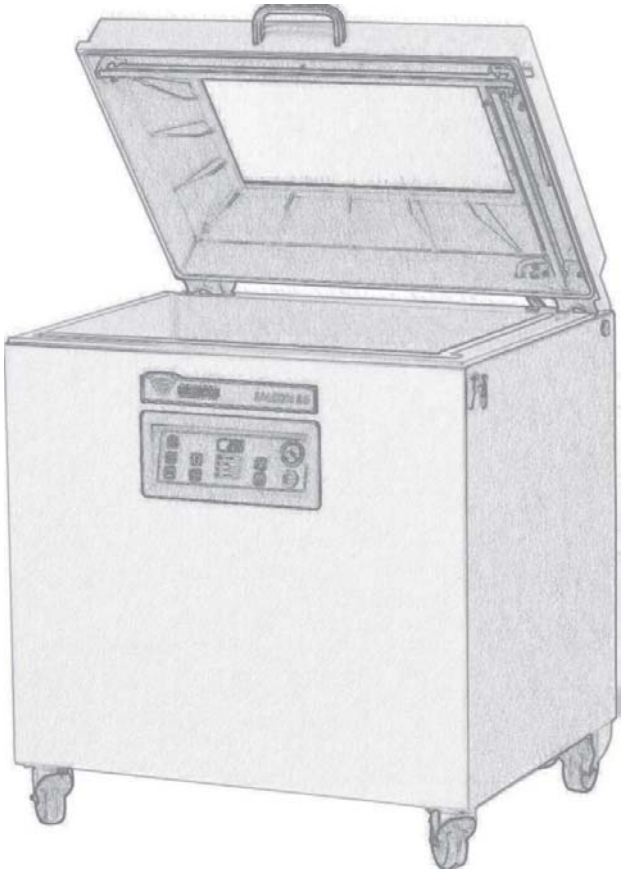
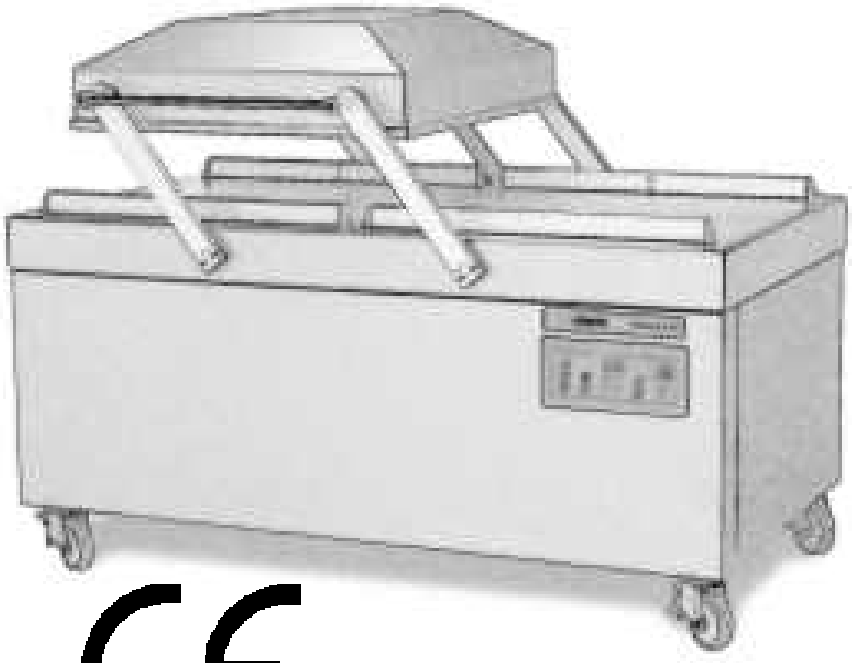
07/2013

Mod: TA-90B/N

Production code: BOXER 42 XL

Diamond
catering equipment





CE

Versie 06.03 DIG.EN

CONTENT USER MANUAL

PRIOR TO STARTING TO USE THE MACHINE, MACHINE REGISTRATION TO BE COMPLETED BY THE USER

Register the machine using the following data. This information is necessary if the supplier is contacted concerning questions or references about the specific machine.

DATA ON MACHINE TAG

Relevant data for answering questions can be found on the machine tag. The machine tag is located at the rear of the machine. Note down the following data:

1. MACHINE TYPE

2. MACHINE NUMBER (MACHINE NO.)

3. VOLTAGE (TENSION)

CONTROL PANEL DATA

When starting the machine, two codes first appear on the large display in succession before control panel switches to operation mode. The first code indicates the model of the machine and the second code indicates the control software version. Write both codes in the space below:

4. CODE 1

5. CODE 2

IMPORTANT FOR INSTALLATION!!! READ THIS FIRST!!!

GENERAL

- First read this manual carefully before the machine is put into operation.
- This manual contains relevant information and instructions for starting up, maintenance and applications.
- If problems arise with the machine that could have been avoided by referring to this manual then the guarantee expires.

- Henkelman BV wishes the customer lots of pleasure for an extended period from the purchase of the machine. If there are any problems or questions then the customer can always approach the supplier.

ENVIRONMENT

- The machine must be moved or transported in an upright position. The machine may NOT be tilted as this can cause damage to the pump.

- Place the machine on a flat, level floor. This is essential for problem free operation of the machine.

- Enough space must be left around the machine for good ventilation. The space must be at least 5 centimetres.

- The ambient temperature in which the machine is operated must be between 5 ^{0}C and 30 ^{0}C. When operating the machine in other ambient temperatures the user must contact the supplier for advice.

- NEVER place the machine directly next to a heat source or a steaming device (for example a combi-steamer, dishwasher or stove)

POWER / EARTH

- Check that the voltage stated on the machine tag is the same as the mains voltage.

- Check the direction which the pump is turning when the machine is connected to a three phase power source.

- Always connect the machine correctly to an earthed socket to avoid danger for fire or electrical shocks (earth connection is green/yellow).

- The power cable must always be free and nothing may be placed on it.

- Replace the power cable immediately if damaged.

- Always disconnect the power if there are problems with the machine or during maintenance, prior to starting work on the machine.

- If the machine is stationary for long periods then the power should always be disconnected.

VACUUM PUMP

- Check before starting the machine if there is oil in the pump (see page 23). NEVER start the machine without oil in the pump.
- Use the right type of oil for the pump (see page 24).
- After moving and/or transporting the machine, always first check the oil level before re-starting operation.
- When starting the machine for the first time or after a lengthy idle period, first run the conditioning program before operating the machine (see page 22).

CONNECTING THE GAS FLUSH SYSTEM (if applicable)

- NEVER use flammable gasses or gas mixtures containing too much oxygen. There is a danger of explosion when using the aforementioned gasses. Accidents and/or damage caused by using abovementioned gasses void all liability on the part of Henkelman BV as well as the guarantee.
- The gas bottles must always be correctly secured. If the gas flush function and/or the machine is not in use then the main cock of the gas bottle must always be closed.
- The pressure of the pressure reducing valve on the gas bottle may NEVER be set to more than 1 atmosphere/ATO. A higher pressure may damage the machine.
- The diameter of the hose nipple connector for the gas bottle is 6 mm (BOXER and MARLIN 42/42 XL), 13 mm (POLAR 2-85 and 2-95), and 8 mm for other machines. The connector is at the rear of the machine.

For more information about the use of gas bottles, consult an authorised gas supplier

CONNECTING COMPRESSED AIR FOR EXTERNAL SEALING PRESSURE (if applicable)

- The pressure from the compressor may NEVER be set to more than 1 atmosphere/ATO. A higher pressure may damage the machine.
- Only dry compressed air may be used for the external seal pressure.
- The diameter of the hose nipple connector the compressor is 6 mm (rear machine)

For more information about the use of compressed air, consult an authorised gas supplier

IMPORTANT FOR OPERATION !!! READ THIS FIRST !!!

GENERAL

- Never pack products that can be damaged during or after vacuum packaging. Live oats may never be vacuumed.
- Refer to this manual if in doubt as to the operation and/or functioning of the machine. If the manual does not offer a solution consult the supplier.
- The guarantee and/or liability expires if damage is caused by repairs and/or changes made by you. In the case of malfunctions contact the supplier.
- In the case of malfunctions always stop the machine and remove the power cable from the wall socket.

GENERAL MAINTENANCE

- It is essential that the machine is serviced regularly to guarantee operation and to keep the machine in optimal condition. The maintenance schedule is clearly defined on page 22. The guarantee automatically expires due to overdue or sloppy maintenance.
- Always remove the power cable from the wall socket for maintenance work; the machine must be completely disconnected.
- If there are doubts about the maintenance activities or if the machine fails to work correctly always contact the supplier.

TRANSPARENT LID (if applicable)

- Never locate the machine near a heat source. This can cause damage to the lid (cracks).
- Never place hot, sharp, or heavy objects on the lid. These can cause damage to the lid (cracks) in the long run.
- Always clean the lid with solvent-free cleaning agents. Solvents can damage the lid.
- Check at least once a week if there are cracks in the lid. If cracks are visible in the lid then the machine must IMMEDIATELY be turned off and not used again until the lid has been replaced. Continuing to work with a cracked lid can cause the lid to implode. All guarantees and/or liability expire in the case of accidents and/or damage caused by working with a cracked lid.
- Replace the transparent lid every 4 years as a precautionary measure as a standard maintenance interval.

VACUUM PUMP

- Regularly check the level and quality of the oil in the pump. If there is too little oil or the quality of the oil is bad (turbid), replace or top up the oil before operating the machine (see page 23). Let the pump conditioning program run at least one full cycle before replacing the oil (see page 22).
- Use the right type of oil for the pump when replacing or filling up (see page 24).
- Use the conditioning program at least once a week to enhance correct and long-lasting pump operation (see page 22).

USE OF GAS FLUSH SYSTEM (if applicable)

- NEVER use flammable gasses or gas mixtures containing too much oxygen. Use thereof can cause risk of explosions. Accidents and/or damage caused by using abovementioned gasses voids all liability on the part of Henkelman BV as well as the guarantee.
- The gas bottles must always be correctly secured. If the gassing function and/or the machine is not in use then the main cock of the gas bottle must always be closed.
- The pressure of the pressure reducing valve on the gas bottle may NEVER be set to more than 1 atmosphere/ATO. A higher pressure may damage the machine.

