

Analytical Diaphragm Pump Series MP[®]

MP31

Replacement for MP30

Instruction Manual
Version 1.00.01



**Dear customer,**

Thank you for buying our product. In this manual you will find all necessary information about this M&C product. The information in the manual is fast and easy to find, so you can start using your M&C product right after you have read the manual.

If you have any question regarding the product or the application, please don't hesitate to contact M&C or your M&C authorized distributor. You will find all the addresses in the appendix of this instruction manual.

For additional information about our products, please go to M&C's website www.mc-techgroup.com. There you can find the data sheets and manuals of our products in German and English.

Disclaimer

This instruction manual does not claim to be complete and it may be subject to technical modifications.

© 03/2021 M&C TechGroup Germany GmbH. The reproduction of this instruction manual as well as parts of the content are not permitted and are subject to approval by M&C TechGroup.

MP® is a registered trade mark.

Version: 1.00.01

The German instruction manual is the original instruction manual.



Table of Contents

- 1 General information.....4**
- 2 Declaration of conformity4**
- 3 Safety Instructions5**
- 4 Warranty5**
- 5 Warning signs and definitions6**
- 6 Introduction.....8**
 - 6.1 Proper use8
 - 6.2 Improper use.....8
- 7 Applications9**
- 8 Safety10**
- 9 Technical data.....11**
 - 9.1 Ambient conditions.....11
- 10 Dimensions12**
- 11 Receipt and storage13**
 - 11.1 Type plate and Serial number.....14
- 12 Installation information14**
 - 12.1 Mechanical.....14
 - 12.2 Electrical15
 - 12.3 Pneumatic16
- 13 Commissioning.....17**
- 14 Decommissioning.....18**
- 15 Maintenance18**
 - 15.1 Servicing schedule.....19
 - 15.2 Replacing diaphragms, valve plates and sealing rings19
- 16 Cleaning.....23**
- 17 Troubleshooting24**
- 18 Returns25**
- 19 Proper disposal of the device.....25**
- 20 Spare parts26**
- 21 Appendix26**

Table of Figures

- Figure 1 Delivery capacity MP319
- Figure 2 Dimensions MP3112
- Figure 3 Type plate on the housing.....14
- Figure 4 Marking needed for correct mounting19
- Figure 5 Sectional drawing of MP31 pump head20
- Figure 6 Aligning disc spring21
- Figure 7 Tightening cap head screws (1-2-3-4) and head plate screws (A-B).....22



Headquarters

M&C TechGroup Germany GmbH ♦ Rehhecke 79 ♦ 40885 Ratingen ♦ Germany

Phone: +49 - 2102 - 935 - 0

E - mail: info@mc-techgroup.com

Website: www.mc-techgroup.com

1 General information

The product described in this instruction manual has been built and tested in our production facility.

All M&C products are packed to be shipped safely. To ensure the safe operation and to maintain the safe condition, all instructions and regulations stated in this instruction manual need to be followed. This instruction manual includes all information regarding proper transportation, storage, installation, operation and maintenance of this product by qualified personnel.

Follow all instructions and warnings closely.

Read this manual carefully before commissioning and operating the device. If you have any questions regarding the product or the application, please don't hesitate to contact M&C or your M&C authorized distributor.

2 Declaration of conformity

With respect to the Machinery Directive 2006/42/EC, the pumps are partly completed machinery and are, therefore, to be regarded as not ready for use. Partly completed machinery may not be commissioned until it has been determined that the machine into which the partly completed machinery is to be installed complies with the provisions of the Machinery Directive 2006/42/EC. The following fundamental requirements of Annex I of Directive 2006/42/EC (general principles) are applied and observed:

General principles No. 1

As these partly completed machines are built-in devices, the mains connections and equipment for disconnecting and switching off the partly completed machinery as well as overcurrent and overload protection gear must be considered when mounting.

Furthermore, protection against contact with moving and hot parts, if present, must be provided during installation.

The pumps comply with Directive 2011/65/EU.

The following harmonized standards are satisfied:

DIN EN 55014-1/2
DIN EN 60204-1
DIN EN 50581
DIN EN 61000-3-2/3

3 Safety Instructions

Follow these safety precautions during installation, commissioning and operation of the device:

Read this instruction manual before commissioning and operating the product. Please make sure to follow all warnings and safety instructions.

Installation and commissioning of electrical devices must be carried out only by qualified skilled personnel in compliance with the current regulations.

The installation and commissioning of the device must conform to the requirements of VDE 0100 'Regulations on the Installation of Power Circuits with Nominal Voltages below 1000 V' and must be in compliance with all relevant regulations and standards.

Before connecting the device, please make sure to compare the supply voltage with the specified voltage on the product label.

Protection against contact to components carrying high voltages: Disconnect the power supply before opening the device for access. Make sure that all external power supplies are disconnected.

Operate the device only in the permitted temperature and pressure ranges. For details please refer to the technical data sheet or instruction manual.

Install the device only in protected areas, sheltered from sun, rain and moisture.

Do not use the pump in hazardous areas.

Installation, maintenance, inspections and any repairs of the devices must be carried out only by qualified skilled personnel in compliance with the current regulations.

4 Warranty

In case of a device failure, please contact immediately M&C or your M&C authorized distributor.

