
Secretion glass bottle	-	2 liters	-
Secretion PP bottle		-	4 liters
Ambient temperature	°C	+ 10 to + 40	
Medium temperature		+ 40	
Bearing	-	maintenance-free	
Reference surface sound pressure level DIN EN ISO 2151	dB (A)	< 45	
Voltage	V	115 / 230	
Frequency	Hz	50/60	
Power	W	0.45	
Fine fuse	A	F 3.15	
Operating mode	-	S 1	
Type of protection DIN EN 60529		IP 40	
Class of insulation DIN EN 600034-1		F (160°C)	
Dimensions (W/D/H) *(without hose)*	mm	342/363/197	395/363/197
Weight	kg	8.0	
Order number:	-		
biovac 106 *inclusive mains connection cable IEC + plug CEE, UK, US*		112037	112037-04

4.3 Intake Pressure/Pumping Speed – Diagram

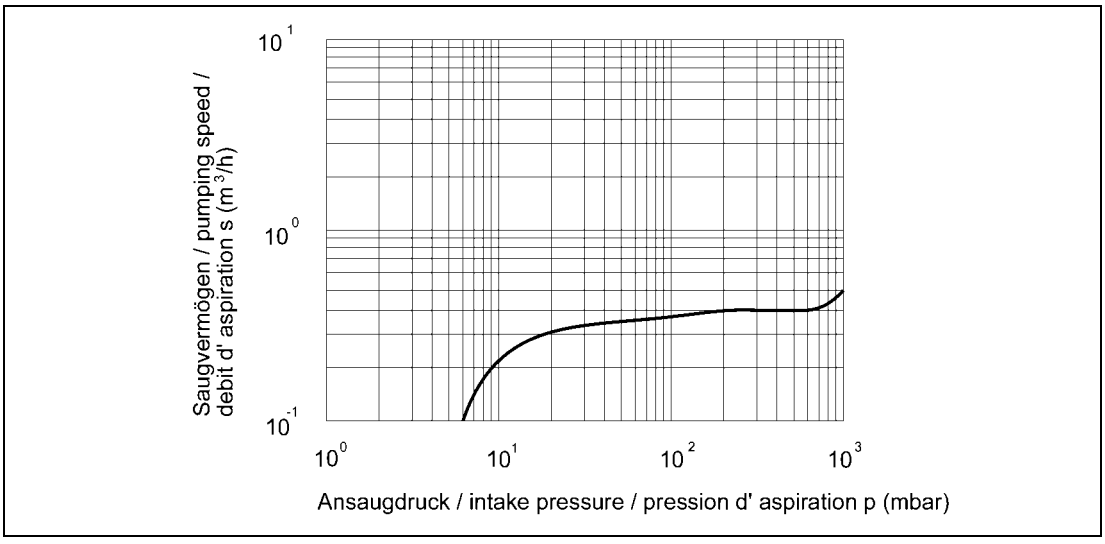


Fig. 4 Intake pressure pumping speed

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 and aid to help in the selection of 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. Gardner Denver Thomas GmbH does not warrant, guarantee or assume any obligation or liability in connection with this information.

5 Installation and Operation

5.1 Unpacking

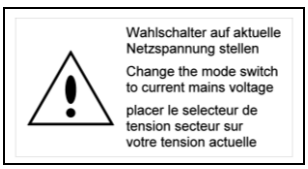
Carefully unpack the **biovac 106 Aspiration System**.

Check 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

Procedure:	
1.	Set the aspiration system on a flat and horizontal surface.
2.	Connect the “handvac” to the suction line **(A)**. *(see also in appendix operation manual)*
3.	Connect the exhaust pipe to the building ventilation system **(B)**.
4.	If required, connect the foot switch *(accessories optional)* to the socket **(C)** provided on the unit.
5.	Set the mode selector switch **(D)** to "Hand" or "Foot". *(see chapter 3.5)*
6.	Voltage selector 115/230 V **(E)** *Label on device:*  *Instructions examine and label remove!*
7.	Connect the system to the power supply **(F)**.
8.	Switch on the unit's main switch **(G)**.