For more information about the use of gas bottles, consult an authorised gas supplier

WARNING SIGNS ON THE MACHINE!!!

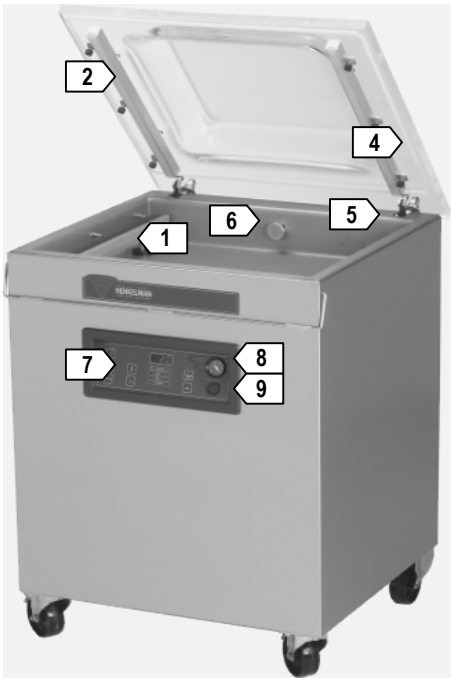
- ONLY use the prescribed power supply voltage.
- Insert the plug firmly into the mains wall socket.
- Always connect the machine to an earthed wall socket
- Always remove the plug during maintenance or when the machine is not in use for extended periods.

- NEVER use flammable gasses or gas mixtures containing too much oxygen. Use thereof can cause risk of explosions
- Accidents and/or damage caused by using abovementioned gasses void(s) all liability on the part of Henkelman BV as well as the guarantee.

IMPORTANT MACHINE PARTS

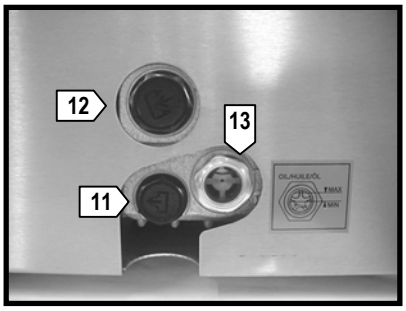
BOXER SERIES

MARLIN SERIES

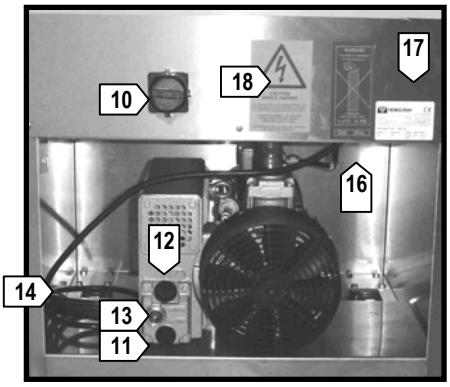


Vacuum chamber

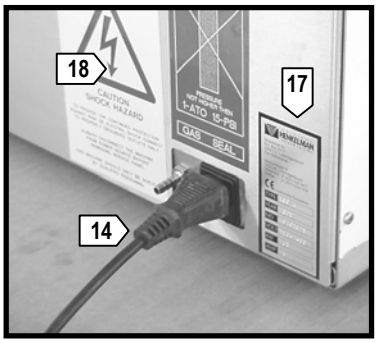
Side view BOXER machines

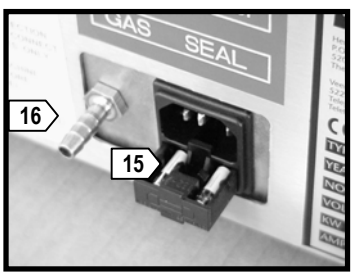


Rear view MARLIN machines



Rear view BOXER machines





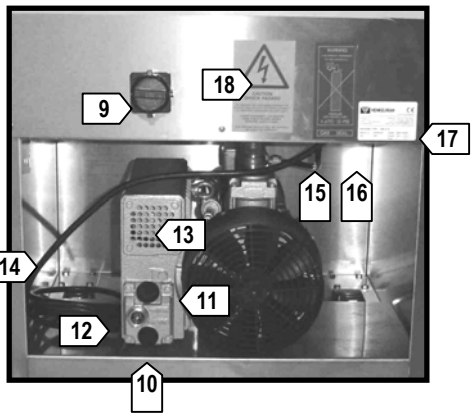
1. Sealing bar(s) in vacuum chamber mounted seal pots with a click system
2. Silicone holder(s) mounted on transparent lid
3. Gas flush nozzles (if applicable)
4. Lid rubber in lid for hermetic seal
5. Gas springs for opening lid after machine cycle
6. Vacuum / Ventilation opening
7. Control panel
8. Vacuum pressure meter
9. ON/OFF Switch
10. Master switch (only MARLIN series)
11. Oil drain plug
12. Oil fill plug
13. Oil inspection window
14. Power cable
15. Fuse holder with fuse (only BOXER series and MARLIN 42 and 42 XL)
16. Gas bottle connector (if applicable) caution max 1 Bar
17. Machine tag
18. Warning stickers

Appearance of parts and machines can deviate from illustrations

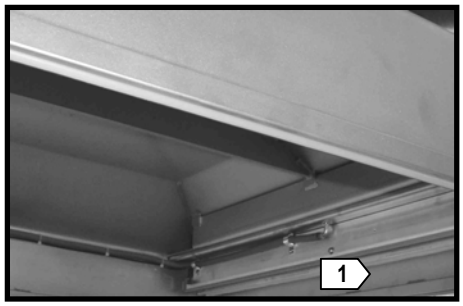
FALCON SERIES

POLAR SERIES

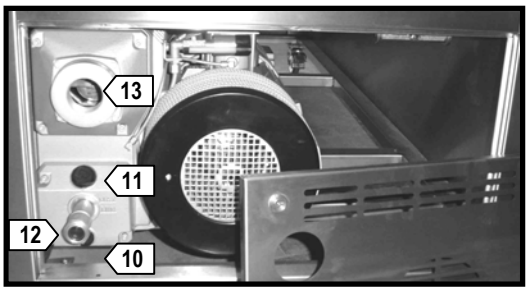
Rear view FALCON series and POLAR single chamber models



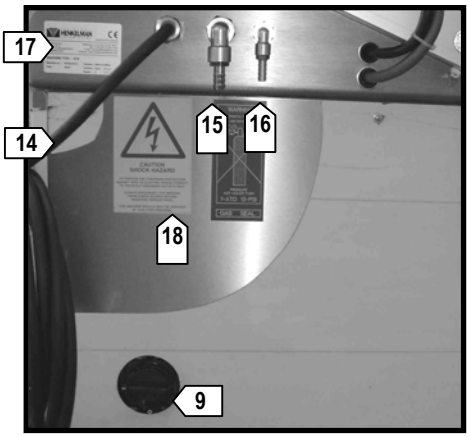
Inside lid POLAR series



Side POLAR double chambers after opening side of housing



Rear view POLAR double chambers



1. Sealing bar(s) in lids mounted by using bolts
2. Silicone holder(s) on holders in vacuum chamber (FALCON) or on work plate (POLAR)
3. Gas flush nozzles mounted on silicone holders (if applicable)
4. Lid rubber in lid for hermetic seal
5. Vacuum / Decompression / Suction pipe
6. Control panel
7. ON/OFF switch
8. Vacuum pressure meter
9. Master switch
10. Oil drain plug/elbow
11. Oil filler cap
12. Oil inspection window
13. Oil spray filter housing
14. Power cable
15. Gas bottle connector (if applicable) caution max 1 Bar
16. Seal pressure connector (if applicable) caution max 1 Bar
17. Machine tag
18. Warning stickers

Appearance of parts and machines can deviate from illustrations

STARTING AND OPERATING THE MACHINE

ON/OFF SWITCH

MASTER SWITCH

The ON/OFF switch is used to turn the machine on and off before and after operation.

CAUTION – The ON/OFF switch does not completely turn off all power to the machine. With the BOXER series, MARLIN 42, MARLIN 42 XL and other models which run on 1 phase power, it is necessary to unplug the power cable from the wall socket before the machine is completely without power. With the other MARLIN models, FALCON series, POLAR series and other models which run on 3 phase power, it is necessary to turn off the master switch before the machine is completely without power. Ensure that the machine is completely without power during maintenance and repair activities.

BOXER series / MARLIN 42 & 42 XL
When the machine is turned on (with the ON/OFF switch), the pump only runs during the vacuum cycle.

MARLIN / FALCON / POLAR series
When the machine is turned on (with the ON/OFF switch), the pump runs continuously. The 3 phase pumps need more time to warm up and turning them on and off has a detrimental effect on their lifespan. If the machine is turned on, but it is not used, the pump will automatically turned off after 10 minutes. This to prevent overheating from the oil, and reduce unnecessary pollution from exhaust filters. We call this function Sleeper function.

SLEEPER FUNCTION
On the models: Marlin, Falcon and Polar, the sleeper function id default switched on. This means if the machine is switched on but not ued, the pump automatically switches of after 10 minutes. By closing the lid the cycle and the pump will start simultaneously. Contact the supplier for more information on the sleeper function.

STARTING THE MACHINE

When the machine is connected and the master switch is switched to 1 (if applicable) then the machine can be turned on using the ON/OFF switch. When starting the machine two codes first appear in succession on the large display before control panel switches to operation mode.

The first code indicates the model of the machine. The second code indicates the control software version. Note both codes on page 4 as they are important for the supplier when making enquiries and/or if any problems arise.

After switching to operation mode the machine is ready for use. If the machine is new or has been unused for a longer period of time then it is advisable to run the pump conditioning program (15 minutes) to heat up and clean the pump. For instructions on the conditioning program, see page 22.

After switching to the operation mode the display could read [OIL]. This means that the operating hours counter is turned on and the set number of operating hours has elapsed. The hour counter is turned off by default but the client or supplier can activate it as a reminder for regular maintenance activities.

When [OIL] is displayed the machine can be still be used as usual but it is advisable to either turn off the hour counter or to reset it. More information on how to set or turn off the operating hours counter can be found on page 17.

STANDARD OPERATING STEPS FOR THE MACHINE

1. Turn the machine on with the ON/OFF switch. Heat up the pump with the condition program when machine has stood idle for some time (instructions page 22).

