



Operating instructions

CFA MOBIL

Model D

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1. General



The purpose of these operating instructions is to ensure the safe and effective use of the carbon dioxide packaging facility. For this reason, these operating instructions should be made available to all users of the device.

It is the duty of every user to read these operating instructions carefully before starting up the device.

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The following symbols will be used in these operating instructions.

! Danger

Imminent danger leading to serious bodily injury or death.

! Warning

A dangerous situation may arise that is likely to lead to personal injury or death.

! Take care

A dangerous situation may arise that is likely to lead to some personal injury or material damage.

! Note

A situation may arise that is likely to cause damage to products, property or the environment.



Application guidelines, useful information.

2. Description of product

2.1. Application

The **CFA MOBIL** carbon dioxide bottling facility is a mobile bottling facility for use in the mobile service sector.

The carbon dioxide is removed in the liquid form from a tank or a storage bottle equipped with a riser, the operating pressure of which is in the region of 30 to 60 bar, and pumped into a container to be filled.

The rubber jacketed supply line which is part of the facility is connected to the supply bottle or tank and the stainless steel jacketed feed line with the filling head is connected with the bottle to be filled.

On no account must this facility be used with tank facilities holding very cold carbon dioxide. The quantity to be introduced into the container to be filled may be in the region of 2 to 30 kg.

The balance necessary for the filling operation is not part of the scope of supply.

The filling facility consists of the following sub-assemblies:

- Housing
- Electric motor with mains switch
- Carbon dioxide pump with filter
- Belt drive
- Pressure gauge
- Safety valve
- Feed line and filling line with filling head.

2.2. Appropriate use

The **CFA MOBIL** carbon dioxide facility has been designed exclusively for bottling/pumping liquid carbon dioxide, excluding very cold carbon dioxide. The relevant rules and regulations must be complied with.

Any use of the bottling facility other than the application detailed above is deemed inappropriate and the manufacturer cannot be held liable for any resulting damage or loss.

2. Description of product

2.3. Technical data

Motor

| | |
|-------------------|---|
| Type of motor | Single phase asynchronous motor with starting capacitor |
| Voltage | 230 V |
| Current intensity | 9.3 A |
| Frequency | 50 Hz |
| Output | 1.1 kW |
| Speed | 1440 1/min |
| Weight | 16.8 kg |

Pump

| | |
|------------------|--|
| Type of pump | Triple plunger pump |
| Delivery rate | approx. 2.5 – 3.5 kg/min, depending on version |
| Speed | approx. 750 1/min |
| Type of oil | SAE 90 |
| Quantity bottled | approx. 0,22 litre |
| Weight | 6 kg |

Belt drive

| | |
|--------|--------------|
| V belt | 1 SPZ 612 LW |
|--------|--------------|

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2. Description of product

Safety valve

| | |
|--------------------------|---------|
| Valve operating pressure | 130 bar |
|--------------------------|---------|


Lines

| | |
|--------------|-----------------------------|
| Filling line | High pressure line ND 5/16" |
| Feed line | High pressure line ND 8 |

Pressure gauge

| | |
|----------------|--------------------|
| Pressure gauge | 0 – 160 bar damped |
|----------------|--------------------|

| | |
|--------------------------------|--------------------|
| Total weight | 42 kg |
| Overall dimensions (L x W x H) | 580 x 365 x 315 mm |

-  The technical data may vary, depending on the construction, and can be changed by the manufacturer without prior notice.

3. Safety Precautions

3.1. General

Handling or operating carbon dioxide packaging facilities in an appropriate manner can lead to serious injuries and, in the worst case, can be fatal.

For this reason, the German legislation has devised strict rules and regulations for the protection of human life. As part of the harmonisation of directives and standards within the European Union, these regulations have in some instances been incorporated into the European Law (e.g. the law relating to the safety of equipment, the guideline on pressure devices, the regulation on operational safety). However, as this process has not yet been completed, the law of the country concerned has so far usually been applied.

For this reason, the regulations of the country concerned must be complied with!

For Germany, the following regulations need to be complied with when operating carbon dioxide packaging facilities:

UVV section 1 (VBG 1), in particular sections 4, 15, 16, 17, 18, 39, 45

UVV section 7 (VBG 4), in particular sections 3, 6

UVV section 13.4 (VBG 16), in particular sections III

UVV section 13.5 (VBG 17), in particular sections VII

The regulation concerning pressurised containers, in particular section 3, section 4 and appendix 1

The technical rules on gases (TRG), in particular 100, 400, 401, 402, 500, 730

The above list is not necessarily complete.

! Note The operating instructions must be made available to all those using the equipment.

! Danger The mains plug must always be pulled out of the socket while working on electrical equipment. Only specially trained personnel may be used.

The device must be installed in surroundings complying with the regulations.

Any carbon dioxide that has escaped through leaking lines or similar may be fatal as a result of suffocation, or cause serious injuries to the skin as a result of cold burns.

On no account must bent or damaged lines be used.

Use only suitable and tested compressed gas containers for packaging or removing gas.

3. Safety Precautions

On no account must safety valves and similar fittings be manipulated.

! Warning On no account must any fluid other than carbon dioxide be used.

Operate the plant only in a state in which it is free from all technical defects.

Work on pressurised structural parts or modifications to the facility may be carried out only with the manufacturer's consent.

The instructions on packaging contained in the TRG must be complied with and a control weighing operation must be carried out.

! Note Only original spare parts or parts subjected to a design test may be used.

Avoid strong torsion (torsional stress) when fixing the hose lines.

For equipment to be operated in Germany, the facilities will be checked by an expert in the plant of the manufacturer Brandschutztechnik Müller GmbH. The instructions contained in the test certificate (test results) must be followed.

All hoses must be verified for safe operation before commissioning and in line with the requirements, but no later than at intervals of 6 months.

3.2. Safety specifications for carbon dioxide liquefied under pressure

3.2.1 Possible hazards and toxicology

Gas liquefied under pressure can have a suffocating effect when present in high concentrations. Low concentrations cause rapid weakening of the circulation. The corresponding symptoms are headaches, nausea and vomiting, possibly leading to loss of consciousness.

3.2.2. First aid measures

On inhalation

Possible symptoms can involve the loss of mobility and of consciousness. The victim will not be aware of being suffocated. Low concentrations of carbon dioxide cause rapid breathing and headache. The victim must be taken to the fresh air while breathing with an

3. Safety Precautions

independent breathing apparatus. Keep the victim warm and at rest. Seek medical advice. In the case of respiratory standstill, provide artificial respiration.

In the case of contact with the skin and the eyes

Rinse out the eyes immediately with water for at least 15 minutes. In the case of cold burns, rinse the affected areas for at least 15 minutes with water. Apply a sterile dressing. Seek medical advice.

3.2.3. Fire fighting measures

All known extinguishing agents can be used. If possible, stop the gas from escaping, remove containers or cool with water from a protected position. In closed rooms, an independent breathing apparatus should be used. The effect of a fire can cause the container to burst/explode.

3.2.4. Accidental release measures

Precautionary measures for personnel

Clear the area; wear protective clothing; on entering the area concerned, use independent breathing equipment unless it can be shown that the surrounding atmosphere presents no danger; provide sufficient ventilation.

