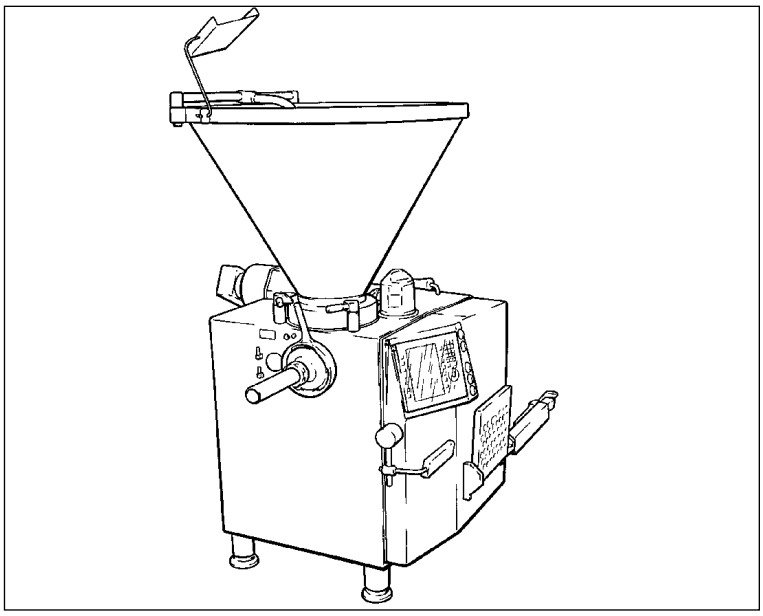
Vacuum filler

ROBOT HP7E (from 160.0215)
ROBOT HP10E (from 161.0312)
ROBOT HP12E (from 165.0234)
ROBOT HP15E (from 162.0241)
ROBOT HP20E (from 163.0300)

Operating instructions



VEMAG

www.vemag.de

We reserve the right to make technical modifications

Issue:	04/10
Version:	3.1 EN (Original operating instructions)
Software Version:	00.02.000

© VEMAG Maschinenbau GmbH • Postfach 1620 • D-27266 Verden
Phone: +49 42 31 77 70 • Fax: +49 42 31 77 72 41
E-Mail: e-mail@vemag.de
http://www.vemag.de

Index

CE

Declaration of conformity

reflecting the intention of EC Machinery Directive 2006/42/EC, Annex IIA

We

VEMAG Maschinenbau GmbH
Weserstraße 32
27283 Verden (Aller)

hereby declare that the

Continuous vacuum filler
ROBOT HP7E type 160
ROBOT HP10E type 161
ROBOT HP12E type 165
ROBOT HP15E type 162
ROBOT HP20E type 163
Machine no. 16x.xxxx

complies with all of the relevant provisions of the EC Machinery Directive 2006/42/EC.

Particular consideration was given to

the standard EN 12463:2004(D) Food Processing Machinery - Filling machines and auxiliary machines - Safety and hygiene requirements

The notified German authority

Prüf- und Zertifizierungsstelle im BG-PRÜFZERT
Fachausschuß Fleischwirtschaft
Lortzingstraße 2, 55127 Mainz

performed a prototype test for this series of fillers. The number of the inspection document issued on 29.12.2009 is FW 09117.

Authorised documentation representative:

Dr. Michael Gerretz
Tel.: +49 (0) 4231-777371
Fax: +49 (0) 4231-777241
gerretz@vemag.de

0. Foreword

These operating instructions cover all the information required to operate the vacuum filler. Two versions of the machine are available:

- ROBOT HP7E / HP10E / HP12E / HP15E / HP20E in the form of a portioning machine
- ROBOT HP7E / HP10E / HP12E / HP15E / HP20E in the form of a portioning and linking machine (optional)

Operating and maintenance instructions for any attachments (optional) can be found in the appropriate separate operating instructions.

If you have any questions which cannot be answered by this manual, please contact VEMAG Customer Service at any time. Our staff will be please to hear your suggestions.

Read the safety instructions (Section 1) first, before starting up the machine. You must follow all safety instructions to prevent injury to people and damage to the machine.

You must follow all instructions on cleaning (Section 7) and maintenance (Section 8). This is the only way to ensure reliable operation, high performance and a long service life of your machine.

1. Safety instructions

1.1 Sphere of application

Two versions of the continuous vacuum filler are available:

- ROBOT HP7E / HP10E / HP12E / HP15E / HP20E in the form of a portioning machine
- ROBOT HP7E / HP10E / HP12E / HP15E / HP20E in the form of a portioning and linking machine (optional)

It can also be fitted with special attachments (optional).

1.2 Use in accordance with purpose

The ROBOT HP7E / HP10E / HP12E / HP15E / HP20E continuous vacuum filler is designed and built for filling, portioning and linking sausages in natural, collagen and cellulose casings. Standard sausage meats are suitable as the product for filling to make fresh sausage, salamis and boiled sausage. The filler can also be used for grinding and separating meat for processing. Other products may only be processed with the express agreement of VEMAG.

The vacuum filler is designed for industrial applications.

The vacuum filler may not be used in an explosive atmosphere.

Raw materials may be processed at a temperature of between -4 °C and + 50 °C.

The vacuum filler requires ambient temperatures between +0.5 °C and +25 °C.

The vacuum filler is designed for one operator. The operator must have been trained on site by VEMAG specialists or one of their representatives.

The vacuum filler may only be cleaned by trained cleaning staff.

The vacuum filler may only be serviced by trained maintenance staff (fitters or electricians).

The manufacturer’s assembly, commissioning, operating and maintenance instructions must be followed to satisfy the conditions of ”use in accordance with purpose”.

The ROBOT HP7E / HP10E / HP12E / HP15E / HP20E continuous vacuum filler is built in accordance with the state of the art and, in the condition in which it is delivered, complies with machinery directive 2006/42/EC.

Nevertheless, the machine may present residual hazards if it:

- is not used in accordance with purpose
- is not used in accordance with these operating instructions,
- is used by untrained staff
- is not carefully cleaned and maintained to specification.

1.3 Explanation of symbols

The following symbols appear in these operating instructions, indicating residual hazards when operating the machine or referring the reader to other important information.

Danger!
This warning symbol refers to important instructions which must be followed to prevent faulty operation which could pose a threat to human life or lead to injury.

Warning!
This warning symbol refers to important instructions which must be followed to prevent faulty operation which could result in damage to the machine or installation or which could jeopardise production.

→ This arrow symbol indicates additional information at another point in the manual or in other documentation.

1.4 General safety instructions

- Any person working on or with the machine must have read and understood these operating instructions, in particular the safety instructions.
- The machine may be used only by trained and authorised staff.
- Responsibilities during operation must be clearly assigned and observed.
- The machine may only be serviced by trained staff authorized to do so.
- The machine may only be used if it is in perfect working order. In the event of changes, such as loss of oil or unusual noises starting, the machine should be stopped immediately and your in-house maintenance department or VEMAG Customer Service informed.
- The machine may not be operated without the housing cover.
- Route mains cables and data cables (e.g. remote control cable) so as to avoid tripping hazards.
- Sockets which are not being used must be firmly sealed with the appropriate protective cap to prevent the penetration of moisture. Corrosion at the contacts can lead to switching errors.
- It is prohibited to remove, switch off or override safety devices. In the event of damage to safety devices, inform VEMAG Customer Service immediately.
- Warning signs on the machine may not be removed or painted over.
- Conversions, attachments and other modifications to the machine not approved by VEMAG are not permitted.
- In all cases, generally-applicable and in-house safety and accident prevention regulations apply in addition to these safety instructions.

1.5 Special safety instructions

Danger!
To prevent injury, switch off the machine before any work (assembly, dismantling, cleaning, maintenance, repair). Then switch off the main switch to disconnect the machine from the mains.

Danger!
To prevent injury in the area of the double screws, switch off the machine before undoing the locking nut. Then switch off the main switch to disconnect the machine from the mains. The filling horn holder or linking gear (optional) may only be fitted or removed with the machine switched off.

Before starting up the machine, always perform the following steps:

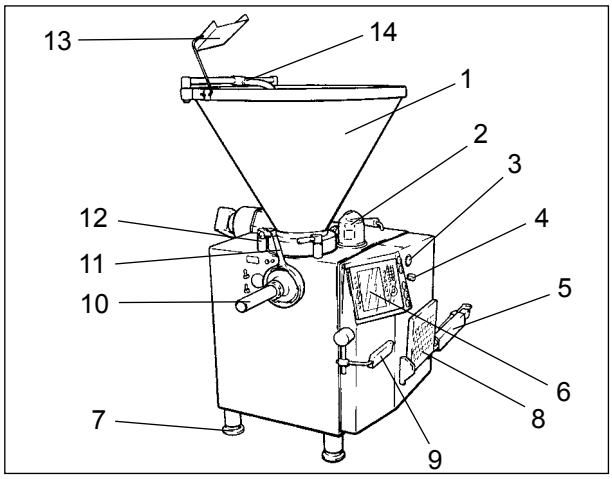
- Check that the machine is in proper condition. Leaking oil indicates leaks which must be eliminated immediately. In this case, inform your in-house maintenance department or VEMAG Customer Service immediately.
- Check that the safety devices on the hopper and filling horn holder are working properly.
  → Section 5
  If you notice any damage, inform VEMAG Customer Service immediately.

Danger!
To prevent injury, switch off the machine before doing any work on the hopper. Then switch off the main switch to disconnect the machine from the mains. Do not climb onto the machine to check the hopper/hopper contents, use only the step provided. Under no circumstances use a ladder or other aid to get at the hopper of the machine.

Danger!
No-one may stand in the area of the lifting/tipping device (optional). Do not put any objects in this area. Only trolleys to DIN 9797 with a capacity of 200 l or 300 l (optional) are permitted.

2. Description

2.1 Overview ROBOT HP7E / HP10E / HP12E / HP15E / HP20E



1 Hopper
2 Vacuum pot
3 Vacuum display
4 Vacuum control valve
5 Lifting/tipping device (optional)
6 Control panel
7 Adjustable feet
8 Step
9 Knee lever
10 Filling horn
11 Locking nut
12 Hopper release mechanism
13 Mirror
14 Stopper

Fig. 2-1
Machine with filling horn

2.2 Brief description

2.2.1 Hopper

The filler is equipped with a hopper for pouring in product for filling. The hopper is fitted with a safety device which switches off the machine when the hopper is open. A mirror attached to the hopper allows the contents to be checked.

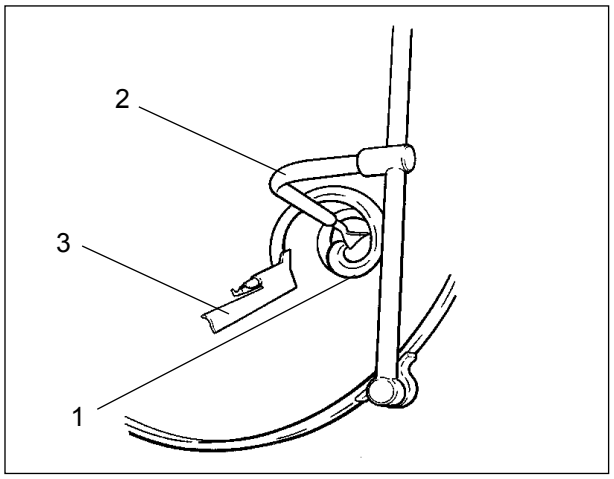
Danger!
To prevent injury, switch off the machine before doing any work on the hopper. Then switch off the main switch to disconnect the machine from the mains. Do not climb onto the machine to check the hopper/hopper contents or for cleaning and maintenance purposes, use only the step provided. Under no circumstances use a ladder or other aid to get at the hopper of the machine.

The hopper is fitted with cushioning as a partial counterweight to prevent the hopper falling shut under its own weight.

Danger!
Proceed especially carefully when opening and closing the hopper to prevent injury (risk of crushing). Grasp the hopper only at the flange to tip it over carefully. Do not open the hopper as long as the lifting and tipping device (optional) is in its top limit position.

2.2.2 Feed screw

The product is compressed in the hopper by the feed screw (1) and fed to the thread of the double screws with the aid of the vacuum. Spiral stopper (2) improves product feed. The scraper (3) attached to the feed screw completely empties the hopper. The scraper is easy to remove for cleaning.



1 Feed screw
2 Spiral stopper
3 Scraper

Fig. 2-2
Feed screw

2.2.3 Double screws

The double screws ensure that the product is conveyed gently and evenly to the outlet. The same volume is conveyed with each rotation of the double screws. In this process, the proportion of air in the product for filling is reduced by the vacuum applied. The double screws feed until completely empty. The speed of the double screws and thus the quantity of product portioned can be infinitely adjusted.

The product for filling can be portioned either continuously or in individual portions. If portioning individually, the number of double screw rotations is a measure of the weight of the individual portion. Individual portions can be linked in the pauses between individual portions.

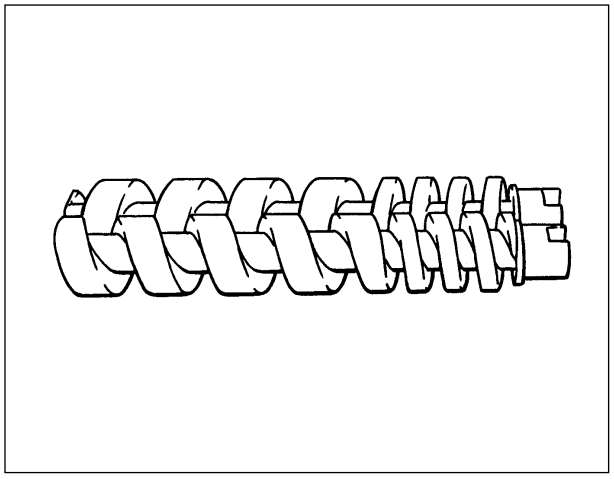
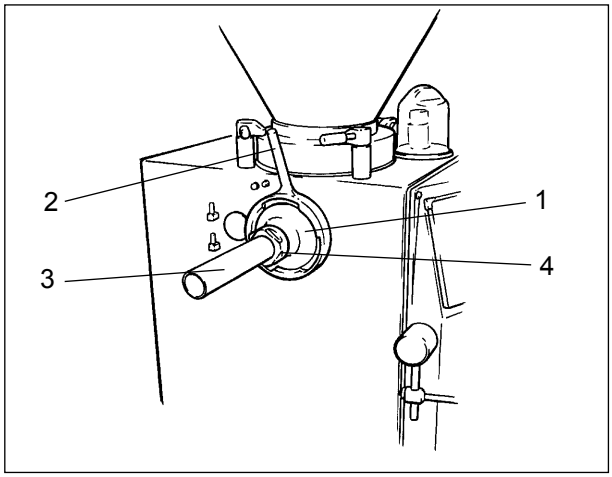


Fig. 2-3
Double screws

2.2.4 Filling horn holder

The machine is fitted with a filling horn holder (1) at the outlet as standard and this is locked at the outlet by the locking nut (2). The filling horn (3) is attached to the filling horn holder with the aid of the filling horn nut (4). The product is ejected through the filling horn by the double screws.



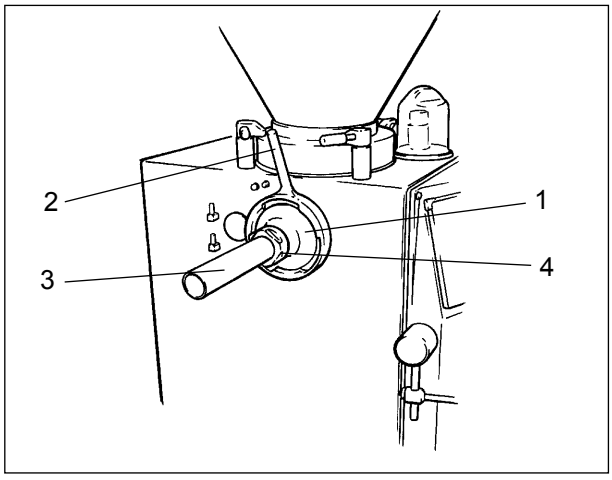
1 Filling horn holder
2 Locking nut
3 Filling horn
4 Filling horn nut

Fig. 2-4
Machine with filling horn holder

2.2.5 Linking gear (optional)

The linking gear (1) is attached to the housing of the machine with the aid of two bearing journals (2) and swivelled in front of the outlet. It is locked in position at the outlet with the locking nut (3) like the filling horn holder. The linking horn (4) is attached to the linking gear with the aid of linking nut (5).

Danger!
To prevent injury, do not use linking horns with sprung heads. Use only completely straight, undamaged linking horns and use the appropriate test program to check the linking horn selected before starting production.

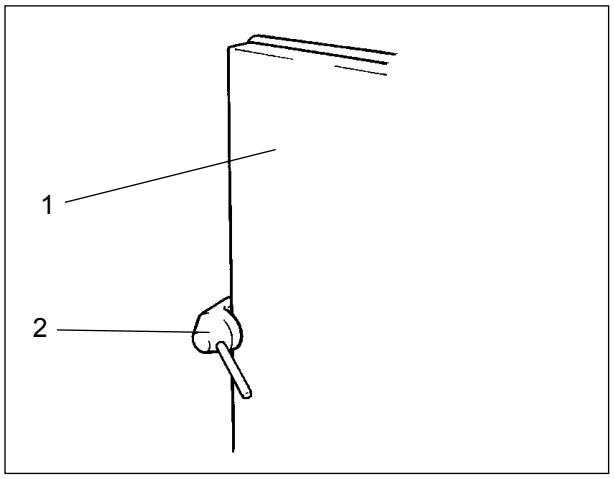


1 Linking gear
2 Bearing journals
3 Locking nut
4 Linking horn
5 Linking nut

Fig. 2-5
Machine with linking gear (optional)

2.2.6 Controls

The controls on the rear of the machine are protected by a cover (1) which is latched with the aid of a toggle (2).

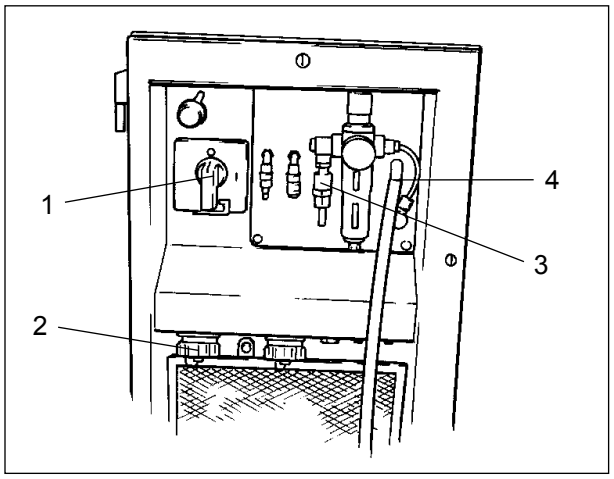


1 Cover
2 Toggle

Fig. 2-6
Controls

Behind the cover is main switch (1) which is used to switch the power supply to the machine on and off.

Attachments and additional devices (optional) can be connected to the power supply of the machine via equipment socket (2). Instead of blind covers, further sockets can be provided for supplementary equipment like coextrusion systems (optional), for example.



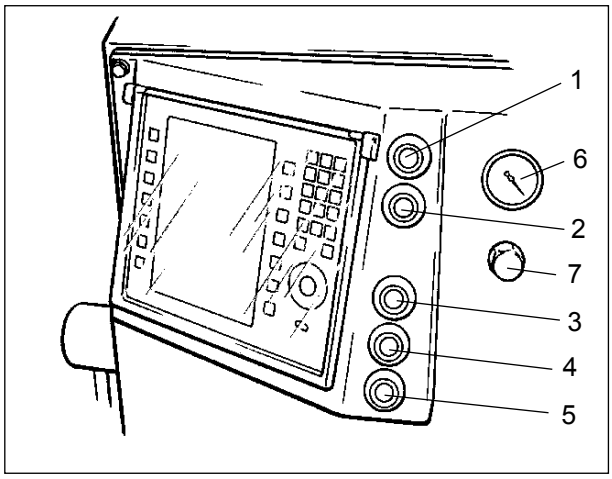
1 Main switch
2 Equipment socket
3 Compressed air connection for automatic separation valve (optional)
4 Pressure monitoring for separation grinder 982 or separation attachment 801 (optional)

Fig. 2-7
Controls

Warning!
Always seal off unused sockets with the appropriate protective cap to prevent moisture and dirt penetrating. Corrosion on the contacts can lead to switching faults.

The following controls are arranged on the control panel on the front of the machine next to the portioning computer:

- ON switch (1)
- OFF switch (2)
- UP key (3) for lifting/tipping device (optional)
- STOP key (4) for lifting/tipping device (optional)
- DOWN key (5) for lifting/tipping device (optional)
- Vacuum display (6)
- Vacuum control valve (7)



1 ON switch
2 OFF switch
3 UP key (optional)
4 STOP key (optional)
5 DOWN key (optional)
6 Vacuum display
7 Vacuum control valve

Fig. 2-8
Machine control panel

ON key

This key switches on the drive of the machine.

OFF key

This key switches off the drive of the machine.

UP key (optional)

This key raises the trolley hoist of the lifting/tipping device (optional). In the top end position above the hopper, the trolley is automatically tipped and emptied. After 30 seconds have elapsed, the trolley hoist can be lowered again using the DOWN key. If it is to be lowered before that, the STOP key has to be pressed first.

STOP key (optional)

This key stops the trolley hoist of the lifting/tipping device (optional).

DOWN key (optional)

This key lowers the trolley hoist of the lifting/tipping device (optional). The trolley hoist stops automatically as soon as the trolley is 500 mm above the ground. To move it into its bottom end position, the key must be pressed again and held down until the final position is reached.

Vacuum display

The vacuum set by the vacuum control valve can be read off in per cent (0 - 100 %) at the vacuum display.

Vacuum control valve

The desired vacuum for evacuating the product can be set using the vacuum control valve. Turning clockwise (+) increases the vacuum, turning anti-clockwise (-) reduces the vacuum.

A second set of buttons for operating the lifting and tipping device (optional) is located on the right-hand side of the front door.

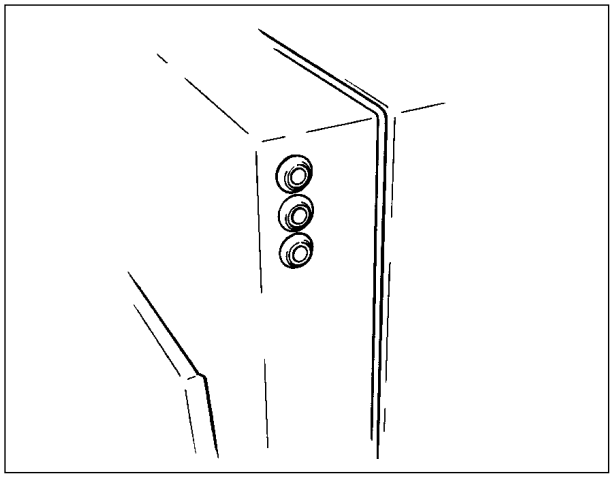


Fig. 2-9
Buttons for lifting and tipping device (optional)

Danger!
When lowering the lifting/tipping device (optional), ensure that there is no-one in this area. Do not deposit any objects in this area.

2.2.7 Knee lever

The filling process is switched on and off using the knee lever. It can be adjusted to suit the height and location of the operator.
→ Section 4.7

2.2.8 Step

At the front of the machine is a step which allows the operator to fill the hopper or get at it for cleaning and maintenance purposes.

Danger!
There is a risk of crushing when folding the step in and out. Proceed with extreme caution when folding the step in and out to prevent injury.

2.2.9 Adjustable feet

To compensate for uneven floors, the machine is fitted with adjustable feet. The height of the machine can be adjusted by up to 80 mm (outlet height 1,000 mm to 1,080 mm).
→ Section 3.2

2.2.10 Front door

The front door of the machine can be swung right open for maintenance work.

2.2.11 Lifting/tipping device (optional)

The lifting/tipping device is designed for trolleys with a capacity of 200 l or 300 l (optional).

3. Installation and commissioning

3.1 Transporting the machine

The machine may only be transported using suitable lifting trucks or fork-lift trucks with a capacity of at least 1,500 kg. If at all possible, move the fork-lift/lifting truck under the machine from the outlet side.

Danger!
Never tilt the machine when transporting it and when setting it up, always keep it horizontal. This prevents the machine tipping over. When transporting the machine, it is essential to observe its centre of gravity.

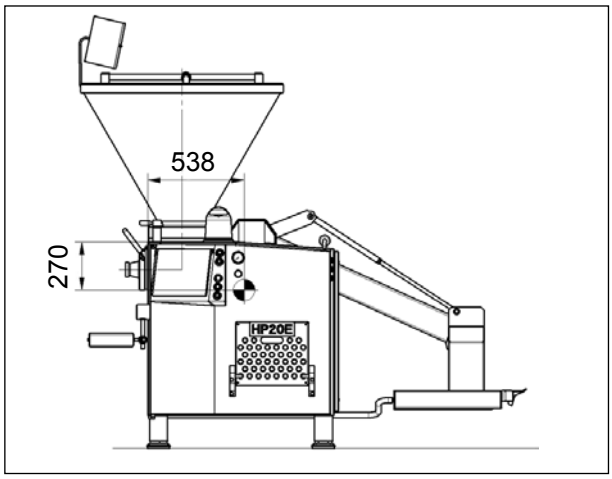


Fig. 3-1
Centre of gravity of the machine

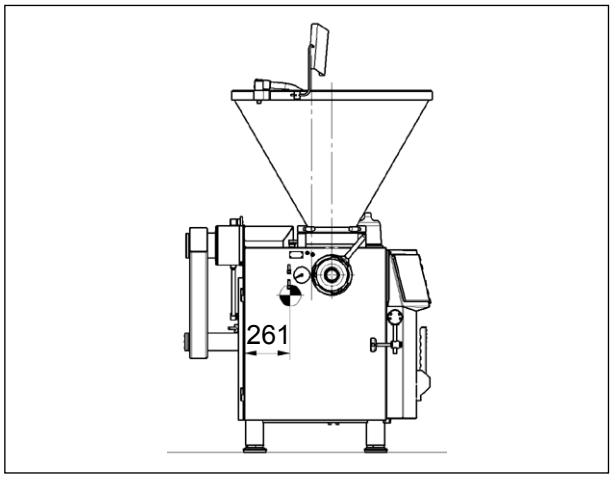
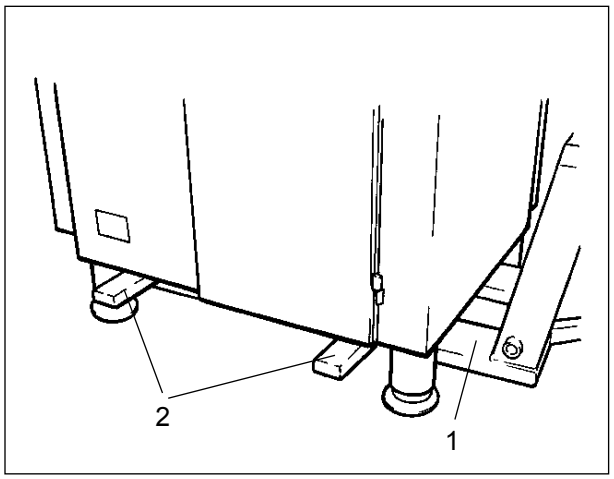


Fig. 3-2
Centre of gravity of the machine

- Drive the lifting truck / fork-lift truck in under the machine so that fork (1) is located precisely centrally between the feet.

Warning!
Place planks (2) between the fork and the machine to prevent the machine slipping during transportation. You must ensure that the fork and the planks are pushed right under the machine so that the connection cable is not damaged by the fork.



1 Fork
2 Plank

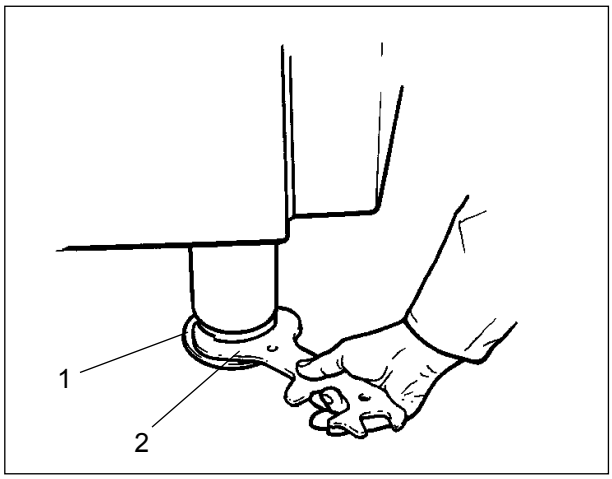
Fig. 3-3
Transporting the machine

3.2 Setting up the machine

The machine must stand firmly on all four feet at all times and be as level as possible. There may only be a slight inclination (max. 2°) in the direction of the outlet side to encourage water to drain off after cleaning. The feet (1) can be adjusted using universal spanner (2). If necessary, the adjustable feet must be used to compensate for any unevenness in the floor until the machine is absolutely level.

The outlet height of the machine is 1,000 mm as standard. It can be increased by up to 80 mm with the aid of the adjustable feet.

- Unscrew feet: height of outlet is increased
- Screw in feet: height of outlet is decreased



1 Adjustable foot
2 Universal spanner

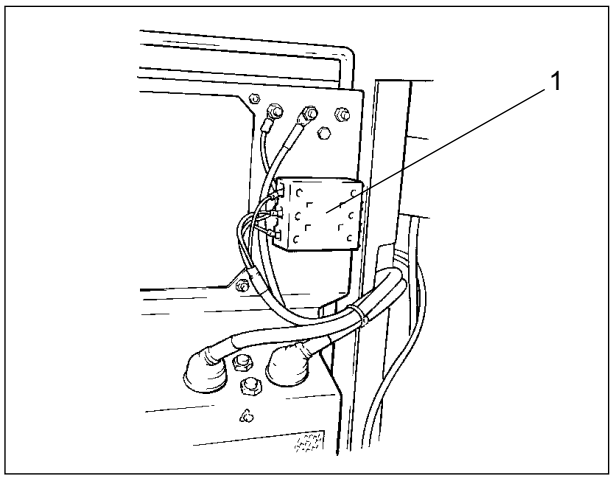
Fig. 3-4
Setting up the machine

Danger!
There is a risk of injury from the machine overturning if the feet are unscrewed too far.
Do not unscrew the machine‘s feet by more than 80 mm.

3.3 Electrical connection

Danger!
To prevent injury (electric shock), the electrical connection may be made only by authorised specialist staff or specialist companies.

- Inside the machine housing, connect the machine to the main switch (1) of the machine using four-core cable with 3 x phase and 1 x earth wire. There is a cable conduit in the base-plate. For correct connection values
  → Section 10



1 Main switch

Fig. 3-5
Electrical connection

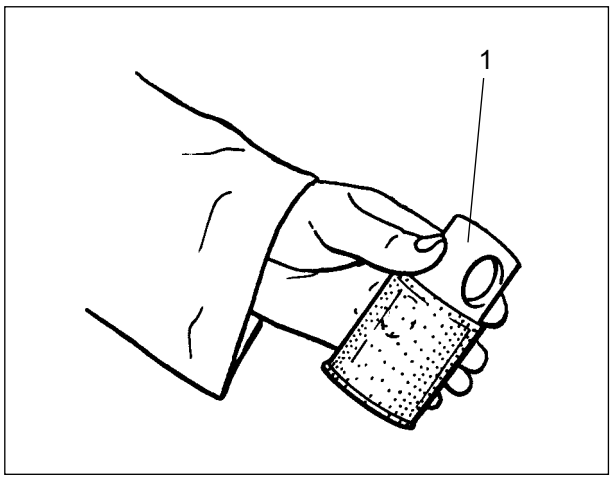
3.4 Checking direction of rotation

Warning!
To avoid damage to the machine, the machine may not be operated for more than 10 seconds in the wrong direction of rotation.

This is why it is essential to check whether the individual phases of the alternating current supply have been connected according to specification after the machine has been electrically connected; if the phases have been switched, the motors start up in the wrong direction of rotation.

To check the direction of rotation, proceed as follows:

- Remove vacuum pot.
- Take hold of the float valve on valve body (1) and pull it horizontally off the vacuum line.



1 Valve body

Fig. 3-6
Float valve

Warning!
Do not take hold of the float valve at the bottom at the screen to avoid tilting when pulling off the valve.

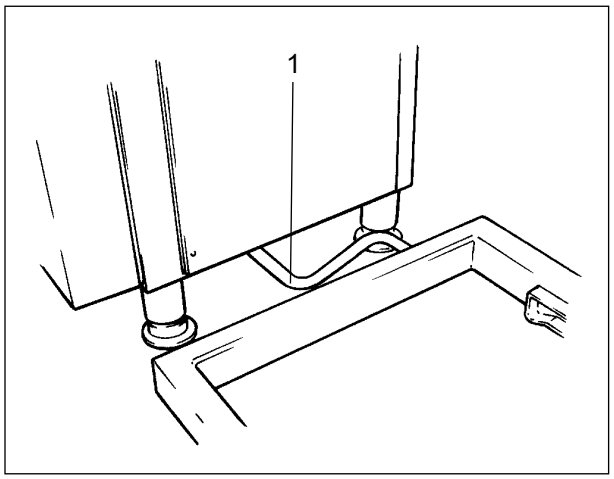
- Switch on the machine and check whether air is being drawn in by the vacuum line. If air is being drawn in, the motors are running in the correct direction of rotation. If no air is drawn in, the motors are running in the incorrect direction of rotation.
- In this case, stop the machine immediately and have the alternating current supply connected in correct phase by authorised specialist staff or a specialist company.
- Repeat the check on direction of rotation if appropriate.
- Put the float valve back on the vacuum line.
- Put the vacuum pot back on.

3.5 Levelling the lifting/tipping device (optional)

The trolley hoist of the lifting/tipping device is set at the factory with the feet of the machine screwed in and on a level floor (outlet height 1,000 mm). If the feet of the machine are screwed out to adjust height or level the machine in the horizontal plane, the stop parts on the lifting/tipping device will have to be reset to obtain the correct height for the trolley.

Adjust the lifting/tipping device as follows:

- Make the machine absolutely level using the adjustable feet.
  → Section 3.2
- Undo the four mounting bolts for the stop bar (1) of the trolley hoist and push the bar right in.

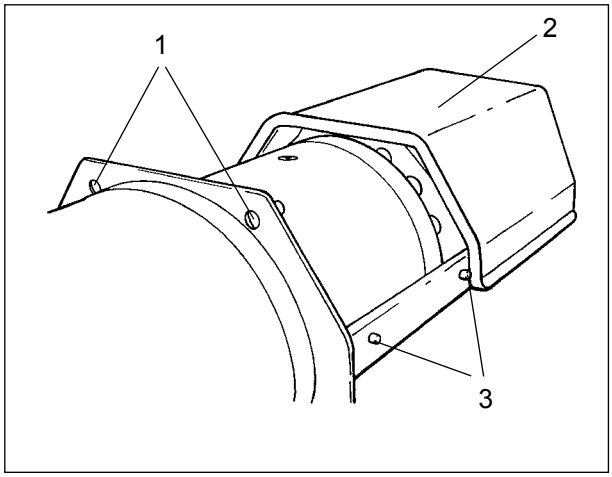


1 Stop bar

Fig. 3-7
Stop

- Switch on the machine and move the arm of the lifting/tipping device to the vertical end position using the UP key.

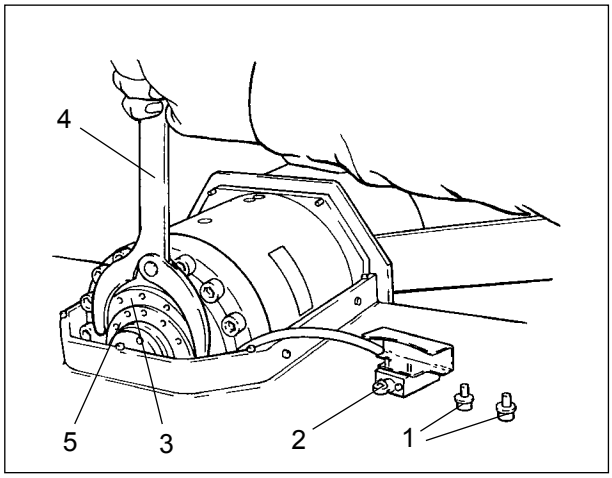
- Undo the two top mounting bolts (1) on the back of drive hood (2) and tap the bolts to release the drive hood. Push the hood and its seal in the direction of the operator side until the pins (3) release the guide grooves and lift it off.