2. Fill the vacuum bag with product. Select the correct format bag that easily fits around the product but is not too large for the product. Ensure hygienic conditions during this operation. Packaging materials, product and hands must be clean and if possible dry.

3. Lay the vacuum bag in the chamber or on the working plate. The open side must be laid over the sealing bar or silicone holder. The bag may however not extrude from the chamber. If the product is a lot lower than the height of the sealing bar or silicone holder then insertplates which are supplied standard with the machine can be used. This makes the operation easier and reduces the cycle time.

BOXER / MARLIN series

FALCON / POLAR series

4. The vacuum bag must be laid without folds over the sealing bar (BOXER and MARLIN) or silicone holder (FALCOM and POLAR).

5. For a gas flush system the opening of the vacuum bag must be pulled over the gas nozzles (see illustration).

6. Multiple vacuum bags can be placed over the sealing bar/silicone holder if the sealing bar/silicone holder is longer than the vacuum bag. Vacuum bags may not however be laid on top of each other on the bar/holder. If there are multiple bars/holders then all bars/holders can of course be used during the same cycle.

7. Use the [PROG] key to choose the desired program. See page 18 for instructions about programming.

8. Close the lid and the machine automatically runs through the full cycle of all activated functions. The lid opens automatically when the last function “ventilation” has been completed.

9. If necessary the cycle can be partially or fully interrupted by pressing the [VACUUM STOP] key or the [STOP] key.

   The [VACUUM STOP] key interrupts the active function (vacuum, gas flushing, sealing, or soft-air ventilation) and automatically continues with the next function.

   The [STOP] key interrupts the entire cycle and goes immediately to the ventilation function.

10. After cycle completion, the packed product (or products) can be removed from the machine.

11. If the machine is equipped with a cut-off sealing system then the remaining flap on the vacuum bag can be torn off.

SAFETY and PRODUCT PROTECTION

The packing process can be partially or fully interrupted at all times:

- Stop active function, press [VACUUM STOP] key
- Stop full machine cycle, press [STOP] key

OPTIMAL AND EFFICIENT PACKAGING RESULT

- Use the correct size and good quality vacuum bags
- Maximum 75% product filling in vacuum bag
- Place vacuum bag fold free over sealing bar/silicone holder (use correct number in insertplates in chamber)
- Pull vacuum bag far enough over gas nozzles (for gas flush) so that no gas is lost and the bag does not move during gas flushing

MACHINE CONTROL PANEL

CONTROL PANEL VERSIONS

General

The digital control panels are implemented with 9 pre-select programs that can be individually set with different function values (to be able to pack different products) Program 0 can not be set and is used for servicing and testing. A program cycle is the complete program of set functions that the machine runs through to package a product.

The control panels are designed with a operation mode and a program mode.
The operation mode is used during operational activities for selecting the program number with the required program cycle. The set values of the function program can also be seen in the operation mode but not changed.
The program mode is used to change the function values within the programs.

The control panels are implemented standard with an automatic conditioning program for the regular maintenance of the pump and two STOP keys for complete cycle interruption or for only active function interruption. There are also a number of built-in service programs. Contact the supplier or Henkelman BV for more information about these programs.

Digital Time Control

The value of all active functions can be set for a certain time period.
The vacuum function, gas flush function (if installed), and soft air function can be set in whole seconds up to a maximum of 99 seconds.
The seal function can be set with an interval of 0.1 seconds and a maximum of 6.0 seconds.

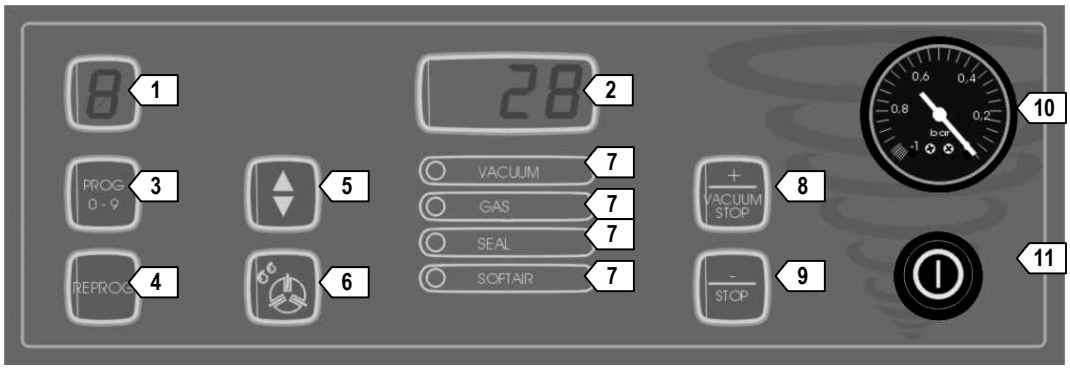
Digital Sensor Control

The value of the vacuum function and the gas flush function (if installed) can be set as a percentage of the vacuum. This is the percentage of the under pressure in the vacuum chamber related to the outside pressure 1 atmosphere/ATO (0%).
The maximum vacuum percentage setting of the vacuum function is 99%.
The minimum vacuum percentage setting of the gas flush function is 30%. This means that the chamber is flushed with gas to 30% under pressure in relation to 1 atmosphere. It is often expressed as 70% is flushed with gas (99+% - 30% = 70%).
The time for the soft air function can be set on whole seconds (max. 99 seconds).
The time for the seal function can be set on 0.1 seconds (max. 6.0 seconds).

The digital sensor control comes standard with the VACUUM PLUS function. The VACUUM PLUS function is a time operated additional vacuum function for setting extra time after reaching the 99% value of the vacuum function (only applicable if 99% is set for the vacuum function). This function provides additional vacuum time for vacuuming any trapped air out of the package.

Contact the supplier or Henkelman BV for information about special operating panels not shown above.

CONTROL PANEL LAYOUT



1. Small Display
Displays active program in operating and program modes.

2. Large Display
Displays the current value of the active function during the program cycle or the set value of the selected function in operation or program mode.

3. PROG 0-9 Keys
Selects program number in operation or program mode.

4. REPROG Key
Switch from operation mode to program mode (for setting function values) and vice versa. After setting new function value(s) within a selected program in program mode, this key must always be used to store the new values for the program in memory.

5. FUNCTION SELECT Key
Selects function within selected program in operation and program mode. The function is selected if the function light is on in front of the function description under the large display.

6. CONDITIONING PROGRAM Key
Start the conditioning program for pump (duration 15 minutes). For instructions on the program, see page 22.

7. FUNCTION Lights
A light in front of the function indicates that the function is active during the program cycle or that the function is selected during the operation or program modes.

Special Remark — *There is an additional time operated vacuum function available at digital sensor control, the VACUUM PLUS function. This function is not displayed on the panel. The VACUUM PLUS function can only be activated if the standard vacuum function is set to 99%*

VACUUM PLUS function display during the cycle (if activated) : The vacuum indicator light remains on after 99% is reached and during the time set for VACUUM PLUS. During the VACUUM PLUS vacuum cycle a dot appears in the right lower corner of the large display.

Display during operation and program mode : If the VACUUM PLUS time is activated during the selected program then a dot appears in the lower right-hand corner of the large display during the operation and program mode. If the functions are selected using the function selection keys then the indicator light in front of VACUUM comes on twice, and the vacuum percentage and VACUUM PLUS time are shown consecutively.

Special Remark — *If the machine has the gas flush function implemented and the function is activated within the selected program then a dot appears in the lower right hand corner of the small display when selecting the program no..*

8. + / STOP VACUUM Key

Function during cycle	Interruption of the active function during the program cycle. The cycle immediately continues with the next function.
Function in program mode	Raise the value of the selected function within the program selected in the program mode.

9. - / STOP Key

Function during cycle	Terminates the program cycle completely. The cycle immediately switches to the ventilation function.
Function in program mode	Lower the value of the selected function within the program selected in the program mode.

10. Vacuum meter

Displays the pressure in the vacuum chamber. See the following table for the relationship between the vacuum meter and the percentage vacuum.

Position vacuum meter	*Vacuum percentage*
0	*0*
0.2	*20*
0.3	*30*
0.4	*40*
0.5	*50*
0.6	*60*
0.7	*70*
0.8	*80*
0.9	*90*
- 1.0	*99+*

11. ON/OFF Switch

The ON/OFF switch is used to turn the machine on and off before and after operation. The switch turns on all units in the machine. Caution, the switch does not completely remove all power from the machine.

OPERATION MODE

When the machine is turned on, the machine switches to operation mode after displaying the two codes (see page 4). The operation mode is the standard setting of the control panel for packaging products. Set values cannot be modified in operation mode.

With the PROG key and function selection keys the set values within the various programs can be viewed. If the machine is ready to package a product (the product is already in the chamber), then all that needs to be done is to choose the program (PROG key) and close the lid. The program cycle starts automatically running through the set functions in the program.

Description of the program cycle for digital time control

1. Select the program number with the PROG key and the small display.
If the selected programme is programmed with the active gas flush function then a dot appears in the lower right hand corner of the small display.

2. Close the lid.

3. Vacuum function
The machine starts to vacuum the chamber.
The light in front of [VACUUM] goes on.
Large Display: decrementing time per second starting at the time set (max. 99 sec.).
Vacuum meter starts increasing to the left.

4. Gas flush function
(if installed)

Once the vacuum function has completed then the gas flush function starts to flush gas into the vacuum chamber.
The light in front of [GAS] goes on.
Large Display: decrementing time per second starting at the time set (max. 99 sec.).
Vacuum meter starts decreasing to the right.

5. Seal function

When the vacuum function or gas flush function (if installed) ends, the seal function starts to seal the vacuum bag(s).
The light in front of [SEAL] goes on.
Large Display: decrementing time per 0.1 second starting at the time set (max. 6.0 sec.).
The reading on the vacuum meter stays the same.

6. Soft-air ventilation function
(if installed)

After ending the seal function the soft air function starts to slowly ventilate the vacuum chamber.
The light in front of [SOFT AIR] goes on.
Large Display: decrementing time per second starting at the time set (max. 99 sec.).
Vacuum meter starts slowly decreasing to the right.