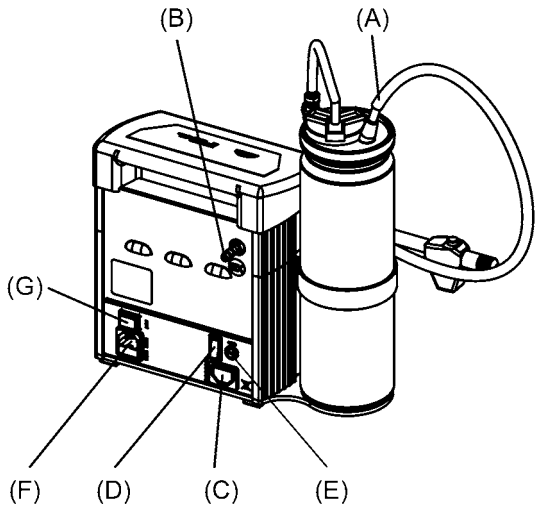
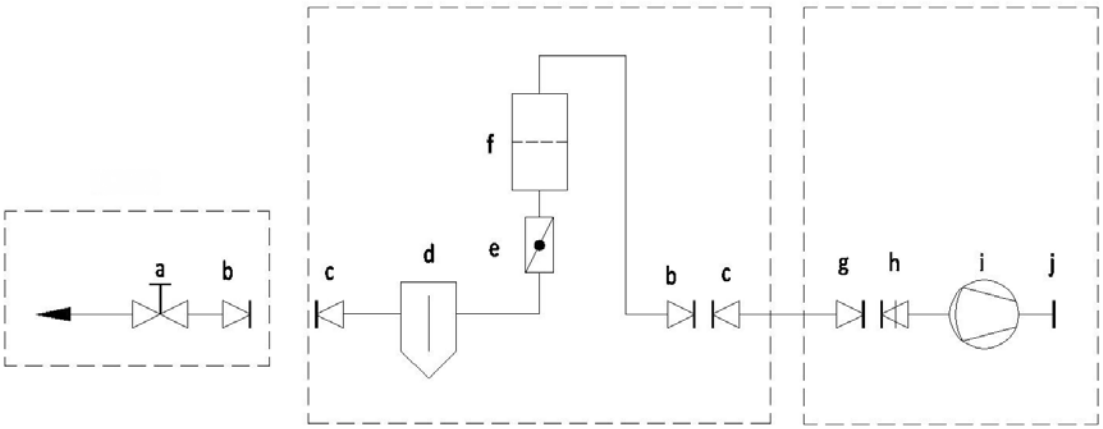


Fig. 5 Rear side - connections (biovac 106 with secretion glass bottle 2 liters)

5.2.1 Connection schematic – biovac 106



handvac *professional* Order no. 112580		**Secretion glass bottle 2 Liters** complete Order no. 112523-1		**Basic unit** biovac 106 Order no. 112573	
		Secretion PP bottle 4 Liters complete Order no. 112523-7		**Basic unit** biovac 106 Order no. 112573-02	
a	**handvac** for aspiration into the bottle	**c**	**Coupling plug**	**g**	**Elbow plug with valve**
		d	**Separator**	**h**	**Connecting coupling** of the pump
		e	**Float valve**		
b	**Coupling**	**f**	**PTFE Filter 1 µm** *(2 Liters bottle)*	**i**	**Diaphragm pump**
			Inline filter 0.22 µm *(4 Liters bottle)* (hydrophobic)		
-	-	**b**	**Coupling**	**j**	**Exhaust connection** Hose nozzle DN 8
		c	**Coupling plug**		

Fig. 6 Connection schematic – biovac 106

5.3 Operation

⚠	**CAUTION!**
Observe the basic safety instructions when using the aspiration systems!	

⚠	**CAUTION!**
Before the device is switched on, the voltage selector must be set with a screwdriver to the voltage of the local power supply, either 115 or 220 V (+/-10%).	

Procedure:

1. The biovac aspiration systems is switched on and off at the operating switch (illuminated rocker switch).
2. Set mode selector switch to ***"Hand"***.
3. For operation using the optional foot switch, set the selector switch to the ***"Foot"*** position and actuate that switch.
4. A low air pressure is generated in the reservoir.
5. Press the black button at the top side of the “handvac” to suck the fluid into the reservoir.
6. A regulator screw is located at the bottom side of the “handvac”. It is used to set the extraction speed.
7. For the safety of the user, a ∅ 55 mm PTFE filter (if necessary hydrophobic) suitable for the requirements and work task must be inserted into the filter casing.

	**CAUTION !**
Please observe the operating instructions included when using the "handvac" !	

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 intake and pressure ports. Another equally good protection may be used.

5.5 Scrap Disposal

	**CAUTION !**
The aspiration systems must be disposed of in accordance with the 2012/19/EU guideline and the specific national regulations. Contaminated systems must be decontaminated according to the laws.	