1 Mounting bolts
2 Drive hood
3 Pins

Fig. 3-8
Drive hood

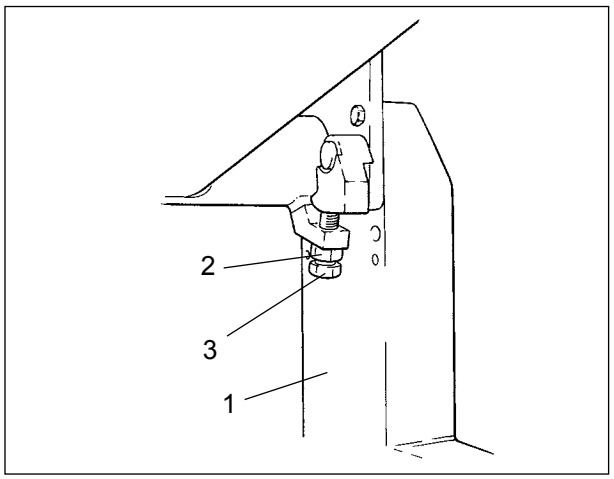
- Undo the mounting screws (1) of switch (2) and put it down on the machine housing.
- Undo the guard ring (3) with the face spanner (4).
- Use the setting ring (5) to set the desired angle of rotation. One turn of the setting ring adjusts the angle of rotation by 2.7°. This corresponds to an adjustment in the height of the trolley hoist of approx. 50 mm. The gap between the floor and the edge of the trolley guide on the trolley hoist needs to be approx. 237 mm.
- Turn clockwise: trolley hoist moves up
- Turn anti-clockwise: trolley hoist moves down



1 Mounting screws
2 Switch
3 Guard ring
4 Face spanner
5 Setting ring

Fig. 3-9
Setting trolley hoist

- Move the arm of the lifting/tipping device into the bottom end position using the DOWN key. Push a trolley into the trolley hoist to check the correct height of the trolley hoist and repeat setting if necessary.
- If the trolley hoist is set to the right height, lock the setting ring again with the guard ring. Attach the switch again.
- Lightly grease the contact surfaces of the seals of the drive hood and put the hood back on. Then tighten up the mounting bolts again.
- The trolley hoist (1) must be absolutely level to ensure that the trolley moves in and is locked in position securely. To do so, undo the guard nut (2) with the universal spanner and adjust stop screw (3).
- Screw in screw: locking lever of trolley hoist moves down
- Screw out screw: locking lever of trolley hoist moves up

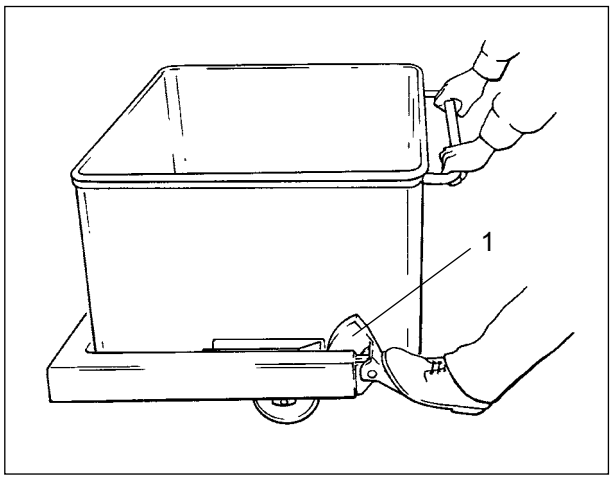


1 Trolley hoist
2 Guard nut
3 Stop screw

Fig. 3-10
Levelling the trolley hoist

- Check that the trolley hoist is level using a spirit level, and push a trolley right into the trolley hoist.

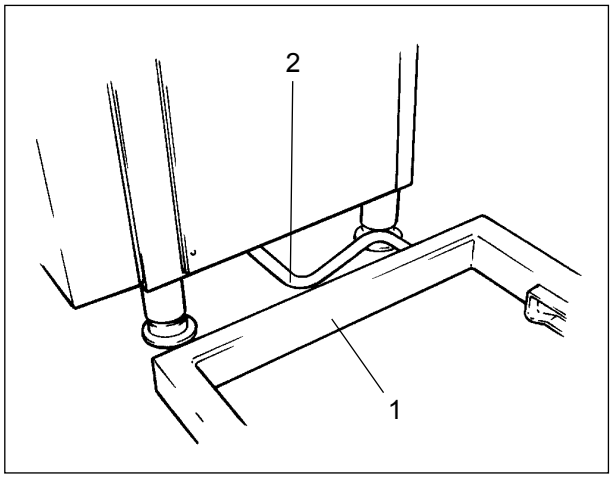
Warning!
Check whether the locking lever (1) is properly locked and is holding the trolley securely in the trolley hoist.



1 Locking lever

Fig. 3-11
Locking the trolley in position

- Then lock the stop screw with the guard nut again.
- If the trolley hoist (1) is correctly level, pull the stop bar (2) out far enough for the gap between the bar and the trolley hoist to be 5 mm and tighten up the four mounting bolts again.



1 Trolley hoist
2 Stop bar

Fig. 3-12
Setting the stop

4. Setting up

4.1 General information

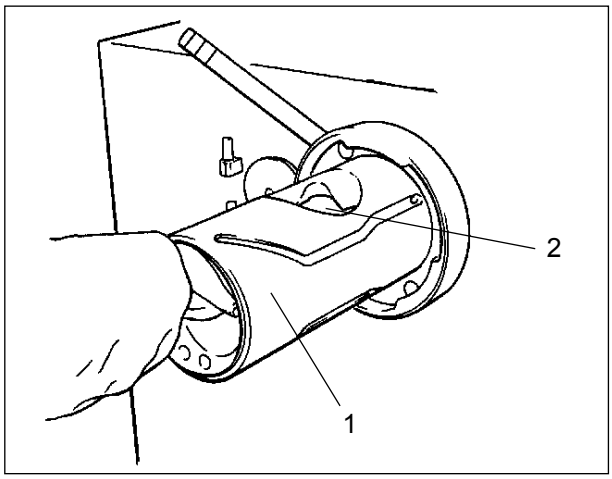
- To set up the machine, select a double screw housing, the double screws to suit the product to be processed and the required accessories.

Danger!
To prevent injury, switch off the machine before setting up. Then switch off the main switch to disconnect the machine from the mains.

4.2 Fitting the double screw housing

Danger!
There is a risk of crushing when fitting and removing the double screw housing and the double screws. To prevent injury, proceed extremely carefully when fitting and dismantling these parts.

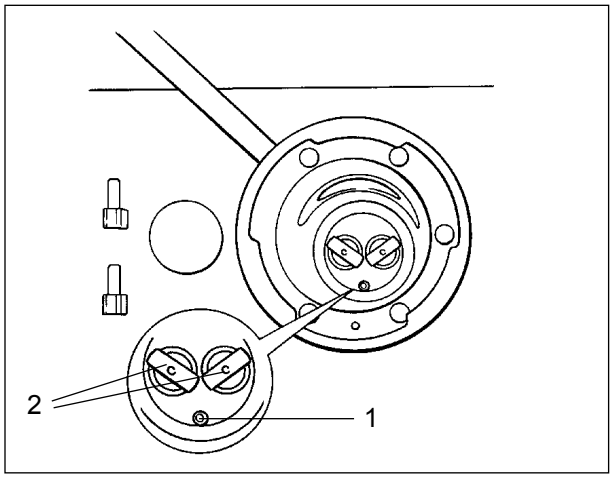
- Push double screw housing (1) right into the feed cylinder of the machine. Inlet bore (2) for product and vacuum should face upwards.



1 Double screw housing
2 Inlet bore

Fig. 4-1
Installing double screw housing

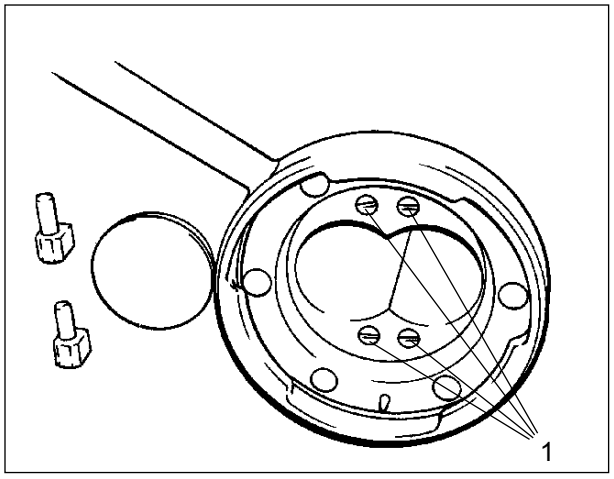
A pin (1) under the coupling pins (2) in the feed cylinder centres the double screw housing which has the appropriate bore on its end face.



1 Centring pin
2 Coupling pins

Fig. 4-2
Centring the double screw housing

- To prevent air bubbles in the product, the air relief bores of the double screw housing should be adjusted to suit the product using the setting screws (1). The air relief bores are closed when the screw slots are horizontal. If the screw slots are vertical with the screws tightened right up, the air relief bores are open.



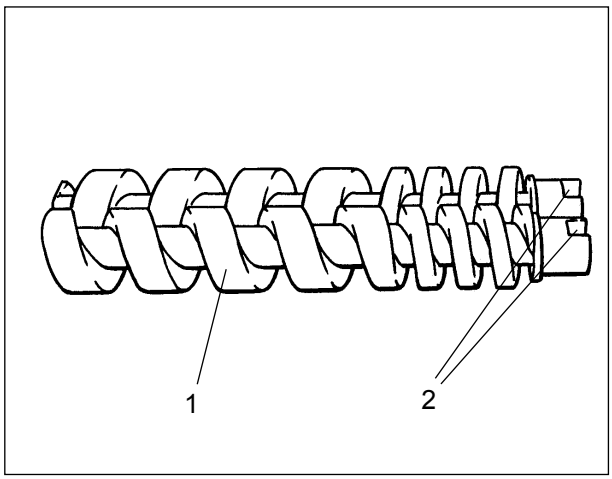
1 Setting screws

Fig. 4-3
Setting the air relief bores

- The product weight set should be compared with the weight actually filled at the start of production.

4.3 Fitting the double screws

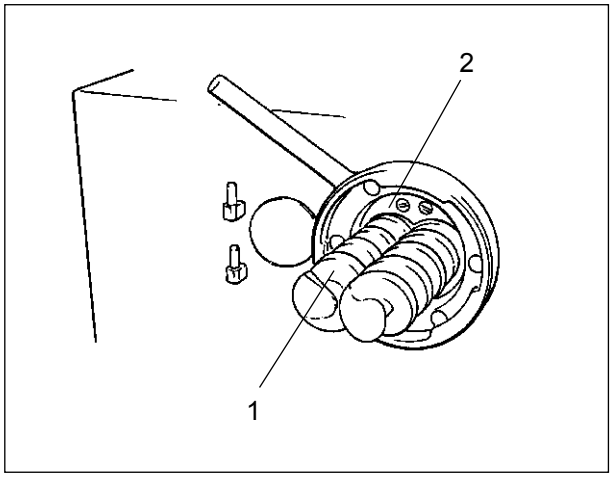
- Position the double screws (1) so that the screw marked left (”links”) is on the left-hand side and the front faces are flush.
- Bring the slots of coupling claws (2) into the correct position in relation to the coupling pins in the feed cylinder by turning the double screws in opposite directions.



1 Double screws
2 Slots

Fig. 4-4
Lining up the double screws

- Push double screws (1) into double screw housing (2) up to the stop. The double screws are properly engaged if the end faces of the double screws and housing are flush.

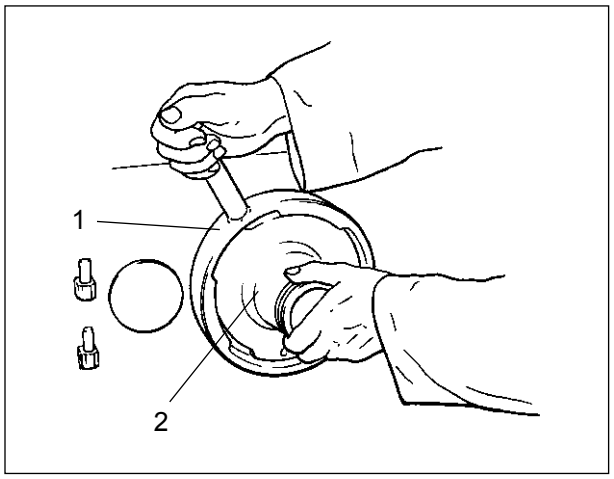


1 Double screws
2 Double screw housing

Fig. 4-5
Installation of double screws

4.4 Fitting the filling horn

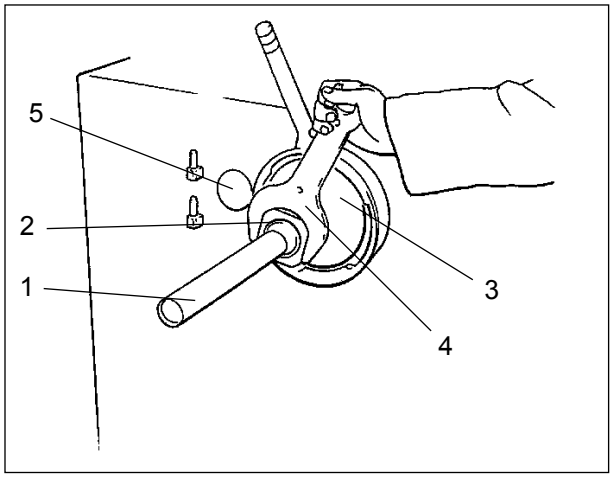
- Adjust locking nut (1) so that the handle is between the 10 and 11 o'clock position and insert filling horn holder (2).
- Turn locknut (1) clockwise to lock the filling horn holder. The handle should now be approximately vertical.



1 Locking nut
2 Filling horn holder

Fig. 4-6
Locking the filling horn holder

- Select a filling horn with the largest possible diameter related to the size of the casing.
- Use the filling horn nut (2) on the filling horn holder (3) to attach the filling horn (1). Use the appropriate universal spanner (4).
- Push the protective cap (5) onto the linking cartridge (if present).



1 Filling horn
2 Filling horn nut
3 Filling horn holder
4 Universal spanner
5 Protective cap

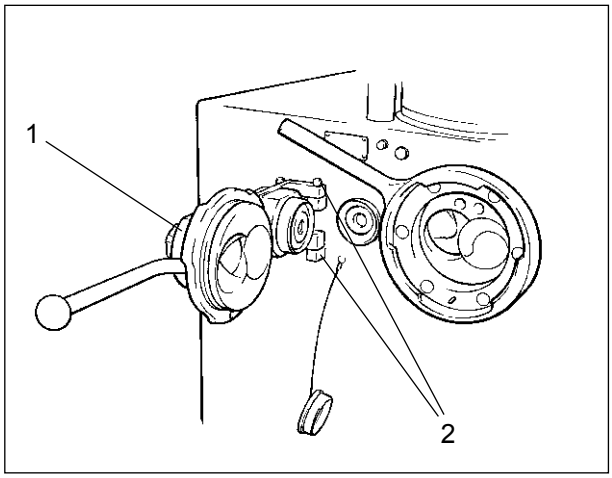
Fig. 4-7
Fitting the filling horn

Danger!
There is a risk of injury if the linking cartridge is left open.
Always place the protective cap on the linking cartridge when working without a linking gear (optional).

4.5 Locking the linking gear (optional)

Danger!
There is a risk of crushing when swivelling the linking gear in and out. To prevent injury, proceed extremely carefully when fitting and dismantling the part.

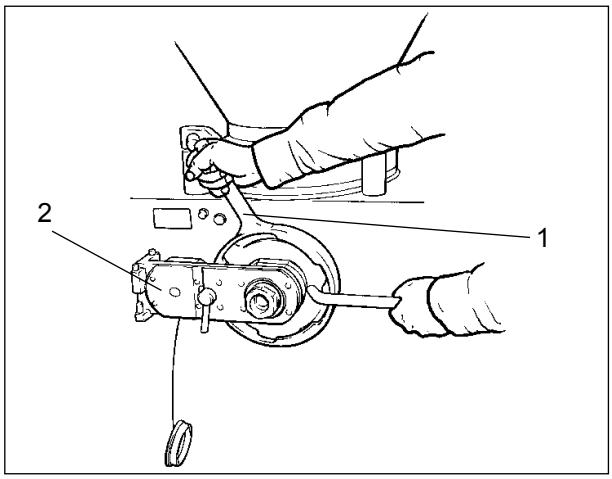
- Attach linking gear (1) to the outlet side of the machine with the aid of the two bearing journals (2).



1 Linking gear
2 Bearing journals

Fig. 4-8
Fitting the linking gear (optional)

- Adjust locking nut (1) so that the handle is between the 10 and 11 o'clock position and swing linking gear (2) in front of the outlet.
- Turn the locking nut clockwise to lock the linking gear. The handle should now be approximately vertical.

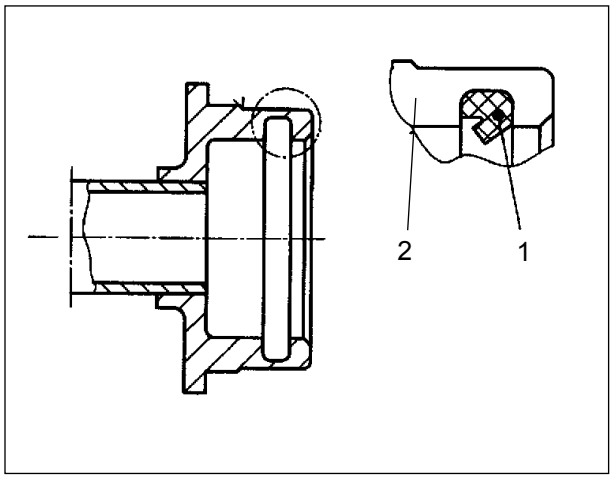


1 Locking nut
2 Linking gear

Fig. 4-9
Locking the linking gear (optional)

4.6 Fitting the linking horn (optional)

- Use a linking horn with the largest possible diameter and shortest possible length related to the size of the casing.
- Fit lip seal (1) in linking horn (2) so that the lug of the lip seal is pointing forwards.



1 Lip seal
2 Linking horn

Fig. 4-10
Fitting the lip seal

- Grease the seal of the linking horn before fitting it to prevent friction problems.

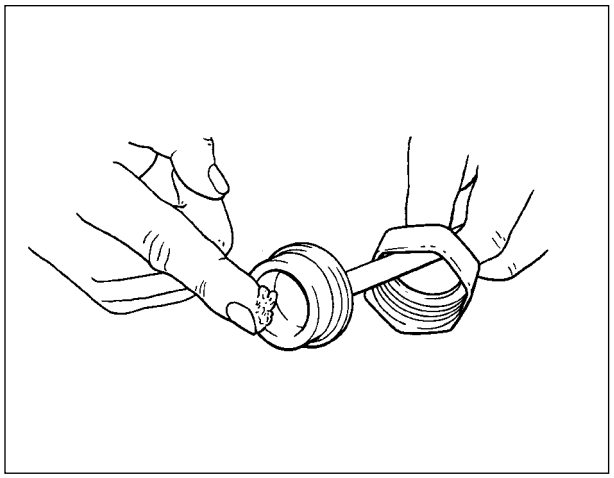
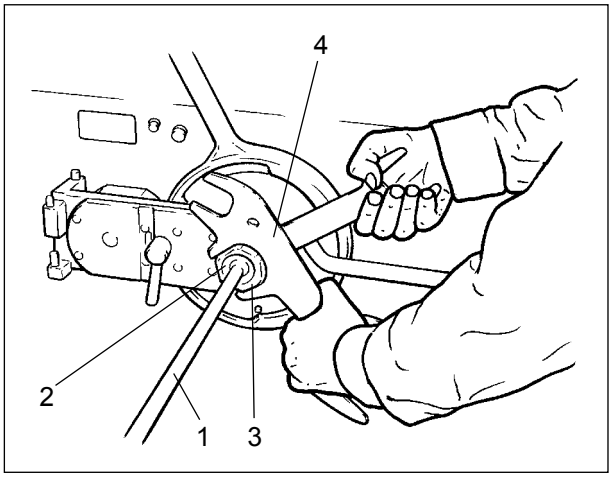


Fig. 4-11
Greasing the linking horn

- Insert linking horn (1) into linking head (2) and tighten linking nut (3) using universal spanner (4). Hold the linking head steady with the second universal spanner as you do so.



1 Linking horn
2 Linking head
3 Linking nut
4 Universal spanner

Fig. 4-12
Fitting the linking horn

- Remove the spanners from the linking nut and linking head before you start the machine.

Warning!
The linking head has a left-hand thread.
- To tighten: turn anti-clockwise
- To loosen: turn clockwise

Warning!
When processing very fine product (e.g. cooked sausage meat) a filler cone can be inserted in the linking gear to optimise the particle definition of the end-product.
→ Linking gear spare parts catalogue

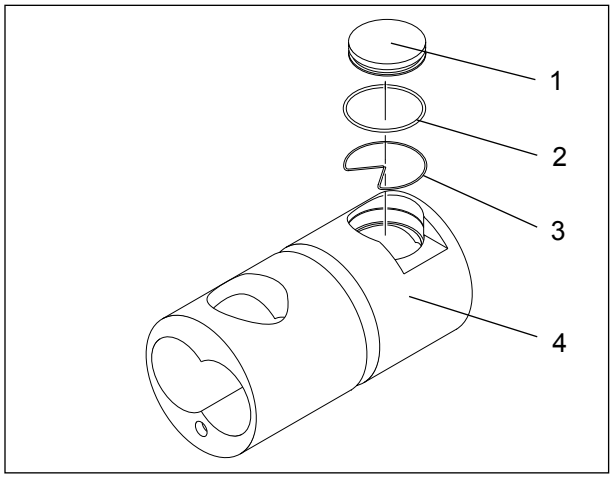
4.7 Setting the vacuum

4.7.1 Filling raw and cooked sausage

- Set the maximum vacuum for filling raw and cooked sausage.

4.7.2 Filling liquid product

- Put blind plug (1) together with O-ring (2) and retaining ring (3) in the rear opening of double screw housing (4).



1 Blind plug
2 O-ring
3 Retaining ring
4 Double screw housing

Fig. 4-13
Double screw housing

Warning!
Before processing any liquid product, check whether the blind plug is located in the double screw housing. If the blind plug is not present, the vacuum pump may be destroyed. If the vacuum pump takes in product or water as a consequence of a missing or incorrectly fitted blind plug, it is essential to proceed as follows to prevent damage to or destruction of the vacuum pump:
- Stop the machine immediately.
- Clean the air filter in the intake line.
- Change the oil in the vacuum pump.

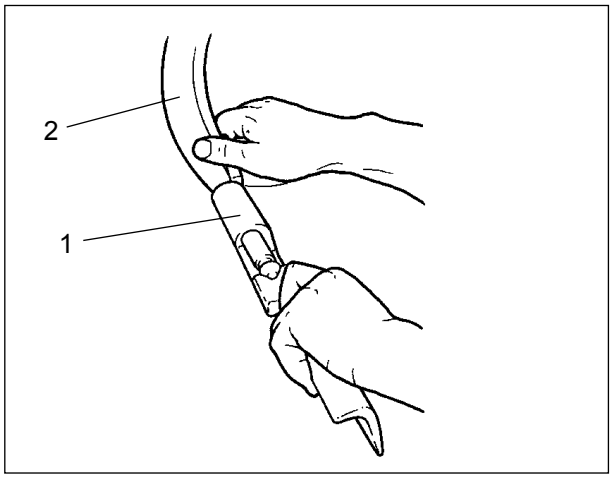
→ Section 8 and vacuum pump operating instructions

4.8 Fitting the scraper

A scraper can be fitted to the hopper for product which sticks to the wall of the hopper. The scraper must be used when processing raw sausage.

Danger!
There is a risk of crushing when fitting and removing the scraper. To prevent injury, proceed extremely carefully when fitting and dismantling the part.

- Put the scraper (1) on the locking pin (2) of the feed screw and make sure it engages.



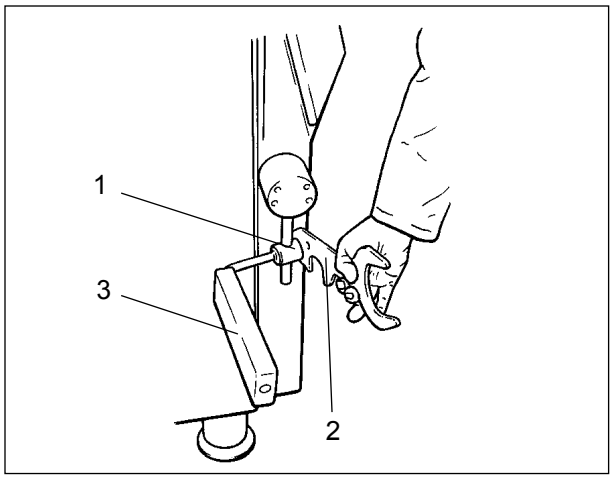
1 Scraper
2 Locking pin

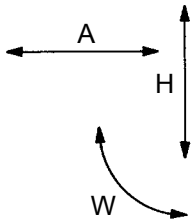
Fig. 4-14
Fitting the scraper

4.9 Adjusting the knee lever

The knee lever can be adjusted in terms of height (H), angle (W) and projection (A) to suit the height and location of the operator.

- Undo the hexagonal nut (1) using the universal spanner (2).
- Adjust the knee lever to the desired height (H) and angle (W).
- Tighten up the hexagonal nut again.
- Move the knee lever plate (3) along the lever shaft until the desired projection (A) is reached. The plate can be taken off the lever shaft altogether if required.





1 Hexagonal nut
2 Universal spanner
3 Knee lever plate

Fig. 4-15
Adjusting the knee lever

5. Operation

5.1 Working with the machine

To start production with the machine, proceed as follows:

- Set up the machine for the product to be filled.
  → Section 4
- Switch on the main switch of the machine.
- Press the ON switch on the machine control panel.

Danger!
You must check that any safety devices are working properly.
- Unlock the hopper and tip it open.
- Remove the filling horn holder.

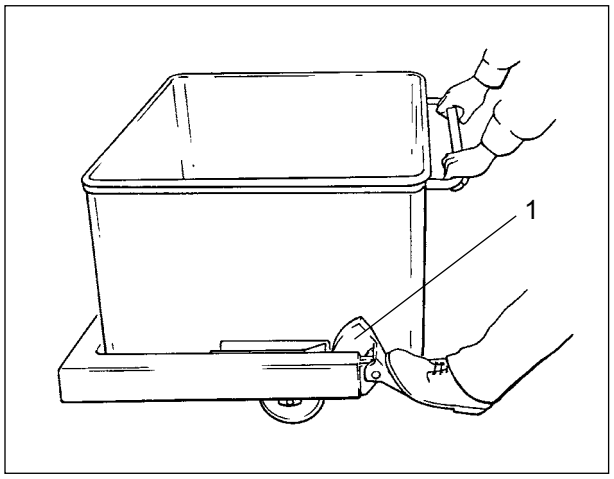
In each of the cases described, the machine must switch off automatically. If the machine does not switch off, work may not continue with the machine. In this case, inform VEMAG Customer Service immediately.

- Pull on a casing suitable for the product to be filled.
- Push the trolley containing product into the trolley hoist of the lifting/tipping device (optional) up to the stop. The locking lever must lock and hold the trolley securely in the trolley hoist.
- Press the UP key of the lifting/tipping device to move the trolley over the hopper with the trolley hoist. The trolley is automatically emptied into the hopper.

Danger!
Make sure that there is no-one in the area of the lifting/tipping device during operation and that no objects have been deposited there.
Insert only undamaged trolleys that will be securely held by the trolley hoist.

- Press the DOWN key to lower the trolley again. The trolley hoist stays approx. 500 mm above the floor. Press the DOWN key again and keep it depressed until the trolley has reached the floor.

- Unlock the locking lever (1) with your foot and pull the trolley out of the trolley hoist.



1 Locking lever

Fig. 5-1
Trolley

- If you want to use the machine to link, test the relevant linking horn for concentricity with the aid of the respective program.
  → Section 6
- Use the portioning computer to select a filling program and check whether the double screws are correctly selected in the portioning computer.
  → Section 6
- Set the vacuum required for the product to be filled at the vacuum control valve. Put the blind plug in the double screw housing if necessary.
  → Section 4

Warning!
You must interrupt the filling process and check the seals of the double screw drive if vacuum level falls uncontrollably during production.
→ Sections 7 and 8

- At the start, allow the machine to run at a slow speed (max. 20 %) until product escapes at the outlet.

This prevents the pumping element “running dry”. When filling hot products, wait about 1 minute to start production. This ensures that all machine parts which come into contact with the product are heated to product temperature.

Danger!
There is a risk of injury at the filling/linking horn (optional) from products being ejected under high pressure. Proceed with extreme caution to prevent injuries.

- Operate the knee lever to start the filling process.

When production is finished, proceed as follows:

- Press the OFF key on the machine control panel.
- Switch off the main switch of the machine.
- Clean the machine in accordance with the instructions in the cleaning schedule.
  → Section 7
- Take the appropriate maintenance measures if necessary.
  → Section 8

5.2 Working with provisional drive

Should the portioning computer of the machine fail, it is possible to continue operating the machine using provisional drive. In this mode, you can run the machine hopper empty at approx. 50 % of nominal speed.

Danger!
The front door of the machine must be swung open to run the hopper empty.
Risk of crushing, dragging in and burns.
Proceed with extreme caution and do not reach into the inside of the machine.

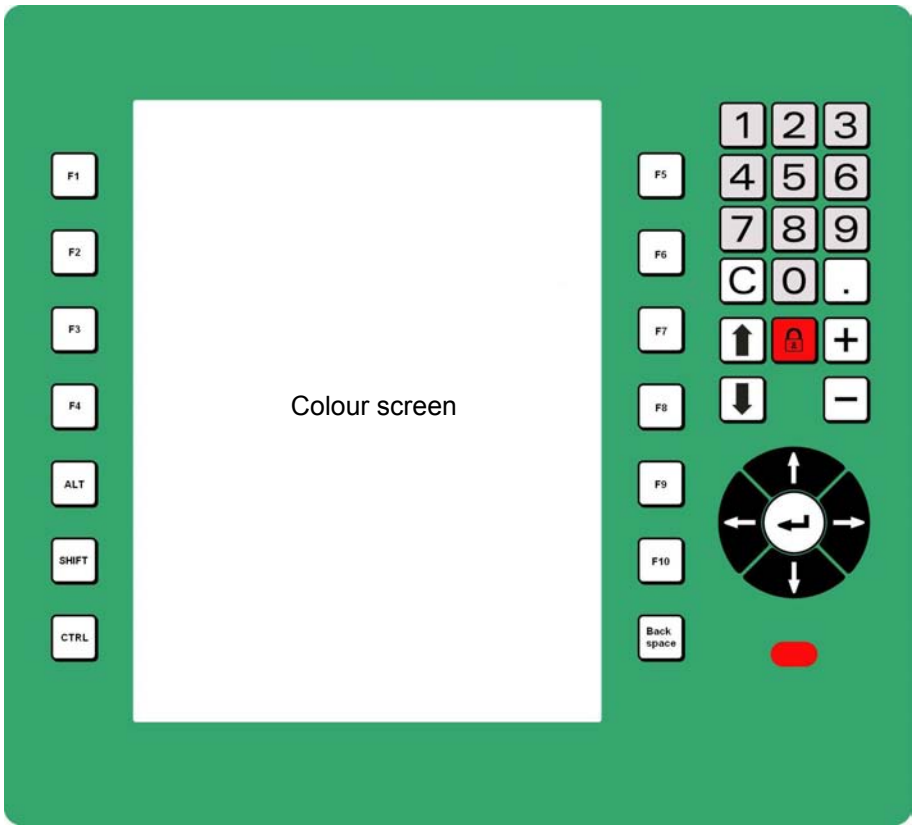
- Press the OFF key on the machine control panel.
- Switch off the main switch of the machine.
- Swing open the front door.
  → Section 8.1
- Switch the main switch of the machine back on.
- Press the ON key on the machine control panel.
- Press push-button S10 on the switch cabinet for the drive controller and keep it depressed until the hopper of the machine has run empty.
- Inform VEMAG Customer Service.
- Press the OFF key on the machine control panel.
- Switch off the main switch of the machine.

6. Graphical control

This section introduces the individual controls of the graphical control system.

- How is the control panel arranged?
- How is the screen arranged?
- What functions do the keys have?
- What messages are displayed?

Function keys



Colour screen

Keypad

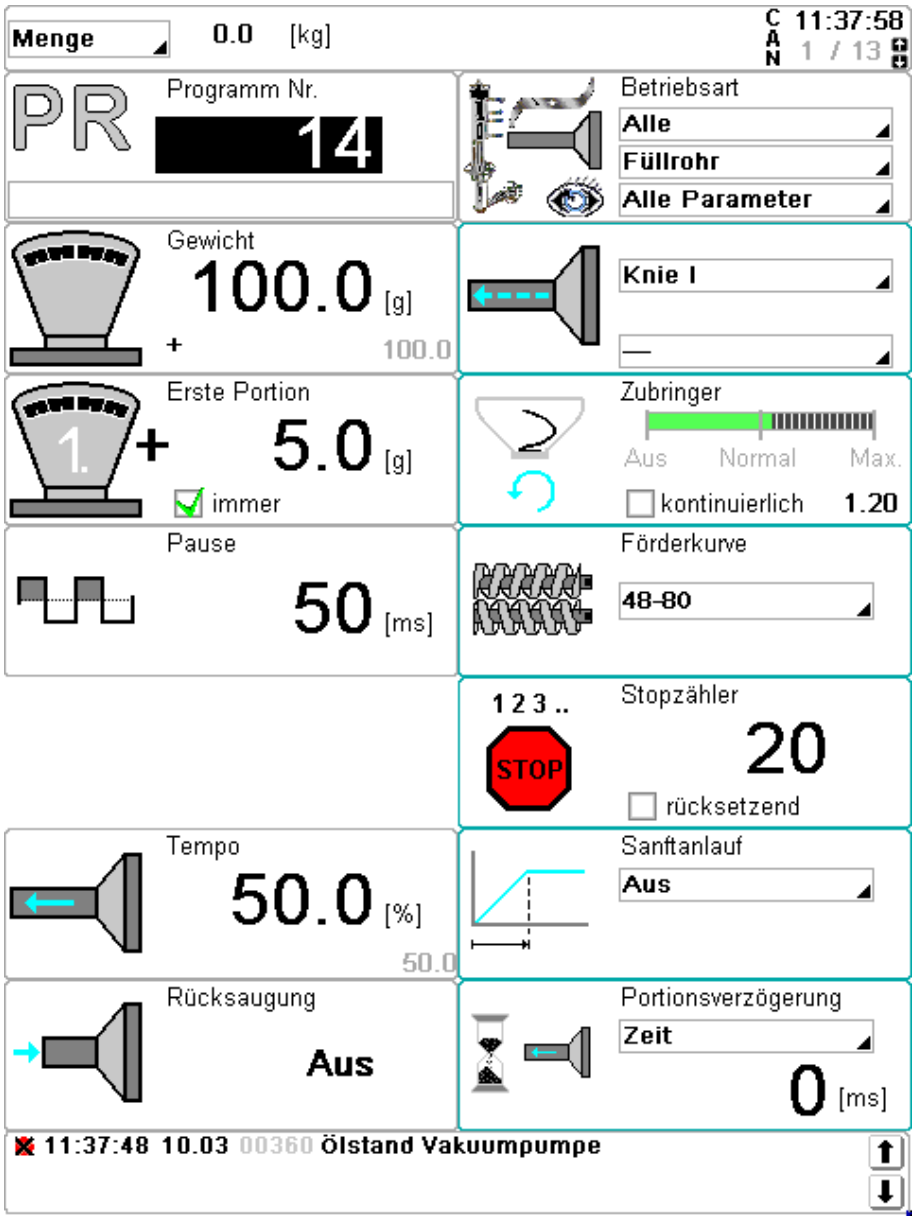
6.1 Control panel

The colour screen and the keys are integrated in the green control panel.