7. Ventilation function

After ending the seal function or the soft air function (if installed) the ventilation function starts ventilating the chamber to 1 atmosphere/ATO and the lid opens.
There are no longer any lights on in front of the functions.
Large Display: lines going up and down until the lid is opened.
The vacuum meter runs back to the right to zero and the lid opens automatically.

8. The product is packed and ready to remove.

Description of the program cycle for digital sensor control

1. Select the program number with the PROG key and the small display.
If the selected program is programmed with the active gas flush function then a dot appears in the lower right hand corner of the small display.
If the selected program is programmed with the active VACUUM PLUS function then a dot appears in the lower right hand corner of the large display.

2. Close the lid.

3. Vacuum function

The machine starts to vacuum the chamber.
The light in front of [VACUUM] goes on.
Large Display: incrementing percentage vacuum until the percentage set (max.. 99%) and a dot in the lower right hand corner if the VACUUM PLUS function is activated.
Vacuum meter starts increasing to the left.

4. VACUUM PLUS function
(if installed)

The machine continues vacuuming the chamber after 99% value is reached.
The light in front of [VACUUM] goes on.
Large Display: decrementing time per second starting at the time set (max. 99 sec.). and a dot in the lower right hand corner.
The vacuum meter will very slowly increment to the left (hardly noticeable).
Remark: can only be installed with a vacuum function whereby the value is set to the maximum of 99%.

5. Gas flush Function
(if installed)

Once the vacuum function has completed then the gas flush function starts to flush gas into the vacuum chamber.
The light in front of [GAS] goes on.
Large Display: decrementing percentage vacuum until the set percentage (min. 30%).
Vacuum meter starts decreasing to the right.

6. Seal function

When the vacuum function or gas flush function (if installed) ends, the seal function starts to seal the vacuum bag(s).
The light in front of [SEAL] goes on.
Large Display: decrementing time per second starting at the time set (max. 6.0 sec.).
The reading on the vacuum meter stays the same.

7. Soft-air ventilation function (if installed)

After ending the seal function the soft air function starts to slowly ventilate the vacuum chamber.
The light in front of [SOFT AIR] goes on.
Large Display: decrementing time per second starting at the time set (max. 99 sec.).
Vacuum meter starts slowly decreasing to the right.

8. Ventilation function

After ending the seal function or the soft air function (if installed) the ventilation function starts ventilating the chamber to 1 atmosphere/ATO and the lid opens.
There are no longer any lights on in front of the functions.
Large Display: lines going up and down until the lid is opened.
The vacuum meter runs back to the right to zero and the lid opens automatically.

9. The product is packed and ready to remove.

PROGRAM MODE

The program mode is used to change the function values within the programs. See page 18-20 for instructions on programming.

OTHER MODES

The control panel also includes a service mode. The conditioning program (see page 22) for the pump and the operation hours counter are the functions most used in this mode.

Operation Hours Counter

One of the service functions is the operation hours counter in order to be able to automatically indicate regular service requirements. This functions sets the number of hours that the pump runs (per 10 hours). Note that for BOXER series and MARLIN 42-42 XL, the pump does not run continuously. Once the number of hours set has been exceeded, the message [OIL] appears on the display (see page 11). The machine can still be used as usual but the message will keep reappearing on the display.

The factory setting for the program operation hours counter is OFF (turned off). The following steps can be followed to activate the operation hours counter or to reset it:

Press the FUNCTION SELECT Key for at least 3 seconds. After 3 seconds the number of operating hours (per 10 hours) will be displayed for about 2 seconds. After 2 seconds the originally set number of hours will be displayed (per 10 hours). When the operation hours counter is turned off, the number of operating hours will not be displayed, instead the message [OFF] will immediately appear after pressing the key for 3 seconds.

The original setting can be modified using the + and – keys (between 0 and 990 hours). If set to 0 then the next time [OFF] will automatically be displayed. The new settings are stored by using the REPROG Key. The actual operation hours are then also reset to zero.

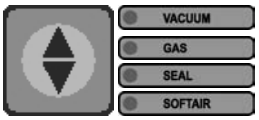
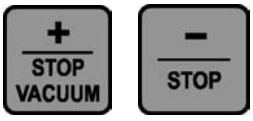
After pressing the REPROG key, the control panel automatically switches over to operation mode.

PROGRAMMING

The function values in a selected program number can be changed using either manual or automatic programming. For units, range and limits of the function values refer to the previous chapter, MACHINE CONTROL PANEL.

10 programs can be selected and set, number 0 to 9. Note: program 0 cannot be programmed. The values in this program are set for service and reference use.

MANUAL PROGRAMMING

Starting situation: machine is in normal operation mode and the lid is open		
A.		**Select the correct program with PROG 0-9 key for setting function values. Program number is displayed on the small display.**
B.		**Press REPROG key to switch into program mode. The program number now starts to blink on the small display.**
C.		**Select the required function for programming with the FUNCTION SELECT Key. The indicator lights will turn on for the active functions when selected.** ***Remark on Seal function for option 1-2 cut-offseal*** **At option 1-2 cut-offseal, the indicator SEAL lights up twice when selected. The first time is for setting the seal time and the second time for setting the cutting time.** ***Remark on option Digital Sensor Control*** **At option sensor control, the indicator VACUUM lights up twice when selected. The first time for the vacuum function (vacuum percentage) The second time for the vacuum plus function (time duration), see pages 14,16**
D.		***Digital Time Control*** **Set the amount of time required for the selected function by using the + and – keys.** ***Digital Sensor Control*** **Set the percentage of vacuum required or the amount of time required for the selected function by using the + and – keys.** ***Remarks*** **Set values are displayed on the large display. The functions vacuum plus (sensor control), gas flush and soft air can be turned off in the programme if required. For turning off a function press the – key until OFF appears on the large display.**
E.		**Repeat steps C and D for setting other function values.**
F.		**Press the REPROG key after setting all relevant functions to store the changes in the program. The control then automatically switches back to operation mode and the machine is ready for use. The newly set values are now the new default values.**

AUTOMATIC PROGRAMMING

Starting situation: machine is in normal operating mode and the lid is open

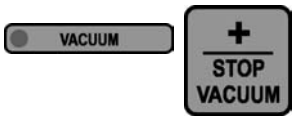
A. 

Select the correct programme with the PROG 0-9 Key for setting function values. The programme number is displayed on the small display.

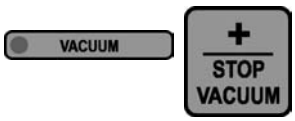
B. 

Then press the REPROG key to switch into programme mode.
The programme number now starts to blink on the small display.

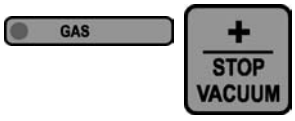
Close the lid. The machine cycle starts automatically.

C. 

VACUUM FUNCTION
Digital Time Control
Time is increasing. As soon as the vacuum meter gets to –1 press the STOP VACUUM Key. The machine cycle automatically switches to the following function.
Remark Digital Time Control
Let the vacuum function run 2 to 4 seconds longer after reaching –1 on the vacuum meter so that "trapped air" in the packaging is also extracted.
Digital Sensor Control
The percentage vacuum increases. As soon as the value 99% is reached press the STOP VACUUM Key. The machine cycle automatically switches to the following function.
Remark
If full vacuum is not required press the STOP VACUUM Key when the required value has been reached.

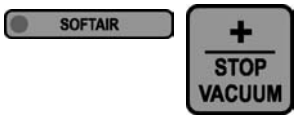
D. 

VACUUM PLUS FUNCTION (only with digital sensor control)
Digital Sensor Control
Time is increasing. Press the STOP VACUUM Key at the required time. The machine cycle automatically switches to the following function.
Remarks
The VACUUM PLUS function can only be de-activated (OFF) by manual programming. The VACUUM PLUS function will only run when VACUUM function has been set at 99%.

E. 

GAS FLUSH FUNCTION (optional)
Digital Time Operation
Time is increasing. As soon as the vacuum meter gets to the required under-pressure, press the STOP VACUUM Key. The machine cycle automatically switches to the following function.
Digital Sensor Control
The percentage vacuum decreases. As soon as the required value is reached press the STOP VACUUM Key. The machine cycle automatically switches to the following function.
Remarks
The minimal under-pressure advised is 0.5 bar or 50% vacuum. The minimum under pressure that can be set is 0.3 bar or 30%. GAS FLUSH function can only be de-activated (OFF) by manual programming.

F. SEAL FUNCTION
Can only be programmed manually. For automatic programming, the set time length will be run and the machine cycle will automatically carry on with the next function.

G. 

SOFT AIR FUNCTION / STORE FUNCTION VALUES IN PROGRAM
Digital Time and Sensor Control
Time is increasing. As soon as the desired setting is reached press the STOP VACUUM Key. After this operation the machine cycle ventilation starts and the lid opens. The values are automatically stored and control panel reverts automatically to the operation mode. The machine is ready for use.
Remarks
The soft air function can only be de-activated (OFF) with manual programming.

SPECIAL REMARKS ON PROGRAMMING

For Digital Sensor Control
The value which is set for the gas flush function is the final vacuum percentage in the vacuum chamber after flushing gas. For example, the vacuum function is set to 99% and gas flush function is set to 60%. This means that after the vacuum function the chamber will be flushed with gas until there is 60% vacuum and 40% (actually 39%) gas in de vacuum chamber.

For automatic programming,
Ensure that all functions are activated in the selected program. Activation means that the function in the program is assigned a value. If the value is OFF then that means that the function is not activated and will not be included in the automatic programming cycle.

For machines with optional gas flush function,
If a program is setup with the active gas flush function then this is indicated by a dot in the lower right hand corner of the small display when selecting the program in the operation mode.

For machines with optional sensor control,
If a program is setup with the active VACUUM PLUS function then this is indicated by a dot in the lower right hand corner of the large display when selecting the program in the operation mode.

If the function's value is OFF then it can only be activated using manual programming.

Contact the supplier for more information about programming.

MACHINE MAINTENANCE

GENERAL

Regular, thorough maintenance is essential for extending the machine's life, for preventing malfunctions and for achieving an optimal packaging result. If the machine is used intensively (more than 4 hours per day) then a professional service is recommended every 6 months. In other cases one complete service per year is sufficient (depending on location, environment, and products).

There are however also small maintenance activities that must be carried out more regularly and that the user can do himself. The following page contains a breakdown of these activities.