Environmental measures

Stop the gas from escaping; prevent the product from passing into the sewer, cellars, operating pits or other locations where a build-up of the product could present a hazard.

3.2.5. Handling and storage

Prevent water from entering into the gas container; prevent a backflow into the gas container; use only equipment suitable for the product and for the pressure and temperature anticipated. In cases of doubt, consult the supplier of the gas. Comply with the operating instructions provided by the supplier of the gas. Store the container in a well ventilated place at temperatures below 50°C. Secure the pressurised container (compressed gas bottle) against toppling over.

3. Safety Precautions

3.2.6. Exposure controls and personal protection

Permissible national exposure value in Germany: TLV 5,000 ppm

Ensure appropriate ventilation, wear hand protection made of leather, protective goggles with side protection, wear safety footwear.

3.2.7. Ecological information

Carbon dioxide is considered to be a cause of the greenhouse effect. Avoid large quantities being released into the atmosphere.

3.2.8. Transport, regulatory and other information

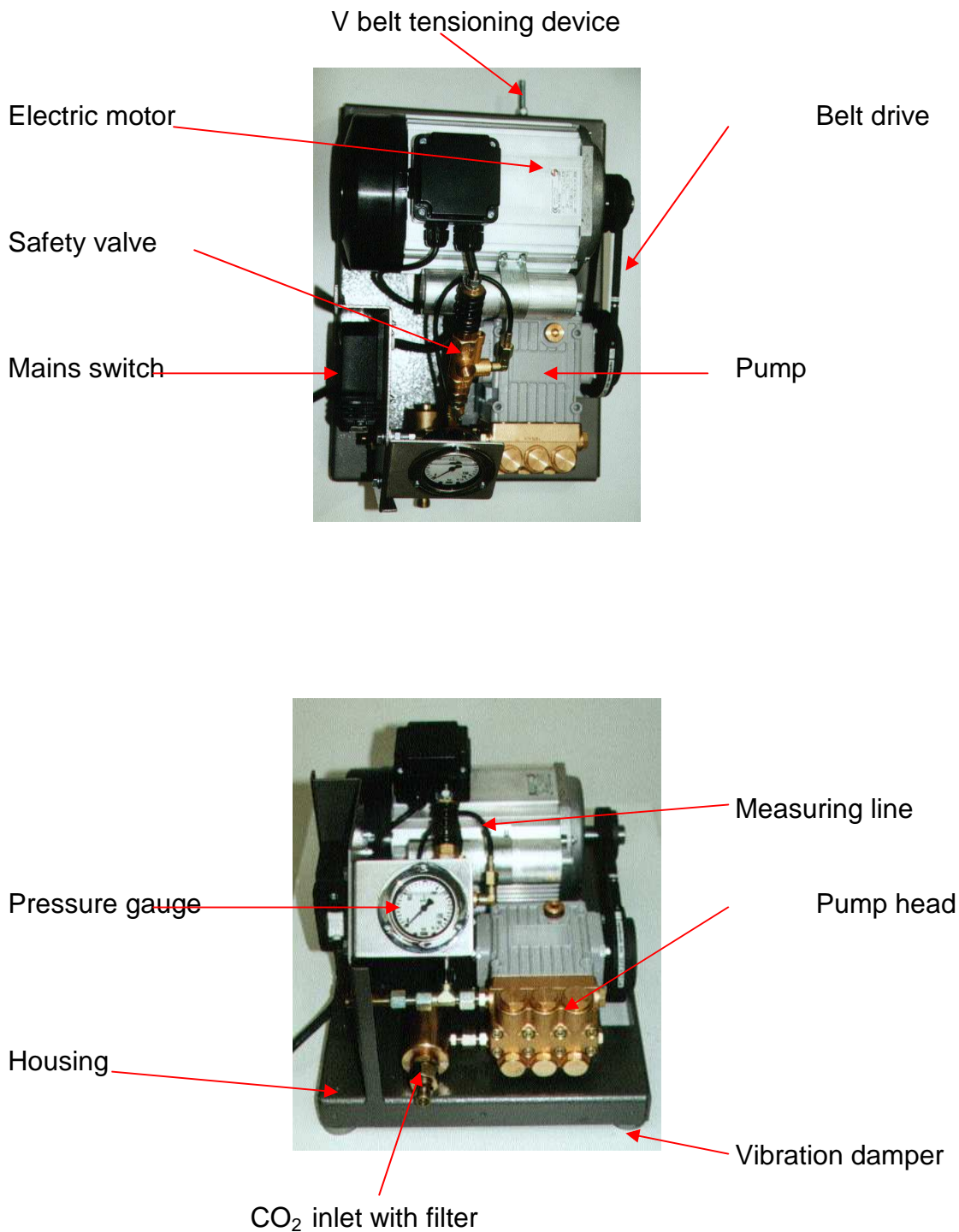
Secure the gas bottles during transportation. The filling valves must be closed. The transport regulations must be complied with. Further information should be obtained from the manufacturer of the gas.

3.2.9. Physical and chemical properties

| | |
|---|---------------------|
| Appearance | Colourless gas |
| Odour | No warning by odour |
| Molecular weight (kg/Kmole) | 44 |
| State at 20°C | Liquefied gas |
| Boiling point (sublimation temperature) | -78.5°C |
| Melting point (triple point) | -56.6°C |
| Critical temperature | 31.1°C |
| Vapour pressure at 20°C | 57.3 bar |
| Relative density, gas (air=1) | 1.3 |
| Solubility in water (20°C, 1 bar) | 2000 mg/l |