The screen is divided into various fields.
→ Section 6.2

There are seven function keys to both the left and the right of the screen which you use to activate the associated area of the screen.

Use the keypad on the right-hand side of the screen to make entries.
→ Section 6.3


Header
Program
Product name
Parameters
Footer
Mode group
Mode
View
Start/stop method
Parameters
Menge
0.0 [kg]
CAN 11:37:58
1 / 13
PR
Programm Nr.
14
Betriebsart
Alle
Füllrohr
Alle Parameter
Gewicht
100.0 [g]
+
100.0
Knie I
—
Erste Portion
1.
+
5.0 [g]
immer
Zubringer
Aus
Normal
Max.
kontinuierlich
1.20
Pause
50 [ms]
Förderkurve
48-80
1 2 3 ..
STOP
Stopzähler
20
rücksetzend
Tempo
50.0 [%]
50.0
Sanftanlauf
Aus
Rücksaugung
Aus
Portionsverzögerung
Zeit
0 [ms]
11:37:48 10.03 00360 Ölstand Vakuumpumpe

6.2 Screen

The screen is divided into five different areas:

- Header
- Program and mode (mode group, mode, view, start/stop method)
- Parameters on the left-hand side of the screen
- Parameters on the right-hand side of the screen
- Footer

6.2.1 Header

The following information is displayed in the header:

- Depending on selection; pieces, portions per minute, quantity in kg or speed (only in straight filling mode)
- Time
- Parameter number if there are more than six (e.g. 1/11 = parameter no. 1 of 11)
- Arrows for direction of travel of the lifting and tipping device (optional)

6.2.2 Program and mode

Program number and product name (if entered) are displayed on the left-hand side of the screen.
→ Section 6.5.1

The mode group (top), mode (centre), view (bottom) and start/stop method are displayed on the right-hand side of the screen.
→ Section 6.5.2

A function key is assigned to these fields.

6.2.3 Basic parameters

The six basic parameters for the filling program in question are displayed on the left-hand side of the screen. It is not possible to change the view of these parameters. A function key is assigned to each of the six fields.

6.2.4 Supplementary parameters

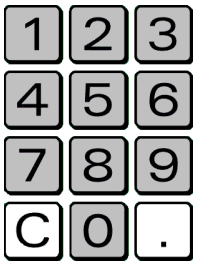
Up to six supplementary parameters for the selected parameter set are displayed on the right-hand side of the screen. The view of these parameters can be changed using the Screen up/down keys. You can modify and save the view of these parameters by modifying the parameter set. A function key is assigned to each of the six fields.

6.2.5 Footer

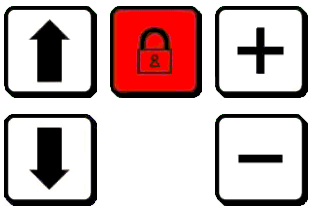
The footer displays status and error messages.
→ Section 6.4

Numerical keypad

Key C (Cancel)



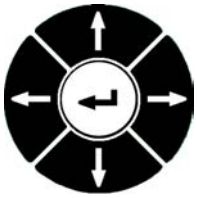
Screen up/down keys



Padlock key

Plus/minus keys

Cursor keys



Enter key

6.3 Keypad

6.3.1 Numerical keypad

Numerical values are entered using the numerical keypad. Every value entered must be confirmed with Enter.

6.3.2 Key C (Cancel)

Key C (Cancel) performs the following functions:

- back to main screen
- cancel input and exit
- exit window and menus without input

6.3.3 Screen up/down keys

Use the two arrow keys to switch pages and scroll through fields and lists. A scroll bar is shown when you scroll.

Menu items followed by ".." show that more pages follow.

6.3.4 Padlock key

The padlock key performs the following functions:

- Open program locking/ userkey

You can use program locking to block entry for almost all parameters.

You can use the userkey to block/release access to Service functions.

6.3.5 Plus/minus keys

- Use the plus/minus keys to increase or reduce values by 1.
- You can also use the minus key to put the symbol in front of negative input.

Enter the value in question before putting in the symbol (e.g.: "5" first, and then "-" to set clip offset).

6.3.6 Cursor keys

The arrow keys in the cursor field are used to move the cursor around the screen. The marking for an active field indicates the position of the cursor. You can also use the cursor keys to navigate around menus.

6.3.7 Enter key

The Enter key is used to confirm all input.

6.4 Status and error messages

The footer displays status and error messages. You can use the arrow keys in the footer to scroll through the last 100 messages. To do this, you need to activate the footer using the cursor keys.

There are six different kinds of message.


- Fault (red and white)


- Fault eliminated (blue and white)


- Warning on display (yellow and black)


- Service message on display (yellow and black)


- Information on display (white and blue)


- Standby indicated (white and green)

Outstanding messages are also displayed in a red and blue window.

Trichter

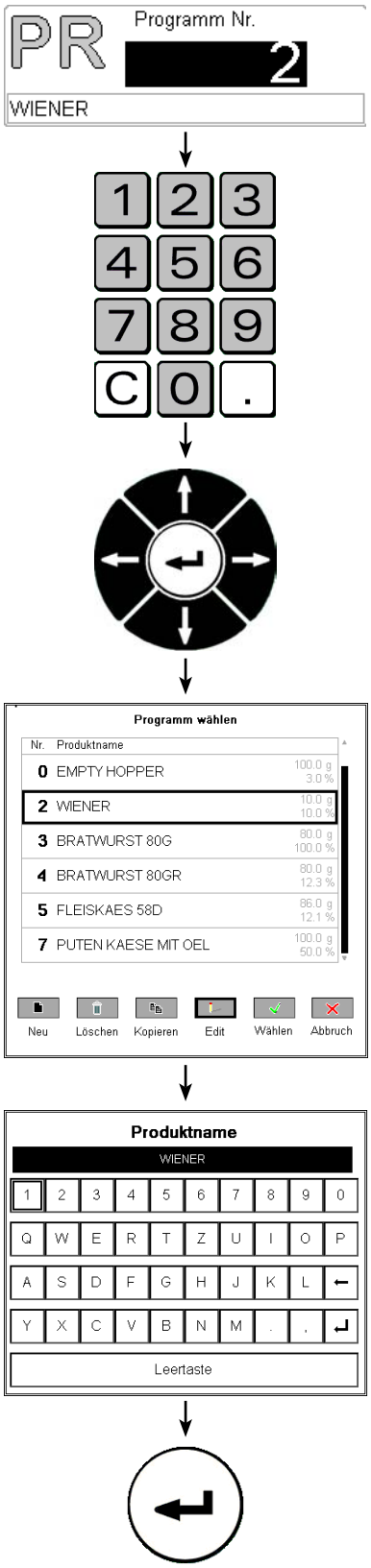
00501

Warning!
The graphical control cannot be operated if there are outstanding messages. The fault must be eliminated or the message acknowledged first. You can hide the message by opening a Service page (bottom left function key + number).

6.5 Principles of operation

This section covers the principles of operating the portioning computer.

- How are programs selected and edited?
- How are programs imported and exported with the aid of a USB stick?
- How are the mode group, mode, view and start/stop method selected?
- How are certain settings (language, password input etc.) made?
- How do you log on with the userkey?



Program number

Product name

Program list with action buttons

6.5.1 Select and edit programs

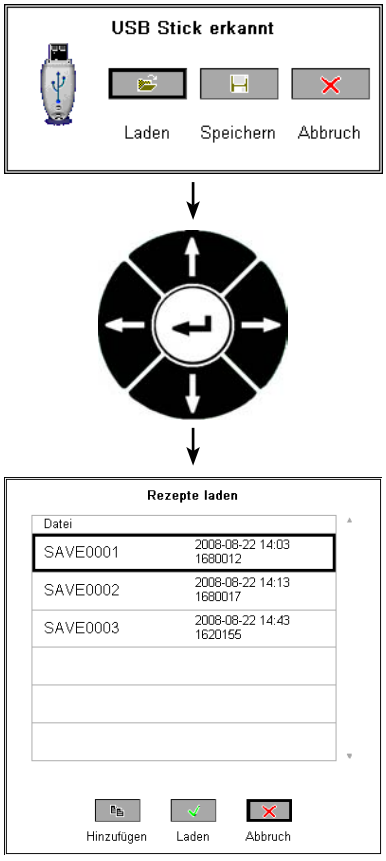
In the *Program* field you can select, edit, copy and delete filling programs and also enter product names for the individual programs. Program numbers 0 to 99 are available.

- Press the *Program* function key.
- Enter the program number using the *numerical keypad*.
- Press *Enter.*
- Select the field for product name using the bottom *cursor key*.
- Press *Enter.* A list of the existing programs appears. Below the list are six keys for selecting the desired action: New/Delete/Copy/Edit/ Select/Cancel.
- Select the action using the *left/right cursor keys*.
- Press *Enter.*

A keyboard is shown for you to enter the product name.

- Enter product name. Letters and numbers are marked using the four *cursor keys* and adopted by pressing *Enter*.
- Press *Enter* on the keypad. The keyboard is hidden again and the product name is adopted.

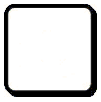
USB stick plugged in

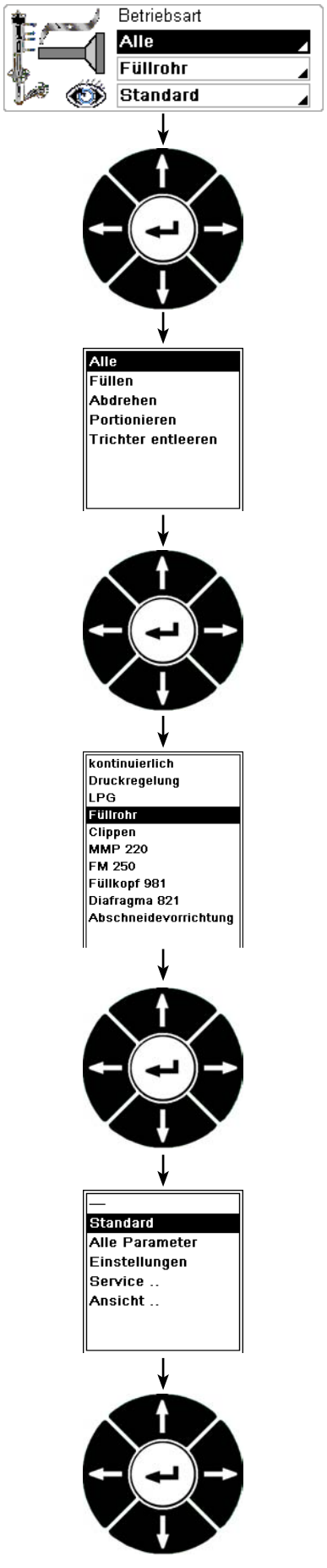


6.5.2 Importing and exporting programs using a USB stick

You can import and export filling programs using a USB stick.
The USB stick is plugged into the rear of the control board.

- Plug in USB stick. The stick is detected automatically.
- Select the action with the cursor keys.
- Press *Enter.*





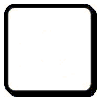
Mode group
Mode
View

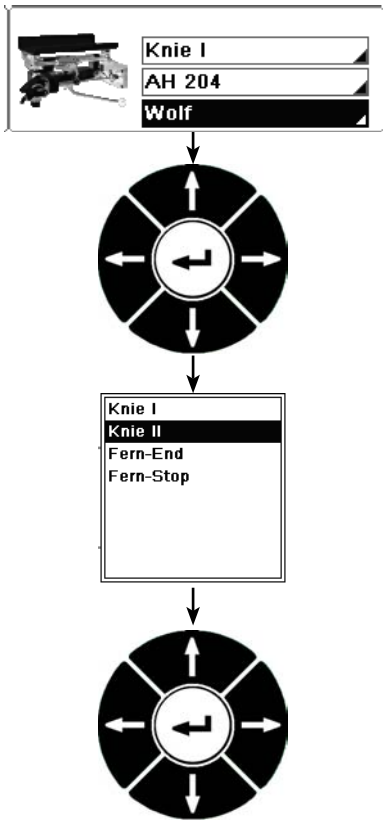
6.5.3 Select mode group, mode and view

In the *Operating mode* field you can select mode group and mode and set the view required for each application. The modes which can be selected are determined by the machine type and the machine configuration.
You can also save settings here and select the Service pages and your language.

- Press the *Operating mode* function key.
- Select the *Operating mode group* field using the *cursor key*.
- Press *Enter.* A list of the possible mode groups is displayed.
- Select the mode group using the *Cursor keys*.
- Press *Enter.*
- Select the *Operating mode* field using the *cursor key*.
- Press *Enter.* A list of the possible modes is displayed.
- Select the mode using the *cursor keys*.
- Press *Enter*.
- Select the *View* field using the *cursor key*.
- Press *Enter.* A list of the possible views and supplementary parameters for the selected mode is displayed.
- Select the view using the *cursor keys*. Views followed by ".." show that more pages follow.
- Press *Enter.*

To set your language
→ Section 6.5.5





Start/stop method
Attachment / Optional Attachment

6.5.4 Select start/stop method

In the *Start/stop method* field you can select the start/stop method and the attachments used.

- Press the *Start/stop method* key.
- Select the *Start/stop method* field using the cursor key.
- Press *Enter.* A list of the possible start/stop methods is displayed.
- Select the start/stop method using the *cursor keys*.
- Press *Enter*.
- Select the *Attachment / Optional* field using the cursor key.
- Press *Enter.* A list of the possible attachments / options is displayed.
- Select the attachment / option using the *cursor keys*.
- Press *Enter*.


Betriebsart
Füllen
kontinuierlich
Einstellungen
Einstellung speichern
System
Sprache
Deutsch
Datum
06.11.2008
Zeit
09:43:53
Passworte
Programmverriegelung
0

6.5.5 Make settings (language, date/time, password)

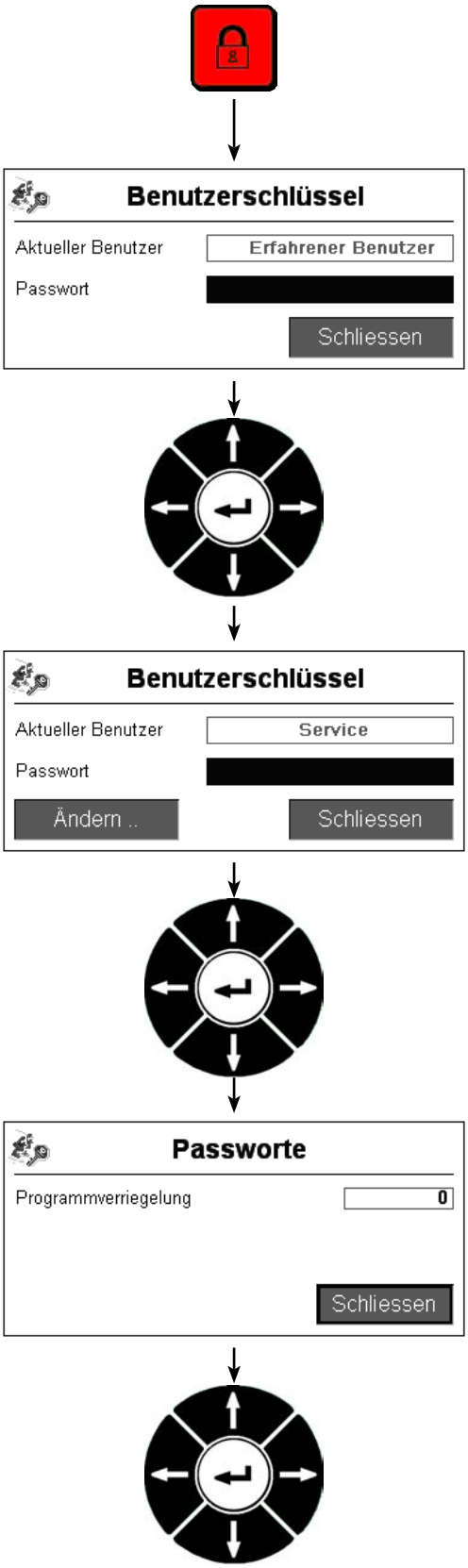
You can select various settings in the *View* field.

- Press the *Operating mode* function key.
- Select the *View* field using the bottom *cursor key*.
- Press *Enter*.
- Select settings using the *cursor keys*.
- Press *Enter*.

Use the corresponding function key to select the language for the screen to display.

- Press the *Language* function key.
- Press *Enter.* A list of the possible languages is displayed.
- Select language using the *cursor keys*.
- Press *Enter.* The screen texts appear in the selected language.

Use the corresponding function key to assign passwords for the userkey. To work with the userkey
→ Section 6.5.6


Benutzerschlüssel
Aktueller Benutzer
Erfahrener Benutzer
Passwort
Schliessen
Benutzerschlüssel
Aktueller Benutzer
Service
Passwort
Ändern ..
Schliessen
Passworte
Programmverriegelung
0
Schliessen

6.5.6 Set up userkey

Access to certain functions can be blocked with the aid of the userkey.

The userkey has five different user types:

- Program locking (switch programs, enter weight corrections and perform a linking horn test)
- Advanced user (set up and modify programs)
- Professional user (optional)
- Service (configure the machine)
- Superuser (full access)

If you want to prevent programs being modified or deleted by accident, you should set up the "Program locking" user type. You need to log on as a Service user to do this.

- Press the padlock key.
- Select user *Service* by using the relevant password.
- Press *Enter*.
- Press *Change*. A „0“ shows that program locking is not active.
- Enter your password using the *numerical keypad* (max. 8 digits).
- Press *Enter*.
- Press *Close*. A red padlock next to the program number shows that the program locking is active.

You can briefly unlock the program using the program locking password. Use the password „0“ to activate program locking again.

If you want to unlock the program definitively, you need to log on as a Service user again and reset the program locking password to „0“.

6.6. Mode groups, modes, start/stop methods and parameters

This section introduces the various mode groups, modes, start/stop methods and parameters.

- What mode groups are there?
- What modes are there?
- What start/stop methods are there?
- What basic parameters are there?
- What supplementary parameters are there for the various applications?

6.6.1 Mode groups, modes and views

Use the *Operating mode* function key to select the mode group, mode and view. You can set the mode groups and modes in the Service area.

There are five different mode groups:

All/Fill/Link/Portion/Miscellaneous

The mode and view depend on the selected mode group.

6.6.2 Start/stop methods

6.6.2.1 Knee I

The feed element runs only as long as the knee lever is being actuated.

6.6.2.2 Knee II

The feed element runs when the knee lever is actuated briefly.
The feed element stops when the knee lever is actuated again.

6.6.2.3 Remote end

The filler is actuated by an attachment via the remote control socket.
The started portion is completed after the attachment stops.

6.6.2.4 Remote stop

The filler is actuated by an attachment via the remote control socket.
The portion is interrupted after the attachment stops.

6.6.3 Basic parameters

The basic parameters are displayed on the left-hand side of the screen. These parameters are required for the majority of applications. The parameters cannot be scrolled.

Supplementary parameters for various applications (e.g. working with a clipper) are explained in the sections which follow.

6.6.3.1 Weight

Display:	Weight
Unit:	Gramme [g]
Resolution:	0.1 g/1 g
Setting range:	1 – 99,999 g
Application:	All applications (not for mode group "Fill")

Enter a new weight

- Enter a new weight.
- Press *Enter*.

Correct weight

- Enter correction value with symbol in front.
- Press *Enter*.

From a filling weight of 1,000 g, resolution automatically switches from 0.1 g to 1 g.

A weight correction can only be made up to a maximum of 90 % of the specified weight. Otherwise the message "Input limit reached" appears.

6.6.3.2 First portion

Display:	First portion
Unit:	Gramme [g]
Resolution:	0.1 g/1 g
Setting range:	0 – 999 g
Application:	Portioning programs (not for weight groups, “Continuous” and “Portions per minute”)

- Enter the weight for the first portion.
- Press *Enter.*

Depending on filling weight, you may also be able to enter negative values here.

The addition to the first portion is made only after a pause of approx. 4 seconds until the machine is restarted by the knee lever or by remote control.

A tick should be placed next to „always“ by pressing the Enter key if an addition is always to be made to the first portion. In this case, the addition to the first portion is made following a restart by the knee lever or by remote control.

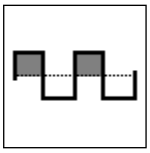
6.6.3.3 Total weight (only for weight groups)

Display:	Total weight
Unit:	Kilogramme [kg]
Resolution:	0.01 kg
Setting range:	-999 – +999 kg
Application:	Weight groups

- Enter correction value with symbol in front.
- Press *Enter*.

You can correct the total weight of the weight group (e.g. kebab stick). The portioning computer automatically recalculates the weights of the individual slices.

6.6.3.4 Pause



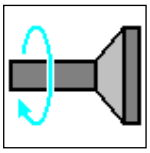
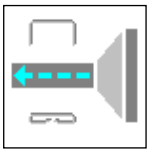
Display:	Pause
Unit:	Milliseconds [ms]
Resolution:	1 ms
Setting range:	0 – 9,999 ms / -1 = single portions
Application:	Portioning programs (not for “LPG” or “Continuous” modes)

- Enter pause time.
- Press *Enter*.

The minimum pause time is limited automatically depending on the parameters in Section 6.6.3.5.

If selecting individual portions, you need to activate the knee lever signal for each portion (AC signal).

6.6.3.5 Linking/clip time/knife/output signal

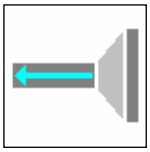


Display:	Linking / clip time / knife / output signal
Unit:	Number / Milliseconds [ms]
Resolution:	0.1 / 1 ms
Setting range:	0 – 150/0 – 9,999 ms (default for knife = 50 ms)
Application:	Linking, clipping, cutting, filling head

- Enter number of links/time.
- Press *Enter*.

If you wish to perform a linking horn test, put a tick in the appropriate field by pressing *Enter*.

6.6.3.6 Speed



Display:	Speed
Unit:	Per cent [%]
Resolution:	0.1 %
Setting range:	0 – 100 %
Application:	All applications (not for pressure control)

- Enter speed.
- Press *Enter*.

Maximum feed rate depends among other things on the feed element and on the machine type. Speed is limited automatically as a function of filling weight to ensure accurate portioning. As weight is reduced, maximum possible speed is adjusted automatically. Only actual speed is reduced (small grey number in the display).

If the speed is controlled by an attachment (external speed control), you can enter a minimum and maximum speed. The speed accelerates at a linear rate between these two values.

Example:

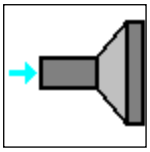
Min. = is an applied voltage of 0 V
Max. = is an applied voltage of e.g. 10 V

If the speed is controlled by a hopper level you can enter a minimum, a normal and maximum value for the speed.

Example:

Min. = is the speed when the hopper is almost empty
Normal = is the speed when the hopper is half full
Max. = is the speed when the hopper is full

6.6.3.7 Back suction

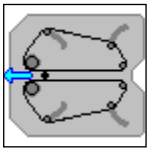


Display:	Back suction
Selection:	On / Off
Unit:	Gramme [g]
Resolution:	0.1 g
Setting range:	0 – 200 g (0 - 120 g for DP machines)
Application:	When switched on, back suction prevents the product running on once a portion has ended.

- Enter back suction quantity. Entering "0" switches off the parameter.
- Press *Enter*.

Machines which are not equipped with the standard filling horn holder but have a larger machine outlet may not perform back suction for safety reasons. In this case, back suction is blocked. The back suction quantity may not exceed the specified weight defined in weight (does not apply to “LPG” mode).

6.6.3.8 LPG belt speed



Display:	LPG belt speed
Unit:	Per cent [%]
Resolution:	1 %
Setting range:	0 – 100 %
Application:	Speed of the dividing belts of the LPG

- Enter belt speed.
- Press *Enter*.

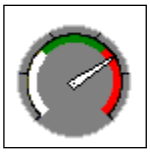
Belt speed can be limited by filling rate and number of links.

6.6.3.9 Portions per minute

Display:	Portions per minute
Unit:	Number
Resolution:	0.1
Setting range:	1.0 – speed limit
Application:	Cutter / continuous cutter / continuous PPM

- Enter the portions per minute.
- Press *Enter*.

6.6.3.10 Pressure control

	**Display:**	Pressure control
	Unit:	Bar [bar]
	Resolution:	0.1 bar
	Setting range:	0.1 – 20 bar / per analogue input
	Application:	All applications requiring a constant filling pressure

- Enter feed pressure to be maintained during filling.
- Press *Enter*.

After the knee lever has been actuated, the machine starts filling the pipe system. The message "System being filled" is displayed. Pressure control is switched off as soon as the hopper has been emptied. The message "Hopper empty?" appears in the display.

6.6.4 Supplementary parameters

The supplementary parameters are displayed on the right-hand side of the screen. These parameters can be summarized in parameter sets for your applications. It is possible to scroll through the parameters.

The basic parameters (e.g. weight) are explained in a previous section.
→ Section 6.6.2

General applications

6.6.4.1 Speed of feed unit screw

Display:	Infeed
Setting range:	Dynamic (default = 1.00)
Application:	Setting the speed of the feed unit screw

- Enter speed of feed unit screw.
- Press *Enter*.

The speed of the feed unit screw is adjusted automatically as a function of the feed element. If required, you can adapt speed infinitely using this parameter.

If the feed unit screw is also to rotate during the pause, place a tick in the "continuous" field by pressing the *Enter* key.

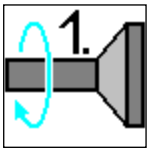
6.6.4.2 Feed unit run-on

Anzeige:	Feed unit run-on
Einheit:	Seconds [sec]
Auflösung:	1 sec
Einstellbereich:	0 - 999 sec
Anwendung:	Feed screw run-on

- Enter the feed screw run-on.
- Press *Enter*.

Enter an amount of time here for how long the feed unit drive should screw beyond the portion end.

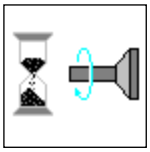
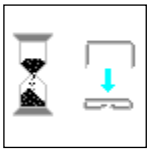
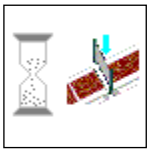
6.6.4.3 First link



Display:	First twist
Unit:	Number
Resolution:	0.1
Setting range:	0 – 6.3
Application:	Linking

- Enter addition for the first link.
- Press *Enter*.

6.6.4.4 Link offset/clip offset/knife offset (minced meat line)

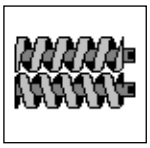




Display:	Twist delay / Clip offset / Knife offset
Unit:	Milliseconds [ms]
Resolution:	1 ms
Setting range:	-3,000 – +3,000 ms (default for linking = -25, default for knife = -60 ms)
Application:	Linking / clipping / minced meat line

- Enter offset.
- Press *Enter*.

Start linking, clipper/ knife before or after end of portion. Pause time is adapted automatically here. Advance is limited by speed and portion size. "0" means linking, clipping or cutting at the end of the portion. A negative value is limited by portion length.

6.6.4.5 Select double screw (HP series only)



Display:	Double screw
Selection:	Double screw type (e.g. 48-80)
Application:	Fillers with a double screw (HP series only)

- Enter double screw type.
- Press *Enter*.

If you select the „grinder“ mode, the selection is restricted to C profile double screws.

6.6.4.6 Select pumping system

Display:	Pumping system
Selection:	Rotary vane pump type (e.g. 10-rotor)
Application:	Fillers with rotary vane pump

- Enter rotary vane pump type.
- Press *Enter*.

6.6.4.7 Stop counter

Display:	Stop counter
Unit:	Number
Resolution:	1
Setting range:	1 – 9,999
Application:	Stopping the machine automatically after a set number of portions

- Enter the number of portions after which the machine is to stop.
- Press *Enter*.

The stop counter is active if a value greater than zero is entered.

The stop counter has two functions.

1. Stopping and resetting the counter as soon as the selected number of pieces is reached (default).

2. Stopping and resetting the counter if more than 4 seconds have passed since the machine was stopped using the knee lever. To execute this function, use the *Enter* key to put a tick in the "Auto reset" field.

6.6.4.8 Soft start-up

Display:	Soft start-up
Selection:	Off / All portions / First portion
Unit:	Milliseconds [ms]
Resolution:	1 ms
Setting range:	Machine-dependent - 9,999 ms
Application:	Starting up the filling process gently

- Enter delay for a softer start-up to the filling process.
- Press *Enter*.

6.6.4.9 Metal detection

Display:	Metal detection
Selection:	Off / Manual / Reject system
Unit:	Gramme [g] / Milliseconds [ms] / Speed [%]
Resolution:	1 g / 1 ms / 1 %
Setting range:	1 – 2,000 g / 10 – 2,000 ms / 10 – 100 %
Application:	Metal detector

- Enter weight/delay time and speed.
- Press *Enter*.

Metal detection has two functions.

1. Manual removal of the foreign body. The foreign body is rejected at a defined weight and speed.
2. Automatic removal of the foreign body using the reject system. The foreign body is rejected at a defined delay time and speed.

6.6.4.10 Vacuum control

Display:	Vacuum control
Selection:	Off / Time
Unit:	Seconds [sec] / Milliseconds [ms]
Resolution:	0.1 sec / 1 ms / 1 ms
Setting range:	0.1 – 25.5 sec / 0 – 99,999 ms (default = 5,000) / 0 – 99,999 ms (default = 15,000)
Application:	Automatic vacuum control (optional)

- Enter venting time.
- Press *Enter.*

The stop valve closes and the feed system is vented for the set time in order to reduce the vacuum in pauses.

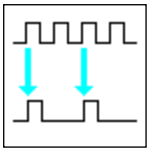
- Enter switch-on delay.
- Press *Enter*.

The machine restarts following the set switch-on delay. This ensures that the required vacuum can be built back up.

- Enter switch-off delay.
- Press *Enter.*

The machine stops, the vacuum is switched off after the set switch-off delay and the feed system is vented.

6.6.4.11 Synchronizing the machine using an external signal



Display:	Portions per signals
Selection:	Off / Number
Unit:	Number / Milliseconds [ms] / Number
Resolution:	1 / 1 ms / 1
Setting range:	1 – 999,999 / 2 – 400 ms / 1 – 9,999
Application:	Continuous mode and portioning controlled by machine downstream (optional)

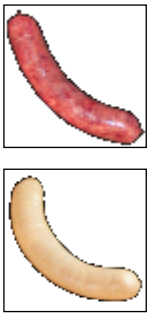
- Enter number of portions and number of signals.
- Press *Enter.*
- Enter tolerance.
- Press *Enter.*
- Enter timeout.
- Press *Enter*.

You can only enter the tolerance and timeout settings in the Service area.

•

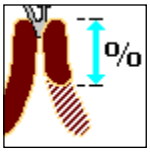
Working with the length portioning machine

6.6.4.12 Product type

	**Display:**	Product type
	Selection:	Cooked sausage / Fresh sausage
	Application:	LPG

- Enter product type
- Press *Enter*.

6.6.4.13 Last portion

	**Display:**	Last portion
	Unit:	Per cent [%]
	Resolution:	0.1 %
	Setting range:	1 – 100 % / 0 = Off
	Application:	LPG

- Enter value in per cent up to which the last portion is to be filled.
- Press *Enter*.

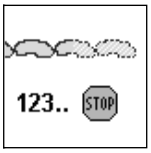
6.6.4.14 Split casing tolerance

	**Display:**	Burst tolerance
	Selection:	Off/Value
	Unit:	Value
	Resolution:	1
	Setting range:	2 – 12
	Application:	LPG 208 with TM 203

- Enter value up to which defective link points / split casings are to be tolerated.
- Press *Enter*.

The higher the value set, the less sensitively the machine reacts.
Example:
setting = 12, i.e. machine only stops after 12 faulty links (split casings).

6.6.4.14 Remaining portions



Display:	Remaining portions
Unit:	Portion
Resolution:	1
Setting range:	0 – 50 / -1 = Off
Application:	LPG 208

- Enter number of portions still to be produced once casing end detection is triggered.

  0 = The current portion is broken off.
  -1 = Ignore sensor.

- Press *Enter*.

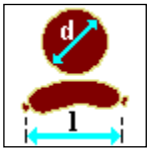
6.6.4.16 Run-on

Display:	Wake
Unit:	Millimetre [mm]
Resolution:	1 mm
Setting range:	0 (= off) - 2,000 mm
Application:	LPG 202

- Enter run-on for the dividing belts to convey the remaining casing out of the dividing belts.
- Press *Enter*.

Working with the hanging machine

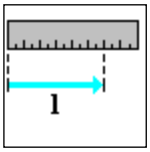
6.6.4.17 Calibre and sausage length

	**Display:**	Calibre / Sausage length
	Unit:	Millimetre [mm]
	Resolution:	1 mm
	Setting range:	8 – 52 mm (depends on mode) / 1 – 32,000 mm
	Application:	Hanging

- Enter casing calibre.
- Press *Enter*.

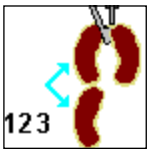
Sausage length is calculated automatically in millimetres and displayed following entry of weight and calibre. Sausage length can be altered manually.

6.6.4.18 Distance from LPV 802

	**Display:**	Distance
	Unit:	Millimetre [mm]
	Resolution:	1 mm
	Setting range:	1 – 2,000 mm (default = 160 mm)
	Application:	Hanging with the LPV 802

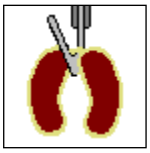
- Enter the length of the casing guide horn.
- Press *Enter*.

6.6.4.19 Sausages before first hook

	**Display:**	Sausages before first hook
	Unit:	Number
	Resolution:	1
	Setting range:	1 – 20
	Application:	Hanging

- Enter the number of sausages to hang before the first hook.
- Press *Enter*.

6.6.4.20 Sausages per hook

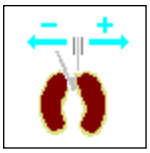


Display:	Sausages per hook
Unit:	Number
Resolution:	1
Setting range:	1 – 99
Application:	Hanging

- Enter the number of sausages to hang between the hooks.
- Press *Enter*.

The number should be divisible by 2. If you would like to hang rings, enter "1".

6.6.4.21 Catch position



Display:	Catch position
Unit:	Millimetre [mm]
Resolution:	1 mm
Setting range:	-999 – +999 mm (default = 0 mm)
Application:	Hanging

- Enter the position in which the hook catches the link.
- Press *Enter*.

If the hook is reaching into the link too early, the value needs to be increased; if the hook is reaching into it too late, the value needs to be reduced.

6.6.4.22 Sausages per stick

Display:	Sausages per stick
Unit:	Number
Resolution:	1
Setting range:	1 – 999
Application:	Hanging

- Enter the number of sausages to be taken up by one smoke stick.
- Press *Enter*.

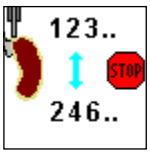
6.6.4.23 End of stick

Display:	End of stick
Selection:	Stop / filled portions
Unit:	Number
Resolution:	1
Setting range:	0 – 10 (default = 0)
Application:	Hanging

- Enter the number of sausages inserted to generate a gap between two sections (smoke sticks).
- Press *Enter*.

Selecting "Stop" makes this parameter into the stop counter.

6.6.4.24 End of portioning (LPV 802 and DHV 841 only)

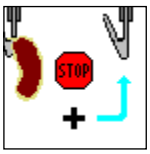


Display:	End of portioning
Selection:	Immediate / Even number
Application:	Hanging (LPV 802 and DHV 841 only)

- Enter criterion for stopping the machine.
- Press *Enter*.

Select "Immediate" if you intend stopping portioning by actuating the knee lever. Select "Even number" if the machine is to stop at an even number of portions after the knee lever has been actuated. For example, if you have produced seven portions when the knee lever is actuated, the machine pumps the eighth portion before stopping.

6.6.4.25 Extra hook



Display:	Extra hook
Unit:	Number
Resolution:	1
Setting range:	0 – 10
Application:	Hanging

- Enter the number of extra hooks still to be cycled after actuation of the knee lever.
- Press *Enter*.

Extra hooks are inserted before the line on the LPV 802 and DHV 841 and after the line on the LPG.