We have a warranty period of 12 months from the delivery date. The warranty covers only appropriately used products and does not cover the consumable parts. Please find the complete warranty conditions in our terms and conditions.

The warranty includes a free-of-charge repair in our production facility or the free replacement of the device. If you return a device to M&C, please be sure that it is properly packaged and shipped with protective packaging. The repaired or replaced device will be shipped free of delivery charges to the point of use.

5 Warning signs and definitions



Danger

The 'Danger' warning sign indicates that death, serious injury and/or significant material damage will be the consequence, if the appropriate precautions should not be taken.



Warning

The 'Warning' warning sign indicates that death, serious injury or damage to property may occur, if the relevant precautionary measures are not observed.



Caution

The 'Caution' warning sign indicates that slight personal injury can occur, if the appropriate safety precautions are not observed.

Caution

'Caution' indicates that damage to property can occur, if the appropriate safety precautions are not observed.



Note

'Note' indicates important information relating to the product or highlights parts of the documentation for special attention.

Qualified Personnel

'Qualified personnel' are experts who are familiar with the installation, mounting, commissioning and operation of these types of products.



High voltages!

Protect yourself and others against damages which might be caused by high voltages.



Toxic!

Acute toxicity (oral, dermal, inhalation)! Toxic when in contact with skin, swallowed or inhaled.



Corrosive!

These substances destroy living tissue and equipment upon contact. Do not breathe vapors; avoid contact with skin and eyes.



Hot surface!

Contact may cause burn! Do not touch!



Wear protective gloves!
Working with chemicals, pointed objects or extremely high temperatures requires wearing protective gloves.



Wear safety glasses!
Protect your eyes while working with chemicals or pointed objects. Wear safety glasses to avoid getting something in your eyes.



Wear protective clothes!
Working with chemicals, pointed objects or extremely high temperatures requires wearing protective clothes.



Use foot protection

6 Introduction

The **MP31** is the replacement for the MP30.

The model **MP31** is equipped with a new bearing, a new diaphragm and a new intermediate plate.

The **MP31** diaphragm pump is suitable for 100 % oil-free transport of corrosive gases. It has been dimensioned and designed specifically for use in the analytical sector. The pump is gas-tight and maintenance-free.

6.1 Proper use

The **MP31** is exclusively intended for the transport of gases and vapors.

The pump may only be installed and operated under the operating parameters and conditions described in chapter 9.

The pump may only be operated when fully assembled and fully delivered.

The pump may only pump media that are compatible with the components in contact with the media.

Only gases and vapors that remain stable at the pressures and temperatures occurring in the pump may be used.

6.2 Improper use

The pumps are not allowed to be operated in explosive atmospheres.

The pumps are not suitable for delivering:

- Dusts
- Fluids
- Aerosols
- Biological and microbiological substances
- Fuel
- Explosive substances and flammable materials
- Fibers
- Oxidants
- Food

Pumps with capacitor motor are not intended for operation with a frequency converter.

7 Applications

The transported gas remains analytically pure due to the absolutely lubricant-free operating of the pump. A special diaphragm and valve system ensure freedom from maintenance and a long service life. The pump is available for 230 V or 115 V mains voltage. The **MP31** has a delivery capacity of 7.5 NI/min at atmospheric pressure. The output on the pressure side is limited to maximum 2.5 bar abs. (see chapter **Fehler! Verweisquelle konnte nicht gefunden werden. Fehler! Verweisquelle konnte nicht gefunden werden.**).

Application examples are:

- Transport of gases and vapors with a temperature of +5 to + 40 °C [41 to 104 °F]
-



Warning

Unknown pumping media damages the pump

Unknown pumping media can cause corrosion or can destroy the pump.

- Prior to use, the compatibility of the materials of the pump head, diaphragm and valves with the unknown pumping media must be verified.

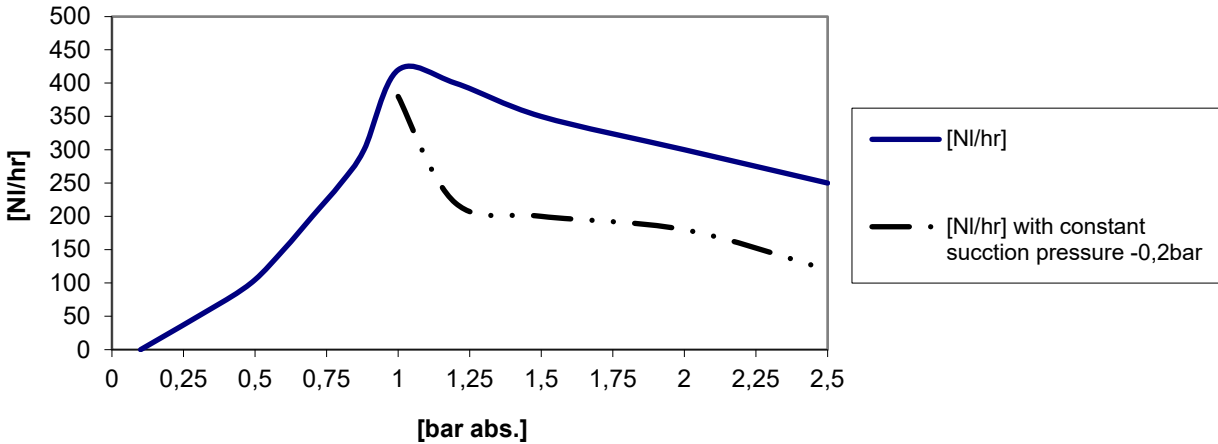


Figure 1 Delivery capacity MP31

8 Safety

The following must be observed concerning safety when using **MP31** diaphragm pumps:

The pump must only be used for the intended purpose (see chapter 6.1.).