IMPORTANT BEFORE AND DURING MAINTENANCE

- The machine must always be completely voltage free before any maintenance is carried out on it. Remove the plug from the wall socket or put the master switch in the O position.
- If the machine is not functioning properly or if it produces strange noises, turn it off immediately with the ON/OFF switch and contact the supplier.
- If the machine is equipped with a gas flush system then always close the main cock during standard maintenance activities. Always take care that the pressure on the pressure reducing valve on the gas bottle is never higher than 1 atmosphere/ATO before, during and after the maintenance activities. A higher pressure may cause irreparable damage to the machine. **NEVER** use flammable gasses or gas mixtures containing oxygen.
- When cleaning transparent lids (if applicable), **NEVER** use cleaning agents containing solvents. Check at least once a week if there are cracks in the lid. In case of cracks, turn off the machine immediately and contact the supplier or Henkelman BV.
- High pressure cleaning is not permitted for cleaning the machine. High pressure cleaning can cause considerable damage to electronic and other parts of the machine.
- Water may never be permitted to enter either the extraction nozzle of the chamber or the blow-off opening of the pump. This would cause irreparable damage to the pump.
- Larger services must always be carried out by an authorised supplier.
- The BOXER and MARLIN 42 and 42 XL machines are designed for a maximum of 5 hours operation per day. Other machines are designed for a maximum of 8 hours per day. The supplier cannot be held responsible for any malfunctions or defects if these operation time limits are clearly exceeded without consultation.
- The machine must be moved or transported in an upright position. The machine may **NOT** be tilted as it can cause damage to the pump.
- The supplier cannot be held responsible for any malfunctions or defects if the maintenance instructions in this manual are not followed.
- Contact the supplier if there are any doubts or questions about maintenance or malfunctions.

STANDARD MAINTENANCE SCHEDULE FOR THE MACHINE

Daily	▪ Clean the vacuum chamber, lid, and housing after use with a damp cloth. ▪ *Make sure that no cleaning agents containing solvents are used.* ▪ *Make sure that no high pressure cleaner is used.*
Weekly	▪ Check the oil level and replace or fill up oil when the oil is turbid or the oil level is too low. For instructions, see page 23. ▪ Activate the conditioning program for the pump at least once a week. ▪ Inspect the sealing bar for damage. Replace teflon tape/sealing wire if the seal quality is no longer sufficient or if the teflon tape/sealing wire is no longer tight and straight on the sealing bar. For instructions, see page 26. ▪ Inspect the lid gasket and replace it when the gasket is damaged or stretched. For instructions, see page 27. ▪ Inspect the transparent lid (if applicable). When cracks are visible, turn off the machine immediately and contact the supplier.
Every Six Months	▪ Replace oil at least once every 6 months.
Yearly	▪ Inspect the oil exhaust filter for saturation. If saturated, replace the filter. For instructions, see page 24. ▪ Contact the supplier for a professional service
Four-yearly	▪ Replace transparent lid and the lid's gas springs (if applicable) ▪ Replace membranes sealcylinder (if applicable)

VACUUM PUMP MAINTENANCE

It is very important to regularly service the pump to ensure extended and correct operation. The following activities are essential for correct maintenance. If the machine is used regularly then it is advisable to have the pump fully inspected at least once a year by the supplier to ensure extended and problem free operation. Contact the supplier for more advice and information.

Conditioning Program

The conditioning program ensures that the pump is thoroughly rinsed. During the program the pump and oil reaches operation temperature so that the oil can better absorb any moisture and contaminants and filter them. The high temperature enables any moisture in the pump to evaporate minimising the risk for rust spots.

The program lasts 15 minutes and it is advisable to run it at least once a week. Turn on the machine, press the key [conditioning program], and close the lid. The program runs automatically. During the program the large display will display moving lines.

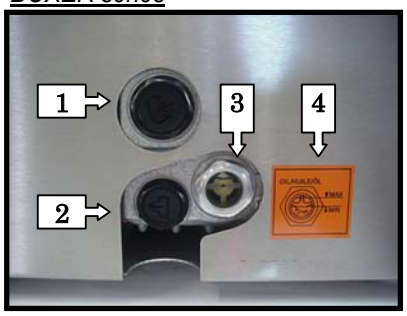
The program can be interrupted at any time using the [STOP] key. It is however important for the sake of good maintenance that the program completes a full 15 minute cycle and therefore advisable only to interrupt the cycle for something urgent.

It is also advisable to run the program before using the machine for the first time, after the machine has been stationary for a lengthy period of time, and especially prior to changing oil.

Changing Oil / Filling Up

The oil level and oil quality must be checked at least once a week. The oil inspection window serves this purpose. Fill up the oil level if it is too low. Replace the oil if it is turbid. Oil must be replaced at least once every 6 months.

BOXER series

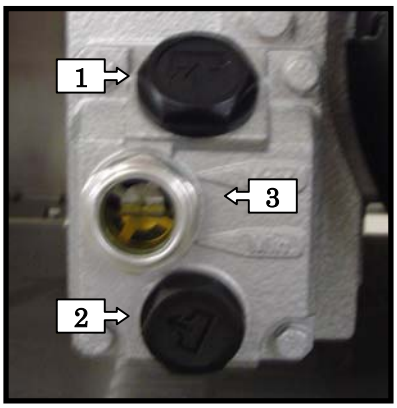


1. Oil fill plug
2. Oil drain plug
3. Oil inspection window
4. Oil level indicator sticker

Take care to use the correct type of oil for the pump

Beware of hot oil fumes during drainage

MARLIN / FALCON / POLAR series



Location at rear or side of machine
View can differ per model

Draining oil

If the oil is white or turbid when checked then it must be replaced. Before draining off the oil let the conditioning program run a full cycle. The dirt and moisture is absorbed by the oil and the oil becomes thinner making draining easier.

After the program has ended the drainage plug can be removed.

CAUTION, when unscrewing hot oil fumes can escape. The oil now drains from the drain hole (an oil pan must be placed underneath). For the BOXER series, when the oil has drained, tilt the machine slightly so that all residual oil can drain off. After draining the oil drain plug is replaced.

Filling up oil

After draining or if the oil level has dropped, oil needs to be filled up. The oil fill plug must be removed with the correct size spanner. The pump can now be filled with oil. Make sure that you add the correct amount (see table on page 24)

TAKE CARE to fill with small amounts at intervals. Fill the oil level to the top of the oil level indicator sticker.

TAKE CARE to replace the oil filter before adding the new oil (see page 24)

Oil types and amounts

It is important to use the correct type and quantity of oil for the pump. The wrong type or too much oil could damage the pump. The ambient temperature where the machine is operated is also important for the type of oil. See amounts and types with related ambient temperatures in the table on the next page.

Examples of supplier brands for the standard types of oil are Shell Vitrea, Aral Motanol GM, BP Energol CS, or Texaco Regal R+ O with related viscosity numbering. If the machine is used outside normal specifications regarding ambient temperature, contact the supplier.

Machine Type	Pump Capacity	Filling (litres)	Ambient Temperature Standard Oil Type 10 - 30 °C	"Cold" Oil Type 5 - 10 °C	"Hot" Oil Type 30 - 40 °C
BOXER 35	016 m³/h	0.4	**Viscosity VG 32**	**VM 32**	**VS 32**
BOXER 42 / 42 XL - MARLIN 42 / 42 XL	021 m³/h	0.4	**Viscosity VG 32**	**VM 32**	**VS 32**
MARLIN 46	040 m³/h	1.0	**Viscosity VG 32**	**VM 32**	**VS 32**
MARLIN 52 / 90 - FALCON 52 / 2-60 – POLAR 52 / 2-40	063 m³/h	1.0	**Viscosity VG 100**	**VM 100**	**VS 100**
FALCON 2-60 - POLAR 2-50	100 m³/h	2.0	**Viscosity VG 100**	**VM 100**	**VS 100**
POLAR 2-75	160 m³/h	5.0	**Viscosity VG 100**	**VM 100**	**VS 100**
POLAR 2-85 / 2-95	300 m³/h	7.0	**Viscosity VG 100**	**VM 100**	**VS 100**

Machines are supplied with standard type oil.
The capacity of models with a 063 m3/h pump and 60Hz voltage, is 2.0 litre instead of 1.0 litre.

Changing the oil filter

The pumps of all models except the BOXER series and MARLIN 42 & 42 XL have oil filters. When replacing the oil the filters must also be replaced. The oil filter is screwed to the rear of the oil exhaust filter housing.

When replacing the oil, it is first drained off. The old filter is then screwed off and replaced by a new one. The pump can now be filled with new oil.

For the correct type of oil filters refer to the list of maintenance parts on page 29.

Oil filter

Inspect and change oil exhaust filter

There are one or more oil exhaust filters in the pump which absorb and filter oil vapours. The filters will become saturated after a period of time and need to be replaced. This is on average between 12 and 18 months. When the filters are saturated it is no longer possible to achieve maximum vacuum.

Filter housing types

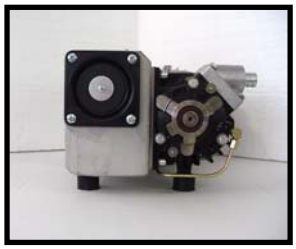
016-021 m3/h

040-063-100 m3/h

160-300 m3/h

- **Filter housings can be located at the side or behind the machine**
- **Appearance can vary depending on the model (multiple housings on pump or multiple filters in one housing)**

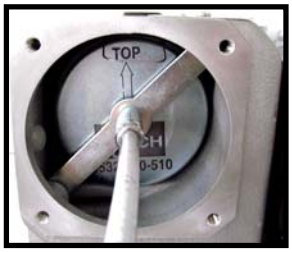
*Change oil exhaust filter(*s)



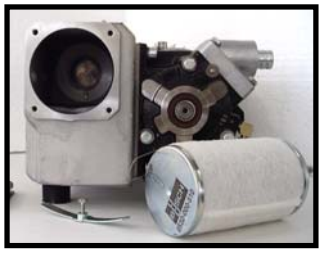
Open rear or side of machine for pump

Screw the cover(s) from the filter housing)

The filter(s) is/are visible behind a tensioner



Release the tensioner(s) with a spanner



Remove tensioner(s) and filter(s) from the housing

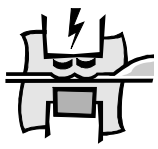
Take care that the filter gasket does not remain behind when removing the filter

- *Place and tension the new filter (take care that the gasket is correctly positioned) in the housing*
- *Screw the cover back onto the housing*
- *Screw the back or side plate on the machine*

- *Pumps and housing can have a different appearance but the principle of replacing remains the same.*
- *Take care that the correct type of filter is used for the pump type, see page 29 for the correct type of filter for the type of pump*
- *It is advisable to have the suppler do this service.*

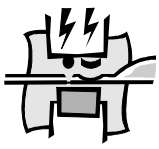
SEALING SYSTEM MAINTENANCE

All or some of the following sealing systems are possible in the BOXER/MARLIN/FALCON/POLAR series. It is essential to know which sealing system is applicable to the relevant machine.