6.6.4.26 Permitted deviation

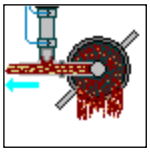
	**Display:**	Permitted deviation
	Unit:	Number
	Resolution:	1
	Setting range:	0 – max. number of sausages per stick
	Application:	Hanging

- Enter the number of sausages which may be missing on the smoke stick.
- Press *Enter*.

This parameter can only be used if the parameter "Sausages per stick" is defined.
Here you enter the number of sausages which may be missing on the number defined in "Sausages per stick".
Example:
sausages per stick = 20
permitted deviation = 3 (i.e. a smoke stick is considered complete, even with 17 sausages)

Working with the automatic separation valve

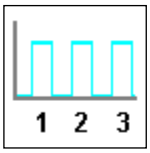
6.6.4.27 Separation valve

	**Display:**	Separation valve
	Selection:	Off/In portion/Portion end/Line end/Line start/Group end
	Unit:	Milliseconds [ms]
	Resolution:	1 ms
	Setting range:	0 – 9,999 ms
	Application:	When a “Portion end” signal is given, portion with the automatic separation valve.

- Enter the time for which the separation valve is to open.
- Press *Enter*.

Select "In portion" if the separation valve is to open during the portion. Select "Portion end" if the separation valve is to open at the end of the portion. Select "Line end" if the separation valve is to open at the end of a line (end of a casing).

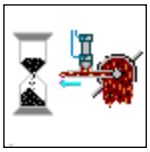
6.6.4.28 Separation interval

	**Display:**	Separation interval
	Unit:	Number
	Resolution:	1
	Setting range:	0 – 99
	Application:	Portioning with automatic separation valve

- Enter the number of intervals within a portion in which the separation valve is to open.
- Press *Enter*.

This parameter is only active if you have selected "In portion" for the parameter "Separation valve".

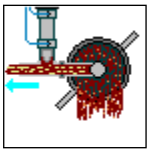
6.6.4.29 Valve offset

	**Display:**	Valve offset
	Unit:	Milliseconds [ms]
	Resolution:	1 ms
	Setting range:	-3,000 – +3,000 ms
	Application:	Portioning with automatic separation valve

- Enter the offset at which the separation valve is to open at the end of a portion.
- Press *Enter*.

This parameter is only active if you have selected “Portion end” or “Group end” for the parameter “Separation valve”. Negative entries are limited by portion time and positive entries by the pause.

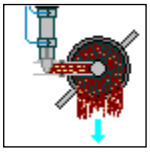
6.6.4.30 Separation valve open



Display:	Separation valve open
Unit:	Gramme [g]
Resolution:	1 g
Setting range:	0 – 5,000 g
Application:	“Continuous” mode

- Enter the weight of the filling quantity for which the separation valve is to be open during straight filling. The separation valve remains open until the weight entered has been filled.
- Press *Enter*.

6.6.4.31 Separation valve closed



Display:	Separation valve closed
Unit:	Gramme [g]
Resolution:	1 g
Setting range:	0 – 15,000 g
Application:	“Continuous” mode

- Enter the weight of the filling quantity for which the separation valve is to be closed during straight filling. The separation valve remains closed until the weight entered has been filled.
- Press *Enter*.

Working with the minced meat line and forming machine

6.6.4.32 Weight groups

Display:	Weight groups
Unit:	Number
Resolution:	1
Setting range:	0 (=off) – 99
Application:	Forming machine FM 250 (kebab production)

- Enter the number of weight groups (e.g. number of kebab sticks) to be produced simultaneously.
- Press *Enter*.

Here you define the number of products (e.g. kebab sticks) to be produced simultaneously. Total weight is calculated automatically and displayed.

6.6.4.33 Group position

Display:	Group position
Unit:	Number
Resolution:	1
Setting range:	1 – number of group portions
Application:	Forming machine FM 250 (kebab production)

The group position is displayed automatically once the individual portion weights have been entered. Enter a "1" here to start a new group (e.g. a new stick) when the machine re-starts.

If, after 4 seconds, you want to go back to the first portion, use the Enter key to put a tick in the “Auto reset” field.

6.6.4.34 Group portions

Display:	Group portion
Unit:	Number of portions/gramme g
Resolution:	1/0.1 g
Setting range:	0 - 99/0.1 g - 60,000.0 g
Application:	Forming machine FM 250 (kebab production)

- Enter the number of portions (e.g. kebab slices) of identical weight.
- Enter weight.
- Press *Enter*.

Here you define how many portions of identical weight you want to produce and determine the weight of these portions.
Example: 1. 5 x 300 [g]
The first portion has a weight of 300 g and is produced a total of five times.

You can enter up to 25 group portions. If the last portion of a frame (e.g. No. 5) is > 0, the next frame is displayed (No. 6 - 10).

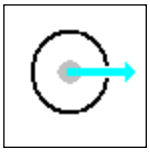
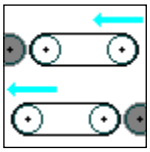
6.6.4.35 Group pause

Display:	Group pause
Unit:	Milliseconds [ms]
Resolution:	1 ms
Setting range:	0 – 9,999 ms (-1 = off)
Application:	Forming machine FM 250 (kebab production)

- Enter group pause.
- Press *Enter*.

Here you define the pause after which all group portions are produced (e.g. set-up time for changing stick when making kebabs). The group pause can only be larger than the value set under "Pause". If the group pause has been switched off, the value set under "Pause" also applies between groups.

6.6.4.36 Belt control (analog output 1)

Display:	Analog output 1 (general applications) / upper belt (forming machine 250) / feed belt (minced meat portioner MMP 220)
Unit:	Per cent [%] / Volts [V]
Resolution:	1 % / 0.1 V
Setting range:	1 – 100 % / 0.0 - 10.0 V / -1 = Speed
Application:	External output / forming machine 250 / minced meat portioner MMP 220

- Enter speed.
- Press *Enter*.

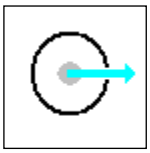
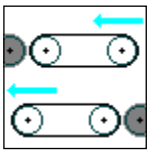
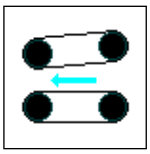
This function is used to set the speed of an external drive (e.g. feed belt).

The setting range of 0 - 100 corresponds to 0 - 10 Volt.

If you select “-1”, the speed of the master and slave machines is synchronised. The speed reflects a voltage value (e.g. 10% = 1 V)

The name for analog output 1 can be edited on the “View” page.

6.6.4.37 Belt control (analog output 2)

Display:	Analog output 2 (general applications) / lower belt (forming machine 250) / transport belt (minced meat portioner MMP 220) / belts for kebab line)
Unit:	Per cent [%] / Volts [V]
Resolution:	1 % / 0.1 V
Setting range:	1 – 100 % / 0.0 - 10.0 V / -1 = Speed
Application:	External output/kebab line and forming machine 250/ minced meat portioner MMP 220

- Enter speed.
- Press *Enter*.

This function is used to set the speed of an external drive (e.g. transport belt).

The setting range of 0 - 100 corresponds to 0 - 10 Volt.

If you select “-1”, the speed of the master and slave machines is synchronised. The speed reflects a voltage value (e.g. 10% = 1 V)

The name for analog output 2 can be edited on the “View” page.

Working with the scale

6.6.4.38 Number of samples (VEMAG Scale 877 / Bizerba ST)

Display:	Number of samples
Unit:	Number
Resolution:	1
Setting range:	1 – 99
Application:	Scale 877 / Bizerba ST

- Enter the number of samples to be placed on the scale.
- Press *Enter*.

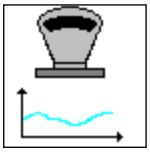
For the check, the computer determines the weight of one portion from this. If a new sample is expected, the corresponding information appears in the display.

6.6.4.39 Print report (VEMAG Scale 877)

Display:	Print report
Application:	Scale 877

- Press the f*unction key* to have the report about the weighing operations performed by Scale 877 printed out.

6.6.4.40 Tendency control (e.g. Process Check)



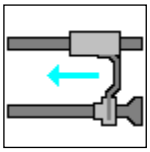
Display:	Tendency control
Selection:	Off / Value
Unit:	Gramme [g]
Resolution:	0.1 g
Setting range:	1 – 10 g
Application:	e.g. Process Check

- Enter correction for weight.
- Press *Enter*.

Tendency control is used to correct weight using pulses from an external scale. Corrections may be positive or negative.

Working with special devices

6.6.4.41 Type of special control

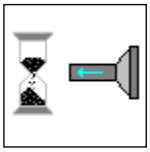


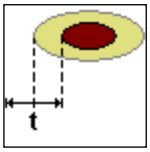
Display:	Casing pusher
Selection:	Off / On
Application:	Automatic casing pusher on DHV 841/

- Switch casing pusher on or off.
- Press *Enter*.

If you activate this parameter, the filling machine stops when it reaches the end of the casing.

6.6.4.42 Portion delay





Display:	Portion delay
Selection:	Off / Time / Signal A-C / Signal S-M / Coex
Unit:	Milliseconds [ms]
Resolution:	1 ms
Setting range:	10 – 999 ms
Application:	Cutter, coextrusion, diaphragm

- Enter portion delay (e.g. position of inner filling on Coex).
- Press *Enter*.

You can enter a delay time (positive values) or an advance time (negative values) for the B machine in the portioning computer of the A machine.

If you select “Signal A-C” or “Signal S-M”, the filling machine starts on a release signal.

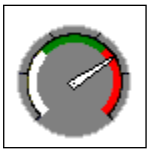
6.6.4.43 Knife (cutter)

Display:	Knife
Selection:	Portion end closed / Portion end open
Application:	Servo cutter 808

- Select whether the knife leaves the outlet open or closes it at the end of the portion.
- Press *Enter*.

The portion is only started when the knife has cleared the outlet.

6.6.4.44 Maximum filling pressure (pressure monitoring on grinding system)



Display:	Max. filling pressure
Unit:	Bar [bar]
Resolution:	0.1 bar
Setting range:	Off / 10 – 50 bar (depending on the machine)
Application:	Separation grinder 982, separation attachment 801

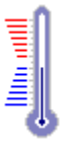
- Enter max. filling pressure which, when reached, will cause the machine to stop.
- Press *Enter*.

This function monitors pressure in separation grinder 982/ separation attachment 801. Current pressure is displayed in bar. When the maximum pressure entered is reached, the machine is stopped. Pressure can be reduced by reducing speed.

The pressure is monitored even if these settings are deactivated. In this case, the monitoring refers to the maximum value set in the machine configuration settings.

Warning!
The machine stopping can be an indication that blades and hole plates are blocked with sinew. In this case, clean the blade set.

6.6.4.45 Maximum temperature (temperature monitoring for the grinding system)



Display:	Temperature
Unit:	Degrees [°C] / Kilogram [kg]
Resolution:	0.1 °C / 1 kg
Setting range:	Off / -19.9 °C – +31.0 °C / 1,0 kg - 99 kg
Application:	Separation grinder 982, separation attachment 801

- Enter the max. temperature, at which to sound the alarm.
- Enter the min. temperature to define a temperature range you wish to monitor.
- Enter the filling volume still to be reached after the alarm is sounded before the machine stops.
- Press Enter.

This function monitors temperature in separation grinder 982/ separation attachment 801. Current temperature is displayed in degrees Celsius. If the temperature is outside the defined range, a message is issued and the relevant indicator comes on.

6.6.4.46 Hopper mode

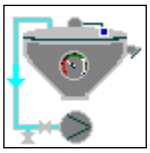
	**Display:**	Hopper mode
	Selection:	Off / Continuous
	Functions:	Vacuum / filling
	Application:	Vacuum hopper 149

- Select hopper mode.
- Press *Enter*.

The switches "Vacuum" and "Fill" switch the control functions for hopper vacuum and level on or off. Active functions are highlighted in green.

Warning!
The vacuum hopper cannot be filled if no vacuum has been applied.

6.6.4.47 Hopper vacuum

	**Display:**	Hopper vacuum
	Unit:	Per cent [%]
	Resolution:	1 %
	Setting range:	5 – 98 % (control range +/- 1 to 10 %)
	Application:	Vacuum hopper 149

- Enter hopper vacuum.
- Press *Enter*.

With the vacuum switched on, the vacuum in the vacuum hopper is kept constant at the set value. The current vacuum is shown by a bar and may fluctuate around the set control range. The vacuum may also drop below the control range when the hopper is being filled.

6.6.4.48 Hopper level

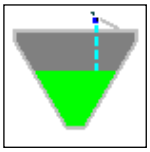
	**Display:**	Hopper level
	Unit:	Per cent [%]
	Resolution:	1 %
	Setting range:	5 – 98 % (control range +/- 3 to 30 %)
	Application:	Vacuum hopper 149

- Enter hopper level.
- Press *Enter*.

Automatic filling of the vacuum hopper is set using the specified level value. If this level is not reached, the vacuum hopper is topped up.
The current level is shown by a bar and may fluctuate around the set control range. Level can be regulated only with hopper vacuum set. If the vacuum is too low, product cannot be taken in from the supply container.

Warning!
The first time evacuation is performed, the display briefly indicates a level. This is caused by humidity generating mist in the hopper. This mist breaks down after a short time.

6.6.4.49 Hopper level (optional)





Display:	Hopper level
Unit:	Off / Automatic / Signal+Stop / Signal / Stop / Speed control
Application:	Monitoring level of hopper (optional)

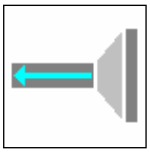
- Enter the mode in which hopper level is to be monitored.
- Press *Enter*.

To use this function, a tick needs to be in the appropriate field on Service page 2. The following modes are possible.

Off:	level monitoring is switched off
Automatic:	The hopper is automatically filled when the filling level is undershot (lower limit). When the upper limit is reached, filling stops. (only possible with external hopper filling)
Signal+Stop:	if the level is undershot (top limit), a signal is output. If the level is undershot (bottom limit) the machine stops.
Signal:	if the level is undershot, a signal is output.
Stop:	If the level is undershot, the machine stops.
Speed control:	The machine runs at the set speed (max., normal, min.) regardless of the hopper‘s filling level.

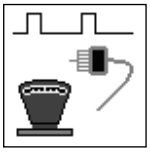
If the product is too close to the sensor (as a consequence of contamination, for example), the corresponding message appears in the display (sensor in undefined state).

6.6.4.50 Speed limit

	**Display:**	Speed limit
	Unit:	Per cent [%] / portions per minute [p/min]
	Resolution:	0.1 % / 1 % / 1
	Setting range::	0 – 100 % / 1 - 999
	Application:	Applications for which the choice of filling speed is to be restricted

- Enter the speed limit.
- Press *Enter*.

6.6.4.51 External portioning

	**Display:**	External portioning
	Unit:	Gram [g]
	Resolution:	1 g
	Setting range::	0 (= Off) - 99999
	Application:	Portioning with an attachment in „Continuous“ and „Pressure control“ modes

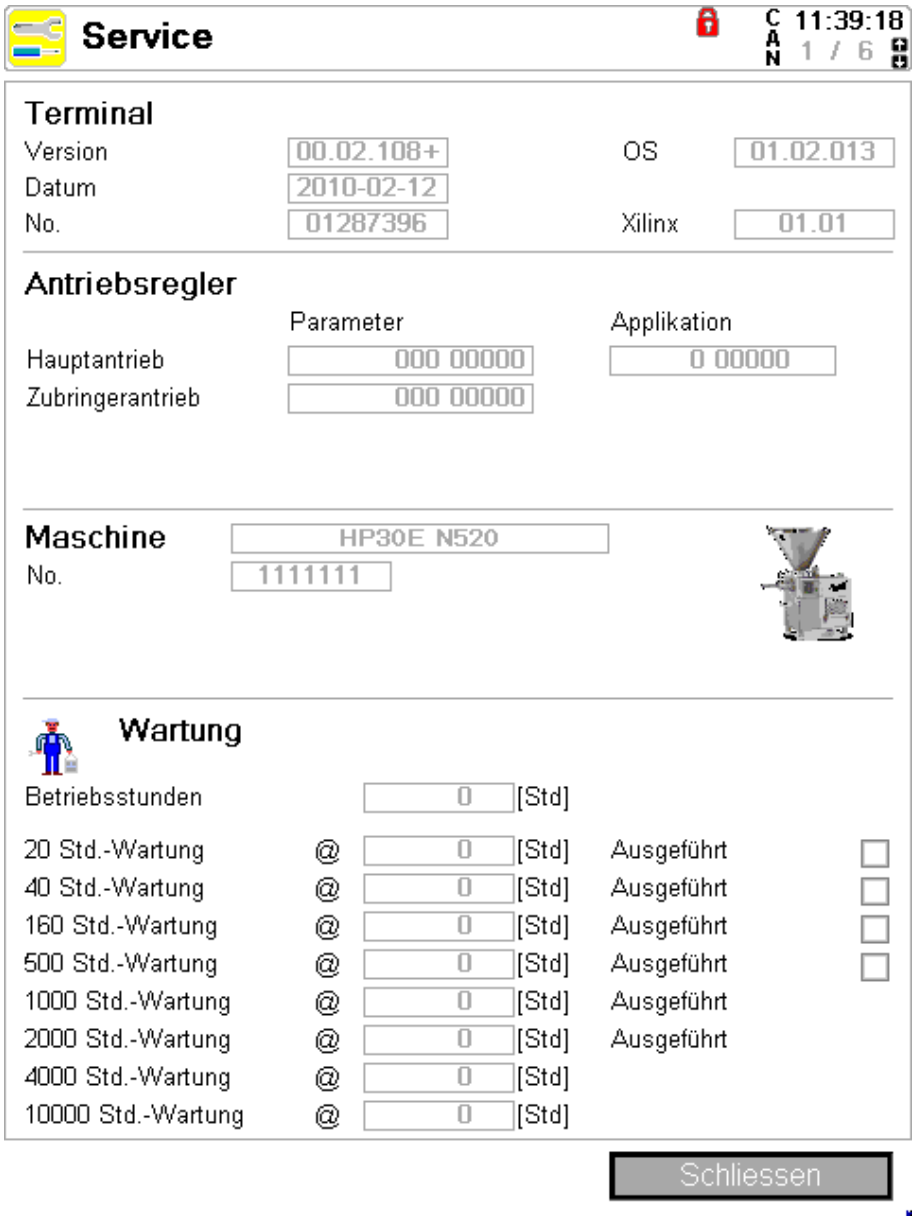
- Enter the weight to be portioned by the attachment.
- Press *Enter*.

The machine receives a signal from „Remote-K“when it reaches the end of the portion.

6.7 Service

This section describes the Service page to which there is general access.

- What information is displayed?


Service
CAN 11:39:18
1 / 6
Terminal
Version 00.02.108+
OS 01.02.013
Datum 2010-02-12
No. 01287396
Xilinx 01.01
Antriebsregler
Parameter
Applikation
Hauptantrieb 000 00000 0 00000
Zubringerantrieb 000 00000
Maschine
HP30E N520
No. 1111111
Wartung
Betriebsstunden 0 [Std]
20 Std.-Wartung @ 0 [Std] Ausgeführt
40 Std.-Wartung @ 0 [Std] Ausgeführt
160 Std.-Wartung @ 0 [Std] Ausgeführt
500 Std.-Wartung @ 0 [Std] Ausgeführt
1000 Std.-Wartung @ 0 [Std] Ausgeführt
2000 Std.-Wartung @ 0 [Std] Ausgeführt
4000 Std.-Wartung @ 0 [Std]
10000 Std.-Wartung @ 0 [Std]
Schliessen

6.7.1 Service pages

On the Service pages you will find general information about the version of the terminal, the drive controllers and the filler.

Make a note of the current version numbers so that you can quote them in the event of a VEMAG Customer Service query.

The operating hours which have been clocked up are shown at the bottom of the page.

Warning!
Put a tick in the corresponding field when you carry out a service. This sets the date for the next service. If no tick is put in the field, the message "00850 Perform maintenance!" will appear each time the machine is started up.

You have read-only access to all the Service pages. The Service pages are released by the userkey.
→ Section 6.5.6

6.8 Messages

6.8.1 List of messages

If a message should appear which is not included in the list below, please note the fault number and contact VEMAG Customer Service.

Number	Message	Cause	Remedy
300	IO modules ready	The IO modules are ready.	-
301	Voltage IO module A4	No voltage at module A4.	Check voltage at module A4.
302	IO module A4	IO module A4 is not present or not functioning properly.	Check that module A4 is firmly seated; replace the module if necessary.
311	Voltage IO module A5	No voltage at module A5.	Check voltage at module A5.
312	IO module A5	IO module A5 is not present or not functioning properly.	Check that module A5 is firmly seated; replace the module if necessary.
320	DIAS communication A1 <-> A3	Communication between A1 (PC) and module A3 (CIC) is defective.	Check the line and the shielding; replace the module or the PC if necessary.
321	CIC module A3	Communication module A3 (CIC) is not present or not functioning properly.	Check the module power supply and the DIAS line.
322	Oil leak detected in feed system drive	The feed system drive has an oil leak (Dairy).	Eliminate the oil leak.
350	F5: vacuum pump/elevator/transformer	Monitoring module F5 has found overheating at the vacuum pump, hoist unit or power transformer.	Allow the machine to cool down. Check the vacuum pump and hoist motors.
351	Voltage F+24V fuse F4	No voltage at F+24V.	Check voltage F+24V and fuse F4.
353	Unexpected signal X3:2 (F6-S2)	Change of status at digital input A4 X3:2 (F6-S2) without matching signal at A4 X6.1 (V+24 V).	Check the wiring from A4 to F6.
354	Unexpected signal X3:2 remote-E	Change of status at digital input X3:2 (remote-E) from module A5 during production.	Check service page 3. Check the contacts between the remote control connector and socket.
355	Unexpected signal X2:4 (F6-S4)	Change of status at digital input A6 X2:4 (F6-S4) without matching signal at A4 X6.1 (V+24 V).	Check the wiring at A6 to F6.
360	Oil level vacuum pump	The oil level in the vacuum pump is too low.	Replenish oil if necessary.
362	Sensor under pressure or defective!	Zero adjustment of pressure sensor failed.	Clear the sensor for zero adjustment. Check the sensor and its wiring; replace the sensor if necessary.
363	IO module A7	IO module A7 is not present or not functioning properly.	Check that module A7 is firmly seated; replace the module if necessary.

Number	Message	Cause	Remedy
364	IO module A6	IO module A6 is not present or not functioning properly.	Check that module A6 is firmly seated; replace the module if necessary.
365	Lubrication filling level	The lubrication filling level is too low.	Check the lubrication filling level.
400	Filling pressure too high!	Filling pressure control has stopped the machine.	In the case of grinding applications, this may indicate blocked hole plates; clean the hole plate if necessary.
401	Hopper empty?	With pressure control running, impossible to generate any pressure, despite full speed.	Pour product into the hopper.
402	System being filled!	At the start of pressure control, the pipe system is filled slowly.	-
403	Product temperature	Product temperature outside set range.	Reduce or increase product temperature.
404	Tighten up union nut!	Pressure monitoring: This hint appears after the pipe system is filled.	-
406	Stops due to product temperature	A preset product volume was filled in excess of the permitted temperature range.	Make sure that the product in the hopper is at the right temperature. Check the setup.
420	More samples!	Scale 877 The operator is requested to put another sample on the scale.	-
421	Result printing!	Scale 877 The scale report is printing.	-
422	********** too light	Scale 877 The sample is min. 20 g lighter than the set weight.	To have the sample weight accepted, place the sample on the scale again.
423	too heavy **********	Scale 877 The sample is min. 20 g heavier than the set weight.	To have the sample weight accepted, place the sample on the scale again.
424	***** +-12.5% *****	Scale 877 The variation in sample weight exceeds 12.5 % of the set weight. The sample is not accepted.	-
425	Check feed element or number of samples put on scale	Scale 877 The sample weight undershoots set weight by 20 % or overshoots it by 200 %.	Check setting on PC. Check feed element.
426	Release scale	Scale 877 Operator is requested to take weight off the scale.	-
501	Hopper	The hopper is open.	Close the hopper.
502	External safety switch	The external safety switch or circuit is open (F6-S4).	Close the external safety switch or circuit. Check external socket X29.
503	Filling horn holder	The filling horn holder or the linking gear is missing.	Insert the filling horn holder or the linking gear or insert again.

Number	Message	Cause	Remedy
504	Please press the start button	In order to restart a machine equipped with an external safety switch after a safety-related incident, approval is required again.	Press the start button.
505	Feed system	The feed system is open.	Close the feed system or close it again.
507	Safety cover open	A safety cover is open.	Close the safety cover or close it again.
541	Recipes loaded	Programs/recipes have been loaded from the USB stick into the machine.	-
542	Recipes saved	The programs/recipes used have been saved on a USB stick.	-
561	Machine parameters are missing	Serious problem when loading machine parameters.	Software update or reinstallation. Make a note of the error number and inform the VEMAG Customer Service team.
563	Machine parameters set to default	Loaded machine parameter was outside valid range - set to default.	Check whether the machine is running correctly. Note the fault number and contact VEMAG Service. Production may be possible.
571	Machine parameters are missing	Serious problem when loading machine parameters.	Software update or reinstallation. Make a note of the error number and inform the VEMAG Customer Service team.
573	Program parameter unknown	Following a software update, there are often new parameters which require the SRAM to be reorganized. This is done automatically and is confirmed by a second message 573 with a blue symbol.	-
574	Program memory may be defective	A rare fault has occurred in the program memory.	Check program parameters. If possible/necessary, re-load the recipes or enter the data manually. Note the fault number and contact VEMAG Service. Production may be possible.
575	Program parameter set to default	Loaded machine parameter was outside valid range - set to default.	Check all the parameters of the current program and correct them if necessary.
600	Remote contact activated!	The A-C remote control signal is active in KNEE modes.	Switch to REMOTE mode or remove the remote control connector.
601	Jumper A-D is missing in remote plug!	An A-D jumper is expected in the remote control connector in REMOTE modes.	Switch to KNEE mode or plug in the remote control connector.
602	Portion end not reached!	Portion was interrupted, for example in Remote-Stop mode.	-

Number	Message	Cause	Remedy
603	Remote control blocked by casing pusher	The casing pusher option is preventing selection of remote mode.	If desired, deactivate the casing pusher option and switch to REMOTE mode.
604	Casing pusher blocked by remote control	REMOTE mode is preventing selection of the casing pusher option.	If desired, switch to KNEE mode and activate the casing pusher option.
605	Metal detection	Machine stopped because metal detected.	Further action depends on the metal detector used and on mode. Contact VEMAG Service if necessary.
606	Target position not reached	The main drive required more than double the calculated time.	This may be an indication that product is too cold or too dense.
608	Portion time exceeded	Calculated portion time exceeded.	This may be an indication that product is too cold or too dense.
609	Input channel already in use!	The selected analog/digital input is already being used by a different function.	If desired, switch to a different input channel.
610	Jumper S-L is missing in remote connector!	The S-L jumper is expected in the remote control connector in the current modes.	Switch mode or plug in the relevant remote control connector.
611	Jumper E-F is missing in remote connector!	The E-F jumper is expected in the remote control connector in the current modes.	Switch mode or plug in the relevant remote control connector.
612	Jumper E-F is misplaced in remote connector!	The E-F jumper is not required in the remote control connector in the current modes.	Switch mode or plug in the relevant remote control connector.
613	Sensor for chain position	The sensor for LPG belt position is not providing a signal to S-K.	Check the sensor for belt position in the LPG.
614	A-C signal interrupted!	The A-C signal was interrupted in the wrong operating state (e.g. because LPG safety cover was opened).	Do not open safety cover during operation. Otherwise check connector contacts for corrosion.
615	Sensor for chain position	The sensor for LPG belt position is not providing a signal to S-K despite belt starting.	Check the sensor for belt position in the LPG.
616	Synchronous signal missing!	The synchronization signal (S-K) failed during production.	Was the line stopped? Check signal (S-K).
621	Lubrication complete	The lubrication system runs every 10 hours for the set number of seconds while the infeed unit is running. The message indicates that the lubrication process is complete.	--
622	Remote-K exceeds speed limit	The Remote-K signal displays the speed if „Portions per signal“ is active. The message indicates that the „Speed limit“ parameter has been exceeded.	Check that the signal to Remote-K and the „Speed limit“ setting match.

Number	Message	Cause	Remedy
624	Limit exceeded	„Print mark control“ exceeded permissible weight.	„Print mark control“ is a complex application that must be checked by an experienced technician. Under certain circumstances, you will have to accept heavier weights.
625	Restart during back suction	The start command came before the back suction process ended.	Check the process: Increasing the back suction does not make sense if the next start is scheduled too soon.
700	Remote access logout	User or application logged out of remote access.	--
701	Remote access	Remote access login failed, not permitted.	--
702	Remote access logout	Remote access logout after time-out of 3 seconds.	--
703	Remote access	Remote access login failed, incorrect password.	--
704	Remote access login	Remote access login - read only	--
705	Remote access login	Remote access login - with read/ write access	--
706	Remote access	Remote access - send message	--
707	Remote access	Remote access - set value	--
802	Correction greater than setpoint	The weight correction entered is too high.	Enter a smaller value for the weight correction.
804	Weight limits speed	The value range for input depends on another parameter and vice versa.	-
805	Clip delay limits pause	The value range for input depends on another parameter and vice versa.	-
806	Knife time/offset limits pause	The value range for input depends on another parameter and vice versa.	-
807	Twist delay limits pause	The value range for input depends on another parameter and vice versa.	-
808	Speed/twist limits pause	The value range for input depends on another parameter and vice versa.	-
809	Preclip/speed limits pause	The value range for input depends on another parameter and vice versa.	-
810	Knife time/offset limits pause	The value range for input depends on another parameter and vice versa.	-
811	Weight/speed limits twist delay	The value range for input depends on another parameter and vice versa.	-
812	Weight/speed limits preclip	The value range for input depends on another parameter and vice versa.	-
813	Weight/speed limits knife offset	The value range for input depends on another parameter and vice versa.	-

Number	Message	Cause	Remedy
814	input limit reached	The value range for input depends on another parameter and vice versa.	-
815	Weight/speed limits knife time	The value range for input depends on another parameter and vice versa.	-
816	Weight/knife time limits speed	The value range for input depends on another parameter and vice versa.	-
817	Belt speed too high!	The value range for input depends on another parameter and vice versa.	-
818	Coextrusion delay too long!	The value range for input depends on another parameter and vice versa.	-
819	Weight limits speed	The combination of weight, feed system, portions per signals and external signals requires a speed > 100 %.	Modify settings, check signals at S-K.
820	Input limit reached	The length of the empty casing is limited to guarantee reliable conveying.	-
821	Speed limit reached	Filling (or belt) speed was limited by the specified value.	Accept the speed limit or increase the specified value.
822	Print mark control active	With the print mark control feature, the filling volume is controlled using print marks on the casing (with signals to Remote-K). This message appears when you enter a weight correction in this mode.	Confirm whether the print marks on the casing or a preset weight correction should be used to control the output weight. Activate or deactivate the print mark control application.
823	Poor distance	For the print mark control application, it is important that the print mark signal (Remote-K) is given while one portion is being filled. Otherwise the message indicates that the sensor is ill positioned (distance to clipping area).	Position the sensor so that the signal (Remote-K) is around the centre of the portion.
850	Perform maintenance!	Indication that servicing is required on the machine.	Perform servicing in accordance with the operating instructions.
851	Maintenance acknowledged by user	Maintenance reminder confirmed by user.	-
900	Drives ready	Drives are ready.	-
901	Main drive not found	Main drive not found on CAN bus.	Check power supply at drive controller FU1 and that the CAN bus lines are correctly wired.
902	Twist drive not found	Linking drive not found on CAN bus.	Check power supply at drive controller FU3 and that the CAN bus lines are correctly wired.
903	Infeed drive not found	Feed unit drive not found on CAN bus.	Check power supply at drive controller FU2 and that the CAN bus lines are correctly wired.

Number	Message	Cause	Remedy
907	Communication main drive	CAN bus communication with main drive interrupted.	Check that CAN bus line is wired correctly.
908	Communication twist drive	CAN bus communication with linking drive interrupted.	Check that CAN bus line is wired correctly.
909	Communication infeed drive	CAN bus communication with feed unit drive interrupted.	Check that CAN bus line is wired correctly.
911	Unexpected twist drive	Unconfigured linking drive found on CAN bus.	Activate the linking drive in the PC if necessary.
912	Unexpected infeed drive	Unconfigured feed unit drive found on CAN bus.	Activate the feed unit drive in the PC if necessary.
913	Back suction blocked at PC	Faulty configuration, back suction lock is active only on PC.	If block required, put the jumper on the drive controller, otherwise remove the tick for the block in the PC.
914	Back suction blocked at drive	Faulty configuration, back suction block is active only on the drive.	If block required, put a tick in the PC, otherwise remove the jumper on the drive controller.
915	Main drive: timeout cancelled	There was no stop signal sent from the main drive to the machine controller.	Make a note of the error messages displayed before this error and inform the VEMAG Customer Service team.
916	Main drive inhibit	Controller for main drive not released.	Check controller release at FU1, terminal 31.
917	Twist drive inhibit	Controller for linking drive not released.	Check controller release at FU3, terminal 31.
918	Infeed drive inhibit	Controller for feed unit drive not released.	Check controller release at FU2, terminal 31.
919	Main drive application	Fault in the application module. This fault occurs in combination with other fault numbers.	Note the numbers of all current faults and contact VEMAG Service.
920	Twist drive application	Fault in the application module. This fault occurs in combination with other fault numbers.	Note the numbers of all current faults and contact VEMAG Service.
922	Main drive manual	Main drive operated manually.	Release manual drive button S10.
923	Twist drive manual	Twist drive operated manually.	Release manual drive button S9.
924	Infeed drive manual	Feed unit drive operated manually.	Release manual drive button S10.
925	Blade drive timeout	The reference movement of the machine‘s internal blade drive took too long.	Check the reference sensor and the blade drive‘s application module. Make a note of the error number and inform the VEMAG Customer Service team.
929	Belt drive not found	Belt drive not found on CAN bus.	Check power supply at drive controller FU4 and that the CAN bus lines are correctly wired.

Number	Message	Cause	Remedy
931	Communication belt drive	CAN bus communication with belt drive interrupted.	Check that CAN bus line is wired correctly.
932	Unexpected belt drive	Unconfigured belt drive found on CAN bus.	Activate the belt drive in the PC if necessary.
933	Belt drive inhibit	Controller for belt drive not released.	Check controller release at FU4, terminal 31.
935	Belt drive manual	Belt drive operated manually.	Release manual drive button.
937	Blade drive timeout	The machine‘s internal blade drive took too long to reach its starting position.	Check the reference sensor and the blade drive‘s application module. Make a note of the error number and inform the VEMAG Customer Service team.
950	External drives ready	The external drive(s) are ready.	--
952	External drive 1 not found	External drive 1 could not be found on the CAN bus.	Check power supply at drive controller FU1 and that the CAN bus lines are correctly wired.
953	External drive 1 communication	CAN bus communication to external drive 1 was interrupted.	Check that CAN bus line is wired correctly.
954	No release for external drive 1	There is no controller release for external drive 1.	Check controller release to FU1, terminal 31.
955	External drive 1 application error	Fault in the application module. This fault occurs in combination with other fault numbers.	Make a note of the numbers of all errors displayed before this error and inform the VEMAG Customer Service team.
956	External drive 1 manual	External drive 1 is operated by hand.	Release manual drive button S10.
957	External drive 1 timeout	The reference movement of the machine‘s external drive 1 took too long.	Check the reference sensor and the blade drive‘s application module. Make a note of the error number and inform the VEMAG Customer Service team.
1000 - 2999	Main drive	The main drive controller is reporting a fault.	Note the fault number and contact VEMAG Customer Service.
3000 - 4999	Twist drive	The linking drive controller is reporting a fault.	Note the fault number and contact VEMAG Customer Service.
5000 - 6999	Infeed drive	The feed unit drive controller is reporting a fault.	Note the fault number and contact VEMAG Customer Service.
7000 - 8999	Belt drive	The belt drive controller is reporting a fault.	Note the fault number and contact VEMAG Service.
21000 - 22999	External drive 1	There is a fault in the primary external drive controller.	Note the fault number and contact VEMAG Customer Service.

7. Cleaning

7.1 General information

The machine and any attachments and additional devices (optional) must be cleaned daily.

Danger!
To prevent injury, take the following measures before cleaning.