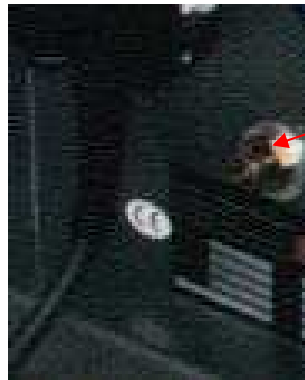
4. Design and operation

4.1. Overview

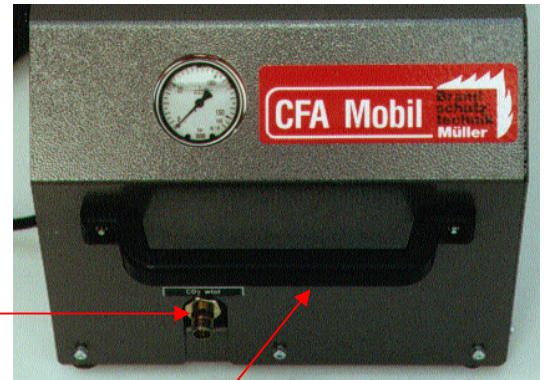


4. Design and operation

4.2. Connections



CO₂ outlet



CO₂ inlet

Handle

Filling line

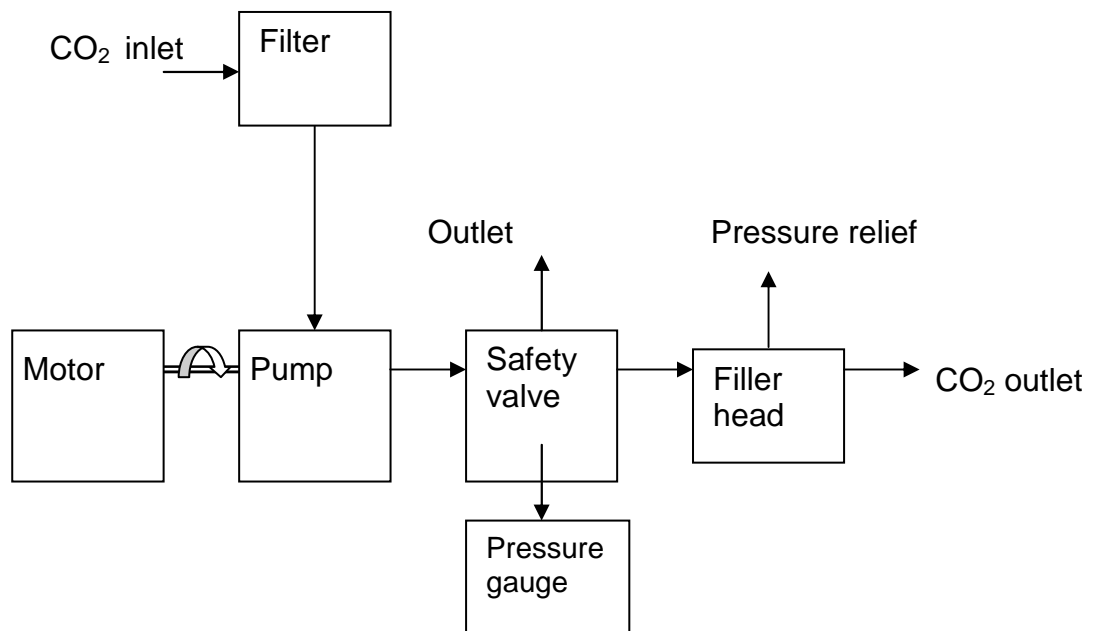


Feed line

Filler head with handwheel, filling and relief valve

4. Design and operation

Block diagram CFA Mobil

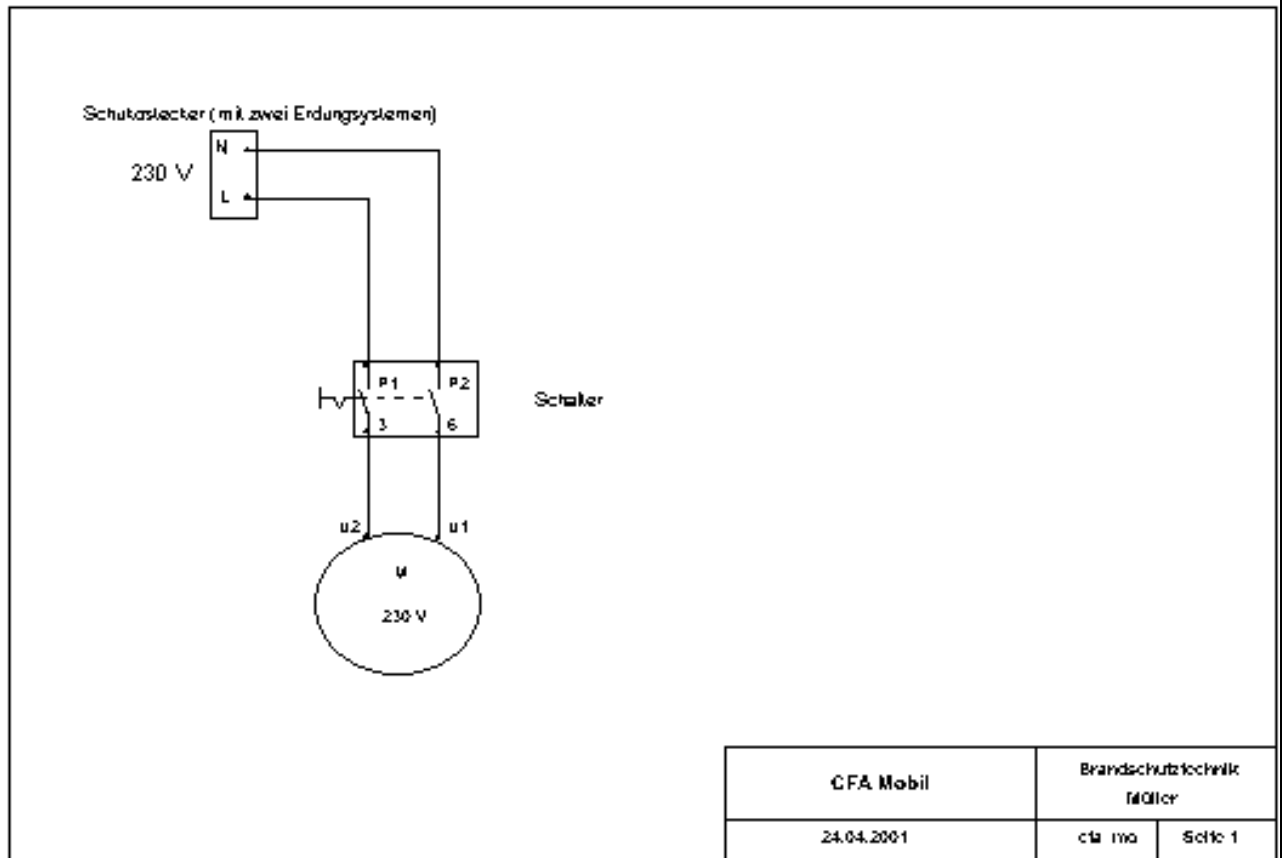


4. Design and operation

Circuit diagram

Schutzstecker (mit zwei Erdungssystemen) = Circuit breaker (with 2 grounding systems)

Schalter = switch



5. Operating and display elements, operating modes

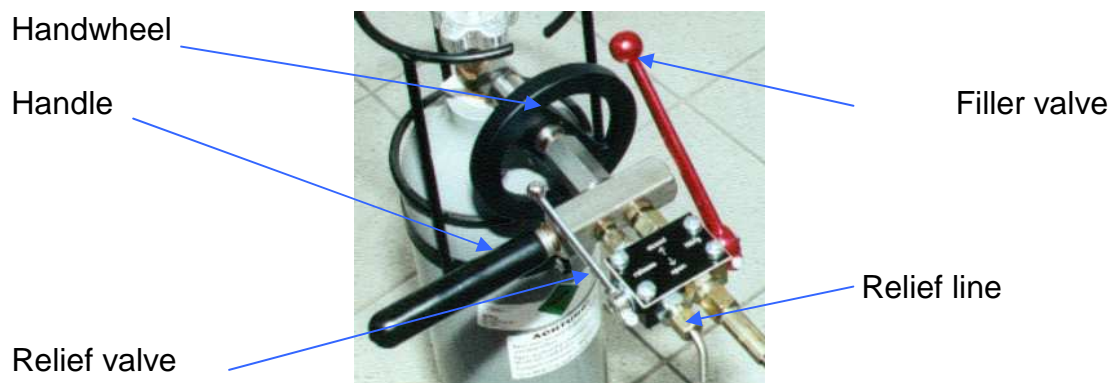
5.1. Pressure gauge



5.2. Mains switch



5.3. Filler head



6. Commissioning

6.1. Installation

Before commissioning the **CFA MOBIL** facility, the transport stopper in the pump housing must be replaced by the oil dip rod supplied. Care must be taken to ensure that no foreign body penetrates into the pump during this operation.