The user is responsible for disposing of the products extracted and decontaminating the secretion bottle and hoses.
Secretion glass bottle and bottle cover are autoclavable. Against hoses and pipettes are expendable materials.
A contaminating of the diaphragm pump is to be avoided by use of a suitable filter.
The used materials of the gas-affecting parts are glass, PP, PEEK, PTFE and EPDM.

6 Maintenance and Servicing

6.1 General Requirements

Repairs of the **biovac 106 Aspiration Systems** may only be performed by the manufacturer or authorized workshops. The prerequisites are a complete and factually correct damage report, and a clean and, if necessary, a decontaminate device.
Send in defective devices for repair either to the manufacturer or to an authorized workshop. The information about the contamination or thorough cleaning is legally binding parts of the contract.

6.2 Maintenance Performed by the User

⚠	**WARNING !**
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.	

The operator may perform maintenance work to the extent indicated below:

⚠	**WARNING !**
Before opening the pump unplug it from the mains.	

6.2.1 Maintenance of the aspiration systems

6.2.1.1 Disassembly

- Disconnect the power supply by pulling the device plug.
- Disconnect the hose connections.
- To empty, clean and decontaminate the secretion bottle, lift it up out of the holder of the aspiration system.
- Unscrew the suction connection and exhaust air filter.
- Unscrew from below the four inner screws on the device.
- Lift the hood off. Now, you can start with the maintenance of the diaphragm pump according *to chapter 6.2.2*.

⚠	**WARNING !**
Wear protective gloves or protective clothing if necessary! Do not clean with compressed air!	

6.2.1.2 Assembly

Assembly takes place in reverse sequence. Use care when carrying out these activities, and check for the proper fit of the couplings.

6.2.1.3 Test

Connect a vacuum measuring device to the intake port and check 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.

6.2.2 Maintenance of the diaphragm pump

Scope of permissible work:

- Inspect the pump chambers, diaphragms and valves,
- Deposits in the inside of the pump must be cleaned out,
- Change the diaphragms, valves and seals.

Tools required:

Tool kit: Order no. 402107, *consists of:*

- Order no. 826801-4 Cross-head screwdriver, size 2,
- Order no. 826801-2 Open spanner, size SW 14.

6.2.2.1 Disassembly

1. Disconnect the power supply and ensure that it cannot be switched on again.
2. To open the cover of the casing, remove the 4 screws from the unit's bottom side.
3. Open the screw clamps of the hose bridge on the pump body with the open spanner, size 14.
4. Remove 2 x 4 screws **(1)** from each connecting head **(2)** with a cross-head screwdriver, size 2.
5. Lift off the connecting head **(2)** and the pump head **(5)**. The diaphragm is now freely exposed.
6. Loosen the defective diaphragm **(6)** by turning it anticlockwise.
7. Valves **(4)** and o-rings **(3)** are located between the connecting and the pump head. When dismounting both heads these parts are accessible.
8. Clean the valves **(4)**, o-rings **(3)** and diaphragm **(6)** with a soft cloth and acetone and replace defective items if necessary.

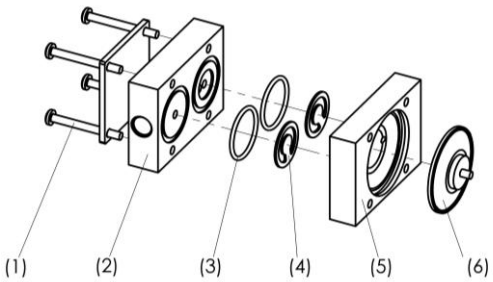


Fig. 8 Disassembly - Assembly

	**WARNING !**
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!**	

6.2.2.2 Assembly *(see Fig. 8)*

1. Place the pump so that the diaphragm **(6)** is lying in a horizontal position.
2. Tighten the diaphragm **(6)** with the torque of 5 - 6 Nm.
3. Bring the connecting rod *(see Fig. 10)* and the diaphragm **(6)** into the central position.
4. Replace the pump head **(5)**.
5. Insert the valves **(4)** and the o-rings **(3)**. Ensure that they are lying completely flat.
   Do not insert the burred side facing the sealing surface.
6. Replace the connecting head **(2)** and tighten the 2 x 4 cross head screws **(1)** with a torque of 3 - 4 Nm.
7. Use an analogue assembly sequence for all heads.
8. Reattach the hose connections with clamping ring screw fittings.
9. Close the casing by shutting the cover.

6.2.2.3 Test

- Connect the pump to the electrical supply.
- 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.