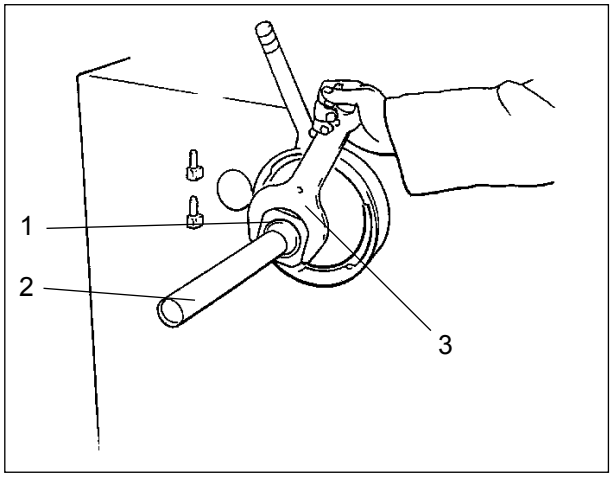
- Press the OFF key on the machine control panel.
- Switch off the main switch of the machine to disconnect it from the mains.
- Disconnect any attachments or additional devices (optional) from the mains and remove the devices
  → Attachment operating instructions

Danger!
The linking gear can heat up at extremely high speeds (risk of burns). To prevent injury, proceed extremely carefully when fitting and dismantling the part.

7.2 Removing parts to be cleaned

7.2.1 Filling horn and filling horn holder

- Undo filling horn nut (1) and remove filling horn (2). To do so, use universal spanner (3).



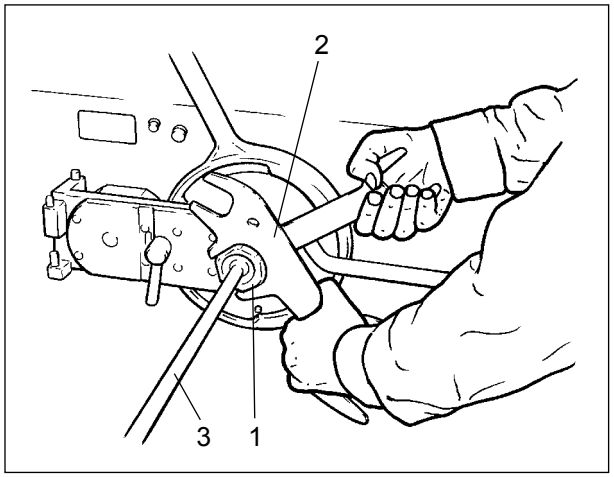
1 Filling horn nut
2 Filling horn
3 Universal spanner

Fig. 7-1
Removing filling horn

- Undo the locking nut with the handle anticlockwise until the bayonet lugs come free and remove the filling horn holder.

7.2.2 Linking horn (optional)

- Undo linking nut (1) with the universal spanner (2) and remove linking horn (3). Hold the linking head steady with the second universal spanner as you do so.



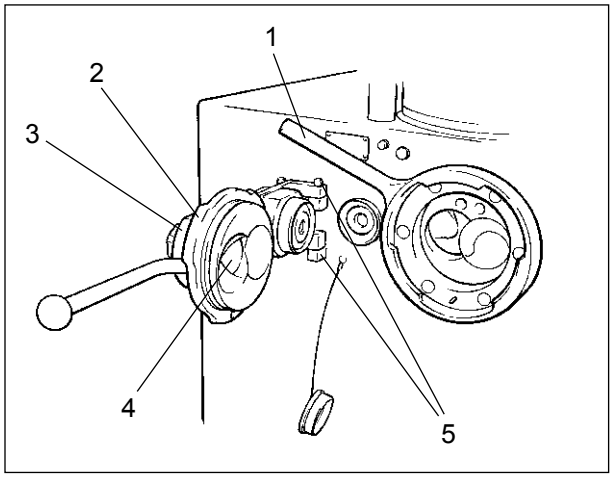
1 Linking nut
2 Universal spanner
3 Linking horn

Fig. 7-2
Removing the linking horn (optional)

Warning!
The linking head has a left-hand thread.
- To tighten up: turn anti-clockwise.
- To undo: turn clockwise.

7.2.3 Linking gear (optional)

- Undo locking nut (1) with the handle anticlockwise until the bayonet lugs (2) come free.
- Swing linking gear (3) to the side.
- Remove filler cone (4) from the linking gear if present. To do so, use the appropriate ejector.
- Lift the linking gear off the bearing journals (5) on the machine housing.

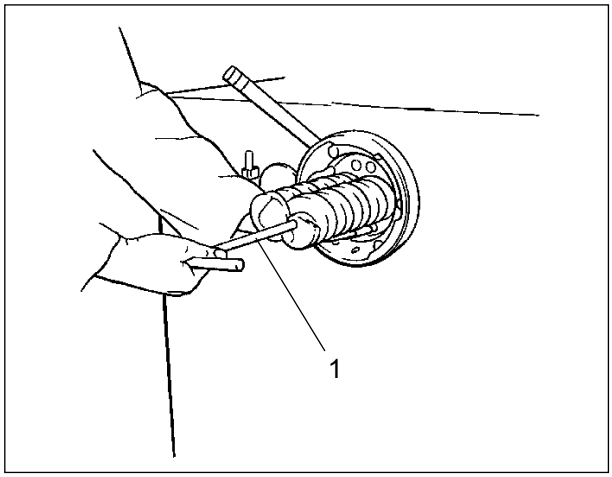


1 Locking nut
2 Bayonet lugs
3 Linking gear
4 Filler cone
5 Bearing journals

Fig. 7-3
Removing the linking gear (optional)

7.2.4 Double screws

- Screw the screw extractor (1) into the threaded bore of the right-hand double screw and pull the double screws out of the double screw housing, holding the screws steady with the other hand.

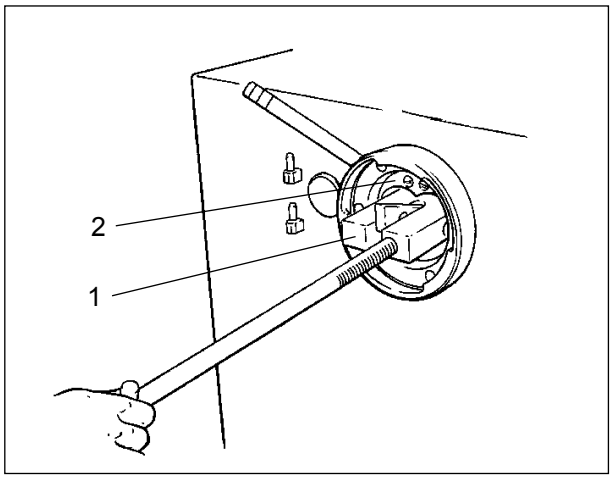


1 Screw extractor

Fig. 7-4
Removing double screws

7.2.5 Double screw housing

- Pull the all-in-one double screw housing/two parts of the housing of the two-part double screw housing right out of the feed cylinder by hand, holding the housing steady with the other hand.
- If the double screw housing cannot be pulled out by hand, push the extraction device (1) into housing (2).



1 Extraction device
2 Double screw housing

Fig. 7-5
Inserting the extraction device

- Twist the spindle in far enough for the extraction device to catch and pull the double screw housing a little way out of the feed cylinder.

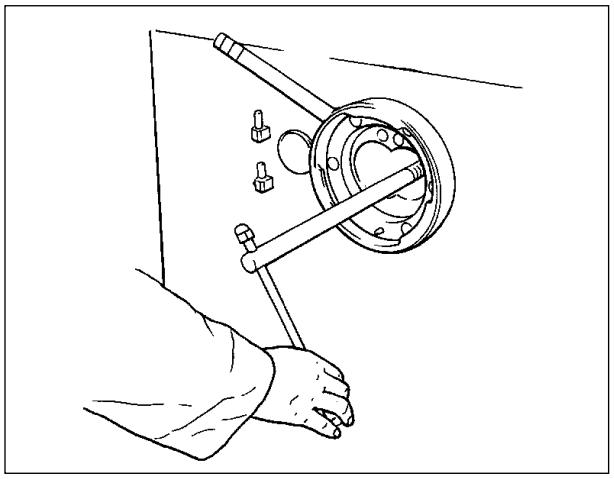
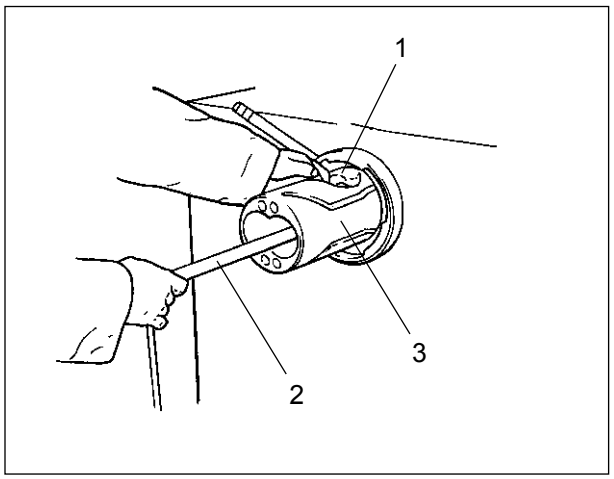


Fig. 7-6
Extraction device catching

- Push down the catch in the inlet bore (1) and pull the extraction device (2) out of the double screw housing (3).



1 Catch
2 Extraction device
3 Double screw housing

Fig. 7-7
Removing the extraction device

Warning!
Proceed carefully when removing the extraction device and be sure to hold the double screw housing/relevant part of the housing steady with the other hand to avoid dropping it.

- Pull the double screw housing/relevant part of the housing right out of the feed cylinder by hand, holding the housing steady with the other hand.

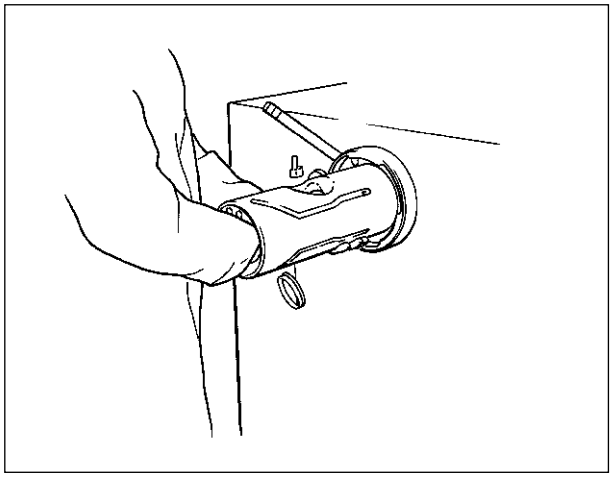


Fig. 7-8
Removing the double screw housing

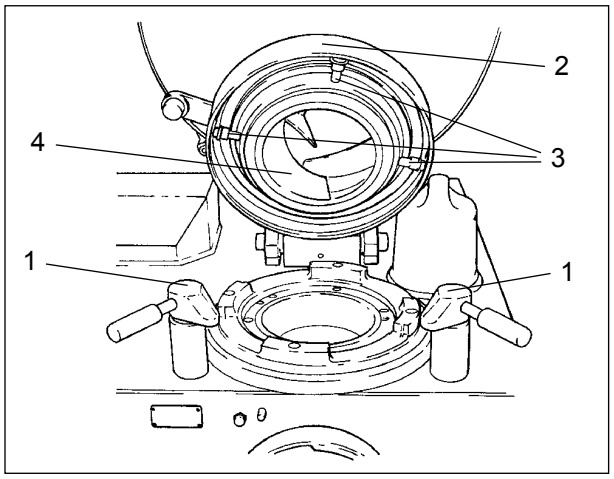
- Then check the rear seal in the feed cylinder for traces of oil.

Warning!
You must check the seals of the double screw drive for traces of oil before cleaning. If traces of oil are present, the double screw drive must be overhauled or replaced. In this case inform VEMAG Customer Service.

7.2.6 Hopper

Danger!
There is a risk of crushing when fitting/removing the feed screw. To prevent injury, proceed extremely carefully when fitting and dismantling the part.

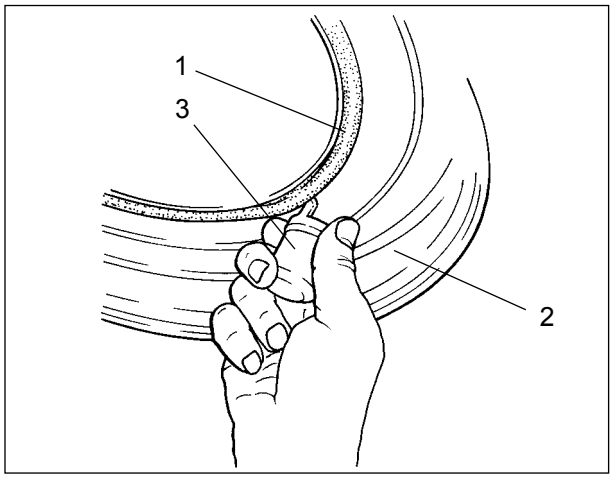
- Unlock the two locking levers (1) on the hopper housing and carefully tip the hopper backwards. Hold the hopper firmly by flange (2) as you do so.
- Remove the scraper in the hopper (if present).
- Push back the three sliding sleeves (3) in the hopper flange, holding the feed screw (4) steady with the other hand. Carefully twist the feed crew out of the hopper flange.



1 Locking levers
2 Flange
3 Sliding sleeves
4 Feed screw

Fig. 7-9
Hopper

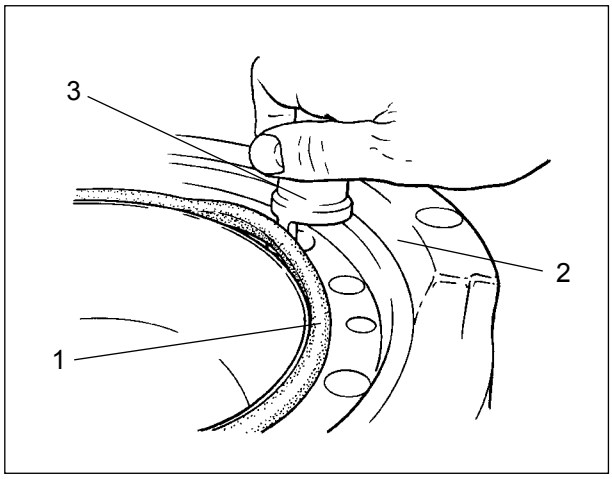
- Remove the sealing ring (1) from the hopper flange (2). Use the appropriate tool at the cleaning plug (3) to do this.



1 Sealing ring
2 Hopper flange
3 Cleaning plug

Fig. 7-10
Feed unit seal

- Remove the sealing ring (1) from the hopper insert (2). Use the appropriate tool at the cleaning plug (3) to do this.

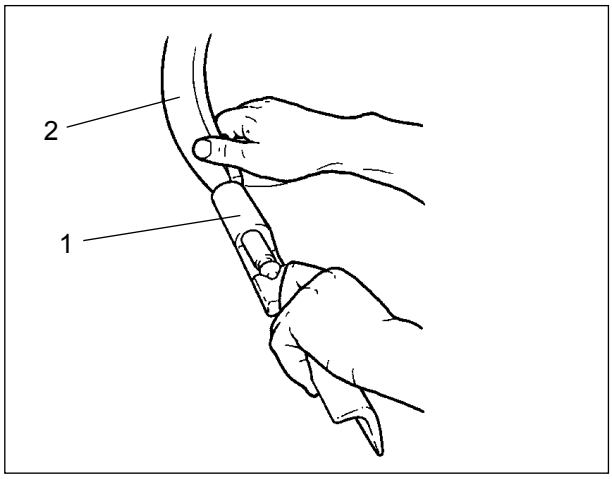


1 Sealing ring
2 Hopper insert
3 Cleaning plug

Fig. 7-11
Feed unit seal

7.2.7 Scraper

- Pull scraper (1) off retaining bolt (2) of the feed screw.

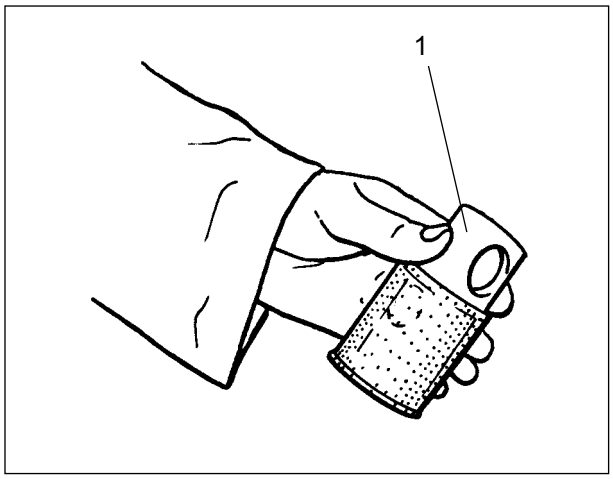


1 Scraper
2 Retaining bolt

Fig. 7-12
Dismantling the scraper

7.2.8 Vacuum system

- Remove the vacuum pot.
- Take hold of the float valve on the valve body (1) and pull it off the intake pipe of the vacuum line in a horizontal direction.

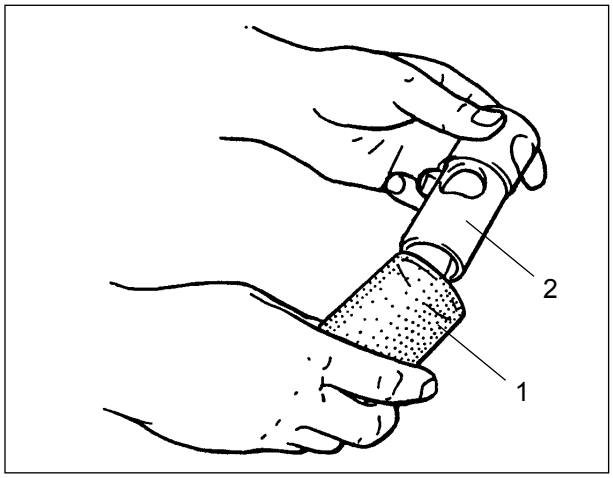


1 Valve body

Fig. 7-13
Float valve

Warning!
Do not take hold of the float valve at the bottom on the screen when pulling it off to avoid it tilting.

- Then pull the screen (1) off valve body (2).

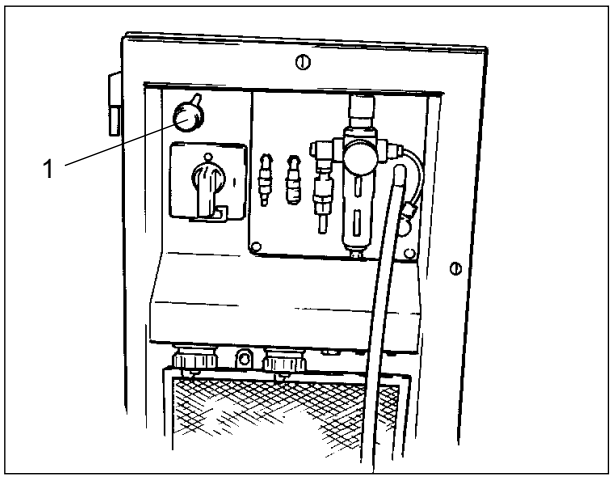


1 Screen
2 Valve body

Fig. 7-14
Float valve

Warning!
Before cleaning, you must plug the cleaning plug onto the intake pipe of the vacuum line to protect the vacuum pump.

Cleaning plug (1) is located behind the cover on the rear of the machine.



1 Cleaning plug

Fig. 7-15
Cleaning plug

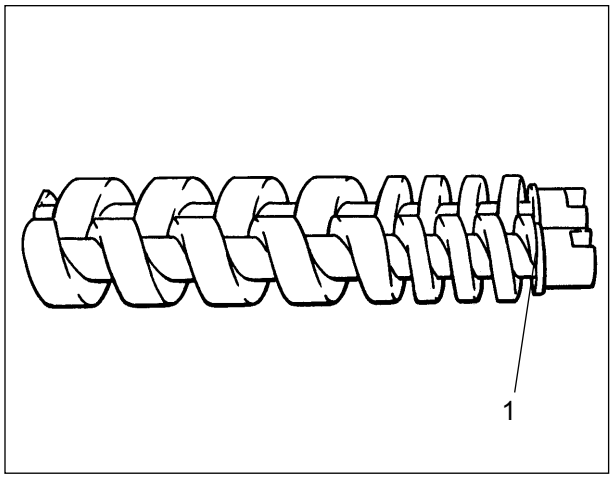
7.3 Cleaning the machine

Clean the machine housing, the hopper, the feed screw, the linking gear (optional) and all the parts which have been removed thoroughly with hot water and a brush and then dry them. The machine is suitable for cleaning with low-pressure cleaning equipment (max. 25 bar).

Warning!
Never aim the jet of water directly at the double screw drive, the sealing elements and the machine control panel when using low-pressure cleaning equipment and keep the nozzle at the distance from the surface of the machine specified for the cleaning equipment.

In addition to the instructions in the cleaning schedule, generally-applicable and product-specific hygiene regulations should be followed.

When cleaning the double screws, pay particular attention to the joints between the screw and the coupling claw (1).



1 Joint

Fig. 7-16
Double screws

7.4 Cleaning schedule

7.4.1 General recommendations

All information relates to single-shift operation.

- Predominant use should be made of alkaline foam cleaning agents.
- To remove mineral deposits such as limescale, use acid foam cleaning agents as required (usually 1x a week).

7.4.2 Chlorine-free alkaline cleaning agents

Perform cleaning as follows:

- Initial rinse with water to remove coarse dirt
- Application of foam to the surfaces for cleaning using a 2 – 5 % solution of P3-topax 19 (alkaline) or 2 – 3 % solution of P3-topax 56 (acid). Time required to take effect: 10 to 20 minutes
- Intermediate rinse with water at 40 – 60 ˚C
- Disinfect if desired and/or required
- Rinse off with water at 40 – 60 ˚C

Warning!
Use chlorine-free alkaline cleaning agents if at all possible, as there is less risk of corrosion in the event of inadequate rinsing off.

Recommended cleaning agents:

Europe	USA	Application					Characteristics
		Clean	Disinfect	Foam	Manual	Rinse	
P3-steril	-	+	+	o	+		Combined cleaning agent and disinfectant, slightly alkaline
P3-topax 19 P3-topactive 200 [2)] Topmaxx 421 [3)] Topmaxx 422 [3)]	Quorum Copper Klenzmaxx TFC Green	+		+			Foam cleaning agent, alkaline
P3-topax 52 P3-topactive 500 Topmaxx 520 [3)]	Quorum Purple Klenzmaxx TFC Red	+		+			Foam cleaning agent, acid
P3-topax 56	Foam Shine	+		+			Foam cleaning agent, acid, contains Zn and Al inhibitors
P3-topactive DES			+	+		o	Disinfectant, acid, peracetic acid
P3-topax 91	Whisper V		+	+	+	o	Foam or spray disinfectant, neutral
P3-topax 990	Quorum Clear V		+	+	+	o	Foam or spray disinfectant, slightly alkalineh
P3-topactive LA [2)]	TFC Pink II	+		+	+		TFC cleaning agent (foam), slightly alkaline
P3-alcodes [1)]	-		+			+	Spray disinfectant, for disinfecting during breaks (ready-to-use), neutral, alcohol-based

+ recommended o recommended in some cases

[1)] Ready-to-use solution

[2)] TFC method: modified foam process (TFC = thin-film cleaning). A mobile viscous cleaning phase is formed which reinforces the cleaning effect and extends contact time on vertical surfaces.

[3)] Long-cling technology: foam adheres to vertical surfaces for 30 to 60 minutes

7.4.3 Chlorine-containing alkaline cleaning agents

Perform cleaning as follows:

- Initial rinse with water to remove coarse dirt
- Application of foam to the surfaces for cleaning using a 2 – 5 % solution of P3-topax 66 (alkaline) or 2 – 3 % solution of P3-topax 56 (acid). Time required to take effect: 10 to 20 minutes
- Intermediate rinse with water at 40 – 60 ˚C
- Disinfect if desired and/or required. Time required to take effect: 10 to 30 minutes
- Rinse off with water at 40 – 60 ˚C

Warning!
No residues of the activated chlorine product should be left on surfaces. Inadequate rinsing may cause metal to corrode or plastics to display symptoms of degradation. This applies even to materials which are considered corrosion-resistant.

Recommended cleaning agents:

Alkaline cleaning agent with chlorine	Acid cleaning agent	Disinfectant
P3-topax 66	P3-topax 56	P3-topax 91 (30 min)
	P3-topax 52	P3-topactive DES (15 min)
P3-topax 686	P3-topactive 500	P3-topax 99 (30 min)
Topmaxx 314 [1)]	Topmaxx 520 [1)]	
P3-steril (manual application, chlorine-free)		P3-alcodes (in concentrate form with no rinsing off)

[1)] Long-cling technology: foam adheres to vertical surfaces for 30 to 60 minutes

In the case of special cleaning requirements and to optimize the cleaning process, please contact your local ECOLAB consultant.

Europe: +49 211- 9893 203

USA: +1 800 392 3392

+1 651 225 3093 (fax)

7.4.4 Specialist cleaning agent for machine interior

Check inside the machine regularly for the build-up of germs and dirt. Clean the inside of the machine if the dirt is excessive.

Clean smeared or dirty areas inside the machine as follows:

- Spray the cleaning agent onto smeared and dirty areas and wipe off immediately with a dry cloth. Alternatively, spray the cleaning agent onto the dry cloth and use this to wipe off dirt and smudges.

Warning!
Disconnect the machine from the mains before using the cleaning agent.
Do not use the cleaning agent in parts that are in contact with the product.
Do not spray the cleaning agent directly onto control panels, electrical parts or cables.

Recommended cleaning agent:

Europe	USA	Application			Characteristics
		Cleaning	Manual	Spray	
RIVOLTA S.L.X. Rapid Aerosol	-	+	+	+	Industrial cleaner for use in the food industry

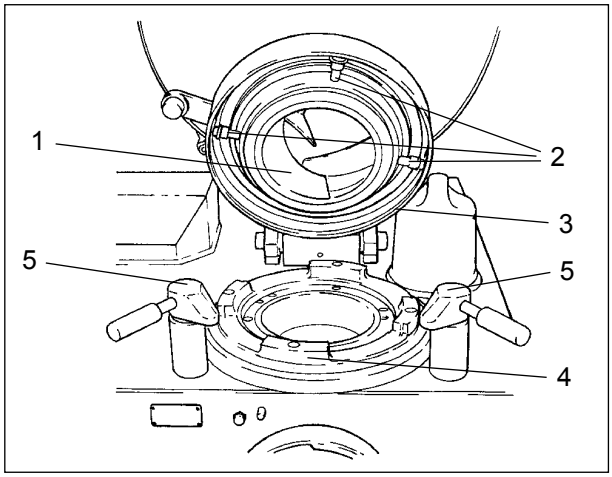
7.5 Lubrication and assembly

- Thoroughly lubricate all dismantled, cleaned and dried parts (apart from vacuum system parts) with a corrosion-inhibiting oil which is safe for food use.
  → Section 10
- Refit the dismantled parts after cleaning and lubrication.

Warning!
Parts which have been removed should be left overnight and not re-fitted until the shift starts the next morning.

7.5.1 Hopper

- Carefully press the sealing rings into the appropriate grooves in the hopper flange and hopper insert. Fit the sealing rings without greasing them.
  → Section 7.2.6
- Lubricate the sealing rings and the sliding ring in the hopper flange by hand before the feed screw is fitted. Use a grease for this which has been approved for contact with foodstuffs.
  → Section 8 and 10
- Guide the feed screw (1) into the hopper so that the three sliding sleeves (2) are located behind the shoulder (3) of the hopper flange.
- Push the sliding sleeves outward so that they engage behind the shoulder, holding the feed screw steady with the other hand.
- Turn the feed screw so that the sliding sleeves can latch in the recesses of the catch ring (4).
- Close the hopper and lock the two locking levers (5) on the hopper housing.



1 Feed screw
2 Sliding sleeves
3 Shoulder
4 Catch ring
5 Locking lever

Fig. 7-17
Hopper

8. Maintenance

8.1 General information

Apart from daily cleaning, the filler needs very little maintenance. For your peace of mind, we recommend that you take out a service contract whereby VEMAG Customer Service carries out all the maintenance work due.

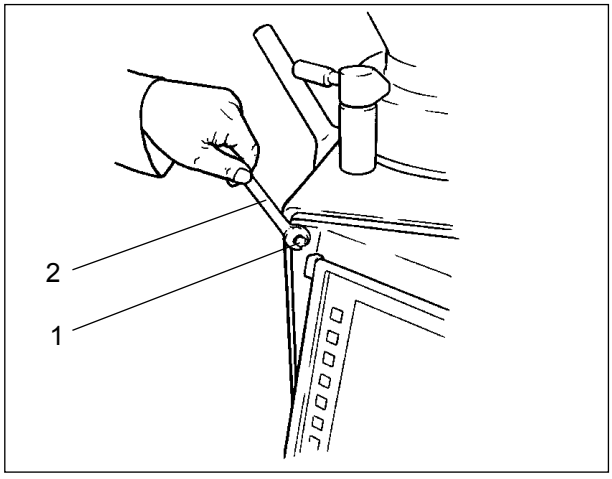
The information below describes the maintenance work to be performed by the owner of the machine. The types and quantities of lubricants required are listed in the appendix. Notes on spare parts required can be found in the spare parts catalogue.
→ Section 10 and spare parts catalogue

Danger!
To prevent injury, switch off the machine before any maintenance work. Then switch off the main switch to disconnect the machine from the mains. The machine has to be switched on for the feed unit drive to be lubricated.

To maintain components inside the drive system the front door must be swung open or the appropriate service hatch of the machine housing removed.

Front door

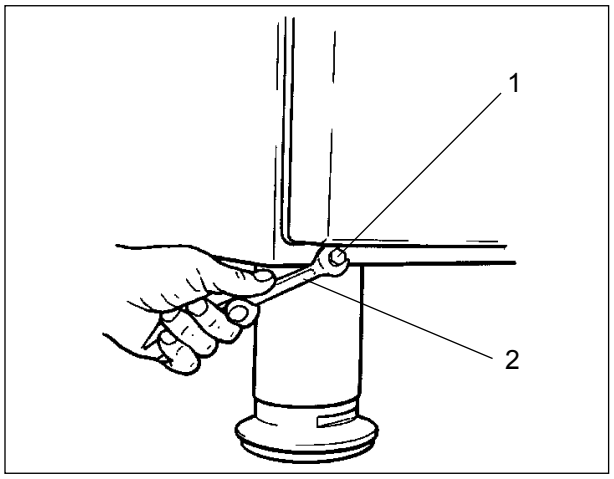
- Undo top assembly bolt (1) of the front door using a spanner (2).



1 Assembly bolt
2 Spanner

Fig. 8-1
Opening the front door

- Undo bottom assembly bolt (1) of the front door using spanner (2).



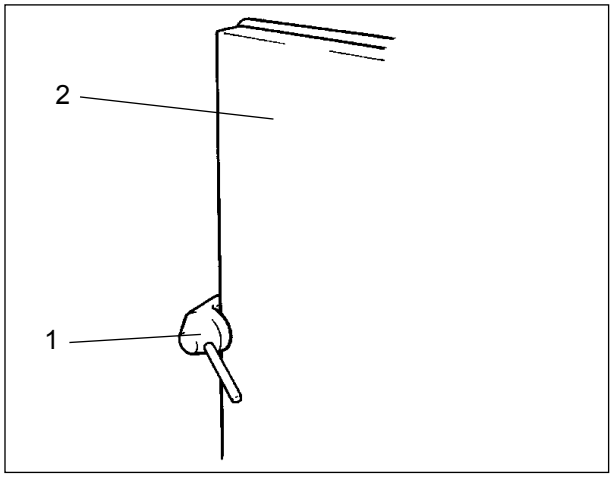
1 Assembly bolt
2 Spanner

Fig. 8-2
Opening the front door

- Swing open the front door.

Service hatch, rear

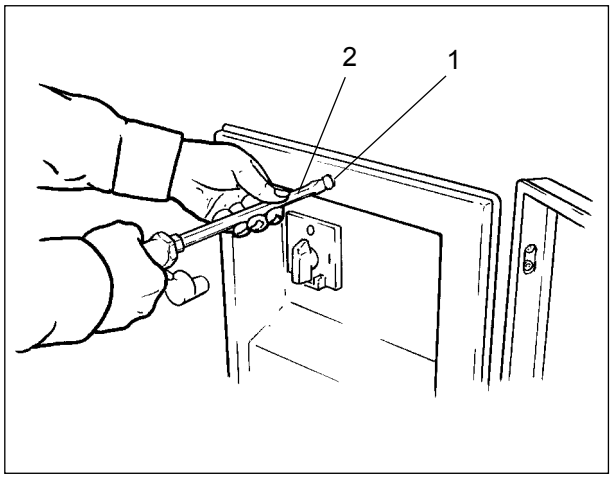
- Unlatch toggle (1) and open cover (2) completely.



1 Toggle
2 Cover

Fig. 8-3
Opening the service hatch

- Undo the assembly bolts (1) of the service hatch using screwdriver (2) to assist.



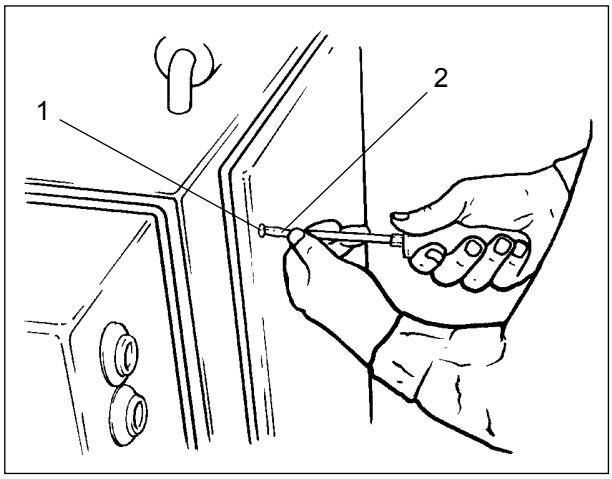
1 Assembly bolt
2 Screwdriver

Fig. 8-4
Opening the service hatch

- Swing open the service hatch.

Service hatch, right-hand side

- Undo the assembly bolts (1) of the service hatch using screwdriver (2) to assist.



1 Assembly bolt
2 Screwdriver

Fig. 8-5
Opening the service hatch

- Swing open the service hatch.

- Carry out the necessary maintenance work according to the maintenance schedule.
  → Section 8.4
- Clean the contact surfaces of the cover seals and lubricate lightly before re-fitting.
- Swing the front door closed again/refit the appropriate service hatch.

Regularly check the hydraulic system of the machine, including all pipe and hose lines, for damage or leaks. Inform VEMAG Customer Service if you find damage or leaks.

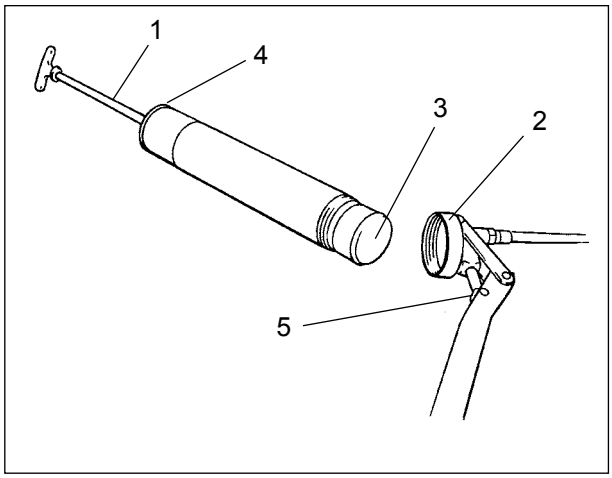
Warning!
DIN 20066 states that the service life of hose lines should not exceed six years. For this reason, you should have the hose lines of the hydraulic unit for the lifting/tipping device (optional) checked by VEMAG Customer Service after six years to avoid leaks.

Warning!
Used oil and other substances should be disposed of in accordance with the relevant environmental protection regulations in force.