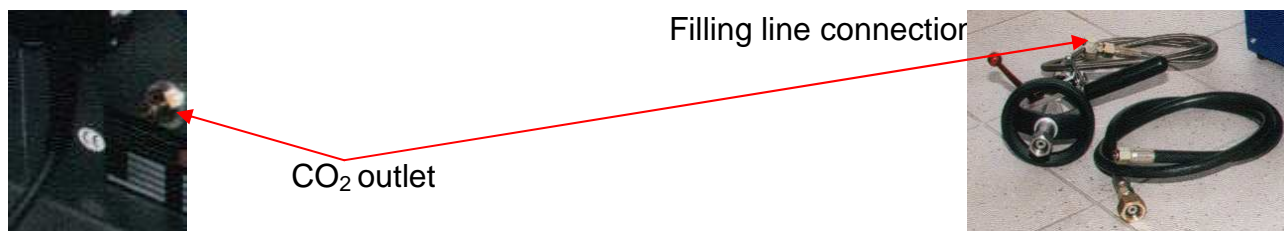
The dip rod is secured to one of the two carrying handles by means of a plastic tape. To insert the dip rod, the screws of the cover should be removed with a screwdriver and the cover removed.

The fixing operation is carried out in the reverse sequence.

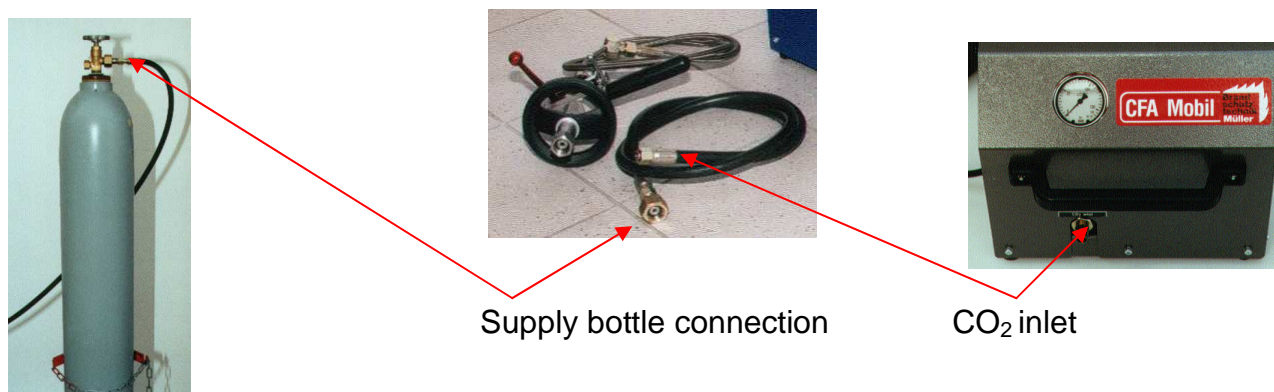
Place the filling facility onto a stable substrate (e.g. workbench) and ensure that the CO₂ bottles are adequately secured to prevent them from tipping over.

6.2. Connections

First, the manual filling handle (filler head) of the filling line is connected to the outlet of the **CFA MOBIL** unit while care needs to be taken to ensure that both valves are closed.



Connect the CO₂ supply bottle by means of the supply line to the inlet of the **CFA MOBIL** unit.



6. Commissioning

Then open the valve of the supply bottle. The pressure gauge of the **CFA MOBIL** will indicate the supply pressure.

! **Note** The filling valve must be closed.

ⓘ A problem-free operation of the facility is possible only in the case of bottles with a riser. Other bottles must not be used. When using a storage vessel with different outlets, care must be taken to ensure that the liquid phase is connected to the inlet of the **CFA MOBIL** unit.

In order to ensure that the pump does not run dry within the gaseous phase, the valve of the supply bottle must be opened; the pressure gauge then indicates the supply pressure. Open the filling valve on the manual filler handle until liquid (snow) can be seen to escape.

ⓘ Avoid the hoses becoming twisted and bent.
Before commissioning the facility, a check for leaks must be carried out on all the connections.

6.3. Testing

Before the device is commissioned, all connections must be checked to ensure that they are tight and leak-proof.

Plug the mains plug into the power supply and ensure that the mains switch is disconnected.

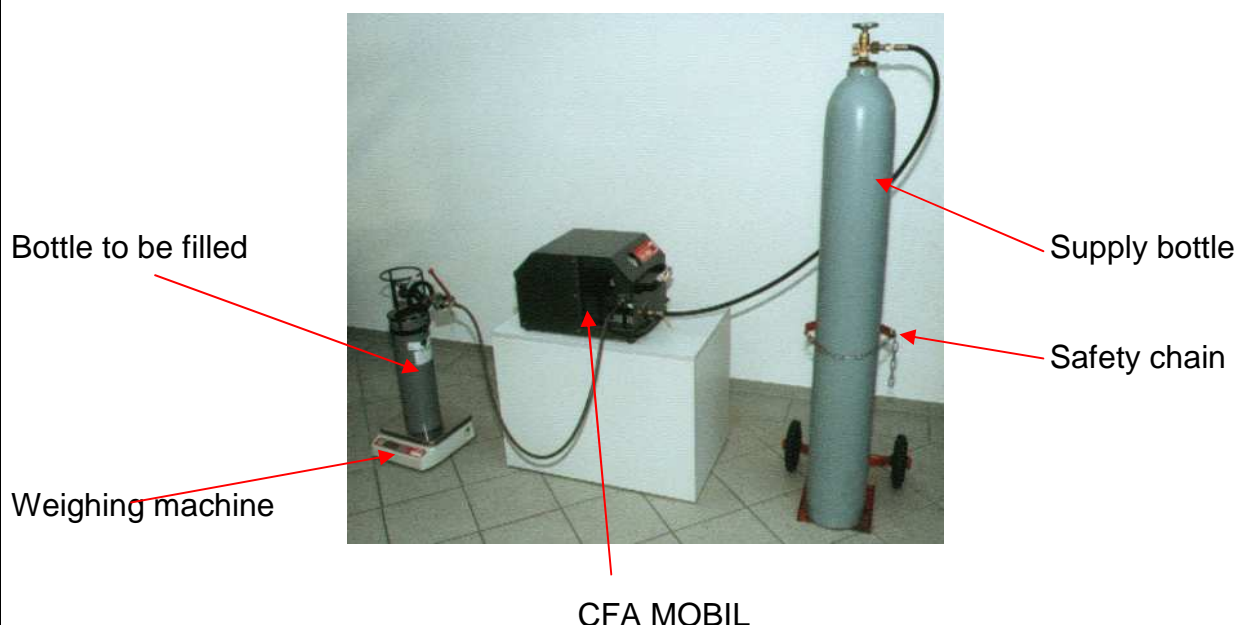
7. Operating instructions

7.1. Operating the device

According to the TRG regulations, the only method permitted in Germany for filling carbon dioxide into bottles is the gravimetric method (according to the weight). Before connecting the filling line to the bottle to be filled, the weight when full must be ascertained on the labelling on the compressed gas bottle. In cases of doubt, please contact the manufacturer of the gas bottle.