6.2.3 Maintenance of other components

- Check that the glass components are undamaged cleaned and if necessary replace.
- Empty the secretion glass bottle in a timely manner.
  (Observe all disposal specifications as applicable to hazardous substances!)
- Check screw connections for tightness and tightened when necessary.
- Check vacuum hoses for leaks and, if necessary, replace them.
- Check for leaks and, if necessary, replace the formed gasket located at the head piece of the drip pan.
- Change the PTFE filter and/or Inline filter at regular, defined intervals.
- Test performance of the quick-fitting couplings with shut-off valves.

	**WARNING !**
When repairing contaminated units, be sure to observe the applicable user specifications regarding decontamination as required. Provide full information about the type of contamination and the used materials and clean the pump thoroughly before handing it over to third parties.	

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.

	**CAUTION !**
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.gardnerdenver.com/de-de/welch
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.	

7 Troubleshooting

Only manufacturing firm and authorized service workshops may work in the **biovac 106 Aspiration System** and accessory components during the warranty period.

Trouble	Cause	Remedy	
		by:	***with:***
Vacuum pump does not start	no power supply	***Qualified electrician***	Check electrical installation
	Motor defective	***Service workshop***	Exchange
	Pump body defective		Repair and/or exchange
Vacuum pump does not generate a vacuum or only an inadequate one	Connected apparatus and/or connecting elements leaking	***User or Service workshop***	Identify and seal the leak, replace the seals and/or hoses if necessary.
	Vacuum pump leaking		Check the hose connections between the pump heads, replace the hoses and/or fittings if necessary.
	Pump head leaking	***Service workshop***	Repair and/or exchange
	Diaphragm defective	***User or Service workshop***	Exchange of the diaphragm *(see chapter 6.2)*
	Valve defective		Exchange of the valve *(see chapter 6.2)*
	Vacuum pump dirty		General maintenance / leaning
	Valves dirty		Cleaning condensates and foreign objects out of the valves.
Running noise	Vacuum pump dirty	***User or Service workshop***	General maintenance / cleaning
Glass components	defective and/or leaking	***User***	Exchange of the glass parts or seals
Cable(s)	defective and/or brittle	***Qualified electrician***	Exchange of the cable(s)

8 Spare Parts Overview

The spare parts list contains all the spare parts and all the information necessary for ordering.
When ordering, please quote the description, quantity, serial number and order number!

	**CAUTION !**
We are not liable for any damage caused by the installation of any parts not supplied by the manufacturer.	

8.1 Service kit - Diaphragm pump

Designation	Order no.
Service kit	402045

The service kit consists of:

Designation	Piece	Order no.
O-Ring ø 25 x 2	4	829250-1
O-Ring ø 8 x 2	6	829210-3
Valve	4	400656
Form diaphragm	2	828929-1