8.2 Grease gun

The cartridges for the grease gun supplied are replaced as follows:

- Pull piston rod (1) back firmly to the stop.
- Unscrew the head of the grease gun (2) and pull out the empty cartridge.
- Remove the cap of the new cartridge and insert fully into the grease gun with this open end first.
- Either cut off the base of the cartridge (3) completely with a knife or pierce a hole in it.
- Screw the head of the grease gun back on and push the piston rod back in, pressing down the small retaining lug (4).
- If no grease emerges after a number of pump strokes, vent the grease gun by pressing the relief knob (5) whilst pumping.



1 Piston rod
2 Head
3 Cartridge
4 Retaining lug
5 Relief knob

Fig. 8-6
Grease gun

8.3 First-time maintenance work

Perform the following maintenance work for the first time after the intervals given. After that, these measures should be effected in accordance with the maintenance schedule.
→ Section 8.4

after 500 operating hours:	Change hydraulic oil in the lifting and tipping device (optional).
after 1000 operating hours:	Change transmission oil of double screw drive.

8.4 Maintenance schedule

All information relates to single-shift operation. The portioning computer shows the number of operating hours reached in each case. All the maintenance tasks included under one operating hours heading should be performed. In the case of monthly maintenance (160 hours), it follows that all daily and weekly maintenance work due should also be performed.

The jobs listed in the maintenance schedule are described in detail in the following sections.

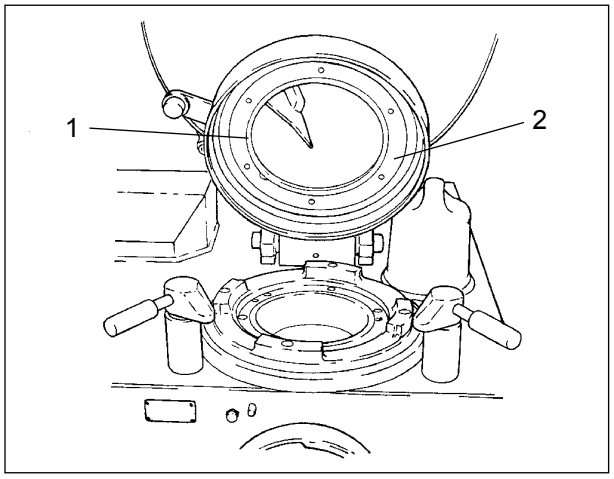
Maintenance interval	Operating hours	Machine part	Maintenance work
daily	8	Feed unit seals	Lubricate sliding ring and seals by hand every time they are cleaned. Use only high-performance grease which is safe for food use.
weekly	20	Feed unit drive	Lubricate drive and bearing 2x a week with the feed unit running slowly. Use only high-performance grease which is safe for food use and resistant to cleaning agents and disinfectants.
	40	Intake	Check air filter in service hatch for contamination and blow out.
	40	Vacuum pump 16 m³ + 40 m³ (optional)	Check oil level. Check for oil leaks. → Operating instructions for vacuum pump
monthly	160	Double screw drive	Check oil level. Check seals.
	160	Vacuum pump 16 m³ + 40 m³ (optional)	Check exhaust air. → Operating instructions for vacuum pump
six-monthly	1000	Feed unit seals	Have seals checked by VEMAG Customer Service.
	1000	Hydraulic unit lifting and tipping device (optional)	Check oil level.
	1000	Vacuum pump 16 m³ + 40 m³ (optional)	Clean. → Operating instructions for vacuum pump
annually	2000	Feed unit drive and feed unit seals	Have parts checked by VEMAG Customer Service and have feed unit seals changed.
	2000	Hydraulic unit lifting and tipping device (optional)	Change oil.
	2000	Vacuum pump 16 m³ + 40 m³ (optional)	Replace air deoiler element. Clean/replace gas ballast valve. Change oil. → Operating instructions for vacuum pump
biennially	4000	Double screw drive	Change oil.
three-yearly	10000	Feed unit drive	Change oil.

8.5 Daily maintenance

8.5.1 Feed unit seals (lubrication)

The feed unit seals must be lubricated daily every time they are cleaned. Use only high-performance grease which is safe for food use.

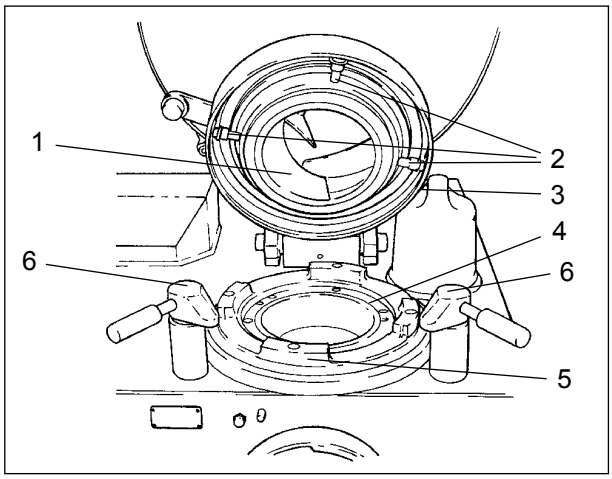
- Carefully press the sealing ring into the appropriate groove in the hopper flange. Fit the sealing ring without greasing it.
  → Section 7.2.6
- Lubricate the sealing ring (1) and the sliding ring (2) in the hopper flange by hand before the feed screw is fitted.



1 Sealing ring
2 Sliding ring

Fig. 8-7
Lubricating the feed unit seals

- Guide the feed screw (1) into the hopper in such a way that the three sliding sleeves (2) are located behind the shoulder (3) of the hopper flange.
- Push the sliding sleeves outwards so that they engage behind the shoulder, holding the feed screw steady with the other hand.
- Carefully press the sealing ring into the appropriate groove in the hopper insert. Fit the sealing ring without greasing it.
  → Section 7.2.6
- Lubricate the sealing ring (4) in the hopper insert by hand.
- Turn the feed screw so that the sliding sleeves can engage in the recesses of the catch ring (5).
- Close the hopper and lock the two locking levers (6) on the hopper housing.



1 Feed screw
2 Sliding sleeves
3 Shoulder
4 Sealing ring
5 Catch ring
6 Locking levers

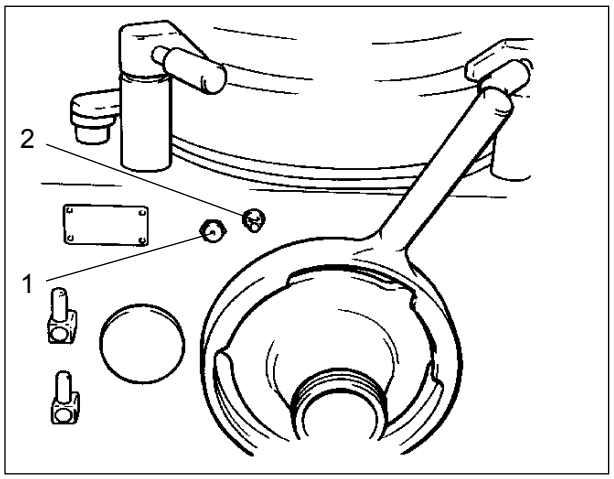
Fig. 8-8
Lubricating the feed unit seals

8.6 Weekly maintenance

8.6.1 Feed unit drive (lubrication)

The feed unit drive and the bearing must be lubricated twice a week with the feed unit running slowly until grease escapes at the relief bore at the outlet side of the machine. Use only high-performance grease which is safe for food use and which is resistant to cleaning agents and disinfectants.

- To do so, connect the grease gun supplied to the left-hand lubricating nipple (1) at the outlet side of the machine and pump several full strokes with the feed unit running until clean grease escapes from relief bore (2).
- Then remove the grease which has escaped.



1 Lubricating nipple
2 Relief bore

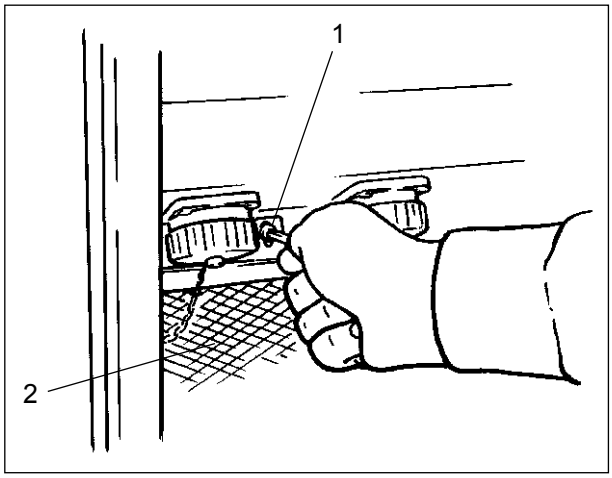
Fig. 8-9
Lubricating the feed unit drive

- If no grease at all escapes at the relief bore, inform VEMAG Customer Service and have the drive/bearing checked.

8.6.2 Intake (air filter)

There is an air filter in the service hatch on the rear which needs to be cleaned weekly.

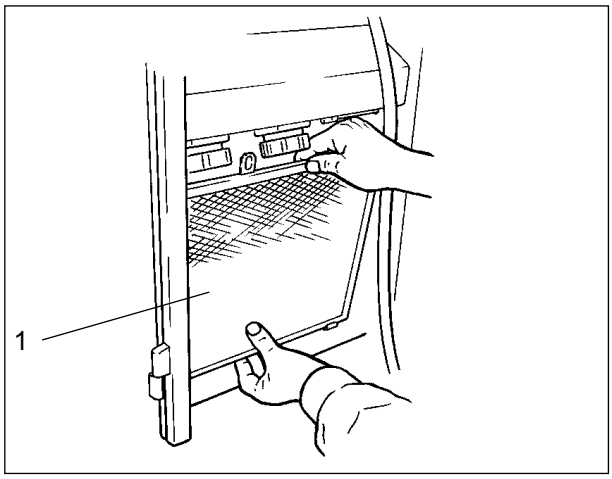
- Unlatch the toggle on the rear of the machine and open the cover completely.
- Undo assembly bolt (1) of the air filter (2).



1 Assembly bolt
2 Air filter

Fig. 8-10
Air filter of the machine

- Take the air filter (1) and pull it out in an upward direction.



1 Air filter

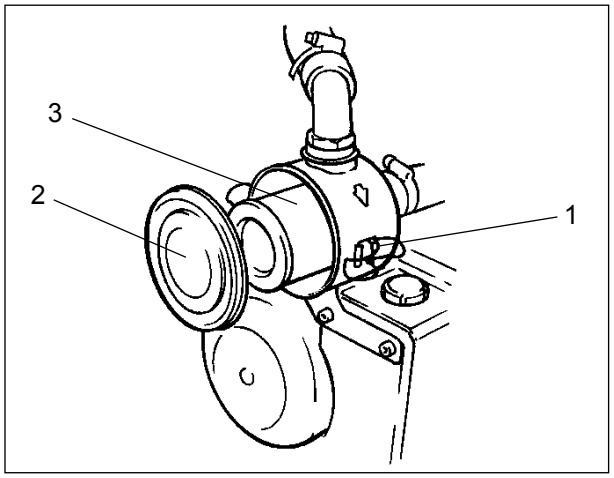
Fig. 8-11
Air filter of the machine

- Clean the air filter by blowing it out.

8.6.3 Vacuum pump (air filter)

An air filter is located in the intake line to the vacuum pump and this needs to be cleaned weekly.

- Open the two locking clips (1) of the air filter and remove the filter cover (2).
- Clean the filter cartridge (3) by blowing it out. If it is severely contaminated, the filter cartridge must be replaced.



1 Locking clips
2 Filter cover
3 Filter cartridge

Fig. 8-12
Air filter of intake line

- Insert the filter cartridge and fix the filter cover in position.

8.6.4 Vacuum pump 16 m³ and 40 m³ (optional)

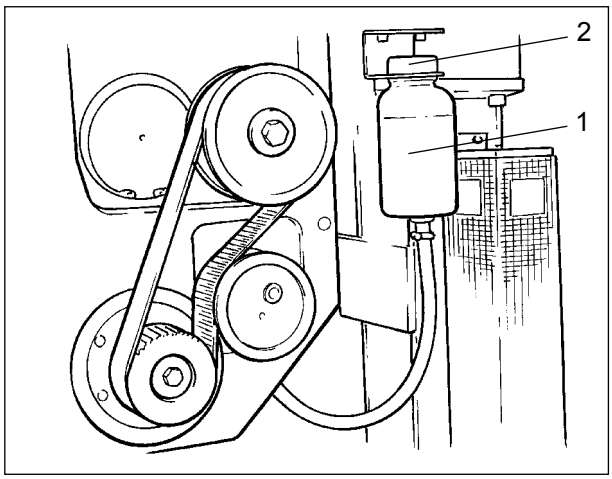
→ Operating instructions for vacuum pump

8.7 Monthly maintenance

8.7.1 Double screw drive (oil level and seals)

The oil expansion reservoir of the double screw drive and its cover are attached in a bracket and connected to the double screw drive by a hose. The oil should come up at least to the marking on the reservoir.

- Open the service hatch on the right-hand side.
- Check the oil level of the double screw drive at the expansion reservoir (1) and replenish with oil if necessary.
- To do so, unscrew the cover (2) of the expansion reservoir, holding the reservoir steady in the other hand, and take it out of its bracket. You must hold the reservoir upright so that no oil escapes. The connecting hose to the double screw drive is long enough to enable filling to take place outside the machine housing.
- After replenishing the oil, replace the expansion reservoir in its bracket and check filling level.
- Check whether oil is present in coiled relief hose for the seals of the double screw drive shafts. If this should be the case, the seals of the double screw drive must be replaced, otherwise there is a risk of oil getting into the double screws.



1 Expansion reservoir
2 Cover

Fig. 8-13
Oil level of double screw drive

- Close the service hatch again.

Warning!
Inform VEMAG Customer Service immediately if there is oil in the relief hose. The seals of the double screw drive must be replaced before production is resumed.

8.7.2 Vacuum pump 16 m³ and 40 m³ (optional)

→ Operating instructions for vacuum pump

8.8 Six-monthly maintenance

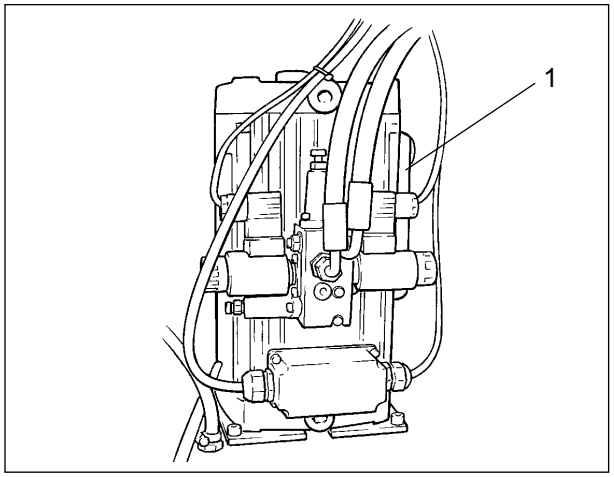
8.8.1 Feed unit seals

- Have the feed unit seals checked by VEMAG Customer Service.

8.8.2 Hydraulic unit (oil level)

The hydraulic unit for the lifting and tipping device (optional) is located behind the service hatch on the rear of the machine. There is a sight glass for checking oil level on the front of the hydraulic unit. The oil should come at least to the centre of the sight glass.

- Open the service hatch on the right-hand side.
- Check the oil level of the hydraulic unit through sight glass (1) provided and top up oil through filler neck if necessary.



1 Sight glass

Fig. 8-14
Oil level of the hydraulic unit

- Close the service hatch again.

Considerable or continuous lack of oil indicates a leak which must be eliminated.

8.8.3 Vacuum pump 16 m³ and 40 m³ (optional)

→ Operating instructions for vacuum pump

8.9 Annual maintenance

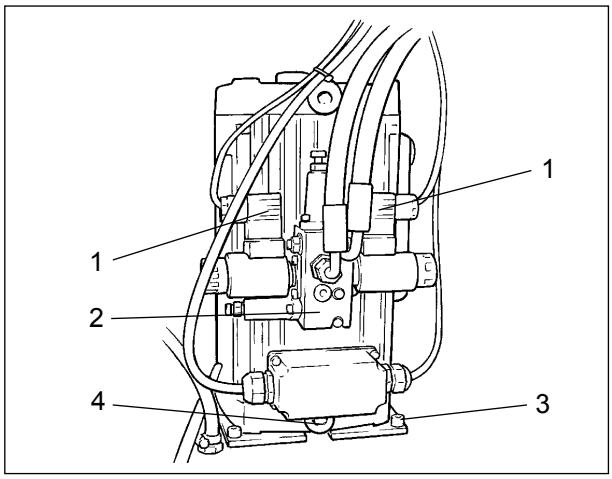
8.9.1 Feed unit drive and feed unit seals

- Have the feed unit checked by VEMAG Customer Service and the feed unit seals replaced.

8.9.2 Hydraulic unit (oil change)

The oil in the hydraulic unit needs to be changed once a year.

- Open the service hatch on the right-hand side.
- Take connectors (1) off valve block (2).
- Undo the assembly bolts (3) attaching the hydraulic unit to the base-plate.
- Lift the hydraulic unit out of the machine.
- Put down the hydraulic unit so that a suitable container can be placed under drain screw (4).



1 Connector
2 Valve block
3 Assembly bolt
4 Oil drain screw

Fig. 8-15
Changing the oil in the hydraulic unit

- Undo the drain screw and drain off the used oil. Then screw the drain screw back up tightly.
- Fill the hydraulic unit with oil through filler neck.
- Put the hydraulic unit back in the machine and tighten the assembly bolts in the baseplate back up.
- Put the connectors back on.
- Close the service hatch again.

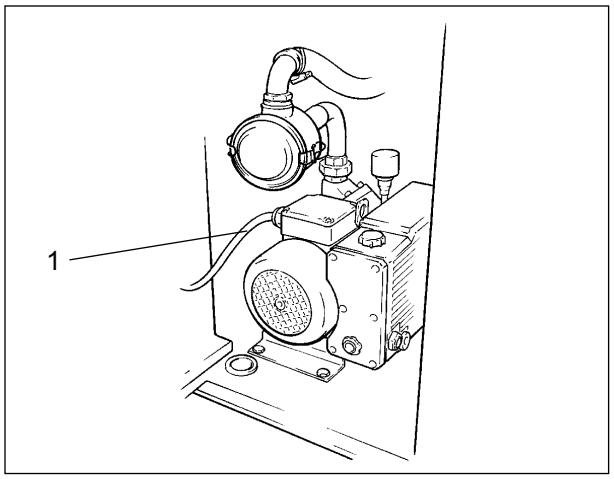
8.9.3 Vacuum pump 16 m³ and 40 m³ (optional)

Danger!
To prevent injury (burns) do not carry out the following work with the pump still warm from operation, but wait until the pump has cooled down.

The vacuum pump has to be removed to allow these maintenance tasks to be performed.

Vacuum pump with 16 m³

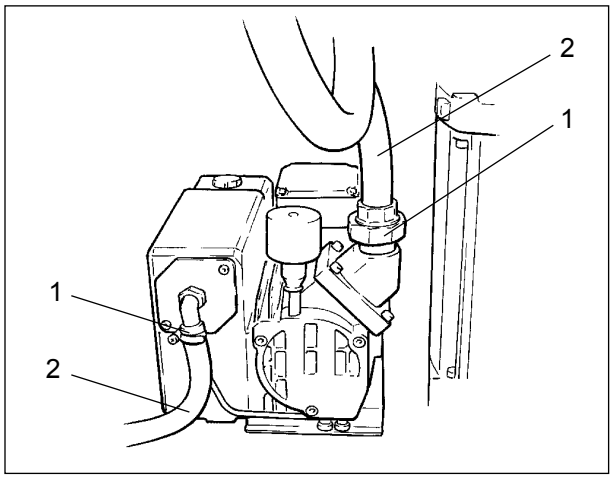
- Unlatch the toggle on the rear of the machine and open the cover completely.
- Remove the air filter in the service hatch.
- Disconnect connecting cable (1).



1 Connecting cable

Fig. 8-16
Removing the vacuum pump

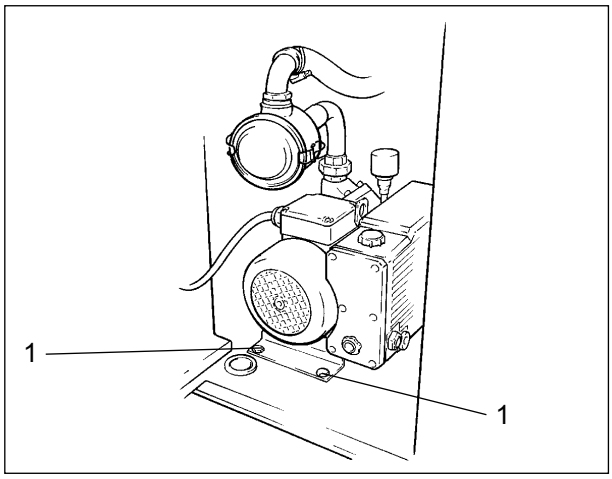
- Open the front door and swing it right open.
- Undo the two hose clamps (1) and pull off the two hoses (2).



1 Hose clamp
2 Hose

Fig. 8-17
Removing the vacuum pump

- Undo the two assembly bolts (1) used to fix the vacuum pump to the base plate.



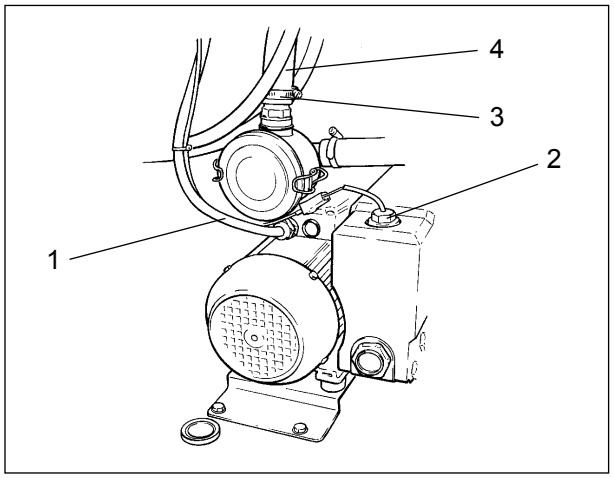
1 Assembly bolt

Fig. 8-18
Removing the vacuum pump

- Lift the vacuum pump forwards out of the machine.
- Take the appropriate maintenance measures.
  → Operating instructions for vacuum pump
- Put the vacuum pump back in the machine and tighten the two assembly bolts in the base plate back up.
- Reattach the connecting cable and the hoses.
- Put the air filter back in the service hatch.
- Close the cover and latch the toggle on the rear of the machine.
- Swing the front door closed and tighten up the two assembly bolts.

Vacuum pump with 40 m³ (optional)

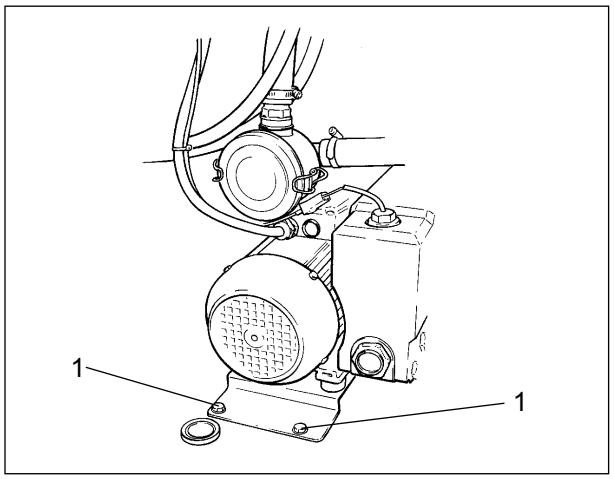
- Unlatch the toggle on the rear of the machine and open the cover completely.
- Remove the air filter in the service hatch.
- Disconnect connecting cable (1).
- Undo sealing screw (2) and pull off the line for the level switch.
- Undo jubilee clip (3) and pull off hose (4).



1 Connecting cable
2 Sealing screw
3 Jubilee clip
4 Hose

Fig. 8-19
Removing the vacuum pump

- Undo the two assembly bolts (1) used to fix the vacuum pump to the base plate.



1 Assembly bolt

Fig. 8-20
Removing the vacuum pump

- Lift the vacuum pump forwards out of the machine.

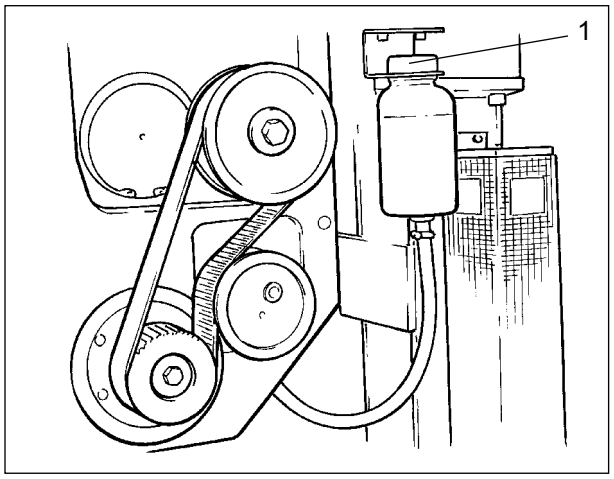
- Take the appropriate maintenance measures.
  → Operating instructions for vacuum pump
- Replace the vacuum pump in the machine and retighten the two assembly bolts in the baseplate.
- Reattach the hose and the connecting cable.
- Screw the sealing screw and the cable for the level switch back in.
- Put the air filter back in the service hatch.
- Close the cover and latch the toggle on the rear of the machine.

8.10 Biennial maintenance

8.10.1 Double screw drive (oil change)

The oil in the double screw drive should be changed every two years.

- Open the service hatch on the right-hand side.
- Unscrew the cover (1) of the expansion reservoir, holding the reservoir steady in the other hand, and take it out of its bracket. You must hold the reservoir upright so that no oil escapes. The connecting hose to the double screw drive is long enough to enable filling to take place outside the machine housing.
- Drain the used oil into a suitable container.
- Then fill the expansion reservoir with fresh oil and attach the expansion reservoir back in its bracket after replenishing it. Check the filling level. The oil should come at least to the marking on the reservoir.
- Check whether oil is present in coiled relief hose for the seals of the double screw drive shafts. If this should be the case, the seals in the double screw drive must be replaced, otherwise there is a risk of oil getting into the double screws.



1 Cover

Fig. 8-21
Changing double screw drive oil

- Close the service hatch again.

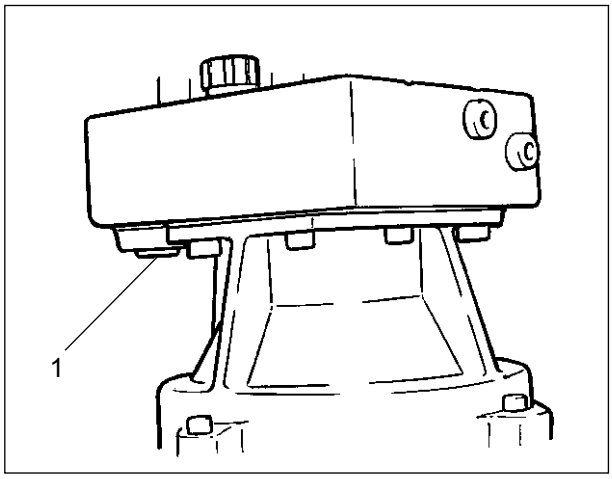
Warning!
Inform VEMAG Customer Service immediately if there is oil in the relief hose. The seals of the double screw drive must be replaced before production is resumed.

8.11 Three-yearly maintenance

8.11.1 Feed drive (oil change)

The oil in the transmission of the feed drive needs to be changed every three years.

- Unlatch the toggle on the rear of the machine and open the cover completely.
- Remove the service hatch on the rear of the machine.
- Undo oil drain screw (1) and drain the oil into a suitable container.
- Drain off the used oil and screw the oil drain screw back up.

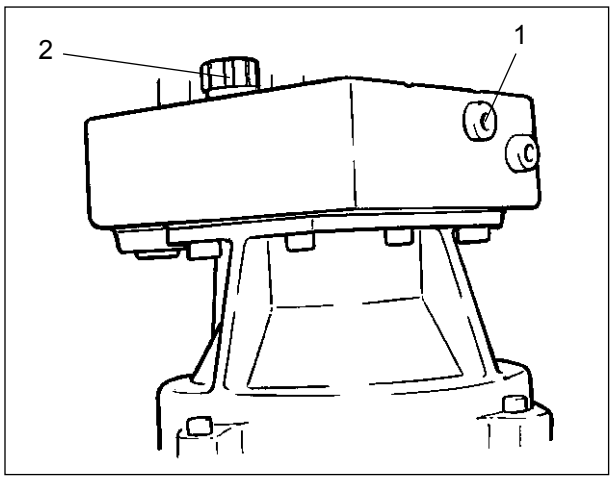


1 Oil drain screw

Fig. 8-22
Changing the oil in the feed drive

The oil must come up to the top check bore in the transmission housing of the transmission.

- Remove sealing screw (1) from the top check bore.
- Fill the transmission housing with oil through filler neck (2) up to the check bore.



1 Sealing screw
2 Filler neck

Fig. 8-23
Changing the oil in the feed drive

- Screw the sealing screw back up.
- Close the cover and latch the toggle on the rear of the machine.

9. Troubleshooting

9.1 General information

Any attachments or additional devices (optional) which may be present should be disconnected from the filling machine for troubleshooting purposes. The relevant safety instructions must be followed. Possible faults, causes and the measures you need to take to remedy them are listed below.

9.2 Troubleshooting table

Fault	Cause	Remedy
Machine does not start.	Hopper open. No filling horn holder.	Source of fault shown in display. Check part displayed.
Vacuum pump not running.	Power switch QM4 triggered. Vacuum pump overloaded.	Switch on power switch. Check vacuum pump.
Display does not light up.	No mains voltage. Main switch not on. Fuse F1, F2, F3 defective. Power supply or graphic control defective.	Have machine back-up fuse replaced by electrician. Switch on main switch. Have fuse replaced by electrician. Have defective part replaced by electrician.
Vacuum level not reached, vacuum unstable.	Leak in vacuum system. Water or product residues in line to display. Air de-oiling element contaminated.	Check vacuum system. Clean or replace line. Replace air de-oiling element.
Machine temperature too high.	Air filter contaminated.	Clean air filter.
Lifting/tipping device (optional) not functioning.	Buttons not reacting. Valve Y1, Y2 is not actuated or is defective. Hoist motor not running. Power switch QM5 triggered.	Inform VEMAG Customer Service. Check valve, voltage is shown by LED below the valve plug. Check hoist motor. Switch on power switch.

Fault	Cause	Remedy
Air trapped in product.	Unsuitable or worn double screw.	Check double screws.
	Vacuum display fluctuating or too low.	Check vacuum system for leaks, paying special attention to the double screw drive seal. If the vacuum display is fluctuating, the vacuum pump is taking in air. In this case, check the float in the valve.
	Air relief bores in double screw housing blocked.	Open air relief bore using the setting screws.
	Too much air blended in.	Use mixing speed during the final bowl-cutting phase.
	Vacuum system blocked.	Check complete vacuum system for free flow.
Weight fluctuations.	Unsuitable double screw.	Check double screw, use 48 mm double screw pitch for portioning small portions.
	Double screw and double screw housing worn.	Measure double screw and double screw housing for wear with a feeler gauge. Air gap between screw and housing max. 0.5 mm.
	Insufficient vacuum, vacuum unstable (vacuum display fluctuating).	Close air relief bores in double screw housing. Check vacuum system.
	Deformed feed screw, wrong double screw set.	Check feed screw. Gap between bottom edge of feed screw and top edge of housing must be 110 - 120 mm.
Drop in output.	Double screw and double screw housing worn.	Check double screw and double screw housing for wear. Measure air gap between double screw and double screw housing.
	Vacuum too low.	Check vacuum setting. The vacuum should be set so that there is no product in the vacuum pot.
	Deformed feed screw.	Check feed screw. Gap between the bottom edge of the feed screw and the top edge of the housing must be 110 - 120 mm.
Raw sausage smears.	Unsuitable double screw.	Select suitable double screw. Check product feed for lumps.
	Insufficient vacuum, vacuum unstable (vacuum display fluctuating).	Check vacuum system.
	Product temperature too high.	Reduce product temperature.

10. Appendix

10.1 General information

Below you will find the technical details relating to the machine and information about the lubricants to be used, about accessories and tools required.

Please give the machine number in the event of any query to VEMAG Customer Service or its agents. You will find this on the rating plate on the rear of the filler. It is also embossed on the machine frame.