Make sure that the personnel have read and understood the operating and installation instructions, particularly the chapter on safety.

The pumps must not be used in areas subject to explosion hazards or for transporting a potentially explosive medium.

Make sure that only specially trained and instructed personnel or specialist personnel work on the pumps. This applies, in particular, to assembly, connection and servicing work.

When connecting other components to the pump, the pneumatic conditions must be observed (see chapter 9.12.3).

When connecting the pump to the electrical system, the relevant safety requirements must be observed.

Observe the regulations on accident prevention and safety during all work on the pumps and during operation.

The compatibility of the pump materials with the medium to be transported must be verified prior to use of the pump and the safety requirements for the media to be used observed.



Warning

When transporting toxic media, system-specific and safety-relevant regulations must be observed (MAC values).

The transported medium must be safely discharged.

Avoid contact with the heads and housing parts, as the pump heats up during operation.

The standard internal thermal safety cut-out protects the pump against overload. The pump automatically restarts after cooling down. Hazardous situations constituted by this must be prevented by suitable measures.

Make certain that no dangers arise from flows when gas connections are open, from the effects of noise or from hot, corrosive, dangerous and environmentally hazardous gases.

Make sure that an EMC-compliant installation of the pump is ensured at all times and that no dangerous situation can thereby arise.

Make sure that the permissible ambient temperature (chapter 9) and the maximum permissible operating overpressure (see chapter 9.1) of the pump are not exceeded.

**Warning**

Upon breakage of the diaphragm and/or leaks, the transferred medium mixes with the air in the surroundings and/or in the pump housing. Make sure that a dangerous situation cannot arise as a result. When pumping hazardous media, observe the safety regulations for the handling of these media.

Therefore, make certain that the temperature of the medium also remains sufficiently below the ignition temperature of the medium even when it is compressed to the maximum permissible operating pressure of the pump.

9 Technical data

Diaphragm pump	MP31/230 V	MP31/115 V
Part No.	02P1510	02P1510a
Voltage supply	230 V 50 Hz ±10 %	115 V 60 Hz ±10 %
Power input	70 W	
Power consumption	0.45 A	0.7 A
Degree of protection	IP54 - DIN 40050	
Delivery capacity max.	7.5 NI/min without pressure	
Operating pressure	0.14 to max. 2.5 bar abs.	
Gas temperature	+5 to +40°C [41 to 104 °F]	
Ambient temperature	+5 to +40 °C [41 to 104 °F]	
Storage temperature	-15 to +60 °C [5 to 140 °F]	
Gas connections	G1/8" female, DIN ISO 228/1*	
Electrical equipment standard	EN 61010, part 1	
Medium contacted parts Pump head Diaphragms Valves	PVDF, SS316Ti CR, PTFE coated FFPM	
Weight	3.1 kg [≈ 6.8 lbs]	3.3 kg [≈ 7.3 lbs]

* The dimensions and designation of the screw-in threads correspond to the respective applicable standard. The tolerances of the thread standards are matched to metal threads and cannot be applied to plastic threads.

Material designations according to ISO 1629 and 1043.1

Please note: NI/h and NI/min refer to the German standard DIN 1343 and are based on these standard conditions: 0 °C [32 °F], 1013 mbar.