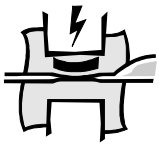


DOUBLE SEAL
2 x 3,5 mm seal

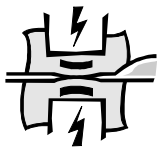
CUT-OFFSEAL
1 x 3,5 mm seal
1 x 1,1 mm cut
single time setting



1-2 CUT-OFFSEAL
1 x 3,5 mm seal
1 x 1,1 mm cut
individual time



WIDE SEAL
1 x 8,0 mm seal

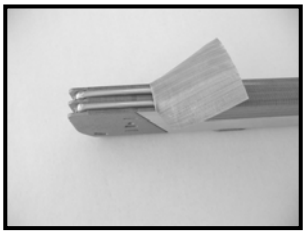


BI-ACTIVE SEAL
1 x 5,0 mm seal
above and below

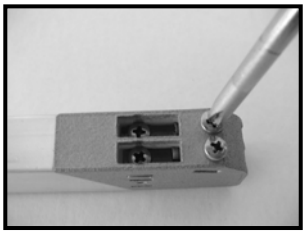
Servicing the sealing bar is almost identical for all systems. The seal quality is partially dependent on the maintenance of the sealing bar and contra-bar (silicone holder). The main maintenance activities are the daily cleaning of the sealing bar and the silicone holder with a damp cloth and a weekly inspection of the bars with replacement of the sealing wire, teflon tape or silicone rubber if irregularities appear on top of the bar or the seal quality is insufficient.

The average maintenance cycle of the sealing bar (teflon tape / sealing wire) is **at least once every 3 months**.
(This indication refers to regular use of the machine, on average 8 hours per day and packaging standard products with standard vacuum packaging materials. No rights can be derived from this indication)

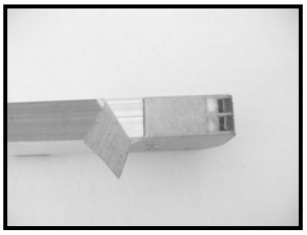
Replace sealing wire and teflon tape



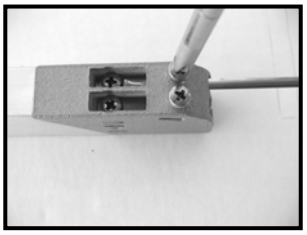
Remove teflon tape



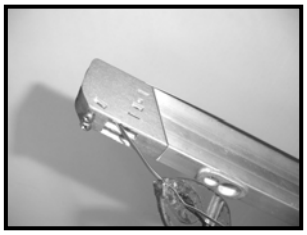
Unscrew and remove sealing wires



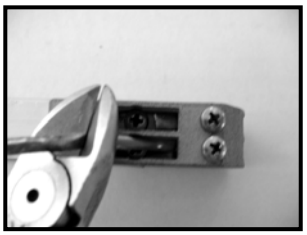
Replace the teflon tape



Screw down new wires onto clamping plate

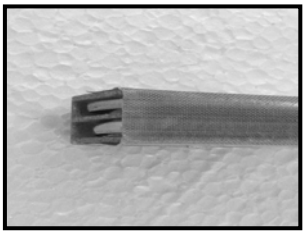


Pull wires taught using a pair of pliers and a vice and screw the wires down on the clamping plate.



1. Remove the sealing bar(s) from the holders (in the chamber or lid) by releasing the click system or by unscrewing the screws.
2. Remove the teflon tape from the sealing bar.
3. The old sealing wires and cut-off wires (if applicable) can be removed by unscrewing the clamp (see illustration) and pulling the wires from the grooves.
4. Remove the teflon tape that is attached to the top of the sealing bar and stick a new piece of teflon tape to the bar of the same length after having degreased and cleaned the bar with a dust free cloth.
5. Cut a new peace of sealing wire or cut-off wire to the size of the sealing beam plus about 15 cm (± 6 inches). If 2 sealing wires or an extra cut-off wire is on the sealing beam then a second sealing wire or cut-off wire must of course be cut.
6. Place the end of the wire or wires through the groove(s) on the side of the sealing beam and screw the wires to the bottom.
7. Place the sealing bar top down in a vice and pull the sealing wire or wires through the other side of the groove(s) on the sealing beam.
8. Pull the wires tight with a pair of pliers and screw them down at the same time. Ensure that the wire (wires) is (are) pulled taught and straight with the help of a pair of pliers before the wires are screwed down.
9. It is handy to use a pair of adjustable pliers as a lever for optimal wire tension. Place one end of the sealing beam in the vice and stretch the wire (wires) by pressing down the bar.
10. Cut off the extruding wire end(s) on both ends after having screwed it tight.
11. Cut a piece of teflon tape as long as the sealing bar plus about 5 cm (± 2 inches).
12. Stick the new teflon tape straight over the new sealing wire (wires). Ensure that the teflon is straight on the sealing bar and that the sticky part is stuck on the side. Ensure that the teflon is stuck on the bar smoothly and without folds.
13. Cut the teflon tape off so that the sticky part does not get stuck on the sides of the clamps but that the teflon extends over the top of the clamps.
14. Place the sealing bar back in the machine. Ensure that the sealing beam is properly clicked onto the holders or that the screws are firmly screwed in.

<u>Special remark bi-active sealing system</u>
The sealing wire must be accurately placed on the upper and lower beams so that the sealing wires line up with each other exactly during sealing.



Cut off the ends of the sealing wire and stick Teflon tape over the sealing beam without folds

See page 29 for correct parts and quantities

SILICONE HOLDER AND LID GASKET MAINTENANCE

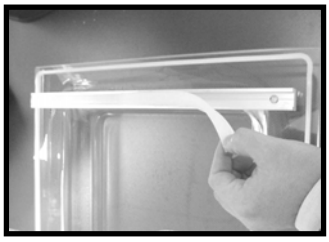
Replace the rubber silicone holder

The silicone holder must be inspected weekly for irregularities on the silicone rubber (mainly caused by burning by the sealing wire). If irregularities appear then the silicone rubber must be replaced.

Average maintenance cycle for silicone rubber is **at least once every 6 months**

(This indication refers to regular use of the machine with standard products. No rights can be derived from this indication)

1. Remove the old silicone rubber from the holder.
2. Cut a new piece of silicone rubber the same size as the old one. The same size is very important, too short or too long will cause problems with sealing.
3. Place the new piece in the silicone holder. Ensure that the silicone rubber is completely and evenly placed in the groove. It is also important that the surface of the silicone rubber is smooth after it is in place and is shows no signs of tension.

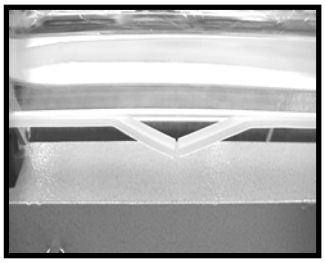


Replace lid gasket

The lid gasket ensures that the vacuum chamber is completely sealed during the machine cycle. This is essential for achieving a maximum vacuum. The lid gasket wears due to the extreme pressure differences and must be replaced regularly. Inspect the lid gasket weekly for tears or damage.

Average maintenance cycle for lid gasket is **at least once every 6 months**
(This indication refers to regular use of the machine, on average 8 hours a day and with standard products. No rights can be derived from this indication)

De length of the new lid gasket is determined by using the old gasket. If the lid rubber is too short or too long it can cause problems closing the lid or leak.



Ensure that the ends of the lid rubber connect up closely

The rubber must be placed evenly and without tension in the holder. The ends must be cut straight and must be laid tightly against each other to avoid leakage.

LIST OF SERVICE PARTS

VACUUM PUMP PARTS

BUSCH VACUUM PUMPS	MODELS
016 m³/h	BOXER 35
021 m³/h	BOXER 42 / 42 XL / 42 XL BA – MARLIN 42 / 42 XL
040 m³/h	MARLIN 46
063 m³/h – 50Hz	MARLIN 52 / 90 – FALCON 52 / 2-60 – POLAR 52 / 2-40
100 m³/h	FALCON 80 / 2-70 – POLAR 80 / 2-50
160 m³/h	POLAR 2-75
300 m³/h	POLAR 2-85 / 2-95

BUSCH	STANDARD OIL			OIL FILTER		OIL MIST FILTER		
	Type	Reference	Litres	Type	Reference	Type	Reference	Amount
016 m³/h	VG 32	0439510	0.40	-	-	50-60Hz	0939003	1
021 m³/h	VG 32	0439510	0.40	-	-	50-60Hz	0939005	1
040 m³/h	VG 100	0439520	1.0	040-063-100	0939090	50-60Hz	0939011	1
063 m³/h – 50Hz	VG 100	0439520	1.0	040-063-100	0939090	50Hz	0939011	1
063 m³/h – 60Hz	VG 100	0439520	2.0	040-063-100	0939090	60Hz	0939010	2
100 m³/h	VG 100	0439520	2.0	040-063-100	0939090	50-60Hz	0939010	2
160 m³/h	VG 100	0439520	5.0	160-300	0939091	50-60Hz	0939015	2
300 m³/h	VG 100	0439520	7.0	160-300	0939091	50-60Hz	0939015	3