10.2 Technical data ROBOT HP7E / HP10E / HP12E / HP15E / HP20E

	ROBOT HP7E	ROBOT HP10E	ROBOT HP12E	ROBOT HP15E	ROBOT HP20E
Filling rate with double screw					
48/80	up to 3,600 kg/h	up to 5,600 kg/h	up to 3,600 kg/h	up to 6,500 kg/h	up to 4,600 kg/h
66/80	up to 5,100 kg/h	up to 8,000 kg/h	up to 5,200 kg/h	up to 9,300 kg/h	up to 6,600 kg/h
72/80	up to 5,500 kg/h	up to 8,600 kg/h	up to 5,600 kg/h	up to 10,000 kg/h	up to 7,000 kg/h
112/80	-	up to 14,000 kg/h	up to 9,100 kg/h	up to 16,200 kg/h	up to 11,400 kg/h
72/90	-	-	up to 8,000 kg/h	up to 14,200 kg/h	up to 10,000 kg/h
112/90	-	-	up to 13,700 kg/h	up to 24,300 kg/h	up to 17,000 kg/h
Portion size:	5 - 99,999 g, adjustable in increments of 0.1 g or 1 g	5 - 99,999 g, adjustable in increments of 0.1 g or 1 g	5 - 99,999 g, adjustable in increments of 0.1 g or 1 g	5 - 99,999 g, adjustable in increments of 0.1 g or 1 g	5 - 99,999 g, adjustable in increments of 0.1 g or 1 g
Portion speed:	> 650 portions/ min. (depends on product, casing and portion size)	> 750 portions/ min. (depends on product, casing and portion size)	> 700 portions/ min. (depends on product, casing and portion size)	> 650 portions/ min. (depends on product, casing and portion size)	> 600 portions/ min. (depends on product, casing and portion size)
Number of links:	0 - 10, infinitely adjustable	0 - 10, infinitely adjustable	0 - 10, infinitely adjustable	0 - 10, infinitely adjustable	0 - 10, infinitely adjustable
Vacuum system:	16 m^3/h	16 m^3/h / 40 m^3/h (optional)	16 m^3/h / 40 m^3/h (optional)	16 m^3/h / 40 m^3/h (optional)	16 m^3/h / 40 m^3/h (optional)
Hopper capacity:	250 l / 350 l (optional)	250 l / 350 l (optional)	250 l / 350 l (optional)	350 l	350 l
Height adjustable by:	80 mm (1,000 - 1,080 mm)	80 mm (1,000 - 1,080 mm)	80 mm (1,000 - 1,080 mm)	80 mm (1,000 - 1,080 mm)	80 mm (1,000 - 1,080 mm)
Total weight including lifting/ tipping device (optional):	approx. 1,220 kg	approx. 1,240 kg	approx. 1,240 kg	approx. 1,250 kg	approx. 1,250 kg
Noise emission:	< 75 db(A)	< 75 db(A)	< 75 db(A)	< 75 db(A)	< 75 db(A)
Power input:	10 kW at 50/60 Hz	14 kW at 50/60 Hz	14 kW at 50/60 Hz	20 kW at 50/60 Hz	20 kW at 50/60 Hz
Main motor:	3.8 kW at 50/60 Hz	7.3 kW at 50/60 Hz	7.3 kW at 50/60 Hz	13.1 kW at 50/60 Hz	13.1 kW at 50/60 Hz
Current consumption at					
220 - 240V, 50/60 Hz	26 A	36 A	36 A	64 A	64 A
400 - 480V, 50/60 Hz	15 A	21 A	21 A	37 A	37 A

Electrical fittings: to DIN EN 60204-1

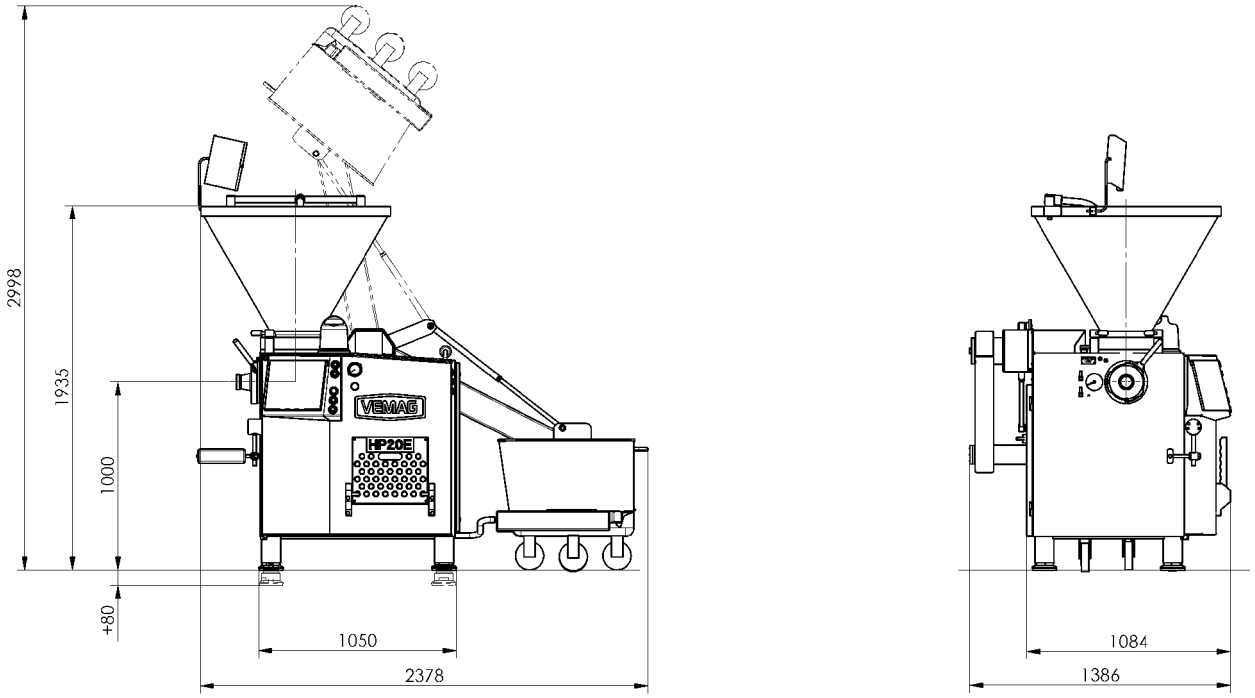
Protection (exterior): IP 65

Protection (interior): IP X3

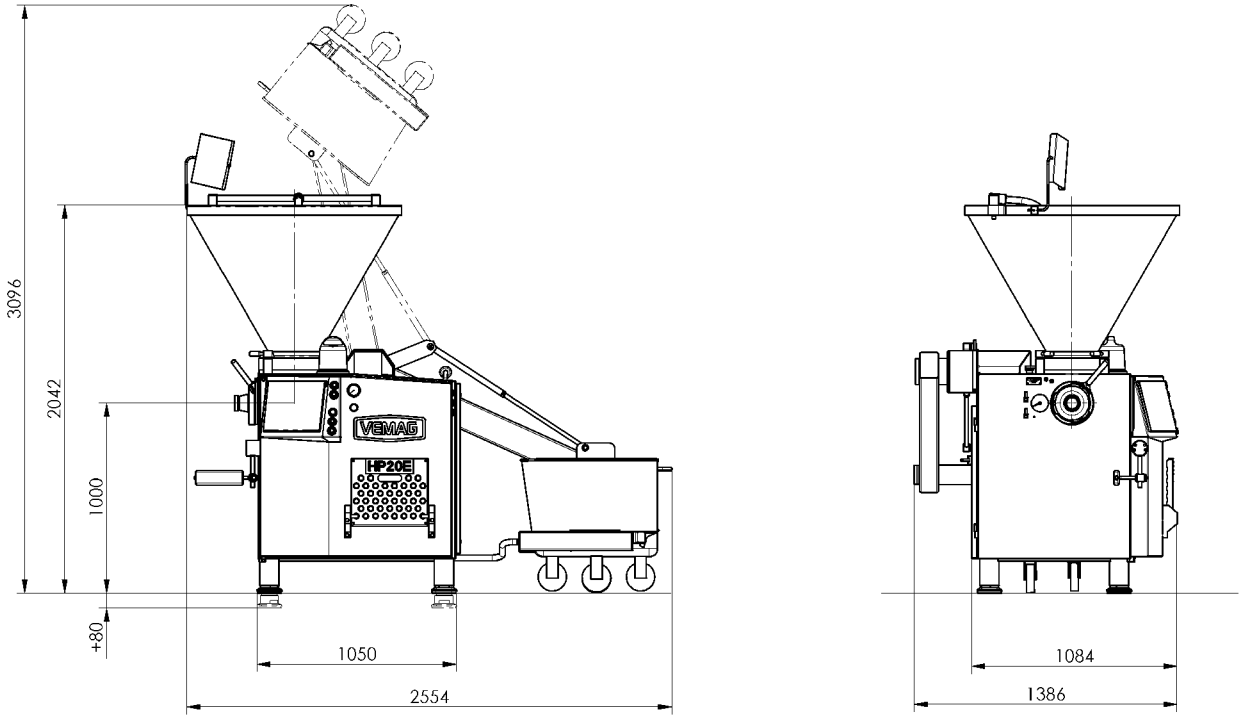
Type of mains connection for TNS mains equipment protection class I (earth wire)

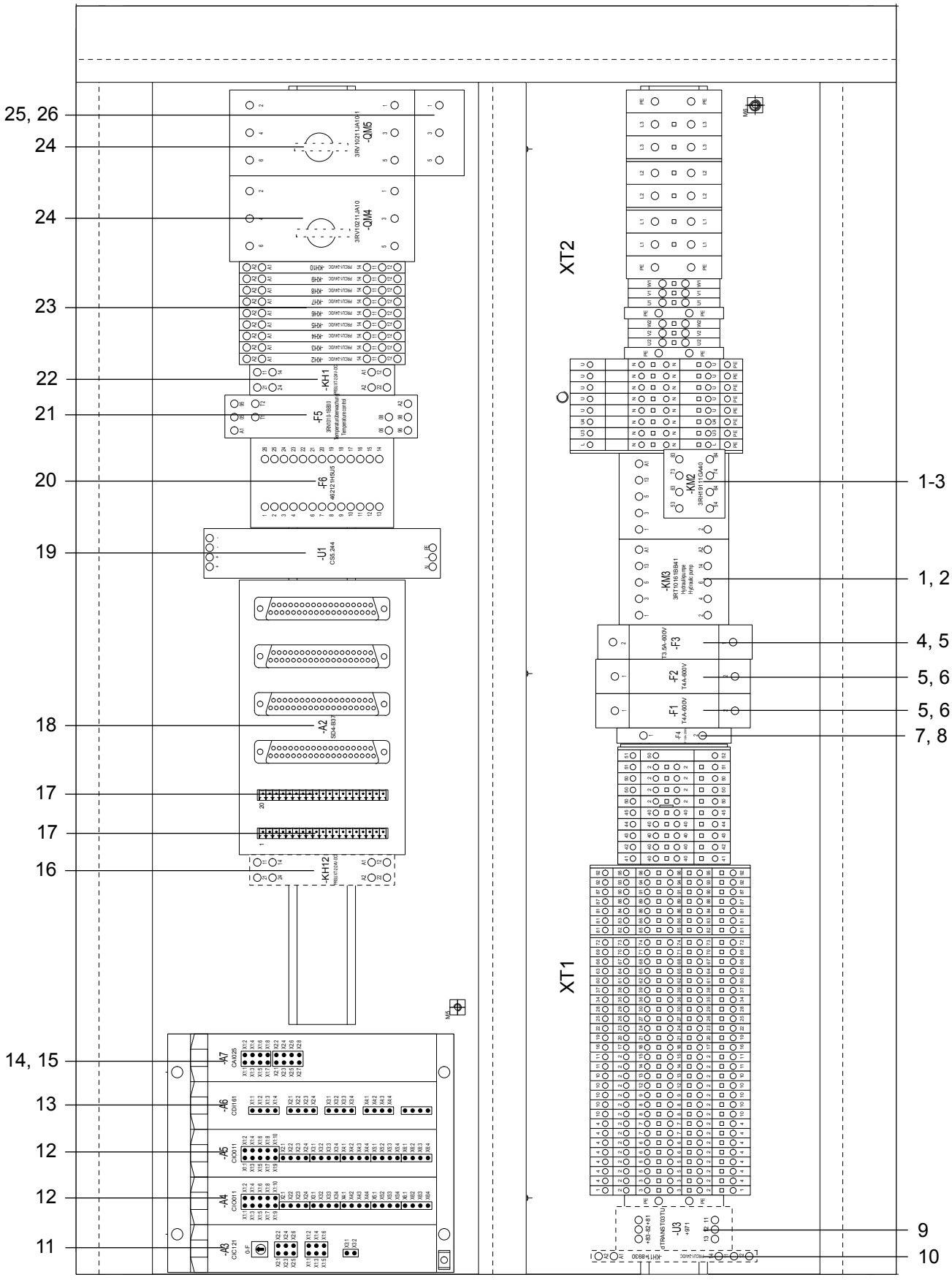
10.3 Dimensional drawings ROBOT HP7E / HP10E / HP12E / HP15E / HP20E

10.3.1 Hopper 250 l



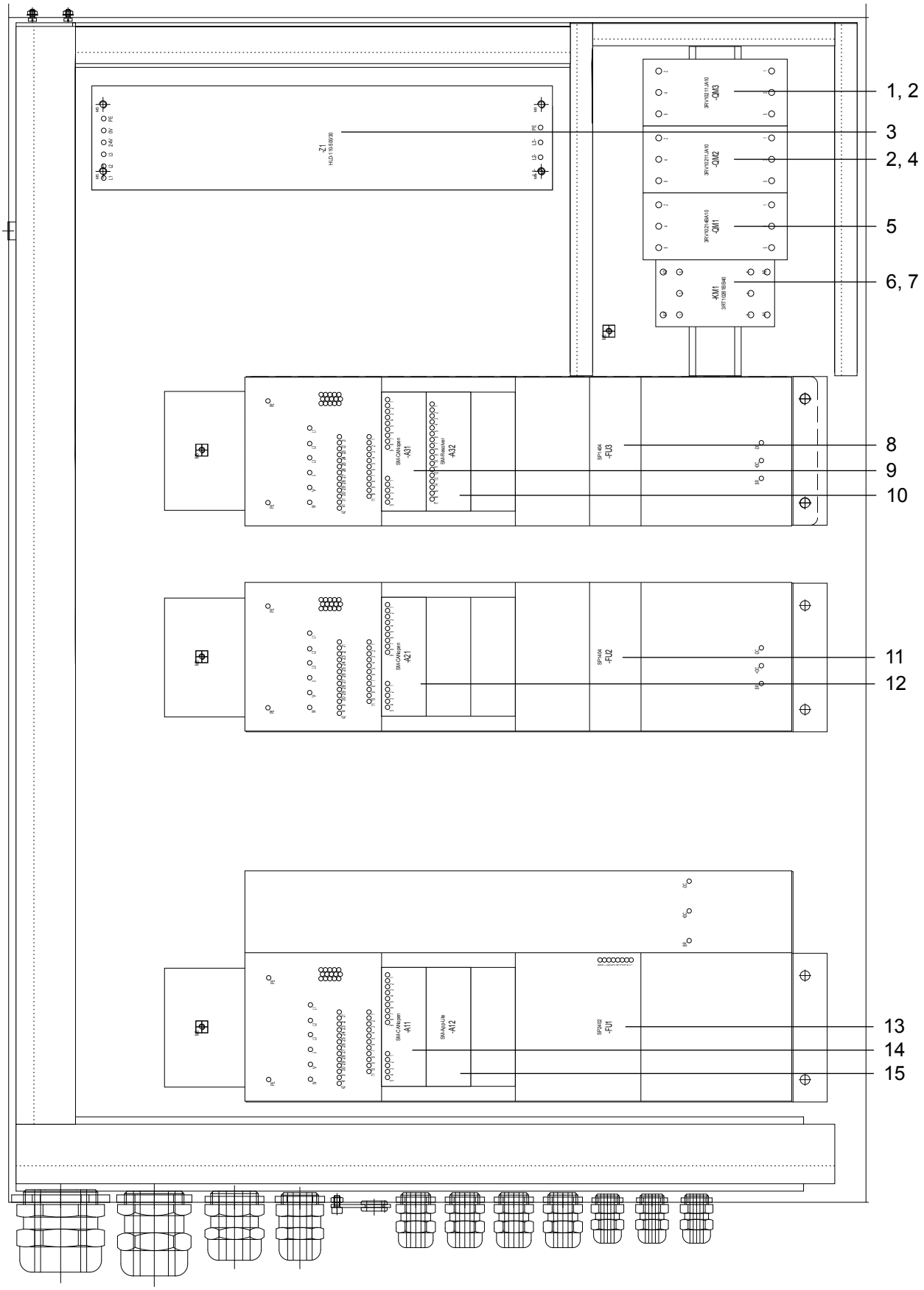
10.3.2 Hopper 350 l




25, 26
24
24
23
22
21
20
19
18
17
17
16
14, 15
13
12
12
11
-QM5
-QM4
-KH10
-KH9
-KH8
-KH7
-KH6
-KH5
-KH4
-KH3
-KH2
-KH1
-F5
-F6
-U1
-A2
-KH12
-A7
-A6
-A5
-A4
-A3
XT2
XT1
-KM2
-KM3
-F3
-F2
-F1
-F4
-U3
-KH1
1-3
1, 2
4, 5
5, 6
5, 6
7, 8
9
10

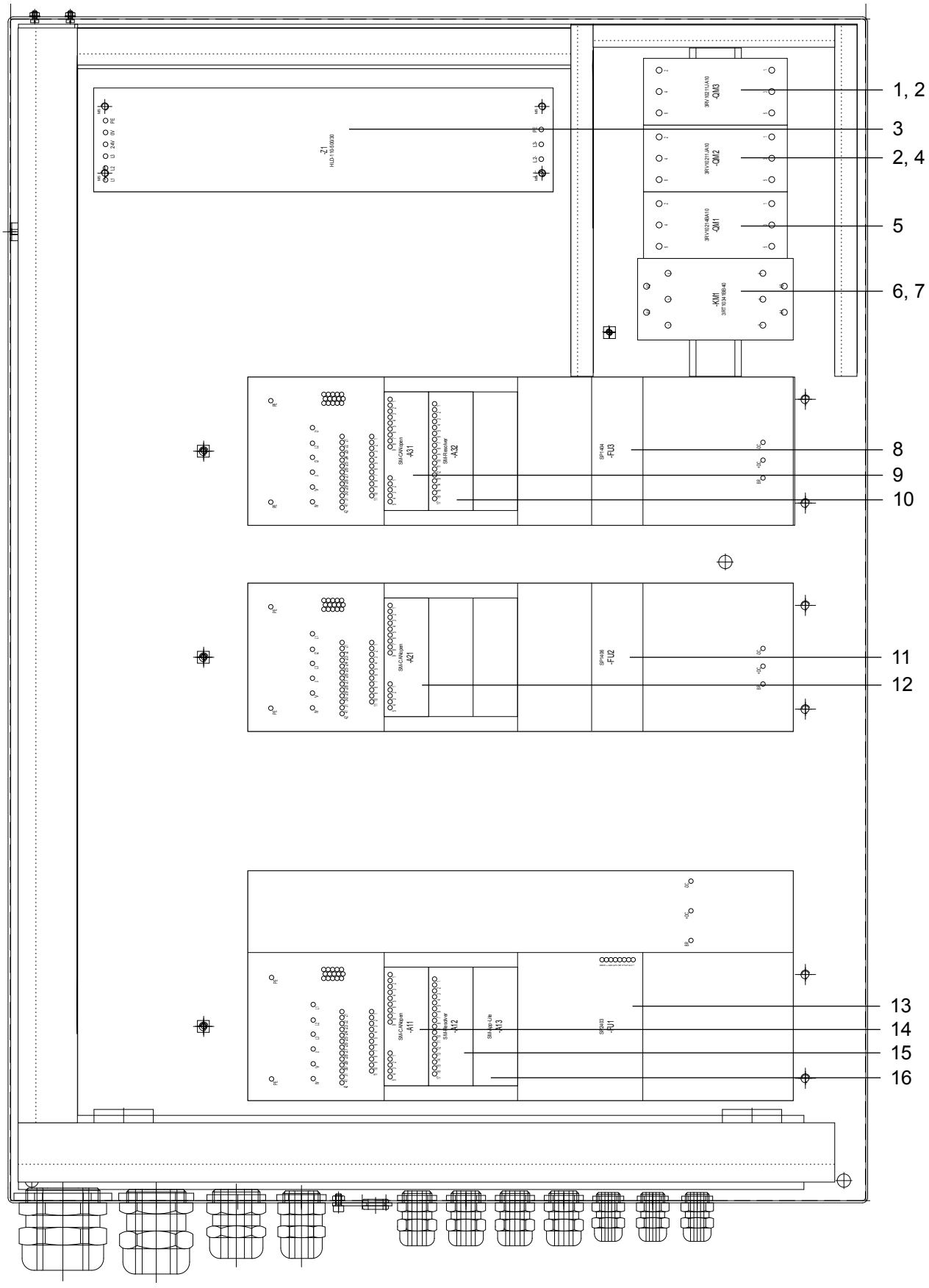
10.4 Electrical control panel (service hatch, right-hand side)

1	Main contactor	KM2, KM3
2	Screening unit	KM2, KM3
3	Auxiliary switch	KM2
4	Fuse	F3, reserve
5	Fuse holder	F1-F3
6	Fuse	F1, F2, reserve
7	Fuse	F4, reserve
8	Fuse holder	F4
9	Temperature measuring transducer (optional)	U3
10	Relay terminal (optional	KH11
11	C-Dias module	A3
12	Multi I/O module	A4, A5
13	Digital inputs module (optional)	A6
14	DMS module (optional)	A7
15	Module carrier	A8
16	Relay module (optional)	KH12
17	Socket board	A2
18	Transfer module	A2
19	Power supply unit	U1
20	Central unit	F6
21	Motor cut-out thermistor	F5
22	Relay module	KH1
23	Relay terminal	KH2-KH10
24	Power switch	QM4, QM5
25	Distributing bar	QM5
26	Feed block	QM5



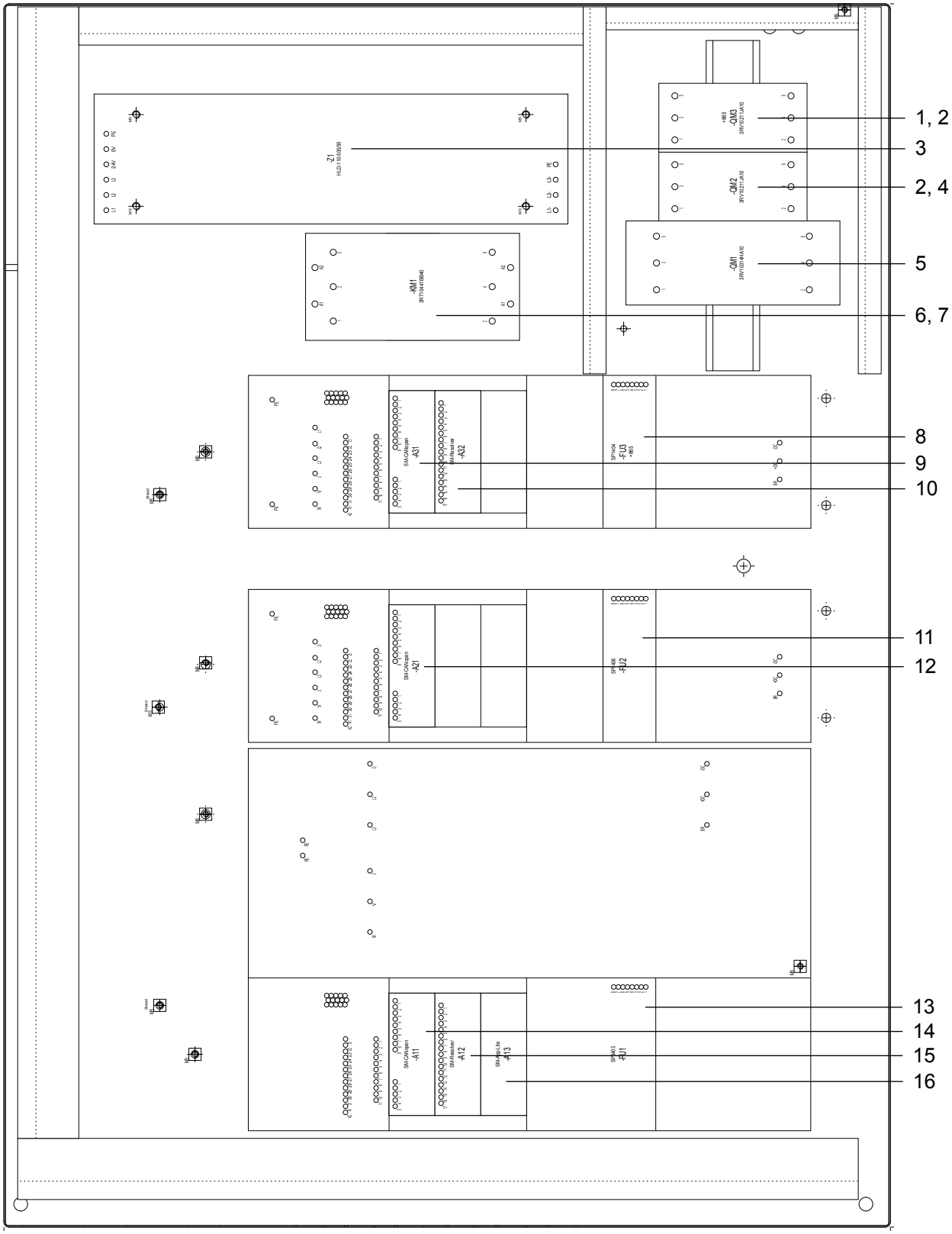
10.5 Drive controller ROBOT HP7E (front door)

1	Power switch (optional)	QM3
2	Distributing bar	QM2, QM3
3	Radio interference suppression filter	Z1
4	Power switch	QM2
5	Power switch	QM1
6	Main contactor	KM1
7	Screening unit	V1
8	Frequency converter linking drive, programmed (optional)	FU3
9	Solutions-Modul SM CANopen (optional)	A31
10	Solutions-Modul resolver (optional)	A32
11	Frequency converter feed unit drive, programmed	FU2
12	Solutions-Modul SM CANopen	A21
13	Frequency converter double screw drive, programmed	FU1
14	Solutions-Modul SM CANopen	A11
15	Application module, programmed	A12



10.6 Drive controller ROBOT HP10E / HP12E (front door)

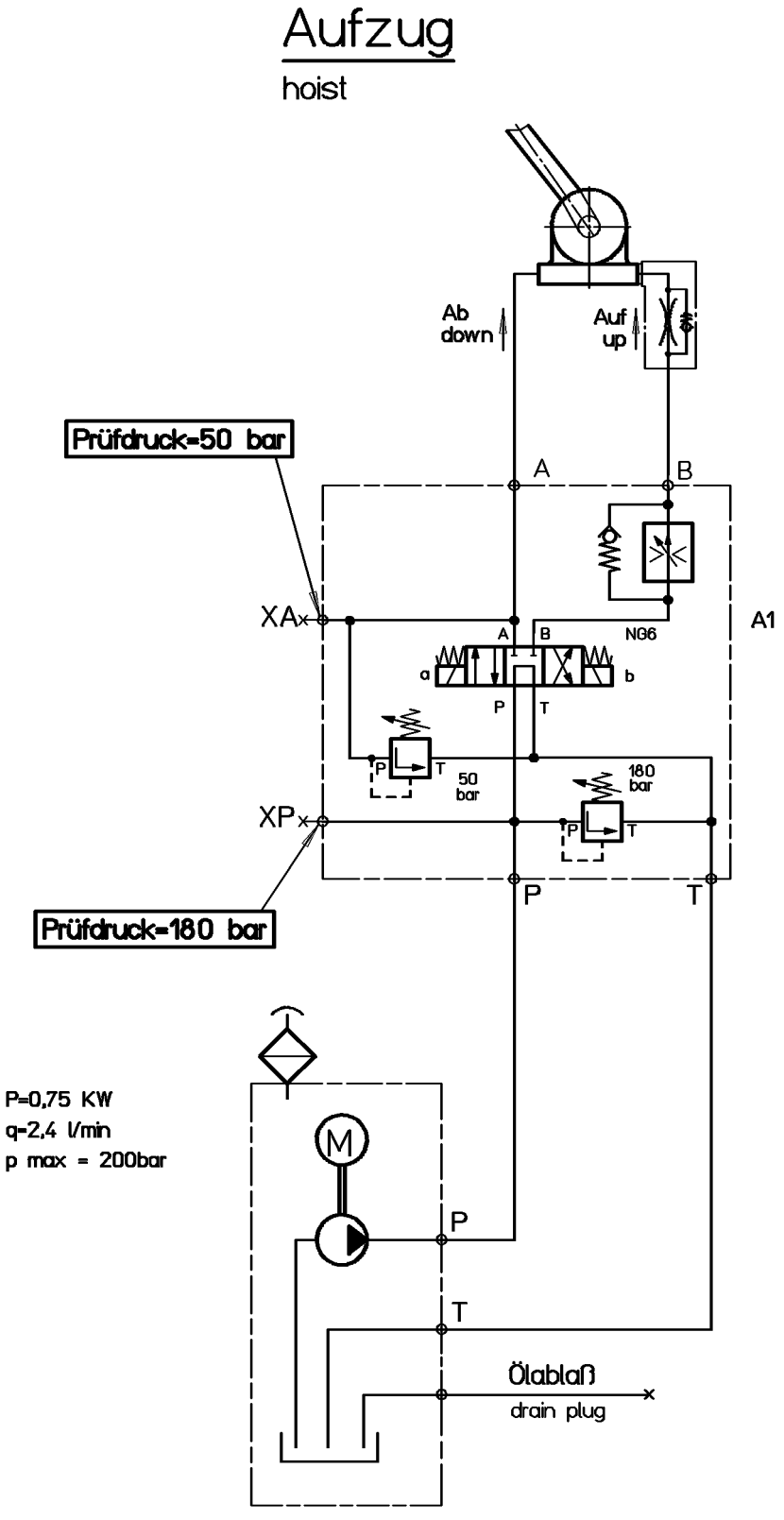
1	Power switch (optional)	QM3
2	Distributing bar	QM2, QM3
3	Radio interference suppression filter	Z1
4	Power switch	QM2
5	Power switch	QM1
6	Main contactor	KM1
7	Screening unit	V1
8	Frequency converter linking drive, programmed (optional)	FU3
9	Solutions-Modul SM CANopen (optional)	A31
10	Solutions-Modul resolver (optional)	A32
11	Frequency converter feed unit drive, programmed	FU2
12	Solutions-Modul SM CANopen	A21
13	Frequency converter double screw drive, programmed	FU1
14	Solutions-Modul SM CANopen	A11
15	Solutions-Modul SM resolver	A12
16	Application module, programmed	A13



10.7 Drive controller ROBOT HP15E / HP20E (front door)

1	Power switch (optional)	QM3
2	Distributing bar	QM2, QM3
3	Radio interference suppression filter	Z1
4	Power switch	QM2
5	Power switch	QM1
6	Main contactor	KM1
7	Screening unit	V1
8	Frequency converter linking drive, programmed (optional)	FU3
9	Solutions-Modul SM CANopen (optional)	A31
10	Solutions-Modul resolver (optional)	A32
11	Frequency converter feed unit drive, programmed	FU2
12	Solutions-Modul SM CANopen	A21
13	Frequency converter double screw drive, programmed	FU1
14	Solutions-Modul SM CANopen	A11
15	Solutions-Modul SM resolver	A12
16	Application module, programmed	A13

10.8 Hydraulic plan



10.9 Lubricants

10.9.1 Double screw drive

Type of oil:	transmission oil
Oil capacity:	approx. 3.0 l
Viscosity class:	ISO VG 100 to DIN 51519
Quality:	C-LP to DIN 51502
Example:	Shell Omala oil 100 (order no. 052001017)

10.9.2 Feed drive

Type of oil:	transmission oil
Oil capacity:	approx. 1.0 l
Viscosity class:	ISO VG 220 to DIN 51519
Quality:	C-LP to DIN 51517
Example:	Shell Omala oil 220 (order no. 052001024)

10.9.3 Hydraulic unit lifting and tipping device (optional)

Type of oil:	hydraulic oil
Oil capacity:	approx. 5.0 l
Viscosity class:	ISO VG 46 to DIN 51519
Quality:	HLP to DIN 51524
Example:	Shell Tellus T46 (order no. 052001010)

10.9.4 Vacuum pump

Type of oil:	compressor oil
Oil capacity:	vacuum pump 16 m^3/h approx. 0.3 l vacuum pump 40 m^3/h (optional) approx. 0.8 l
Viscosity class:	ISO-VG 46 to DIN 51519
Quality:	VDL to DIN 51506
Example:	VEMAG special oil (order no. 052001029)

10.9.5 Feed unit seals and feed unit drive

Type of grease:	high-performance grease which is safe for food use and resistant to cleaning agents and disinfectants
Example:	VEMAG special grease (order no. 052008026)

10.9.6 Individual parts

Type of oil:	white oil which is safe for food use and resistant to cleaning agents and disinfectants

10.10 Accessories

10.10.1 Double screw selection

The following double screws are recommended for setting up the filling machine as a function of the product to be processed.

Type of double screw	Application	**Order no.**
72-367HZ	for boiled sausage, salami (without grinder)	912310048
72-367HPZ	for boiled sausage, salami (without grinder)	912310098
72C/72SC/36N-367HPZ	for boiled ham, ground beef	945348720
112C/112SC/48N-452HPZ	for boiled ham, ground beef	947448930
48C/72SC/48N-367HPZ	for grinder applications	942378639
66C/66SC/48N-367HPZ	for grinder applications	944378639

Warning!
For grinder applications, use only the double screws in the list above.

10.10.2 Filling horn selection

The following filling horns are available for straight filling.

Horn dia.	**Filling horns to DIN 9798**	**Filling horns with crowned outlet**
8	901100080	-
9	901100090	-
10	901100100	-
12	901100120	-
13	901100130	-
14	901100140	-
15	901100150	-
16	901100160	901500160
18	901100180	901500180
20	901100200	901500200
22	901100220	901500220
24	901100240	901500240
28	901100280	901500280
30	901100300	901500300
35	901100350	901500350
40	901100400	901500400
45	901100450	-
50	901100500	-
55	901100550	-
60	901100600	-

10.10.3 Linking horns

The linking horn should be selected as a function of the casing holding device used. To select a suitable linking horn
→ Casing holding device operating instructions

10.10.4 Miscellaneous accessories

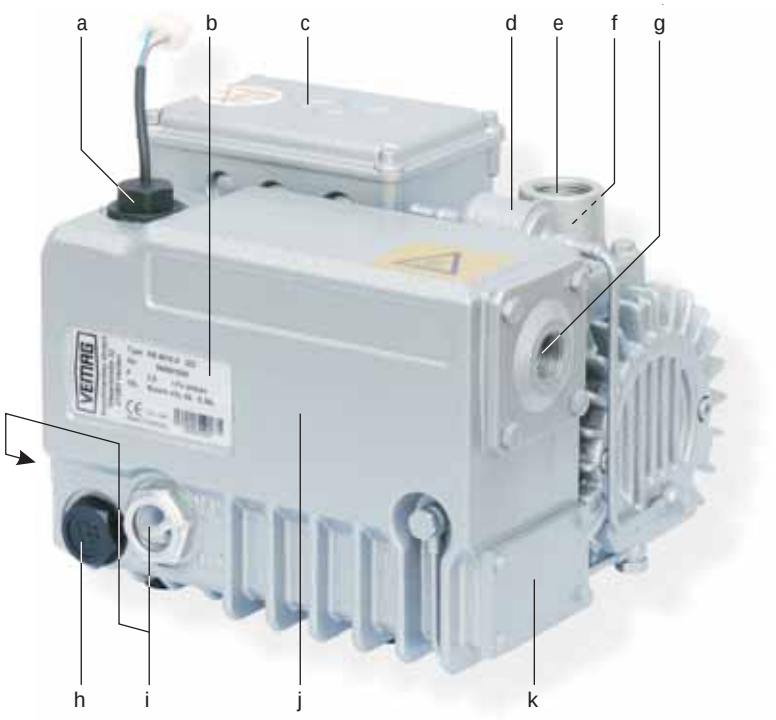
Component	Use	Order no.
Filling horn holder	for 367 mm double screws	936315000
Filling horn holder	for 454 mm double screws	936316002
Filling horn nut	for attaching filling horn	930100017
Blind plug	double screw housing	920001010
Cleaning plug	vacuum line intake pipe	142300600

10.10.5 Tools

The following tools are required for daily cleaning and for maintaining the machine.

Tool	Use	Order no.	Scope of supply
Atomizer canister	lubrication	067287501	yes
Grease gun	lubricating feed system	067064001	yes
Grease gun hose	lubricating feed system	067064002	yes
WAF 80/30/50 universal spanner	filling horn nut, adjustable feet, knee lever, linking head, trolley hoist	126030041	yes
WAF 13/17 double spanner	trolley hoist, mirror	069120131	yes
Face spanner	guard ring and setting ring on drive of lifting/tipping device (optional)	069171251	yes
Threaded screw extractor	double screws held at rear	110930010	yes
Hooked screw extractor	double screws held at front	110930111	-
Threaded screw extractor	double screws with tapering front	118031000	-
Extraction device	double screw housing	114038000	yes

Operating and Maintenance Instructions
Vacuum Pumps
R 5 KC 0016 D VEMAG



a Oil fill plug / Oil level switch
b Nameplate, vacuum pump
c Terminal box
d Filter of the gas ballast
e Suction connection
f Screen
g Gas discharge
h Oil drain plug
i Oil sight glasses
j Oil separator
k Cleaning port

Congratulations on your purchase of the Busch vacuum pump. With watchful observation of the field's requirements, innovation and steady development Busch delivers modern vacuum and pressure solutions worldwide.

These operating and maintenance instructions are meant for users, who obtained the vacuum pump R 5 KC 0016 D as a component of a machine, e.g. a food packaging machine. These operating and maintenance instructions are valid together with the operating instructions of this machine.

If you obtained the vacuum pump R 5 KC 0016 D as an individual unit and require information for the proper integration of the vacuum pump into a machine or system please contact your Busch representative (→ rear cover page).

Electrical installation work must only be executed by qualified personnel.

Intended Use

The vacuum pump must only be used as intended by the manufacturer of the machine or system which the vacuum pump has become a part of. Observe the operating instructions from the manufacturer of the machine or system which the vacuum pump has become a part of!

Maintenance

The oil and the exhaust filter can be contaminated with process residues: wear personal protective equipment as appropriate!

The maintenance intervals depend very much on the individual operating conditions. The intervals given below shall be considered as starting values which should be shortened or extended as appropriate. Observe the operating instructions from the manufacturer of the machine or system which the vacuum pump has become a part of!

Weekly:

- Check the level and the colour of the oil (i)

No low level indication from the level switch (a), ...

Oil level between MIN- and MAX-marking (i), light and transparent, a little foamy or a little tarnished: okay

Level switch (a) indicates low level, ...

Oil level underneath MIN-marking (i): top up oil. A high oil consumption can be an indicator for a defective vacuum pump.

In case of indication of an overfilling, ...

Oil level exceeds MAX-marking (i): excessive dilution with condensates.

Milky discolouration that does not vanish after sedation of the oil: contamination with foreign material. Change the oil (→ Oil Change), check the process, use an inlet air filter, check the inlet air filter.

Dark oil: overheated oil. Change the oil (→ Oil Change), check the process, check the cooling of the vacuum pump.