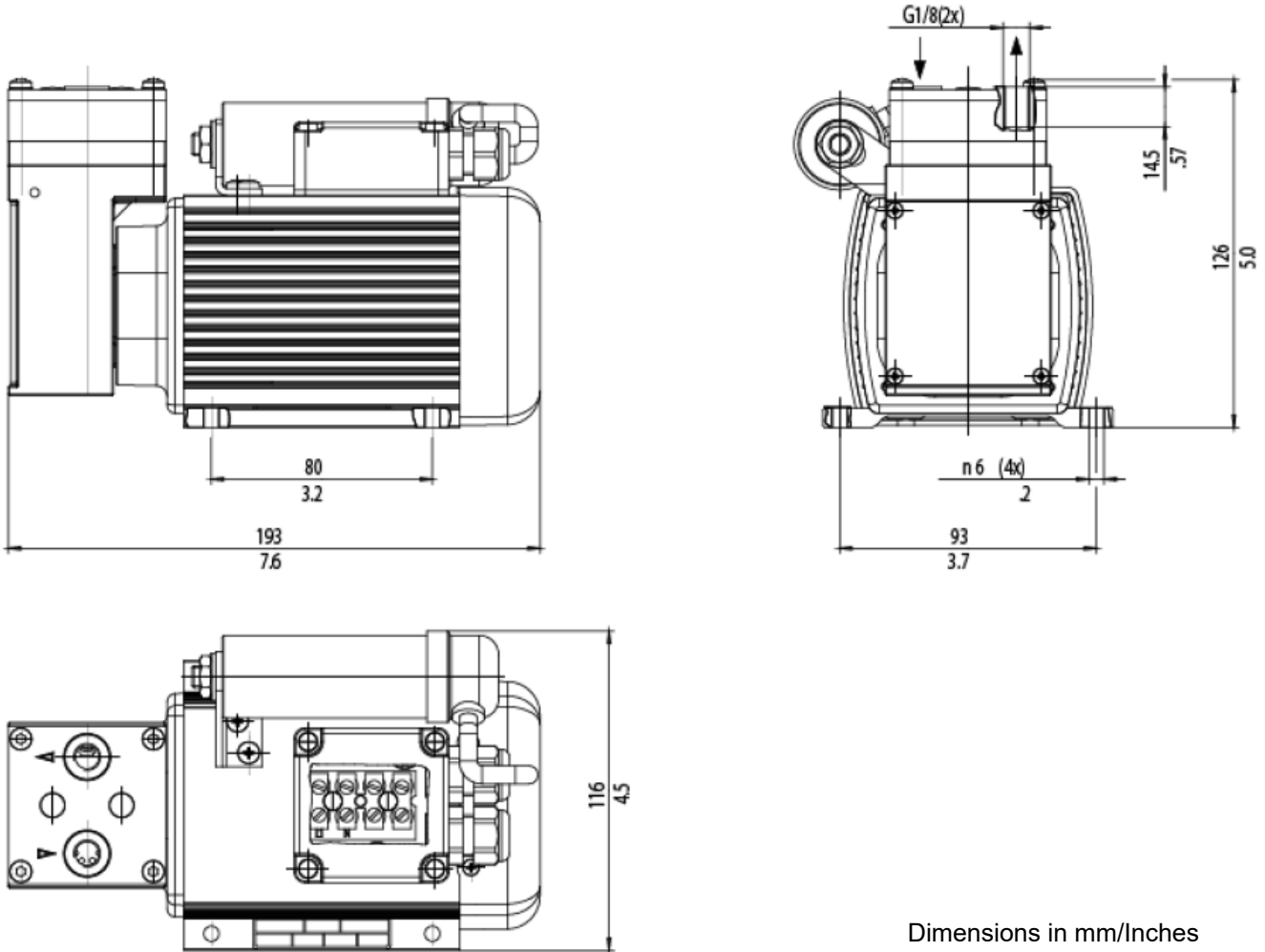
9.1 Ambient conditions

The following ambient conditions must be maintained during operation:

- Ambient temperature range in operation: +5 to + 40 °C [41 to 104 °F].
- The pumps must be protected from water and dust.
- Sufficient ventilation must be provided during operation.
- The pump type **MP31** must not be used in areas subject to explosion hazards or for transporting a potentially explosive medium. The pumps have the degree of protection IP54 as standard.

10 Dimensions

The dimensions of the **MP31** are shown below.



Dimensions in mm/Inches

Figure 2 Dimensions MP31

11 Receipt and storage



Caution

Personal injury and/or property damage due to incorrect or improper transport of the pump.

In the event of incorrect or improper transport, the pump can fall down, be damaged or injure persons.

- Use suitable auxiliary means if necessary (carrying strap, lifting gear, etc.).
- Where appropriate, wear suitable personal protective equipment (e.g., safety shoes, safety gloves).



Caution

Risk of injury from sharp edges on the packaging.

There is a risk of injury from cutting on the sharp edges when grabbing corners or when opening the packaging.

- Where appropriate, wear suitable personal protective equipment (e.g., safety shoes, safety gloves).

- Carefully remove the diaphragm pump and any accessories from the transport packaging immediately upon receipt and check the delivery against the delivery note.
- Check the contents for possible transport damage and immediately notify the transport insurer of any damage.



The diaphragm pump should be stored in a protected, frost-free room.

Before commissioning, make sure that the pump has reached the ambient temperature.

11.1 Type plate and Serial number

The type plate with the serial number is attached to the pump housing at the mounting plate of the MP31.



Figure 3 Type plate on the housing

12 Installation information

The safety rules and regulations for the prevention of accidents must be observed during installation and also subsequent operation. The information in Chapter 8 must be observed.

The safety requirements applicable to the respective media to be transported must be observed.



Note

In order to prevent a disturbing accumulation of heat, the pumps should be installed away from sources of heat and freely ventilated.

For installation outdoors, the pump must be installed in a protective housing frost-free in winter and sufficiently ventilated in summer. Direct exposure to sunlight must be avoided.



Note

Pumps have mechanical moving parts that can induce vibrations. To prevent damages at the pump or at peripheral components/facilities as well as minimizing noise development an appropriate vibration decoupling is necessary. For this M&C can deliver e.g. anti-vibration pads.

This explicit is also valid for the connection of the sample lines at the pump head.

12.1 Mechanical

- The fixing dimensions are shown in Figure 2.
- The pumps must be installed in such a way that the impeller is able to draw in sufficient cooling air.

- The pumps should be installed at the highest point in the system and/or with the pump head pointing downward to prevent an accumulation of condensate – this will extend the useful life of the pump.

12.2 Electrical



Danger

Danger to life from electric shock

- Only have the pump connected by an authorized specialist.
- Only have the pump connected if the power supply is disconnected.

Qualified Personnel



Electrical installation must take place in compliance with the safety regulations. Before connecting the pump, safe isolation from the supply must be ensured.

- The protective conductor must be connected to the pump motor.
- A device for disconnecting the pump from the electrical system must be provided in the electrical installation (according to EN 60335-1).