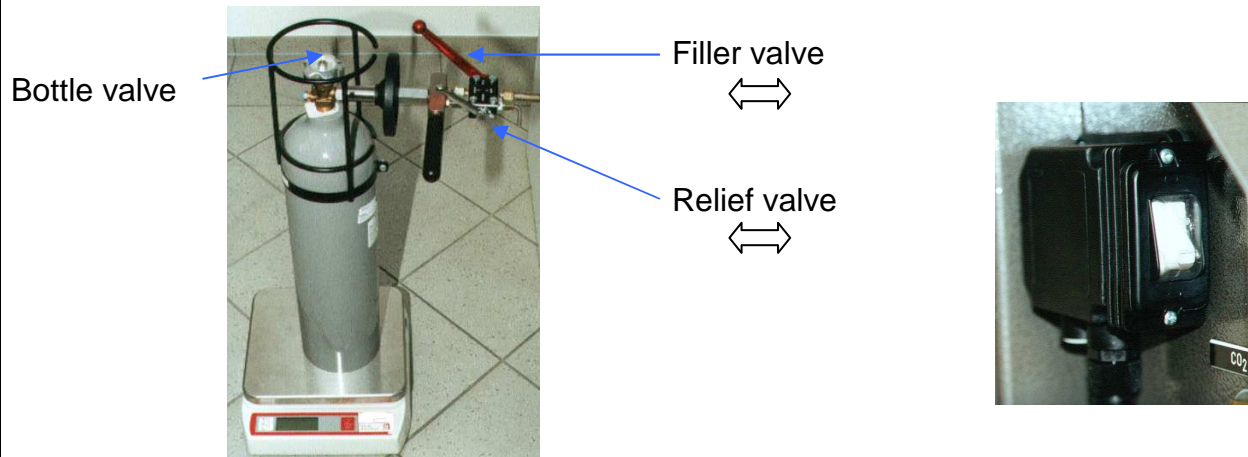
7.2. Weighing

! Warning The bottles must always be secured to prevent them from toppling over.



7. Operating instructions

7.3 Filling



1. Open bottle valve
2. Open filler valve
3. Switch mains switch on

Fill the bottle only up to the maximum filling weight.

- i** The filling weight is reached when:
the actual total weight less the weight of the bottle in the empty state, including the filling head (tare weight) is equal to the weight when full as indicated

! Warning On no account overfill compressed gas bottles.

4. Switch the mains switch off.
5. Close the filler valve and the bottle valve.
6. Open the relief valve and release the pressure from the facility.
7. Unscrew the filler head.

! Note After each filling operation, a control weighing operation needs to be carried out.

- i** The filling process can be carried out only at a temperature below the critical temperature of the carbon dioxide.
In general, the filling operation can no longer be carried out at a temperature above 25°C.

7. Operating instructions

7.4. Malfunctioning and remedial measures

| Problem | Possible causes | Elimination |
|--|----------------------------|--|
| Motor cannot be started | Mains plug not connected | Connect mains plug |
| | Mains switch not connected | Connect mains switch |
| | Mains switch defective | Replace mains switch |
| | Motor defective | Replace motor |
| | | |
| No storage pressure | Supply bottle empty | Replace bottle |
| | Valve of bottle closed | Open valve of bottle |
| | Pressure gauge defective | Replace pressure gauge |
| Pump does not convey product | Bottle has no riser | Replace bottle |
| | Gas phase in the line | Open filling valve until liquid phase begins to emerge |
| Pump does not convey product | Pump valves leaking | Replace valves |
| | Inlet filter blocked | Clean filter |
| Gas escapes between pump head and crankcase | Gasket rings leaking | Replace gasket rings |
| Oil escapes between pump head and crankcase | Packing leaks | Replace pump |

7. Operating instructions

| Problem | Possible cause | Elimination |
|--|---------------------------------------|--|
| Pump operates with a lot of noise | Cavitation | Prepare liquid phase or replace valves |
| White precipitate in the oil | Water in the crankcase | Oil change |
| Safety valve is triggered | Pressure within the facility too high | Open valve of bottle or filler valve |
| Safety valve responds at low pressure | Safety valve defective | Replace valve |
| Belt drive operates noisily | V-belt tension too low | Tension V-belt |
| Pressure gauge not working | Supply bottle not open | Open supply bottle |
| | Pressure gauge defective | Replace pressure gauge |

8. Servicing

The carbon dioxide bottling facility **CFA MOBIL** must be inspected and serviced at regular intervals.

The pump must be serviced only by personnel with the necessary knowledge and tools at its disposal allowing a proper inspection.

! Warning Before starting the servicing operations, the motor must be switched off and the mains plug disconnected in order to avoid the motor being inadvertently started up.
The valves of the compressed gas bottle must be closed.
The pressure must be released and the supply lines to the facility disconnected.

ⓘ Before starting the servicing operations, the rear cover must be removed.

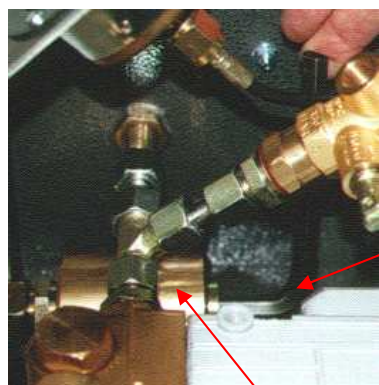
8.1. Servicing of the filter

8.1.1. Servicing intervals

Monthly or as required:

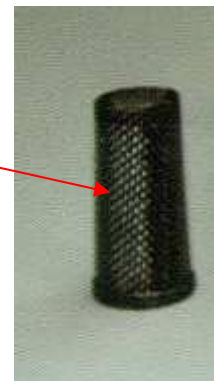
Clean the filter insert

8.1.2. Installation and servicing



Filter housing

Filter insert



Unscrew the filter housing with the key and remove the filter, clean it and, if necessary, replace it. The installation of the conical filter insert takes place in the reverse sequence.