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

8.2 Spare parts views

8.2.1 Complete unit - biovac 106 with secretion glass bottle 2 liters

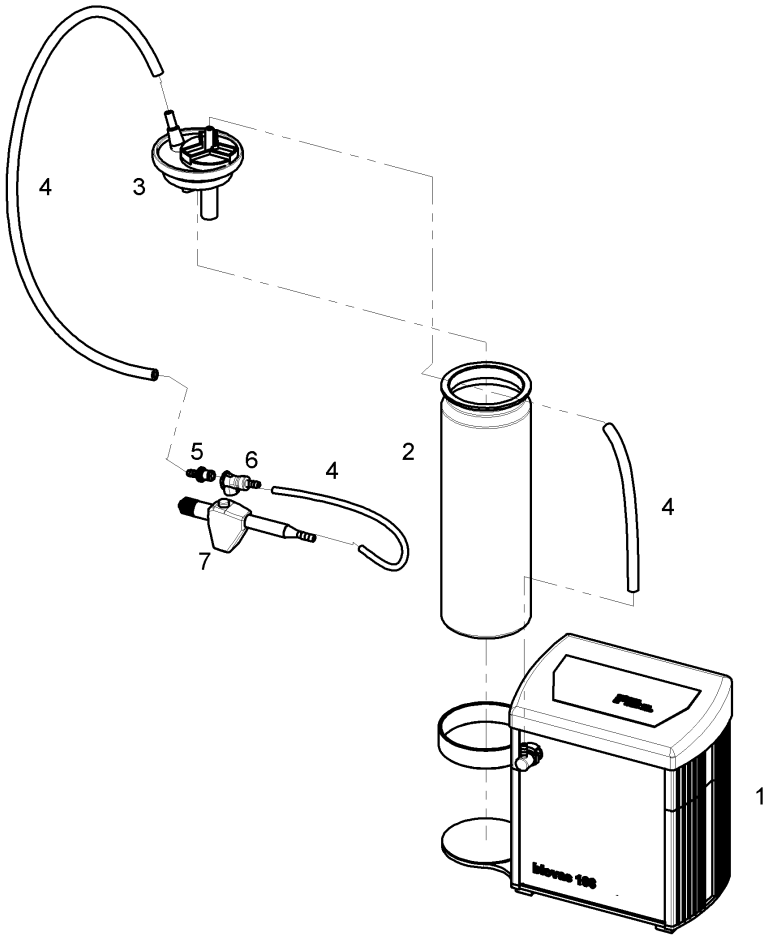


Fig. 9a Explosion view – complete unit biovac 106 with secretion glass bottle 2 liters

8.2.1.1 Spare parts list - Complete unit biovac 106 with secretion glass bottle 2 liters

Pos.	Designation	Piece	Order no.
1	**Basic unit complete** *(spare parts see chapter 8.2.3)*	**1**	**112573**
-	**Secretion glass bottle complete, 2 Liters** *(consisting of position: 2 – 6)*	**1**	**112523-1**
2	- Secretion glass bottle, 2 Liters	1	828840
3	- Cover complete for secretion glass bottle	1	828840-1
4	- Silicone hose (inside Ø 6 mm x wall thickness 3 mm)	0,8 m	828374
5	- Coupling plug + hose connector f. hose inside diameter 6.4 mm	1	829157-1
6	- Coupling + hose connector for hose inside diameter 6.4 mm	1	829157-20
7	**handvac *professional*** (*Set consisting of:* handvac Pipettor with adapters, stand, silicone hose and coupling, *see in appendix operation manual „handvac"; in fig. 9a not completely shown)*	**1**	**112580**

8.2.2 Complete unit - biovac 106 with secretion PP bottle 4 liters

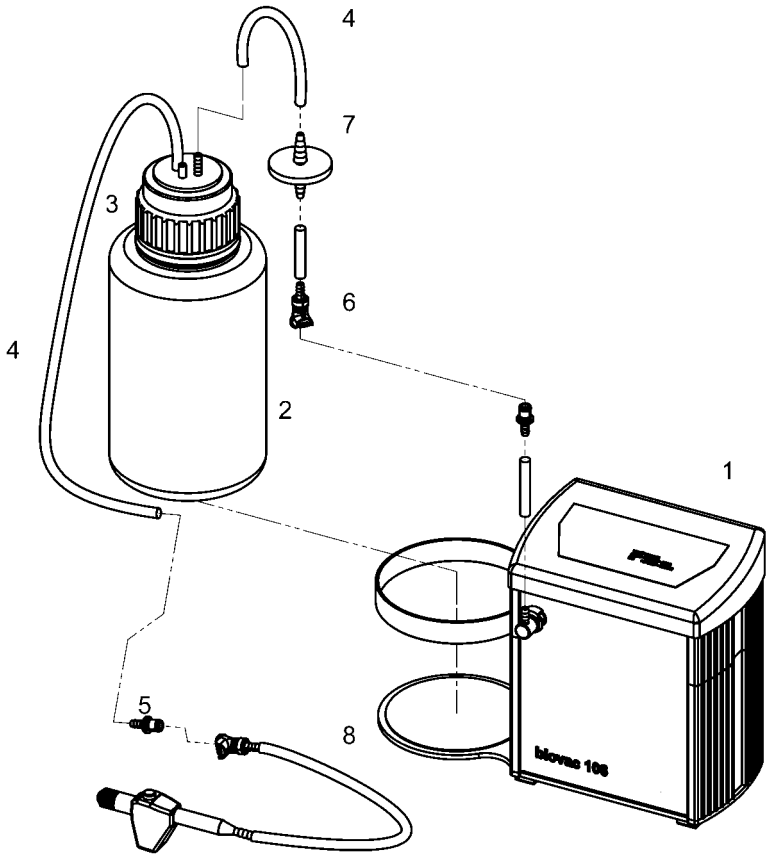


Fig. 9b Explosion view – complete unit biovac 106 with secretion PP bottle 4 liters