The supply circuit should be provided with a fuse with a rating corresponding to the current consumption (over-current protection, current consumption, see chapter 9).



Warning

The supply voltage must be compared with the voltage shown on the rating plate. A voltage deviation of about $\pm 10\%$ is admissible.



The pumps must be mounted so that contact with live parts (e.g. electrical connection, possibly motor windings) is excluded.

12.3 Pneumatic



Caution

Personal injury or property damage through ejected plugs

If not removed, the plugs on the pressure side of the pump can be ejected during operation by the resulting overpressure.

- Remove the plugs during installation.
- Wear appropriate personal protective equipment.



Note

Components to be connected to the pump must conform to the pneumatic data of the pump.

1. Remove safety plugs from threaded gas connections (thread size G1/8”).
2. Accessories such as threaded hose couplings must be screwed into the threaded connection with sealing tape (the use of sealing tape is unnecessary when using for example **M&C** couplings with part No. 05V1045).
3. Connect suction and pressure pipe.



Note

Do not interchange hose connections for sample gas inlet and outlet; the connections are appropriately marked.

After connecting all pipes, they must be checked for tightness.

When connecting the hoses to optional threaded hose couplings, the following should be noted:



Note

The tightness of the connection can only be ensured when the connecting hose has a straight terminating edge (use of a hose cutter).

4. Loosen the swivel nut of the clamping ring by turning anticlockwise; it must be ensured that the nut is carefully removed from the coupling, so that the clamping ring lying loosely in the clamping ring is not lost.
5. Slide the swivel nut on to the connecting hose.
6. Slide the clamping ring with the thicker part pointing towards the nut on to the connecting hose.
7. Fit the hose on to the supporting nipple in the coupling;
8. Tighten the swivel nut hand-tight.

The hose is not connected non-slip and pressure-proof.

Optional threaded couplings for DN 4/6 or DN 6/8 can be obtained through M&C

9. Route the suction and pressure pipe so that no condensate can flow into the pump.

13 Commissioning



Risk of burns from hot pump parts and/or hot medium

Some pump parts may be hot during or after operation of the pump.

- Allow the pump to cool after operation.
- Take protective measures to protect against touching hot parts.



Warning

Injury to eyes

Coming too close to the inlet/outlet of the pump may result in injury to the eyes due to the present vacuum/operating pressure.

- Do not look into the pump inlet/outlet during operation.



Warning

Dangerous situations due to automatic starting of the motor.

The standard internal thermal switch protects the pump from overload. The pump restarts automatically after cooling down.

- Take suitable measures to avoid dangerous situations arising from this.

Operate the pump only under the operating parameters and operating conditions described in chapter 9.

Ensure the intended use of the pump (see chapter 6.1).

Exclude unintended use (see chapter 6.2) of the pump.

Observe the information on safety in chapter 8.

The pumps are built-in devices. Before they are commissioned, it must be ensured that the machines or systems into which the pumps are installed comply with the relevant provisions.



Warning

Risk of pump head bursting due to excessive pressure increase

- Do not exceed the maximum permissible operating pressure (see chapter 9).
- Monitor the pressure during operation.
- If the pressure exceeds the maximum permissible operating pressure of the pump: immediately switch off the pump and remedy the fault (see chapter 17)
- Only throttle or regulate the air or gas quantity on the suction line to prevent the maximum permissible operating pressure from being exceeded.
- If the air quantity or gas quantity on the pressure line is throttled or regulated, make sure that the maximum permissible operating pressure at the pump is not exceeded.
- Ensure that the pump outlet is not closed or restricted.

**Warning**

Risk of dangerous gas mixtures during pump operation if diaphragm breaks

If the diaphragm breaks, the medium will mix with the air in the compressor housing or in the surroundings.

- Stop pump immediately.
- Replace the diaphragm prior to further operation (see chapter 15.215.2 Replacing diaphragms, valve plates and sealing rings 15.2)

14 Decommissioning

**Note**

The site of installation of the diaphragm pump must remain frost-free also during the time when the unit is switched off.

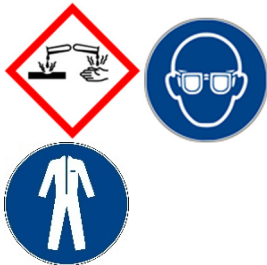
- When taking out of service (switching off the pump), restore normal atmospheric pressure in the lines. (relieve the pump pneumatically).
- Before restarting the pump at the electrical connection, observe the relevant standards, directives, regulations and technical standards.
- Check the pump regularly for external damage or leakage.

**Warning**

Aggressive media

Aggressive media lead to burns during decommissioning.

- Flush the pump under atmospheric pressure conditions with inert gas. If there is no danger of explosion, flushing can also be carried out with air.



Aggressive media residues possible.

- Wear protective goggles and appropriate protective clothing when dismantling, repairing or cleaning the pump.

15 Maintenance

**Warning**

Danger of injury through not using genuine spare parts

The functionality of the pump and its safety will be lost, if genuine spare parts are not used. The validity of the CE conformity is rendered void if genuine parts are not used.

- Use only genuine spare parts from M&C for servicing work.

Before carrying out maintenance work, the system and process-specific safety measures must be observed!