8. Servicing

8.2. Servicing of the belt drive

8.2.1. Servicing intervals

After the first month or after 20 operating hours:

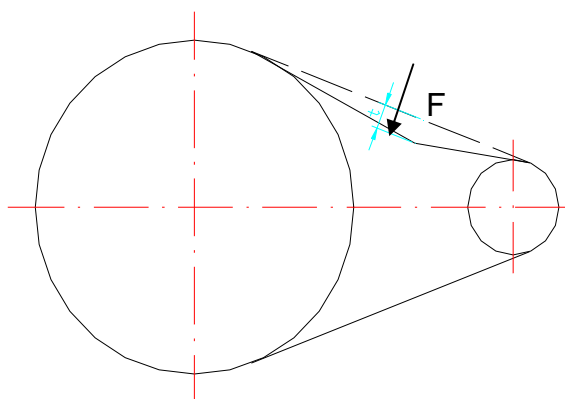
Check the V-belt tension

Every 6 months or after 100 operating hours:

Check the V-belt tension

8.2.2. Installation and servicing

Checking of the V-belt tension



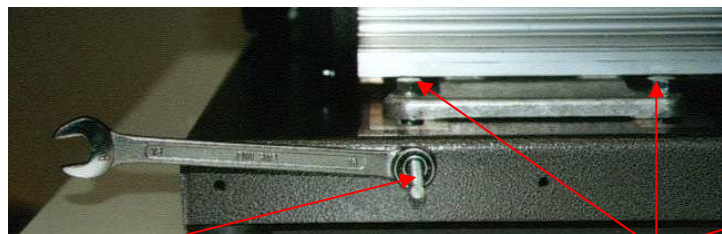
| | | |
|------------------------|---------------------|-------|
| Depth of impression t: | New belts | 7 mm |
| | Belts after running | 10 mm |

Test force F: 50 N

Re-tensioning of the V-belts

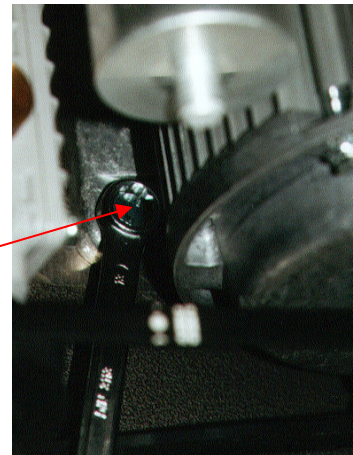
The belt tension of new V-belt must be checked after a short operating period. Correct pre-tensioning is obtained by subjecting the motor to torsional stress.

8. Servicing



Tightening screw

4 Motor clamping screws



For this purpose, the clamping screws of the motor should be unscrewed and the tightening screws tightened as required. Subsequently, retighten the motor clamping screws. Care should be taken to ensure that the belt pulleys are flush. Otherwise the wear on the V-belt will be excessive.

Replacing of the V-belt

Unscrew the clamping screws as described above and unscrew the tightening screws such that the motor can be pushed forward up to the stop. Subsequently, put on the new belt and tension it as described above.

8.3. Servicing of the pump

8.3.1. Servicing intervals

after 50 operating hours:

Oil change

Subsequently, every 200 operating hours or after six months:

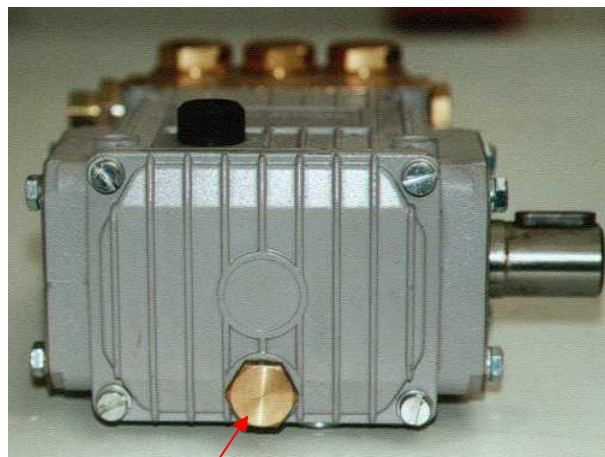
Oil change

If required, i.e. in the case of condensation forming in the crankcase:

Oil change

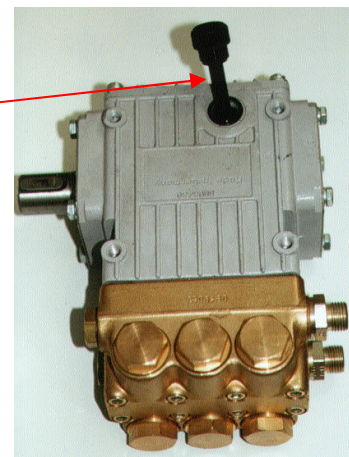
8. Servicing

8.3.2. Installation and servicing



Oil drain plug

Oil level indicator



The oil check can be carried out either at the inspection glass on the side or by means of the oil level indicator.

Oil change: Drain the oil at the drain plug, subsequently fill in the oil at the oil level indicator opening and monitor either by means of the oil level indicator or at the inspection glass. The oil level at the inspection glass should be approximately in the centre of the inspection glass; on the indicator, it should be between the two markings.

Oil grade: SAE 90

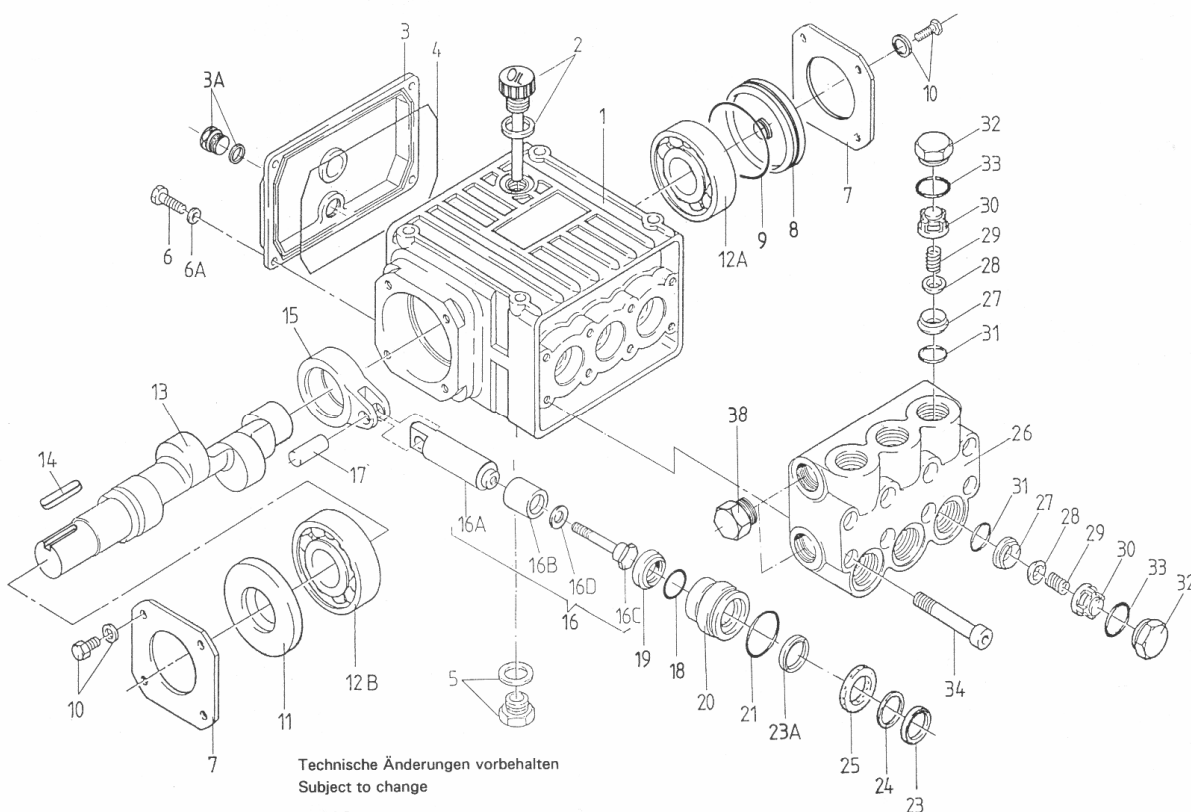
9. Repairs

ⓘ Repair work should only be carried out by qualified personnel.
Before undertaking repair work, remove the cover.