- Check the vacuum pump for oil leaks - in case of leaks have the vacuum pump repaired (Busch service)

Monthly:

- Check that the drive motor current drawn is in the usual range and that the discharged gas is free from oil; if it is not: change the exhaust filter (→ Change of the Exhaust Filter)

In case an inlet air filter is installed:

- ◆ Check the inlet air filter, if necessary replace

In case of operation in a dusty environment:

- ◆ Clean as described under → Every 6 Months:

Every 6 Months:

- Make sure that the housing is free from dust and dirt, clean if necessary
- Make sure that the vacuum pump is shut down and locked against inadvertent start up
- Clean the fan cowlings, fan wheels, the ventilation grilles and cooling fins

Every Year:

- Replace the exhaust filter (→ Change of the Exhaust Filter)

In case an inlet air filter is installed:

  - ◆ Replace the inlet air filter

- Check the inlet screen (f, 261), clean if necessary
- Replace the filter of the gas ballast (d, 440)

Every 500 - 2000 Operating Hours:

Observe the operating instructions from the manufacturer of the machine which the vacuum pump has become a part of.

- Change the oil (→ Oil Change)

Oil Change

After switching off the vacuum pump at normal operating temperature wait no more than 20 minutes before the oil is drained (the oil shall still be warm when being drained).

- Completely drain the used oil (h)
- Remove the cover of the cleaning port (k), check the oil sump for residues, mechanically remove the residues if necessary
- Fill in approx. 0.3 litres of vacuum pump oil (a)
- Dispose of the used oil in compliance with applicable regulations

Change of the Exhaust Filter

Eye protection goggles must be worn while changing the exhaust filter!

- Make sure that the vacuum pump is shut down and locked against inadvertent start up
- Remove the exhaust cover (g) from the oil separator (j)
- Loosen the screw in the centre of the exhaust filter retaining spring, but do not remove it at this time
- Press the exhaust filter retaining spring out of the indent and rotate it
- Remove the exhaust filter retaining spring from the oil separator (j)
- Pull the exhaust filter out of the oil separator (j)
- Install the new exhaust filter in reverse order
- Dispose of the used exhaust filter in compliance with applicable regulations

Dismantling and Disposal

The inside of the vacuum pump, the oil and the exhaust filter can be contaminated with process residues: wear personal protective equipment as appropriate!

- Drain the oil and dispose of it in compliance with applicable regulations
- Remove the exhaust filter (→ Change of the Exhaust Filter) and dispose of it in compliance with applicable regulations
- Make sure that the vacuum pump is not contaminated with harmful foreign material

According to the best knowledge at the time of printing of this manual the materials used for the manufacture of the vacuum pump involve no risk.

- Dispose of the vacuum pump as scrap metal

Technical Data

Nominal suction capacity (50Hz/60Hz)	m³/h	16 / 19
Ultimate pressure	hPa (=mbar) abs.	20
Motor nominal rating (50Hz/60Hz)	kW	0.55
Motor nominal speed (50Hz/60Hz)	min^{-1}	3000 / 3600
Sound pressure level (EN ISO 2151) (50Hz/60Hz)	dB (A)	60 / 64
Operating temperature (50Hz/60Hz)	°C	82 / 92
Ambient temperature range	°C	0 ... 40
Ambient pressure		Atmospheric pressure
Oil quantity	l	0.3
Oil furnished ex-works		VSL 068
Weight approx. (50Hz/60Hz)	kg	~19

Spare Parts / Spare Parts Kits

The exclusive use of genuine spare parts and consumables is a prerequisite for the proper function of the vacuum pump and for the granting of warranty, guarantee or goodwill.

Find the list of Busch companies all over the world (by the time of the publication of these operating and maintenance instructions) on → page 8 (rear cover page).

Find the up-to-date list of Busch companies and agencies all over the world on the internet at **www.busch-vacuum.com**.

Pos.	Part	Qty	Part no.
—	Vacuum pump, complete 090.116.700	0	1113 148 917
125	Filter spring	1	0947 000 719
261	Screen	1	0534 000 056
440	Gas ballast, complete 090.116.513	1	0916 106 678
—	Oil level switch 090.116.701	1	0652 149 308

Spare parts kit	Description	Part no.
Service kit	consisting of exhaust filter and pertinent seals 090.116.512	0992 146 818
Set of seals/gaskets	consisting of all necessary seals	0990 146 817
Overhaul kit	consisting of seal set and all wearing parts 090.116.511	0993 146 816

Oil

Denomination	VSL 068
ISO-VG	68
Base	PAO
Density [g/cm³]	0.83
Kinematic viscosity at 40 °C [mm²/s]	68
Kinematic viscosity at 100 °C [mm²/s]	10
Flashpoint [°C]	240
Pourpoint [°C]	–55
Part no. 1 l packaging	0831 131 846
Part no. 5 l packaging	0831 131 847
Remark	Food applications (NSF H1); VEMAG-part no. 1l-packaging: 052.001.029
Filling quantity, approx. [l]	0.3

EC-Declaration of Conformity

Note: This Declaration of Conformity and the CE-mark affixed to the nameplate are valid for the vacuum pump within the Busch-scope of delivery. When this vacuum pump is integrated into a superordinate machinery the manufacturer of the superordinate machinery (this can be the operating company, too) must conduct the conformity assessment process acc. to the Directive Machinery 2006/42/EC for the superordinate machine, issue the Declaration of Conformity for it and affix the CE-mark.

We

Busch Produktions GmbH
Schauinslandstr. 1
79689 Maulburg
Germany

declare that vacuum pumps **KC 0016 D VEMAG**

in accordance with the European Directives:

- "Machinery" 2006/42/EC,
- "Electrical Equipment Designed for Use within Certain Voltage Limits" (so called "Low Voltage") 2006/95/EC,
- "Electromagnetic Compatibility" 2004/108/EC,

have been designed and manufactured to the following specifications:

Standard	Title of the Standard
Harmonised Standards	
EN ISO 12100-1 EN ISO 12100-2	Safety of machinery - Basic concepts, general principles of design - Part 1 and 2
EN ISO 13857	Safety of machinery - Safety distances to prevent hazard zones being reached by the upper and lower limbs
EN 1012-1 EN 1012-2	Compressors and vacuum pumps - Safety requirements - Part 1 and 2
EN ISO 2151	Acoustics - Noise test code for compressors and vacuum pumps - Engineering method (grade 2)
EN 60204-1	Safety of machinery - Electrical equipment of machines - Part 1: General requirements
EN 61000-6-1 EN 61000-6-2	Electromagnetic compatibility (EMC) - Generic immunity standards
EN 61000-6-3 EN 61000-6-4	Electromagnetic compatibility (EMC) - Generic emission standards

Manufacturer	Person authorised to compile the technical file
Dr.-Ing. Karl Busch	**Andrej Riwe**
General director	Technical writer

Troubleshooting

WARNING

Risk of electrical shock, risk of damage to equipment.

Electrical installation work must only be executed by qualified personnel that knows and observes the following regulations:
- IEC 364 or CENELEC HD 384 or DIN VDE 0100, respectively,
- IEC-Report 664 or DIN VDE 0110,
- BGV A2 (VBG 4) or equivalent national accident prevention regulation.

CAUTION

During operation the surface of the vacuum pump may reach temperatures of more than 70 °C.

Risk of burns!

Let the vacuum pump cool down prior to a required contact or wear heat protection gloves.

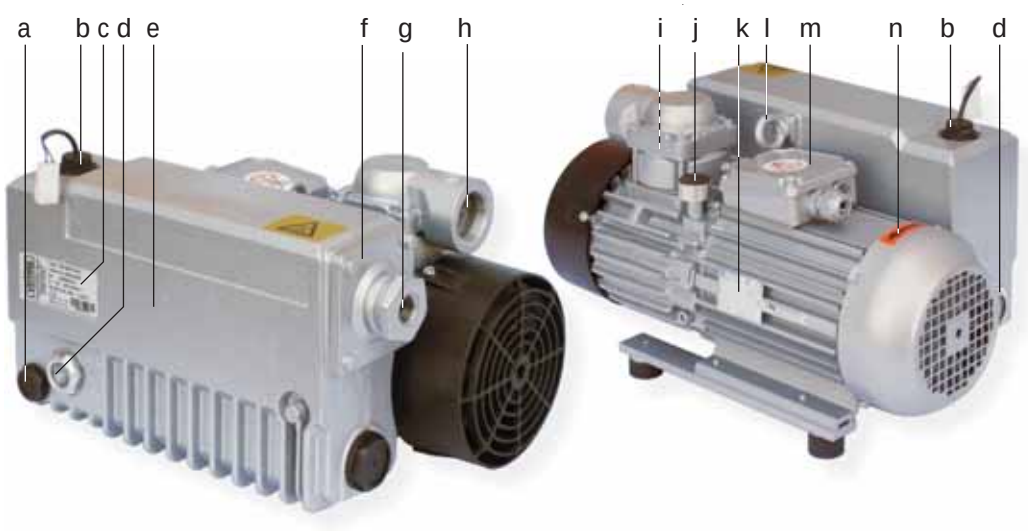
Problem	Possible Cause	Remedy
The vacuum pump does not reach the usual pressure The drive motor draws a too high current (compare with initial value after commissioning) Evacuation of the system takes too long	The vacuum system or suction line is not leak-tight	Check the hose or pipe connections for possible leak
	In case a vacuum relief valve/regulating system is installed: The vacuum relief valve/regulating system is misadjusted or defective	Adjust, repair or replace, respectively
	Contaminated oil (the most common cause)	Change the oil (→ page 1: Maintenance)
	No or not enough oil in the reservoir	Top up oil (→ page 1: Maintenance)
	The exhaust filter is partially clogged	Replace the exhaust filter (→ page 1: Maintenance)
	The screen (f, 261) in the suction connection (e) is partially clogged	Clean the screen (f, 261) If cleaning is required too frequently install a filter upstream
	In case a filter is installed on the suction connection (e): The filter on the suction connection (e) is partially clogged	Clean or replace the inlet air filter, respectively
	Partial clogging in the suction, discharge or pressure line	Remove the clogging
	Long suction, discharge or pressure line with too small diameter	Use larger diameter
	The valve disk of the inlet non-return valve is stuck in closed or partially open position	Disassemble the inlet, clean the screen (f, 261) and the valve as required and reassemble
	The oil tubing is defective or leaking The oil return line is broken	Tighten the connections Replace the connections and/or the tubing (replace with identically dimensioned parts only)
	A shaft seal is leaking	Replace the shaft seal ring (Busch service)
	An/The exhaust valve is not properly seated or stuck in partially open position	Disassemble and reassemble the exhaust valve(s) (Busch service)
	A vane is blocked in the rotor or otherwise damaged	Free the vanes or replace with new ones (Busch service)
	The radial clearance between the rotor and the cylinder is no longer adequate	Readjust the vacuum pump (Busch service)
	Internal parts are worn or damaged	Repair the vacuum pump (Busch service)
	The oil return line starts in an area vented to atmospheric pressure. Particularly on small model pumps, a fairly large amount of air is sucked through the oil return line, which may prevent the ultimate pressure from reaching 20 bar abs. In order to exclude this possible cause: either temporarily disconnect the oil return line from its connection near the exhaust opening and close it or squirt oil through the gas discharge (g)	

The gas conveyed by the vacuum pump smells displeasing	Process components evaporating under vacuum Readily volatile and thus gaseous components of the oil, e.g. additives, particularly right after an oil change. **Note**: This is no indication of a malfunction of the oil separator. The oil separator is able to retain droplets of oil, however no gaseous components of it.	Check the process, if applicable Use a different type of oil, if applicable
The vacuum pump does not start	The drive motor is not supplied with the correct voltage or is overloaded	Supply the drive motor with the correct voltage
	The drive motor starter overload protection is too small or trip level is too low	Compare the trip level of the drive motor starter overload protection with the data on the nameplate, correct if necessary In case of high ambient temperature: set the trip level of the drive motor starter overload protection 5 percent above the nominal drive motor current
	One of the fuses has blown	Check the fuses
	The connection cable is too small or too long causing a voltage drop at the vacuum pump	Use sufficiently dimensioned cable
	The vacuum pump or the drive motor is blocked	Make sure the drive motor is disconnected from the power supply Remove the fan cover Try to turn the drive motor with the vacuum pump by hand If the vacuum pump is blocked: Repair the vacuum pump (Busch service)
	The drive motor is defective	Replace the drive motor (Busch service)
The vacuum pump is blocked	Solid foreign matter has entered the vacuum pump	Repair the vacuum pump (Busch service) Make sure the suction line is equipped with a screen If necessary additionally provide a filter
	Corrosion in the vacuum pump from remaining condensate	Repair the vacuum pump (Busch service) Check the process Observe the chapter Conveying Condensable Vapours (→ page)
	The vacuum pump was run in the wrong direction	Repair the vacuum pump (Busch service) When connecting the vacuum pump make sure the vacuum pump will run in the correct direction (→ page : Installation)
	After shutting down the vacuum pump the vacuum system exerted underpressure onto the pump chamber which sucked back excessive oil from the oil separator into the pump chamber When the vacuum pump was restarted too much oil was enclosed between the vanes Oil could not be compressed and thus broke a vane	Repair the vacuum pump (Busch service) Make sure the vacuum system will not exert underpressure onto the shut-down vacuum pump, if necessary provide an additional shut-off valve or non-return valve
	After shutting down the vacuum pump condensate ran into the pump chamber When the vacuum pump was restarted too much condensate was enclosed between the vanes Condensate could not be compressed and thus broke a vane	Repair the vacuum pump (Busch service) Make sure no condensate will enter the vacuum pump, if necessary provide a drip leg and a drain cock Drain condensate regularly

The vacuum pump starts, but labours or runs noisily or rattles The drive motor draws a too high current (compare with initial value after commissioning)	Loose connection(s) in the drive motor terminal box Not all drive motor coils are properly connected The drive motor operates on two phases only	Check the proper connection of the wires against the connection diagram Tighten or replace loose connections
	The vacuum pump runs in the wrong direction	Verification and rectification → page : Installation and Commissioning
	Standstill over several weeks or months	Let the vacuum pump run warm with inlet closed
	Oil viscosity is too high for the ambient temperature	Use synthetic oil, if necessary use oil of the next lower viscosity class (CAUTION: operation with too low viscosity can cause chatter marks inside the cylinder) Warm up the oil with a heater prior to starting up the vacuum pump, or run the vacuum pump in intervals in order not to let it get too cold
	Improper oil quantity, unsuitable oil type	Use the proper quantity of one of the recommended oils (→ page : Oil change: → page 1: Maintenance)
	No oil change over extended period of time	Perform oil change incl. flushing (→ page 1: Maintenance)
	The exhaust filter is clogged and appears black from burnt oil	Flush the vacuum pump Replace the exhaust filter Fill in new oil (→ page 1: Maintenance) In case the oil life is too short: use oil with better heat resistance (→ page : Oil) or retrofit cooling
	Foreign objects in the vacuum pump Broken vanes Stuck bearings	Repair the vacuum pump (Busch service)
The vacuum pump runs very noisily	Defective bearings	Repair the vacuum pump (Busch service)
	Stuck vanes	Repair the vacuum pump (Busch service) Use only recommended oils (→ page : Oil) and change more frequently
The vacuum pump runs very hot (the oil sump temperature shall not exceed 100 °C)	Insufficient air ventilation	Make sure that the cooling of the vacuum pump is not impeded by dust/dirt Clean the fan cowling, the fan wheel, the ventilation grille and the cooling fins Install the vacuum pump in a narrow space only if sufficient ventilation is ensured On a vacuum pump with oil-cooler: clean the intermediate spaces of the finned tube
	Ambient temperature too high	Observe the permitted ambient temperatures
	Temperature of the inlet gas too high	Observe the permitted temperatures for the inlet gas
	The exhaust filter is partially clogged	Replace the exhaust filter
	Not enough oil in the reservoir	Top up oil

	Oil burnt from overheating	Flush the vacuum pump Replace the exhaust filter Fill in new oil (→ page 1: Maintenance) In case the oil life is too short: use oil with better heat resistance (→ page : Oil) or retrofit cooling
	Mains frequency or voltage outside tolerance range	Provide a more stable power supply
	Partial clogging of filters or screens Partial clogging in the suction, discharge or pressure line	Remove the clogging
	Long suction, discharge or pressure line with too small diameter	Use larger diameter
The vacuum pump fumes or expels oil droplets through the gas discharge The oil level drops	The exhaust filter is not properly seated	Check the proper position of the exhaust filter, if necessary insert properly (→ page 1: Maintenance)
	The o-ring is missing or damaged	Add or replace resp. the o-ring (→ page 1: Maintenance)
	The exhaust filter shows cracks	Replace the exhaust filter (→ page 1: Maintenance)
	The exhaust filter is clogged with foreign matter **Note**: The saturation of the exhaust filter with oil is no fault and does not impair the function of the exhaust filter! Oil dropping down from the exhaust filter is returned to the oil circulation.	Replace the exhaust filter (→ page 1: Maintenance)
	The oil return line is clogged or broken	Clean a clogged oil return line Replace a broken oil return line with an identically dimensioned line, top up oil (if necessary by Busch service)
The oil is black	Oil change intervals are too long The oil was overheated	Flush the vacuum pump Replace the exhaust filter Fill in new oil (→ page 1: Maintenance) In case the oil life is too short: use oil with better heat resistance (→ page : Oil) or retrofit cooling
The oil is watery and coloured white	The vacuum pump aspirated water or significant amounts of humidity The filter of the gas ballast is clogged	Flush the vacuum pump Replace the exhaust filter Fill in new oil (→ page 1: Maintenance) Modify the operational mode (→ page : Operating Notes → Conveying Condensable Vapours) Replace the filter of the gas ballast (d, 440)
The oil is resinous and/or sticky	Improper oil type, perhaps in confusion Topping up of incompatible oil	Flush the vacuum pump Replace the exhaust filter Fill in new oil (→ page 1: Maintenance) Make sure the proper oil is used for changing and topping up
The oil foams	Mixing of incompatible oils	Flush the vacuum pump Replace the exhaust filter Fill in new oil (→ page 1: Maintenance) Make sure the proper oil is used for topping up

Operating and Maintenance Instructions
Vacuum Pumps
R 5 KC 0040 D VEMAG



a Oil drain plug
b Oil fill plug / Oil level switch
c Nameplate, vacuum pump
d Oil sight glasses
e Oil separator
f Exhaust cover plate
g Gas discharge
h Suction connection
i Screen
j Gas ballast
k Nameplate, drive motor
l Eye bolt
m Terminal box
n Directional arrow

Congratulations on your purchase of the Busch vacuum pump. With watchful observation of the field's requirements, innovation and steady development Busch delivers modern vacuum and pressure solutions worldwide.

These operating and maintenance instructions are meant for users, who obtained the vacuum pump R 5 KC 0040 D as a component of a machine, e.g. a food packaging machine. These operating and maintenance instructions are valid together with the operating instructions of this machine.

If you obtained the vacuum pump R 5 KC 0040 D as an individual unit and require information for the proper integration of the vacuum pump into a machine or system please contact your Busch representative (→ rear cover page).

Electrical installation work must only be executed by qualified personnel.

Intended Use

The vacuum pump must only be used as intended by the manufacturer of the machine or system which the vacuum pump has become a part of. Observe the operating instructions from the manufacturer of the machine or system which the vacuum pump has become a part of!

Maintenance

The oil and the exhaust filter can be contaminated with process residues: wear personal protective equipment as appropriate!

The maintenance intervals depend very much on the individual operating conditions. The intervals given below shall be considered as starting values which should be shortened or extended as appropriate. Observe the operating instructions from the manufacturer of the machine or system which the vacuum pump has become a part of!

Weekly:

- Check the level and the colour of the oil (d)

No low level indication from the level switch (b), ...

Oil level between MIN- and MAX-marking (d), light and transparent, a little foamy or a little tarnished: okay

Level switch (b) indicates low level, ...

Oil level underneath MIN-marking (d): top up oil. A high oil consumption can be an indicator for a defective vacuum pump.

In case of indication of an overfilling, ...

Oil level exceeds MAX-marking (d): excessive dilution with condensates.

Milky discolouration that does not vanish after sedation of the oil: contamination with foreign material. Change the oil (→ Oil Change), check the process, use an inlet air filter, check the inlet air filter.

Dark oil: overheated oil. Change the oil (→ Oil Change), check the process, check the cooling of the vacuum pump.

- Check the vacuum pump for oil leaks - in case of leaks have the vacuum pump repaired (Busch service)

Monthly:

- Check that the drive motor current drawn is in the usual range and that the discharged gas is free from oil; if it is not: change the exhaust filter (→ Change of the Exhaust Filter)

In case an inlet air filter is installed:

- ◆ Check the inlet air filter, if necessary replace

In case of operation in a dusty environment:

- ◆ Clean as described under → Every 6 Months:

Every 6 Months:

- Make sure that the housing is free from dust and dirt, clean if necessary
- Make sure that the vacuum pump is shut down and locked against inadvertent start up
- Clean the fan cowlings, fan wheels, the ventilation grilles and cooling fins

Every Year:

- Replace the exhaust filter (→ Change of the Exhaust Filter)

In case an inlet air filter is installed:

- ◆ Replace the inlet air filter

- Check the inlet screen (i, 261), clean if necessary
- Clean the foam insert of the gas ballast (j, 440)

Every 500 - 2000 Operating Hours:

Observe the operating instructions from the manufacturer of the machine which the vacuum pump has become a part of.

- Change the oil (→ Oil Change)

Oil Change

After switching off the vacuum pump at normal operating temperature wait no more than 20 minutes before the oil is drained (the oil shall still be warm when being drained).

- Completely drain the used oil (a)
- Fill in approx. 0.8 litres of vacuum pump oil (b)
- Dispose of the used oil in compliance with applicable regulations

Change of the Exhaust Filter

Eye protection goggles must be worn while changing the exhaust filter!

- Make sure that the vacuum pump is shut down and locked against inadvertent start up
- Remove the exhaust cover (f) from the oil separator (e)
- Loosen the screw in the centre of the exhaust filter retaining spring, but do not remove it at this time
- Press the exhaust filter retaining spring out of the indent and rotate it
- Remove the exhaust filter retaining spring from the oil separator (e)
- Pull the exhaust filter out of the oil separator (e)
- Install the new exhaust filter in reverse order
- Dispose of the used exhaust filter in compliance with applicable regulations

Dismantling and Disposal

The inside of the vacuum pump, the oil and the exhaust filter can be contaminated with process residues: wear personal protective equipment as appropriate!

- Drain the oil and dispose of it in compliance with applicable regulations
- Remove the exhaust filter (→ Change of the Exhaust Filter) and dispose of it in compliance with applicable regulations
- Make sure that the vacuum pump is not contaminated with harmful foreign material

According to the best knowledge at the time of printing of this manual the materials used for the manufacture of the vacuum pump involve no risk.

- Dispose of the vacuum pump as scrap metal

Technical Data

Nominal suction capacity (50Hz/60Hz)	m³/h	40 / 48
Ultimate pressure	hPa (=mbar) abs.	20
Motor nominal rating (50Hz/60Hz)	kW	1.5
Motor nominal speed (50Hz/60Hz)	min^{-1}	3000 / 3600
Sound pressure level (EN ISO 2151) (50Hz/60Hz)	dB (A)	69 / 71
Operating temperature (50Hz/60Hz)	°C	80 / 85
Ambient temperature range	°C	0 ... 40
Ambient pressure		Atmospheric pressure
Oil quantity	l	0.8
Oil furnished ex-works		VSL 068
Weight approx. (50Hz/60Hz)	kg	~29

Spare Parts / Spare Parts Kits

The exclusive use of genuine spare parts and consumables is a prerequisite for the proper function of the vacuum pump and for the granting of warranty, guarantee or goodwill.

Find the list of Busch companies all over the world (by the time of the publication of these operating and maintenance instructions) on → page 8 (rear cover page).

Find the up-to-date list of Busch companies and agencies all over the world on the internet at **www.busch-vacuum.com**.

Pos.	Part	Qty	Part no.
—	Vacuum pump, complete 090.116.600	1	1113 149 918
125	Filter spring	1	0947 000 720
261	Screen	1	0534 000 018
440	Gas ballast, complete	1	0916 122 393
—	Oil level switch 090.116.601	1	0652 149 306

Spare parts kit	Description	Part no.
Service kit	consisting of exhaust filter and pertinent seals 090.116.361	0992 148 010
Set of seals/gaskets	consisting of all necessary seals	0990 148 008
Overhaul kit	consisting of seal set and all wearing parts 090.116.360	0993 148 009

Oil

Denomination	VSL 068
ISO-VG	68
Base	PAO
Density [g/cm³]	0.83
Kinematic viscosity at 40 °C [mm²/s]	68
Kinematic viscosity at 100 °C [mm²/s]	10
Flashpoint [°C]	240
Pourpoint [°C]	–55
Part no. 1 l packaging	0831 131 846
Part no. 5 l packaging	0831 131 847
Remark	Food applications (NSF H1); VEMAG-part no. 1l-packaging: 052.001.029
Filling quantity, approx. [l]	0.8

EC-Declaration of Conformity

Note: This Declaration of Conformity and the CE-mark affixed to the nameplate are valid for the vacuum pump within the Busch-scope of delivery. When this vacuum pump is integrated into a superordinate machinery the manufacturer of the superordinate machinery (this can be the operating company, too) must conduct the conformity assessment process acc. to the Directive Machinery 2006/42/EC for the superordinate machine, issue the Declaration of Conformity for it and affix the CE-mark.

We

Busch Produktions GmbH
Schauinslandstr. 1
79689 Maulburg
Germany

declare that vacuum pumps **KC 0040 D VEMAG**

in accordance with the European Directives:

- "Machinery" 2006/42/EC,
- "Electrical Equipment Designed for Use within Certain Voltage Limits" (so called "Low Voltage") 2006/95/EC,
- "Electromagnetic Compatibility" 2004/108/EC,

have been designed and manufactured to the following specifications:

Standard	Title of the Standard
Harmonised Standards	
EN ISO 12100-1 EN ISO 12100-2	Safety of machinery - Basic concepts, general principles of design - Part 1 and 2
EN ISO 13857	Safety of machinery - Safety distances to prevent hazard zones being reached by the upper and lower limbs
EN 1012-1 EN 1012-2	Compressors and vacuum pumps - Safety requirements - Part 1 and 2
EN ISO 2151	Acoustics - Noise test code for compressors and vacuum pumps - Engineering method (grade 2)
EN 60204-1	Safety of machinery - Electrical equipment of machines - Part 1: General requirements
EN 61000-6-1 EN 61000-6-2	Electromagnetic compatibility (EMC) - Generic immunity standards
EN 61000-6-3 EN 61000-6-4	Electromagnetic compatibility (EMC) - Generic emission standards

Manufacturer	Person authorised to compile the technical file
Dr.-Ing. Karl Busch	**Andrej Riwe**
General director	Technical writer

Troubleshooting

WARNING

Risk of electrical shock, risk of damage to equipment.

Electrical installation work must only be executed by qualified personnel that knows and observes the following regulations:
- IEC 364 or CENELEC HD 384 or DIN VDE 0100, respectively,
- IEC-Report 664 or DIN VDE 0110,
- BGV A2 (VBG 4) or equivalent national accident prevention regulation.

CAUTION

During operation the surface of the vacuum pump may reach temperatures of more than 70 °C.

Risk of burns!

Let the vacuum pump cool down prior to a required contact or wear heat protection gloves.

Problem	Possible Cause	Remedy
The vacuum pump does not reach the usual pressure The drive motor draws a too high current (compare with initial value after commissioning) Evacuation of the system takes too long	The vacuum system or suction line is not leak-tight	Check the hose or pipe connections for possible leak
	In case a vacuum relief valve/regulating system is installed: The vacuum relief valve/regulating system is misadjusted or defective	Adjust, repair or replace, respectively
	Contaminated oil (the most common cause)	Change the oil (→ page 1: Maintenance)
	No or not enough oil in the reservoir	Top up oil (→ page 1: Maintenance)
	The exhaust filter is partially clogged	Replace the exhaust filter (→ page 1: Maintenance)
	The screen (i, 261) in the suction connection (h) is partially clogged	Clean the screen (i, 261) If cleaning is required too frequently install a filter upstream
	In case a filter is installed on the suction connection (h): The filter on the suction connection (h) is partially clogged	Clean or replace the inlet air filter, respectively
	Partial clogging in the suction, discharge or pressure line	Remove the clogging
	Long suction, discharge or pressure line with too small diameter	Use larger diameter
	The valve disk of the inlet non-return valve is stuck in closed or partially open position	Disassemble the inlet, clean the screen (i, 261) and the valve as required and reassemble
	The oil tubing is defective or leaking The oil return line is broken	Tighten the connections Replace the connections and/or the tubing (replace with identically dimensioned parts only)
	A shaft seal is leaking	Replace the shaft seal ring (Busch service)
	An/The exhaust valve is not properly seated or stuck in partially open position	Disassemble and reassemble the exhaust valve(s) (Busch service)
	A vane is blocked in the rotor or otherwise damaged	Free the vanes or replace with new ones (Busch service)
	The radial clearance between the rotor and the cylinder is no longer adequate	Readjust the vacuum pump (Busch service)
	Internal parts are worn or damaged	Repair the vacuum pump (Busch service)
	The oil return line starts in an area vented to atmospheric pressure. Particularly on small model pumps, a fairly large amount of air is sucked through the oil return line, which may prevent the ultimate pressure from reaching 20 bar abs. In order to exclude this possible cause: either temporarily disconnect the oil return line from its connection near the exhaust opening and close it or squirt oil through the gas discharge (g)	

The gas conveyed by the vacuum pump smells displeasing	Process components evaporating under vacuum Readily volatile and thus gaseous components of the oil, e.g. additives, particularly right after an oil change. **Note**: This is no indication of a malfunction of the oil separator. The oil separator is able to retain droplets of oil, however no gaseous components of it.	Check the process, if applicable Use a different type of oil, if applicable
The vacuum pump does not start	The drive motor is not supplied with the correct voltage or is overloaded	Supply the drive motor with the correct voltage
	The drive motor starter overload protection is too small or trip level is too low	Compare the trip level of the drive motor starter overload protection with the data on the nameplate, correct if necessary In case of high ambient temperature: set the trip level of the drive motor starter overload protection 5 percent above the nominal drive motor current
	One of the fuses has blown	Check the fuses
	The connection cable is too small or too long causing a voltage drop at the vacuum pump	Use sufficiently dimensioned cable
	The vacuum pump or the drive motor is blocked	Make sure the drive motor is disconnected from the power supply Remove the fan cover Try to turn the drive motor with the vacuum pump by hand If the vacuum pump is blocked: Repair the vacuum pump (Busch service)
	The drive motor is defective	Replace the drive motor (Busch service)
The vacuum pump is blocked	Solid foreign matter has entered the vacuum pump	Repair the vacuum pump (Busch service) Make sure the suction line is equipped with a screen If necessary additionally provide a filter
	Corrosion in the vacuum pump from remaining condensate	Repair the vacuum pump (Busch service) Check the process Observe the chapter Conveying Condensable Vapours (→ page)
	The vacuum pump was run in the wrong direction	Repair the vacuum pump (Busch service) When connecting the vacuum pump make sure the vacuum pump will run in the correct direction (→ page : Installation)
	After shutting down the vacuum pump the vacuum system exerted underpressure onto the pump chamber which sucked back excessive oil from the oil separator into the pump chamber When the vacuum pump was restarted too much oil was enclosed between the vanes Oil could not be compressed and thus broke a vane	Repair the vacuum pump (Busch service) Make sure the vacuum system will not exert underpressure onto the shut-down vacuum pump, if necessary provide an additional shut-off valve or non-return valve
	After shutting down the vacuum pump condensate ran into the pump chamber When the vacuum pump was restarted too much condensate was enclosed between the vanes Condensate could not be compressed and thus broke a vane	Repair the vacuum pump (Busch service) Make sure no condensate will enter the vacuum pump, if necessary provide a drip leg and a drain cock Drain condensate regularly

The vacuum pump starts, but labours or runs noisily or rattles The drive motor draws a too high current (compare with initial value after commissioning)	Loose connection(s) in the drive motor terminal box Not all drive motor coils are properly connected The drive motor operates on two phases only	Check the proper connection of the wires against the connection diagram Tighten or replace loose connections
	The vacuum pump runs in the wrong direction	Verification and rectification → page : Installation and Commissioning
	Standstill over several weeks or months	Let the vacuum pump run warm with inlet closed
	Oil viscosity is too high for the ambient temperature	Use synthetic oil, if necessary use oil of the next lower viscosity class (CAUTION: operation with too low viscosity can cause chatter marks inside the cylinder) Warm up the oil with a heater prior to starting up the vacuum pump, or run the vacuum pump in intervals in order not to let it get too cold
	Improper oil quantity, unsuitable oil type	Use the proper quantity of one of the recommended oils (→ page : Oil change: → page 1: Maintenance)
	No oil change over extended period of time	Perform oil change incl. flushing (→ page 1: Maintenance)
	The exhaust filter is clogged and appears black from burnt oil	Flush the vacuum pump Replace the exhaust filter Fill in new oil (→ page 1: Maintenance) In case the oil life is too short: use oil with better heat resistance (→ page : Oil) or retrofit cooling
	Foreign objects in the vacuum pump Broken vanes Stuck bearings	Repair the vacuum pump (Busch service)
The vacuum pump runs very noisily	Defective bearings	Repair the vacuum pump (Busch service)
	Stuck vanes	Repair the vacuum pump (Busch service) Use only recommended oils (→ page : Oil) and change more frequently
The vacuum pump runs very hot (the oil sump temperature shall not exceed 100 °C)	Insufficient air ventilation	Make sure that the cooling of the vacuum pump is not impeded by dust/dirt Clean the fan cowling, the fan wheel, the ventilation grille and the cooling fins Install the vacuum pump in a narrow space only if sufficient ventilation is ensured On a vacuum pump with oil-cooler: clean the intermediate spaces of the finned tube
	Ambient temperature too high	Observe the permitted ambient temperatures
	Temperature of the inlet gas too high	Observe the permitted temperatures for the inlet gas
	The exhaust filter is partially clogged	Replace the exhaust filter
	Not enough oil in the reservoir	Top up oil

	Oil burnt from overheating	Flush the vacuum pump Replace the exhaust filter Fill in new oil (→ page 1: Maintenance) In case the oil life is too short: use oil with better heat resistance (→ page : Oil) or retrofit cooling
	Mains frequency or voltage outside tolerance range	Provide a more stable power supply
	Partial clogging of filters or screens Partial clogging in the suction, discharge or pressure line	Remove the clogging
	Long suction, discharge or pressure line with too small diameter	Use larger diameter
The vacuum pump fumes or expels oil droplets through the gas discharge The oil level drops	The exhaust filter is not properly seated	Check the proper position of the exhaust filter, if necessary insert properly (→ page 1: Maintenance)
	The o-ring is missing or damaged	Add or replace resp. the o-ring (→ page 1: Maintenance)
	The exhaust filter shows cracks	Replace the exhaust filter (→ page 1: Maintenance)
	The exhaust filter is clogged with foreign matter **Note**: The saturation of the exhaust filter with oil is no fault and does not impair the function of the exhaust filter! Oil dropping down from the exhaust filter is returned to the oil circulation.	Replace the exhaust filter (→ page 1: Maintenance)
	The oil return line is clogged or broken	Clean a clogged oil return line Replace a broken oil return line with an identically dimensioned line, top up oil (if necessary by Busch service)
The oil is black	Oil change intervals are too long The oil was overheated	Flush the vacuum pump Replace the exhaust filter Fill in new oil (→ page 1: Maintenance) In case the oil life is too short: use oil with better heat resistance (→ page : Oil) or retrofit cooling
The oil is watery and coloured white	The vacuum pump aspirated water or significant amounts of humidity The filter of the gas ballast (j, 440) is clogged	Flush the vacuum pump Replace the exhaust filter Fill in new oil (→ page 1: Maintenance) Modify the operational mode (→ page : Operating Notes → Conveying Condensable Vapours) Clean the foam insert of the gas ballast (j, 440)
The oil is resinous and/or sticky	Improper oil type, perhaps in confusion Topping up of incompatible oil	Flush the vacuum pump Replace the exhaust filter Fill in new oil (→ page 1: Maintenance) Make sure the proper oil is used for changing and topping up
The oil foams	Mixing of incompatible oils	Flush the vacuum pump Replace the exhaust filter Fill in new oil (→ page 1: Maintenance) Make sure the proper oil is used for topping up