15.1 Servicing schedule

- Inspect the pump periodically for external damage or leakage
- Check regularly for conspicuous changes in the noise and vibrations.
- Inspect the pump periodically for external damage or leakage

15.2 Replacing diaphragms, valve plates and sealing rings



Health hazard due to dangerous substances in the pump

Depending on the medium being transferred, caustic burns or poisoning is possible.

- Wear protective equipment if necessary, e.g., protective gloves, goggles.
- Clean the pump with suitable measures.

Diaphragms and valve plates are the only wearing parts of the pumps and can be easily replaced.



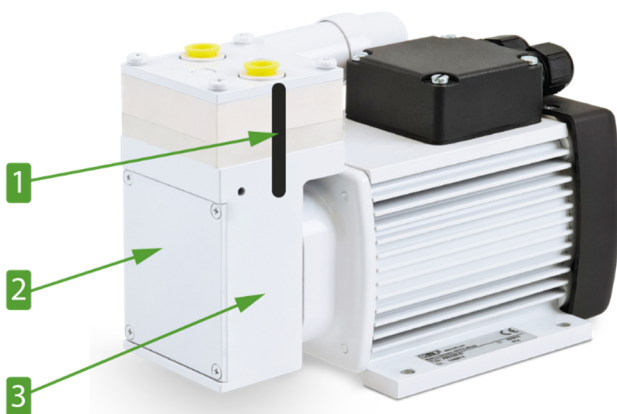
It is recommended to replace valve plates, diaphragms and sealing rings simultaneously to maintain the life expectancy of the pump.

For the maintenance or repair of the pump, the following tools and parts are required:

- 2 valve plates, 2 sealing rings and 1 diaphragm according to spare parts list.
- Cross-tip screwdriver No.2.
- Cross-tip screwdriver No.1.
- Felt-tip pen.

Disassemble the pump head:

- 1 Mark the position of the pressure plate, head cover, intermediate plate and housing **3** with a continuous felt-tip pen line **1**.



1 Felt-tip pen marking

2 Housing cover

3 Pump housing

Figure 4 Marking needed for correct mounting

- The housing cover **2** is fastened with four cap screws. Loosen these 4 cap screws and remove the housing cover **2**.

The counterweight is visible.

Fehler! Verweisquelle konnte nicht gefunden werden. shows the sectional drawing of the pump head.