! Attention Unqualified repair and maintenance or manipulation of the device can
Lead to premature breakdown or, at worst, to personal injury.

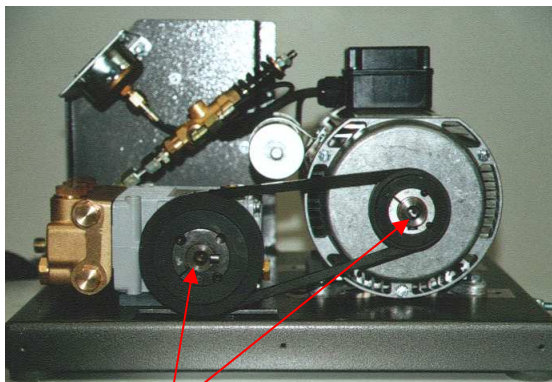
In the case of unqualified repair and maintenance or manipulation of the device, the
manufacturer declines any responsibility insofar as it has not been agreed with him
beforehand.

9.1. Pump



9. Repairs

9.1.1. Changing the pump



Belt pulley

! Important The unit must be free of pressure and the power supply cut off.

1. Unclamp the inlet and outlet tubes.
2. Slacken the retaining bolts and tension bolt of the electric motor.
3. Unscrew the retaining bolt of the belt pulley, withdraw the pulley and remove the V-belt.
4. Unscrew the four retaining bolts on the underside of the pump housing and lift off the pump.
5. Remove the screw fittings from the pump and screw them into the new pump using a thread sealing product.
6. Seat the new pump on the housing and secure.
7. Re-attach the inlet/outlet tubes.
8. Mount and align the pulley.
9. Fit V-belt and tension (see Chapter 8, Maintenance).
10. Check the oil level and carry out a test run of the pump.

9.1.2. Changing the valves

Unscrew plug (32) with a ring spanner, remove the valves from underneath and replace with new ones.

The new valves in correspondence of the upper plastic bracket may need to be shortened by about 2 mm. After installation tighten the plug with 75 Nm.

On assembly please take note of the layout.

9. Repairs

9.1.3. Changing the gaskets

Loosen hexagonal socket bolts (34) and draw valve-housing (26) forwards over the plungers. Remove the leakage return rings, back-up rings and lip seals from the valve housing (26) and gasket seat. Insert new lip seals in reverse order. Check the plunger surfaces for damage. Tighten the hexagonal socket bolts with 15 Nm.

9.2. V_belt drive

Changing the V-belt

(see Chapter 8, Maintenance)

9.3. Replacing the electric motor

! Important The unit must be free of pressure and the power supply turned off.

1. Open the clamp-casing on the electric motor and loosen the cable attachments.
2. Loosen the retaining bolts and tension bolt of the electric motor.
3. Unscrew the pulley retaining bolts , withdraw the pulley and remove the V-belt
4. Remove the four retaining bolts on the underside of the motor housing and lift off the motor.
5. Seat the new motor on the housing and secure.
6. Mount and align the pulley.
7. Fit V-belt and tension (see Chapter 8, Maintenance).
8. Connect cables in clamp-casing in reverse order.
9. Carry out a test run of the motor.

10. Closing down, storing

Please avoid long-time storage in an environment with heavy dust content, high humidity and temperatures below freezing point.

If the condensate production is heavy the pump oil has to be exchanged before the start up.

! Caution Shutdown of the machine always only with released pressure.

Ice formation inside the pump and tubes can cause damage on the pump and tubes or even destroy them.

11. Packing and transportation

The carbon dioxide filling station always has to be transported in the horizontal position to avoid emerging of the additives.

All necessary measures have to be taken to avoid damages of the machine during the transportation.

-  Do not transport the machine with connected compressed gas bottles.

12. Disposal

The structural components of the CFA MOBIL and the additives, such as oil, must never be inexpertly disposed, because they can harm the environment.

i Please pay attention to the factual country regulations concerning the disposal.

Disregarding these regulations may in the most cases result in the prosecution.

Don't dispose this machine as household garbage.

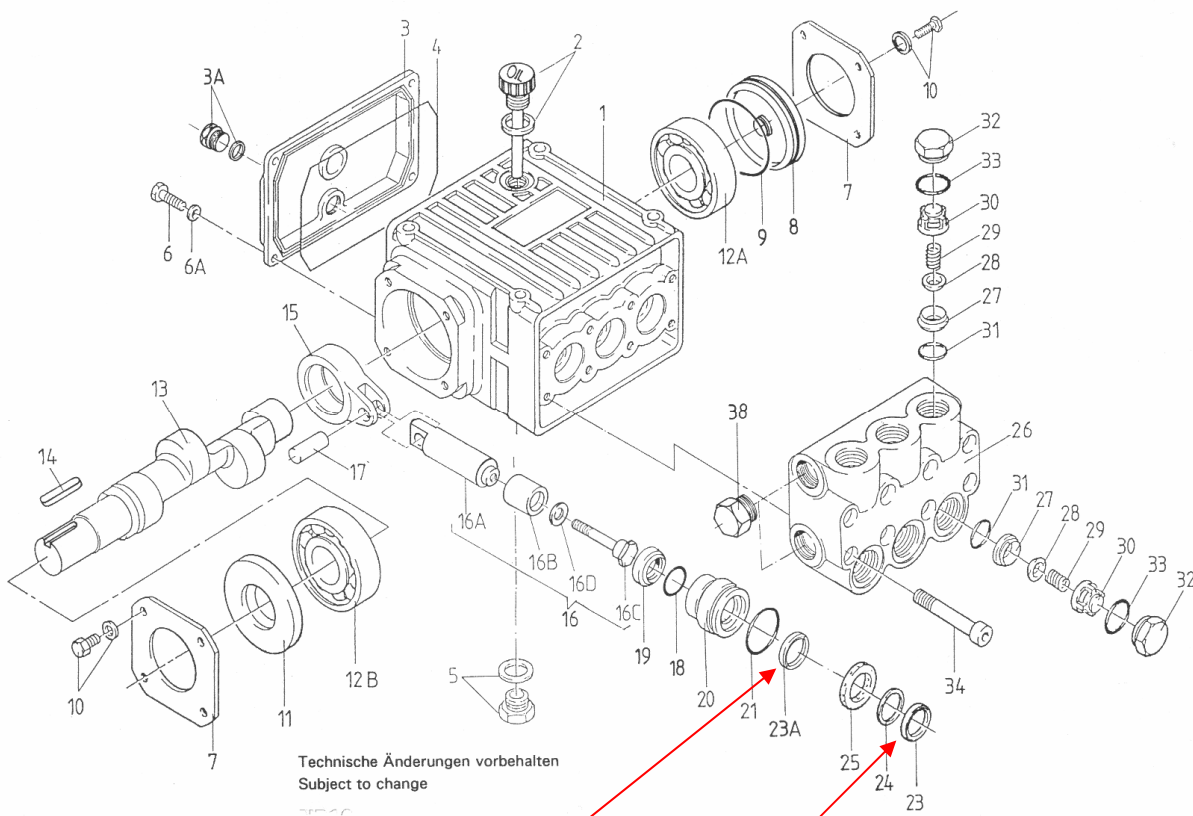
After having drained the used oil and returned it to the collection point for oil return the machine under indication of our registration code to the responsible collecting point for electrical appliances.