8.2.2.1 Spare parts list - Complete unit biovac 106 with secretion PP bottle 4 liters

Pos.	Designation	Piece	Order no.
1	**Basic unit complete** *(spare parts see chapter 8.2.3)*	**1**	**112573-02**
-	**Secretion PP bottle complete, 4 liters** *(consisting of position: 2 – 7)*	**1**	**112523-7**
2	- Secretion PP bottle with cover, 4 liters	1	828853
3	- Float valve *(in the cover)*	1	112581
4	- Silicone hose (inside Ø 6 mm x wall thickness 3 mm)	0,8 m	828374
5	- Coupling plug + hose connector f. hose inside diameter 6.4 mm	1	829157-1
6	- Coupling + hose connector for hose inside diameter 6.4 mm	1	829157-20
7	- Inline filter	1	112555-04
8	**handvac *professional*** (*Set consisting of:* handvac Pipettor with adapters, stand, silicone hose and coupling, *see in appendix operation manual „handvac“; in fig. 9b not completely shown)*	**1**	**112580**

8.2.3 Spare parts view - Basic unit complete

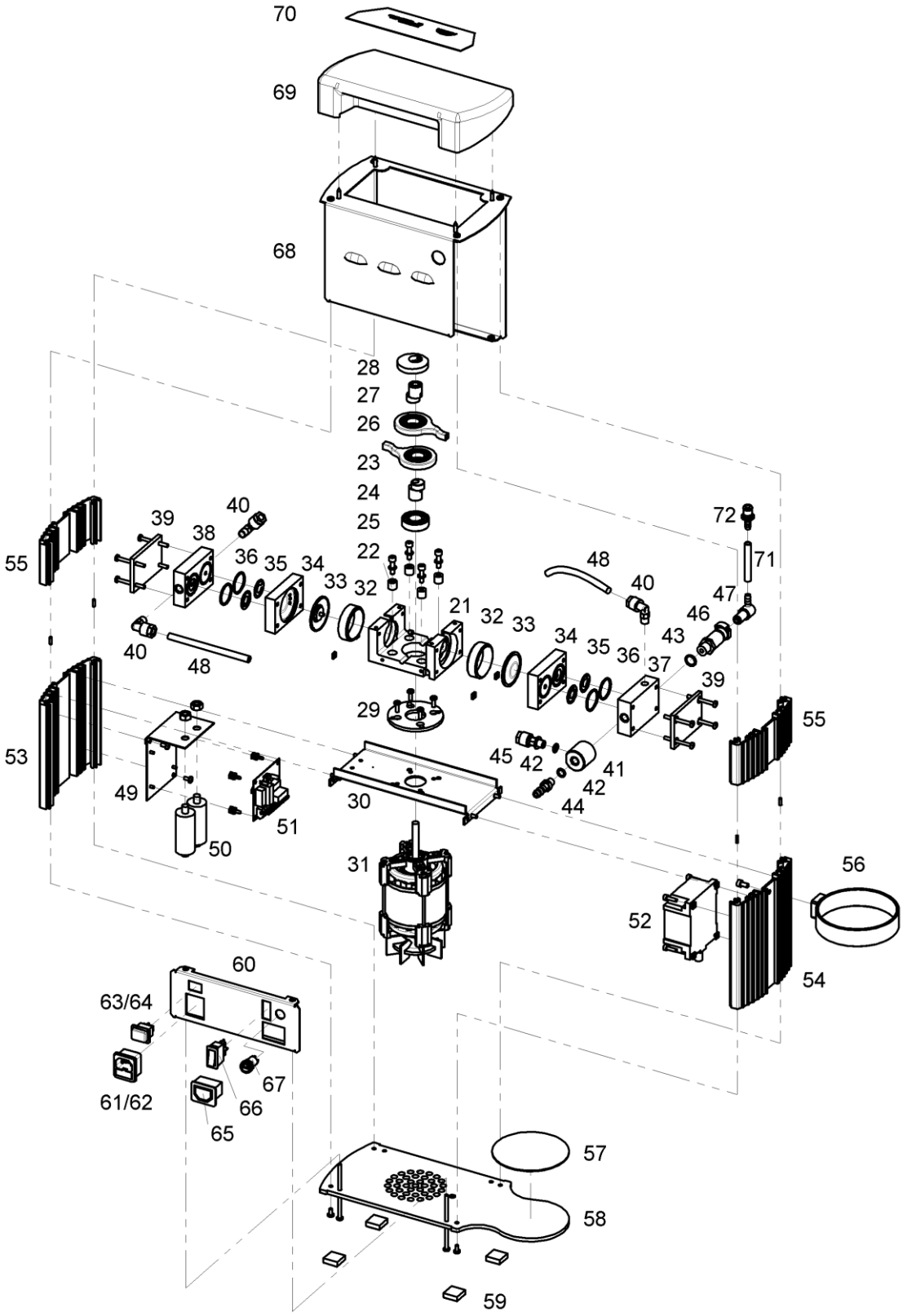


Fig. 10 Explosion view – Basic unit complete

8.2.3.1 Spare parts list - Basic unit complete

Pos.	Designation	Piece	Order numbers for:	
			(2 Liters) 112037	(4 Liters) 112037-04
-	Basic unit complete *(consisting of position: 20 – 72)*	1	112573	112573-02
20 *)	Basic pump on intermediate plate *(consisting of position: 20 – 33)*	1	410201-02	410201-02
21	- Pump casing	1	400944	400944
22	- Rubber element	4	400916	400916
-	- Drive 1 complete *(consisting of position: 23 – 25)*	2	400919	400919
23	- Piston rod with ball bearing	1	400892-01	400892-01
24	- Eccentric	1	400915	400915
25	- Grooved ball bearing	1	824963-1	824963-1
-	- Drive 2 complete *(consisting of position: 26 – 27)*	1	400919-01	400919-01
26	- Piston rod with ball bearing	1	400892-01	400892-01
27	- Eccentric	1	400915	400915
28	- Mass balance	1	400945	400945
29	- Insulating washer	1	400893-04	400893-04
30	- Intermediate plate	1	410215	410215
31	- Condenser motor	1	400998-03	400998-03
32	- Cylinder	2	400914	400914
33	- Form diaphragm	2	828929-1	828929-1
34	Pump head	2	400898-04	400898-04
35	Valve	4	400656	400656
36	O-Ring Ø 25 x 2	4	829250-1	829250-1
37	Connection head	1	400899-06	400899-06