SEAL SYSTEMS

PARTS	SPECIFICATIONS	REFERENCE	QUANTITY
Teflon tape	46 mm wide teflon tape	0305515	length sealing beam + 5 cm
Double Seal	2 x 3.5 mm round wire	0305000	2 wires length of sealing beam + 15 cm
Cut-off seal	1 x 3.5 mm round wire 1 x 1.1 mm round wire	0305000 0305010	1 wire length of sealing beam + 15 cm 1 wire length of sealing beam + 15 cm
1-2 Cut-off seal	1 x 3.5 mm round wire 1 x 1.1 mm round wire	0305000 0305010	1 wire length of sealing beam + 15 cm 1 wire length of sealing beam + 15 cm
Broad Seal	1 x 8.0 mm flat wire	0305025	1 wire length of sealing beam + 15 cm
Bi-Active Seal	1 x 5.0 mm flat wire 1 x 8.0 mm flat wire	0305020 0305025	1 wire length of sealing beam + 15 cm 1 wire length of sealing beam + 15 cm
Silicone Rubber	Silicone 17 x 8	0320200	length silicone holder

LID GASKET

MODELS	REFERENCE	LENGTHS PER MODEL (in cm)	
BOXER SERIES **MARLIN 42 / 42 XL**	0320215	BOXER 35 BOXER 42 / MARLIN 42 BOXER 42 XL / BOXER 42 XL BA / MARLIN 42 XL	175 190 210
MARLIN 46 / 52 / 90 **FALCON SERIES** **POLAR 52 / 80 / 2-40 / 2-50**	0320210	MARLIN 46 MARLIN 52 / FALCON 52 / POLAR 52 MARLIN 90 FALCON 80 / POLAR 80 FALCON 2-60 / 2-70 POLAR 2-40 / 2-50	255 250 290 300 260 / 300 280 / 300
POLAR 2-75 / 2-85 / 2-95	0320228	POLAR 2-75 / 2-85 / 2-95	350 / 390 / 440

Lengths specified are always a little longer and must be cut to the correct length.

TECHNICAL SPECIFICATIONS

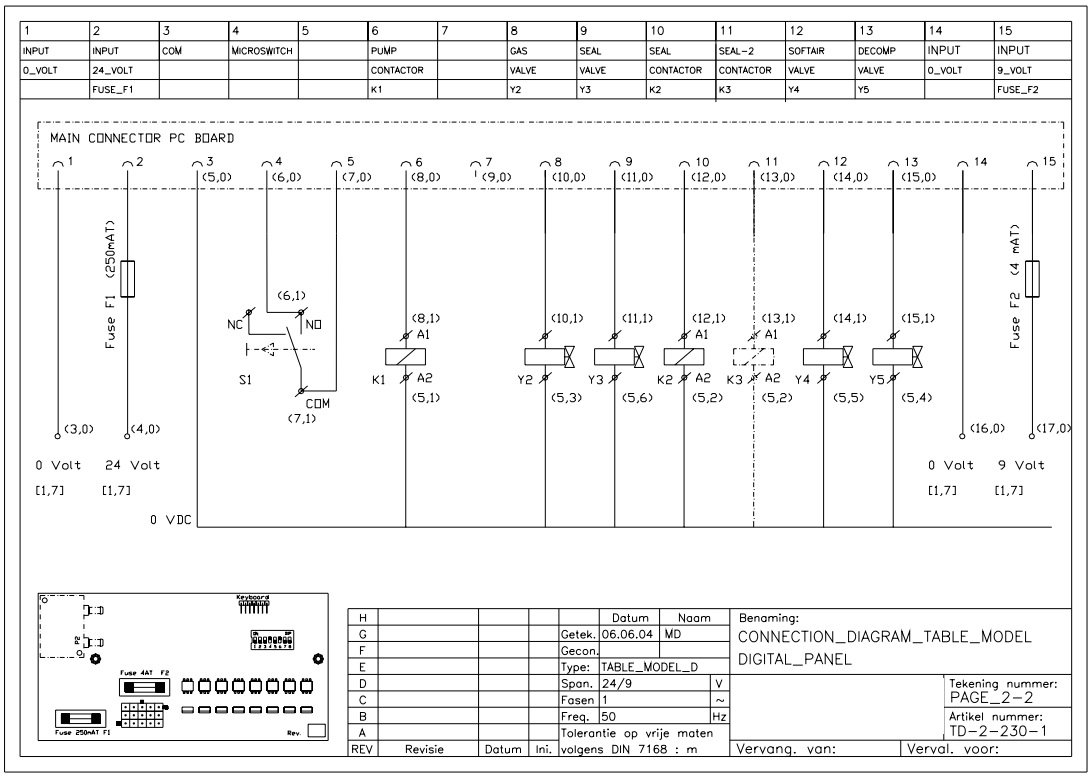
MODEL	VACUUM CHAMBER WORKING PLATE	LID	HOUSING	DIMENSIONS (mm)	PUMP (m^3/h)	FINAL VACUUM (%)
BOXER SERIES						
35	Stainless steel	Transparent	Stainless steel	450x525x385	016	99,80%
42	Stainless steel	Transparent	Stainless steel	490x525x430	021	99,80%
42 XL	Stainless steel	Transparent	Stainless steel	490x610x445	021	99,80%
42 XL Bi-active	Stainless steel	Transparent	Stainless steel	490x610x420	021	99,80%
MARLIN SERIES						
42	Stainless steel	Transparent	Stainless steel	490x525x985	021	99,80%
42 XL	Stainless steel	Transparent	Stainless steel	490x610x985	021	99,80%
46	Stainless steel	Transparent	Stainless steel	780x660x970	040	99,98%
52	Stainless steel	Transparent	Stainless steel	700x690x1030	063	99,98%
90	Stainless steel	Transparent	Stainless steel	1065x480x960	063	99,98%
FALCON SERIES						
52	Aluminium	Aluminium/Sightglass	Stainless steel	700x690x1070	063	99,98%
80	Aluminium	Aluminium/Sightglass	Stainless steel	900x820x1070	100	99,98%
2-60	Aluminium	Aluminium/Sightglass	Stainless steel	1060x880x1070	063	99,98%
2-70	Aluminium	Aluminium/Sightglass	Stainless steel	1260x1010x1070	100	99,98%
POLAR SERIES						
52	Stainless steel	Stainless steel	Stainless steel	700x730x1100	063	99,98%
80	Stainless steel	Stainless steel	Stainless steel	920x790x1125	100	99,98%
2-40	Stainless steel	Stainless steel	Stainless steel	1480x790x1090 *	063	99,98%
2-50	Stainless steel	Stainless steel	Stainless steel	1480x970x1120 *	100	99,98%
2-75	Stainless steel	Stainless steel	Stainless steel	1545x1150x1150 *	160	99,99%
2-85	Stainless steel	Stainless steel	Stainless steel	1900x1300x1150 *	300	99,99%
2-95	Stainless steel	Stainless steel	Stainless steel	2420x1210x1130	300	99,99%

Specifications can deviate from optional models. Items marked with *are the new type executed with the suction pipe to the lid.

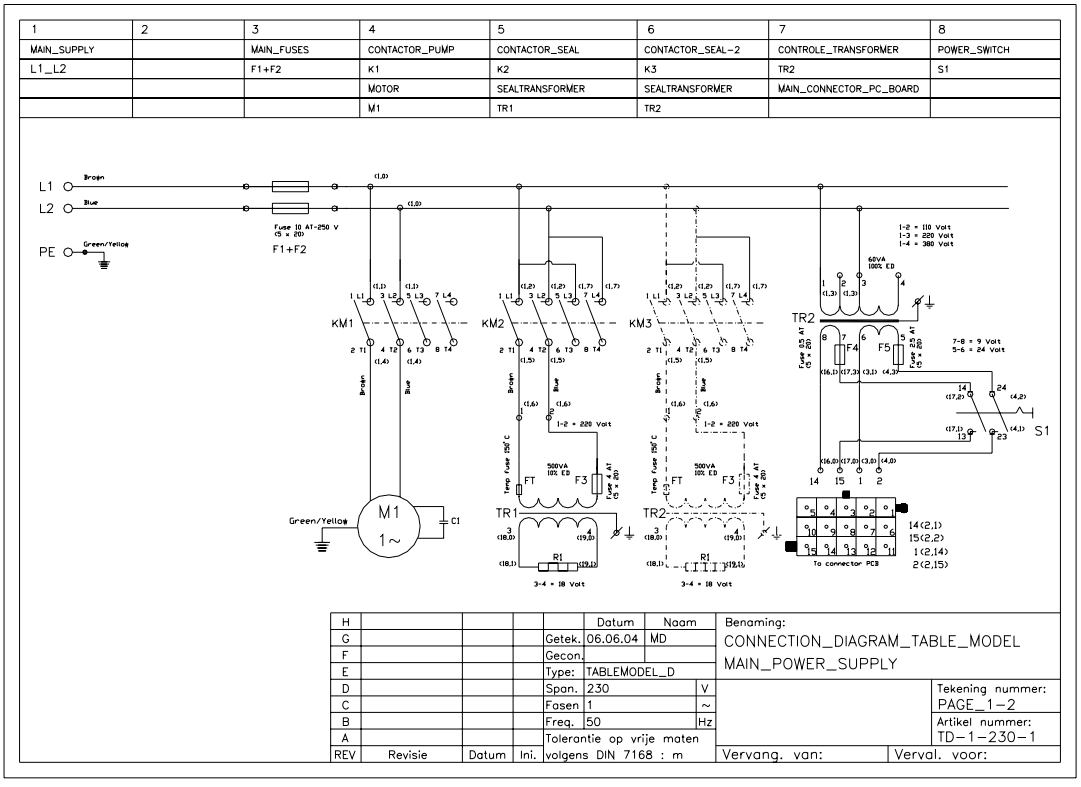
Standard ambient temperature	5 ^{0}C – 30 ^{0}C
For deviating ambient temperatures	see page 24 for special oil specifications
Maximum use per day	BOXER series / MARLIN 42 & 42 XL 5 hours per day Other machines: 8 hours per day
Electricity	Voltage: see machine tag Frequency: see machine tag Power: see machine tag
Electrical connection	Maximum fluctuation ± 10% of the official registered voltage
Gas bottle connector diameter (if applicable)	BOXER series / MARLIN 42 & 42 XL diameter 6 mm POLAR 2-85 / 2-95: diameter 13 mm OTHER MODELS: diameter 8 mm
Maximum pressure gas bottle connector (if applicable)	1 ATO
External seal pressure connection (if applicable)	diameter 6 mm
Sound level	< 70 DB