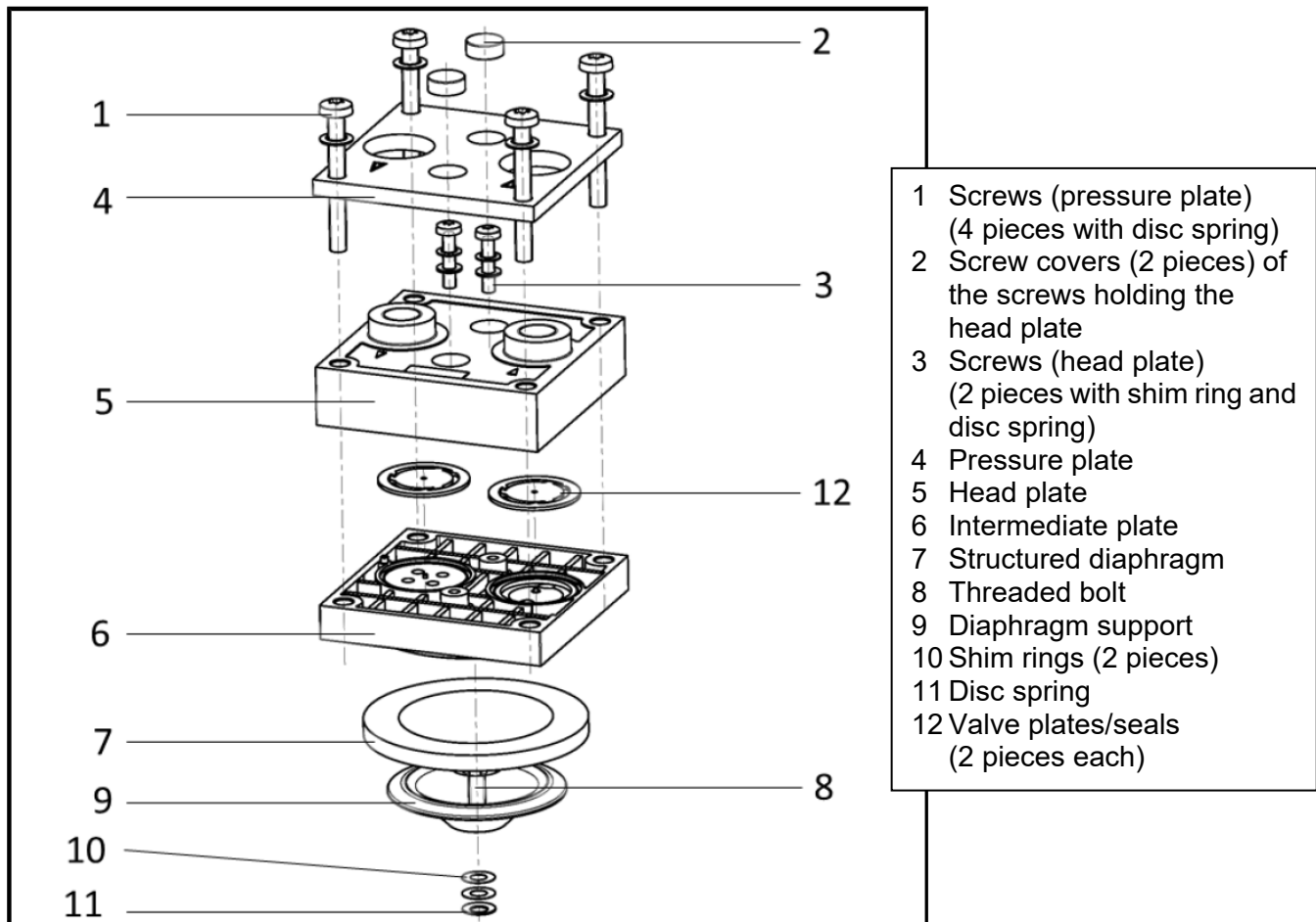


Figure 5 Sectional drawing of MP31 pump head

- Loosen the four screws **1** and remove the pressure plate **4**.
- Remove the screw covers **2** loosen the two screws **3** and remove the head plate **5** and the intermediate plate **6**.

The structured diaphragm **7** is visible.

Replacing the structured diaphragm (numbering see Figure 5 and Figure 6):

- Turn the pump to the side; this keeps the shim rings **10** and the disc spring **11** from falling into the pump chamber when removing the structured diaphragm **7**.
- Move the structured diaphragm **7** by turning the counterweight to the upper reversal point.
- Lift the structured diaphragm **7** onto opposing side edges; hold the structured diaphragm and unscrew it counterclockwise.
- Remove the diaphragm support **9**, shim ring(s) **10** and disc spring **11** from the threaded bolt **8** of the structured diaphragm and keep in a safe place.

- 5 Check all parts for soiling and clean them if necessary.

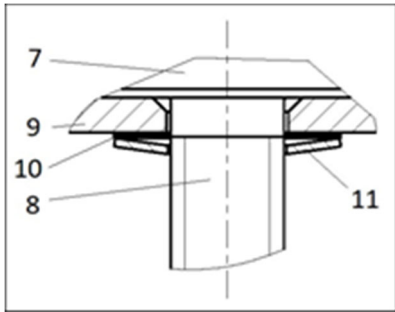


Figure 6 Aligning disc spring

- 6 Push diaphragm support **9**, shim ring(s) **10** and disc spring **11** onto the threaded bolt **8** of the new structured diaphragm **7** in this order.



Note

The edge of the disc of the disc spring **11** must be aligned with the structured diaphragm **7** (see Figure 6)

- 7 Move the connecting rod (connection part between drive shaft and structured diaphragm) to the upper reversal point by turning the counterweight.
- 8 Screw the structured diaphragm **7** with diaphragm support **9**, shim ring(s) **10** and disc spring **11** clockwise onto the connecting rod and hand tighten.

Replacing valve plates/seals (numbering see Figure 5) :

1. Remove the valve plates/seals **12** from the intermediate plate **6**.
2. Check the valve seats, intermediate plate **6** and head plate **5** for soiling and damage. Clean the parts if necessary.
3. Contact M&C in the event of unevenness, scratches or corrosion. Order and replace damaged parts.
4. Insert the new valve plates/seals **12** in the valve seats of the intermediate plates **6**.
5. Place the head plate **5** on the intermediate plate according to the felt-tip pen marking.
6. Check the centering of the head plate **5** by means of a slight lateral movement.
7. Connect head plate (5) and intermediate plate **6**. To do this, screw in screws **3** with disc spring **11** and shim rings **10** until the screw head is seated flat, i.e., until the first resistance is encountered. Apply a small amount of thread locker (Loctite 222 or comparable product) to the threads of the screws.

Mounting the pump head:

- 1 Place the pump head on the housing according to the felt-tip pen marking.
- 2 Place the pressure plate **4** on the head plate **5** according to the felt-tip pen marking (numbering see Figure 5).

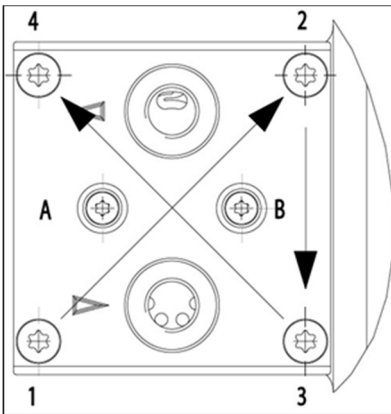


Figure 7 Tightening cap head screws (1-2-3-4) and head plate screws (A-B)

- 3 Screw in the four screws for the pressure plate **(1-2-3-4)** with disc springs and slightly tighten them crosswise in the order 1-2-3-4 with 1 Nm.
- 4 Check for ease of movement of the pump by turning the counterweight.
- 5 Tighten the four screws for the pressure plate **(1-2-3-4)** with disc springs crosswise in the order 1-2-3-4. Tightening torque: 2.1 Nm.
- 6 Then tighten the two screws for the head plate **(A-B)** another quarter turn (tightening torque: 30 Ncm) and mount the two screw covers.

Final steps:

1. Mount the housing cover.
2. Check the pump head and pneumatic connections for leaks.
3. Properly dispose of the replaced structured diaphragm and valve plates/seals.



Note

To ensure the required gas tightness of the pump following servicing, a leak test is to be performed.



Risk of injury and poisoning from leaks

- Before recommissioning the pump, check the pump heads and pneumatic connections for leaks. Leaks may lead to poisoning, chemical burns or similar injuries.