WEEE: DE 60436264 CFA

13. List of spare parts

Pump NP



Grooved ring, black Grooved ring, brown

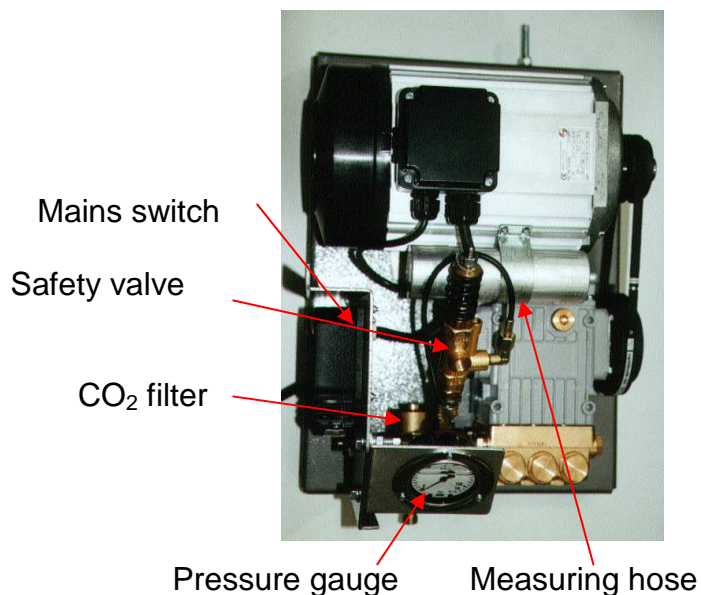
| Pump | Number of units | Part Number |
|--------------------|-----------------|-------------|
| Pump NP 3.5 kg/min | 1 | 186136 |
| Pump NP 2.5 kg/min | 1 | 186137 |

13. List of spare parts

| Pump head | Number of units | Part Number |
|---------------------------------|-----------------|-------------|
| Set of sealings (grooved rings) | 1 | 186134 |
| Set of valves | 1 | 186135 |



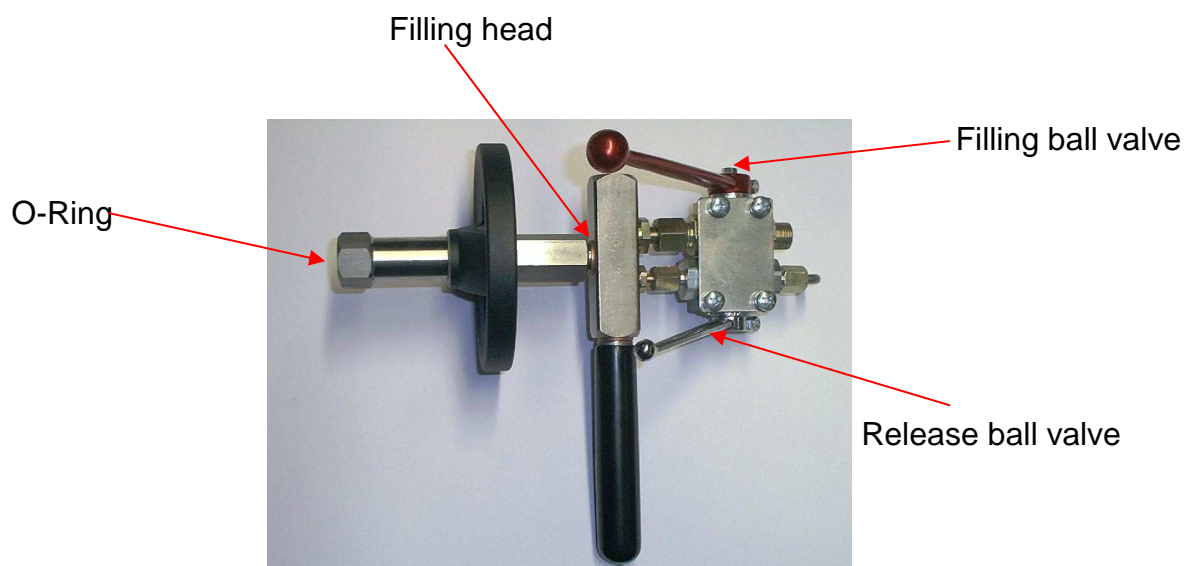
CO₂ supply hose



| Pump stand | Number of units | Part Number |
|---------------------------|-----------------|-------------|
| V-belt: 1 LW 662 SPZ | 1 | 186139 |
| Safety valve, new | 1 | 187040 |
| Safety valve, in exchange | 1 | 187236 |
| Pressure gauge 0-160 bar | 1 | 186138 |
| Mains switch | 1 | M25 |
| Measuring hose | 1 | 187268 |

13. List of spare parts

| | | |
|---------------------------------------|---|--------|
| CO ₂ filter, complete | 1 | 186987 |
| Filter insert | 1 | 187094 |
| CO ₂ supply hose, complete | 1 | 186111 |



| Filling head | Number of units | Part Number |
|--|------------------------|--------------------|
| Filling head, complete | 1 | 186145 |
| O-Ring 13x2 | 1 | 187193 |
| Filling ball valve | 1 | 186126 |
| Set of sealings for Filling ball valve | 1 | 186132 |
| Release ball valve | 1 | 186133 |
| Filling hose, DN 8, 1500mm | 1 | 186107 |

Additional spare parts are available on request!

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**EC- Declaration of Conformity
According to the EC-directives 2006/42/EC "Machinery Directive"**

We herewith declare that the in the following described machine corresponds to the relevant and fundamental health and safety requirements of the EC-directives due to the manner in which it has been conceived and to its construction as well as to the version put into circulation by us. The present declaration will be invalid in case of an alteration of the machine not discussed with and agreed by us.

Designation of the machine: CFA Mobil

Type of machine: Carbon dioxide filling station

Relevant EC-directives: EC-directive 2006/42/EC "Machinery Directive"
EC-low voltage directive (2006/95/EC)
EC-directive electro magnetic compatibility
(2004/108/EC)

Applied harmonized standards, in particular: EN ISO 12100-1 and EN 12100-2;
EN 60 204-1, EN 60 309-1

Applied national standards and technical specifications, in particular:

Date: 18.01.2010


Herbert Müller, Executive Director