38	Connection head	1	400899-05	400899-05
39	Pressure plate	2	400935	400935
40	Threaded elbow joint PVDF, 8 – 1/8“	3	829936-1	829936-1
41	Distributor PP, G 1/8“ – 2 x G 1/8“ L	1	400921	400921
42	O-ring Ø 8 x 2	4	829210-3	829210-3
43	O-ring Ø 12 x 2	1	829217-3	829217-3
44	Hose nozzle PP, G 1/8“	1	710797	710797
45	Straight threaded joint with seal edge PVDF, 8 - 1/8“	1	829919	829919
46	Quick release coupling PP, NW 7.2 mm - ¼“ - 6.4 mm	1	829996-2	829996-2
47	Angle with hose connector PP, NW 7.2 mm -¼“- 6.4 mm	1	829996-1	829996-1
48	Vacuum hose PTFE, 8 / 6x1 mm	0.1 m	828331	828331
49	Adapter plate	1	400949-03	400949-03
50	Motor operating condenser 2,5 µF	2	825459	825459
51	Time controlling VAPU 0003	1	825681	825681
52	One-coil transformer UI 48/17	1	825702	825702
53	Aluminium profile 155	1	400979	400979
54	Aluminium profile 155	1	400979-05	400979-05
55	Aluminium profile 60	2	400979-06	400979-06
56	Guard ring for bottle	1	112561-10	112561-11
57	Rubber plate	1	112547-02	112547-04
58	Foot plate	1	112567	112567-01
59	Casing foot	5	829112	829112
60	Switch panel	1	400568-01	400568-01
61	Combination connector	1	825274-9	825274-9
62	Fine-wire fuse F 3.15 A	1	825391-1	825391-1
63	Rocker switch 4 (1) A green	1	825186-3	825186-3
64	Protective cap transparency, small	1	825188-1	825188-1
65	Socket for non-heating apparatus	1	825274-7	825274-7
66	Rocker switch 16 (4) A green	1	825186-1	825186-1
67	Voltage selector 115/230 V	1	825187	825187
68	Casing	1	112557-13	112557-13
69	Casing cover	1	410216	410216
70	Front foil (Front design)	1	828906-03	828906-03
71	Silicone hose (inside Ø 6 mm x wall thickness 3 mm)	1 m	828374	828374
72	Coupling plug + hose connector f. hose inside diameter 6.4 mm	1	829157-1	829157-1
-	Mains connection cable IEC with plug CEE (D)	1	825885	825885
	Mains connection cable IEC with plug BS (UK)	1	825878	825878
	Mains connection cable IEC with plug NEMA 1-15 (US)	1	825903	825903

***)** The "basic pump" module (pos.: 20 – 33) can only be supplied complete under order number 410201-02.

EG - Konformitätserklärung
EC Declaration of Conformity / *CE Déclaration de Conformité*