16 Cleaning



Caution

Risk of burns from hot pump parts

The pump head or motor may still be hot after operation of the pump.

- Allow the pump to cool after operation.



Warning

Health hazard due to dangerous substances in the pump

Depending on the medium being transferred, caustic burns or poisoning is possible.

- Wear protective equipment if necessary, e.g., protective gloves, goggles.
- Clean the pump with suitable measures.



Note

During cleaning work, ensure that no fluids enter the interior of the housing.

When replacing the valve plates and diaphragms, all parts must be checked for fouling before assembling the valve head and cleaned if necessary. If available, the parts should carefully be blown out with compressed air.

17 Troubleshooting



Danger

Qualified

Personnel



Danger to life from electric shock

- All work on the pump may only be performed by an authorized specialist..
- Disconnect the pump power supply before working on the pump.
- Check and ensure that no voltage is present.

Allow the pump to cool before troubleshooting.

The following instructions for troubleshooting are hierarchically structured, i.e. to be used in the specified order

Problem/Indication	Possible cause	Check/Remedy
Pump does not transport	Pump is not connected to the electrical mains.	Connect the pump to the electrical mains.
	No voltage in the electrical mains.	Check the room fuse and switch it on if necessary.
	Connections or lines are blocked.	Check the connections and lines. Remove the blockage..
	An external valve is closed or a filter is clogged.	Check external valves and filters.
	Condensate has collected in the pump head.	Separate the source of the condensate from the pump. Flush the pump with air at atmospheric pressure for a few minutes (if necessary for safety reasons: with an inert gas). Install the pump at the highest location in the system.
	Diaphragm or reed valves are worn or defective.	Change the diaphragm and valve springs (see chapter 15.2 Replacing diaphragms, valve plates and sealing rings).
Flow rate, pressure or vacuum too low The pump is not achieving the flow rate specified in the technical specifications or in the data sheet.	Condensate has collected in the pump head.	Separate the source of the condensate from the pump. Flush the pump with air at atmospheric pressure for a few minutes (if necessary for safety reasons: with an inert gas). Install the pump at the highest location in the system.
	Condensate has collected in the pump head.	Separate the source of the condensate from the pump. Flush the pump with air at atmospheric pressure for a few minutes (if necessary for safety reasons: with an inert gas). Install the pump at the highest location in the system.

Problem/Indication	Possible cause	Check/Remedy
Flow rate, pressure or vacuum too low The pump is not achieving the flow rate specified in the technical specifications or in the data sheet.	Pneumatic lines or connection parts have insufficient cross section or are throttled.	Disconnect the pump from the system to determine the output values. Eliminate throttling (e.g., valve) if necessary. Use lines or connection parts with a larger cross section if necessary.
	Leaks occur at connections, lines or pump head.	Eliminate the leaks.
	Connections or lines are completely or partially plugged.	Check the connections and lines. Remove any parts and particles that are causing plugging.
	Head parts are soiled.	Clean the head components.
	Operating diaphragm broken	Shut down the pump immediately.
	Diaphragm or valve plates are worn or defective.	Change the diaphragm and valve plates (see Chapter 15.2 Replacing diaphragms, valve plates and sealing rings).
Pump exhibiting changed running noises and vibrations.	Pump bearing worn or defective.	Determine the cause. Contact M&C Customer Service.
	Motor worn or defective.	Contact M&C Customer Service.

**Note**

If none of the specified faults can be located, despite the pump not operating correctly, the pump should be returned to M&C for examination.

18 Returns

If you send your diaphragm pump to M&C Customer Service for repair, then we require a fully completed RMA Service Receipt. You can find the RMA Service Receipt on our website www.mc-techgroup.com under Service & Support → Returns.

There you enter information about the pumped medium, especially about aggressive pumped media.

If hazardous or highly aggressive gases have been pumped with the pump, the pump must be cleaned before shipment.

19 Proper disposal of the device

At the end of the life cycle of our products, it is important to take care of the appropriate disposal of obsolete electrical and non-electrical devices. To help protect our environment, please follow the rules and regulations of your country regarding recycling and waste management.

20 Spare parts

Wear, tear and replacement part requirements depend on specific operating conditions. The recommended quantities are based on experience and are not binding.

Diaphragm Pump Type MP31 (C) consumable parts, (R) recommended spare parts, (S) spare parts					
			Recommended quantity in operation [years]		
		C/R/S	1	2	3
90P1502	Structured diaphragm MP31	R	1	2	3
90P1507	Valve plate/seals MP30/31	R	2	4	6
90P1520	Head plate MP30/31	R	-	1	-
90P1527	Intermediate plate MP31	R	-	1	-
PVDF male connectors with G-thread (ISO 1010031)					
05V1045	Straight connector DN 4/6-G 1/8" male, material: PVDF	S	-	-	2
05V1050	Straight connector DN 6/8-G 1/8" male, material: PVDF	S	-	-	2
05V6600	Ferrule DN 4/6 PVDF	S	2	2	4
05V6602	Ferrule DN 6/8 PVDF	S	2	2	4
05V6605	Union nut DN 4/6 PVDF	S	2	2	4
05V6607	Union nut DN 6/8 PVDF	S	2	2	4

21 Appendix



More product documentation is available on our Internet catalogue:
www.mc-techgroup.com