DE: **Hiermit erklären wir**	WELCH by Gardner Denver	**Gardner Denver Thomas GmbH** Am Vogelherd 20 98693 Ilmenau Germany	T +49 3677 604 0 F +49 3677 604 131 welch.emea@gardnerdenver.com www.gardnerdenver.com/de-de/welch

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 (Gardner Denver Thomas 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 (Gardner Denver Thomas 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)*	**Absaugsystem** / Aspiration System / *Système d'aspiration* **biovac 106**
Artikel-Nr. / Fabrication No. / *No. de fabrication*	112037, 112037-04

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:*		
X	**2006/42/EG**	**Maschinenrichtlinie** / EC machinery directive / *directive CE sur les machines* (17.05.2006)
	2014/34/EU	**ATEX-Richtlinie für Verwendungen in explosionsgefährdeten Bereichen, Anhang III** / ATEX Guideline for use in potentially explosive atmospheres, Appendix III / *ATEX Directive for applications in hazardous areas, Annex III*
X	**2014/30/EU**	**Elektromagnetische Verträglichkeit** / EC Electromagnetic Compatibility Directive / *Directive CE relative à la compatibilité électromagnétique*
X	**2011/65/EU**	**Gefährliche Stoffe in Elektro- und Elektronikgeräten (RoHS II) /** Dangerous materials in electrical and electronics devices (RoHS II) / *Substances dangereuses dans les appareils électriques et électroniques (RoHS II)*
X	**2012/19/EU**	**Elektro- und Elektronik - Altgeräte (WEEE)** / Electrical and electronics - old devices (WEEE) / *Électro et électronique - appareils de contralto (WEEE)*
X	**China – RoHS II**	**Umweltschutzgesetz** – China 2016-01 / Environment protection law / *Loi sur la protection de environnement*

Angewandte harmonisierte Normen: / Applied harmonized standards: / *Standards appliques et harmonises:*		
	DIN EN 1127-1: 2011-10	**Explosionsfähige Atmosphären – Explosionsschutz - Teil 1: Grundlagen und Methodik** / Explosive atmospheres - Explosion prevention and protection - part 1: Basic concepts and methodology / *Atmosphères explosives - Protection contre les explosions - partie 1 : prescriptions et méthodologie*
	DIN EN 13463-1: 2009-07	**Nicht-elektrische Geräte für den Einsatz in explosionsgefährdeten Bereichen - Teil 1: Grundlagen und Anforderungen /** Non-electrical equipment for use in potentially explosive atmospheres - part 1: Basic method and requirements / *Appareils non électriques destinés à être utilisés en atmosphères explosibles - partie 1 : prescriptions et méthodologie*
	DIN EN 13463-5: 2011-10	**Nicht-elektrische Geräte für den Einsatz in explosionsgefährdeten Bereichen - Teil 5: Schutz durch konstruktive Sicherheit ‚c' /** Non-electrical equipment for use in potentially explosive atmospheres - part 5: Protection by constructional safety 'c' / *Appareils non électriques destinés à être utilisés en atmosphères explosibles - partie 5 : protection par sécurité de construction « c »*
X	**DIN EN ISO 12100: 2011-03**	**Sicherheit von Maschinen - Allgemeine Gestaltungsleitsätze Risikobeurteilung und Risikominderung /** Safety of machinery - General principles for design - Risk assessment and risk reduction / *Sécurité des machines - / Principes généraux pour l'évaluation des risques et la réduction des risques*
X	**DIN EN ISO 13857: 2008-06**	**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*
X	**DIN EN 1012-2: 2011-12**	**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*
X	**DIN EN ISO 2151: 2009-01**	**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*
X	**DIN EN 60204-1: 2014-10**	**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*
X	**EN 61000-6-2: 2011-06**	**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*
X	**EN 61000-6-4: 2011-09**	**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*
X	**DIN EN 50110-1: 2014-02**	**Betrieb von elektrischen Anlagen /** Operation of electrical installations / *Fonctionnement des installations électriques*
X	**DIN EN 61010-1/A1:2015-04**	**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*

Bevollmächtigter Vertreter mit Sitz in der Europäischen Gemeinschaft und Person, die befugt ist, die technischen Unterlagen zu erstellen. /
Authorized representative established in the European Community and person, who is authorized to compile the technical file. /
Représentant autorisé établi dans la Communauté européenne et personne autorisée à établir la documentation technique.

Gardner Denver Thomas GmbH Am Vogelherd 20 98693 Ilmenau / Germany	**Datum /** *Data*	**2019-08-06**
Werksleiter / Plant manager / *Directeur d'usine*	**Name** / Name / *Nom* **Robert Götz**	ppa.