ELECTRICAL DIAGRAMS

Control Current Diagram BOXER series / MARLIN 42/42 XL

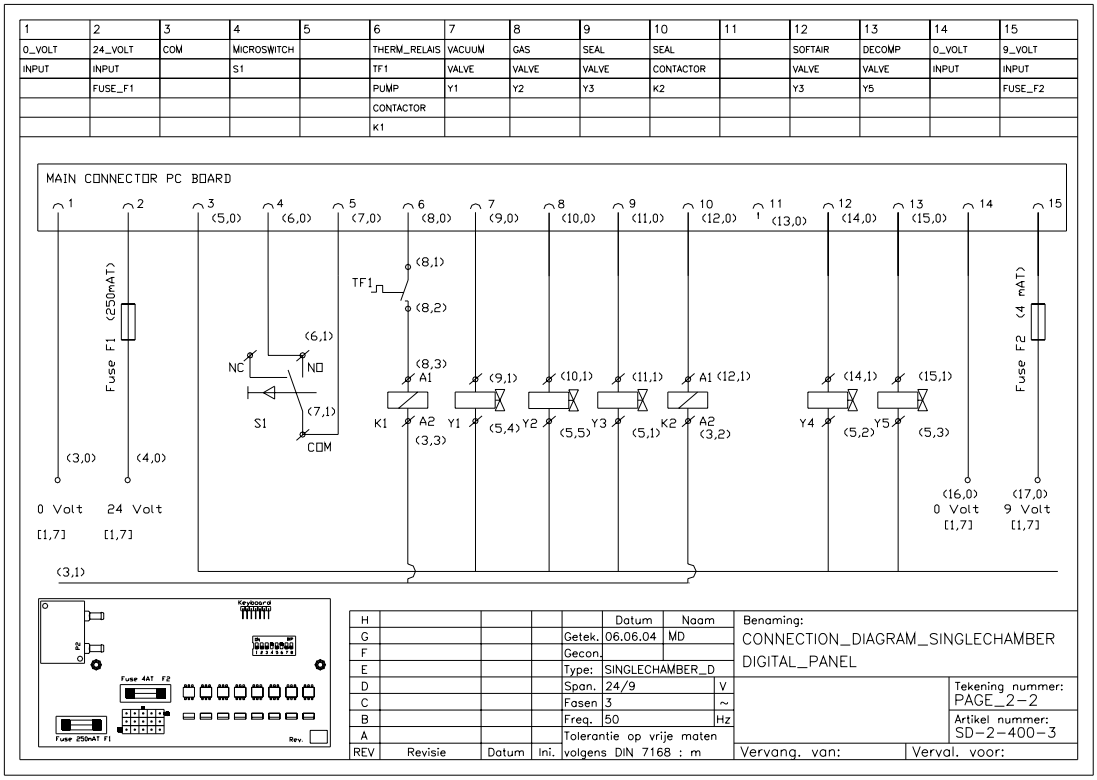


Power Circuit Diagram BOXER series / MARLIN 42/42 XL



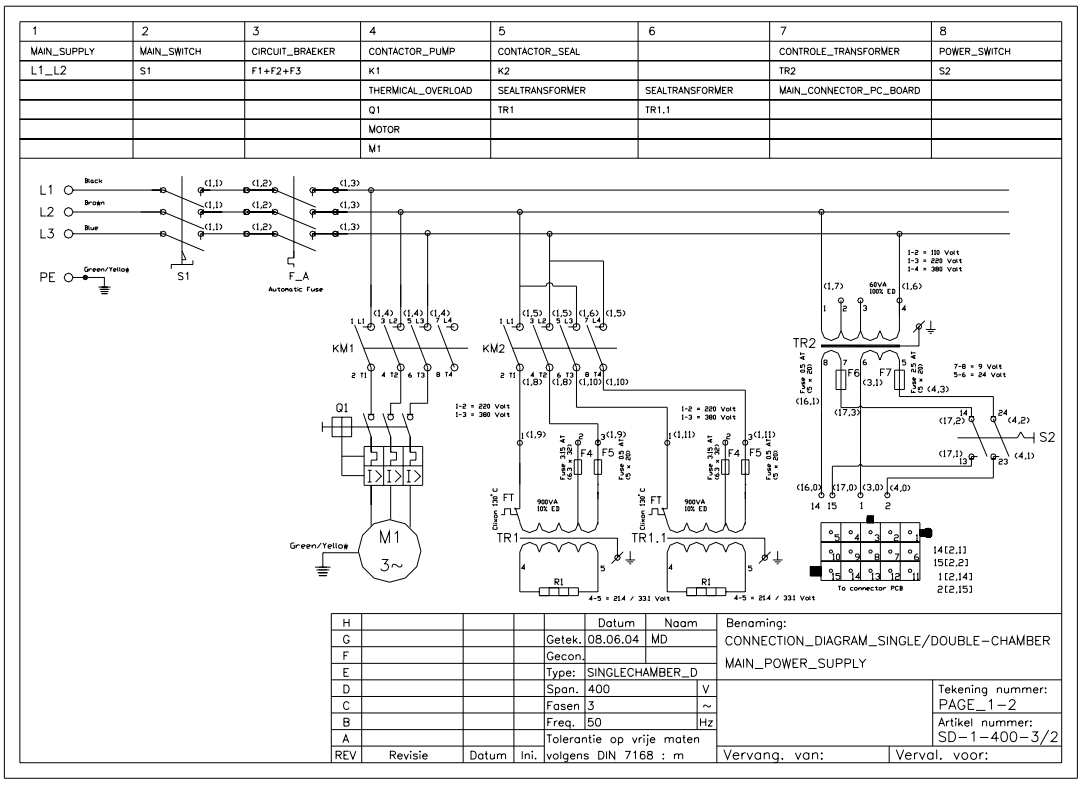
Diagrams are shown for standard configurations.

Control Current Diagram MARLIN 46/52/90 / FALCON 52/80 / POLAR 52/80



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0_VOLT	24_VOLT	COM	MICROSWITCH		THERM_RELAIS	VACUUM	GAS	SEAL	SEAL		SOFTAIR	DECOMP	0_VOLT	9_VOLT
INPUT	INPUT		S1		TF1	VALVE	VALVE	VALVE	CONTACTOR		VALVE	VALVE	INPUT	INPUT
	FUSE_F1				PUMP	Y1	Y2	Y3	K2		Y3	Y5		FUSE_F2
					CONTACTOR									
					K1									

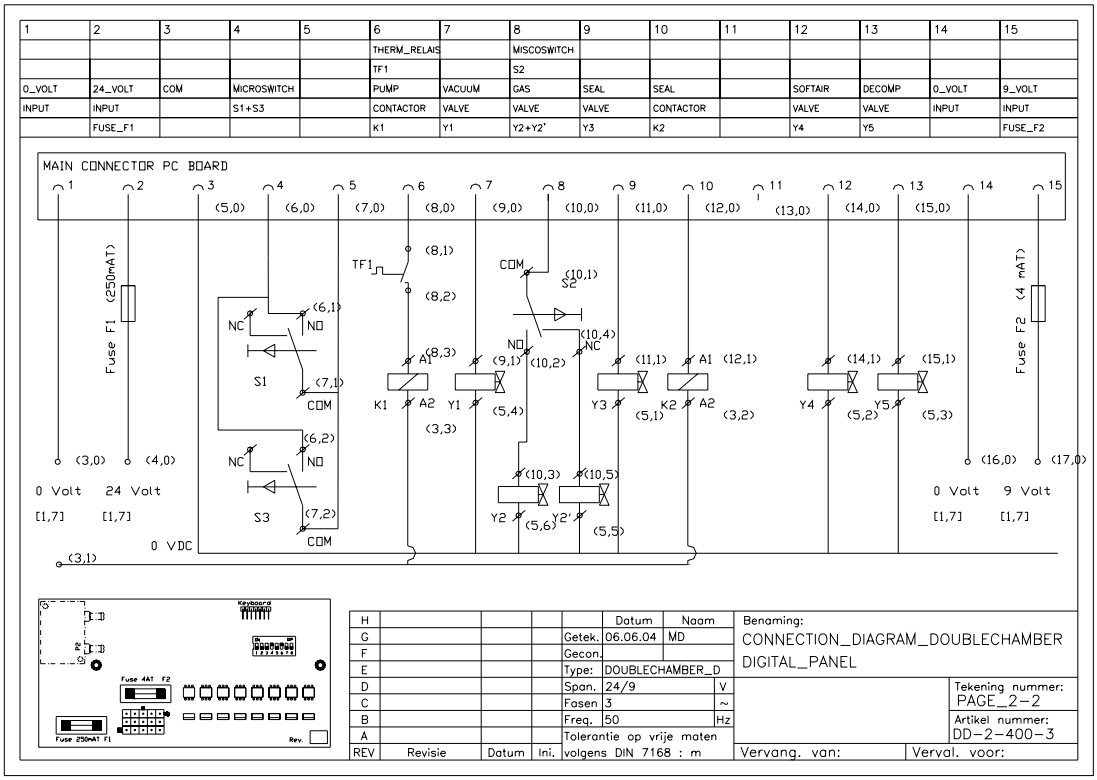
Power Circuit Diagram MARLIN 46/52/90 / FALCON 52/80 / POLAR 52/80



1	2	3	4	5	6	7	8
MAIN_SUPPLY	MAIN_SWITCH	CIRCUIT_BRAEKER	CONTACTOR_PUMP	CONTACTOR_SEAL		CONTROLE_TRANSFORMER	POWER_SWITCH
L1_L2	S1	F1+F2+F3	K1	K2		TR2	S2
			THERMICAL_OVERLOAD	SEALTRANSFORMER	SEALTRANSFORMER	MAIN_CONNECTOR_PC_BOARD	
			Q1	TR1	TR1.1		
			MOTOR				
			M1				

Diagrams are shown for standard configurations.

Control Current Diagram FALCON 2-60/2-70 / POLAR 2-40/2-50/2-75/2-85/2-95



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
					THERM_RELAIS		MISCOSWITCH							
					TF1		S2							
0_VOLT	24_VOLT	COM	MICROSWITCH		PUMP	VACUUM	GAS	SEAL	SEAL		SOFTAIR	DECOMP	0_VOLT	9_VOLT
INPUT	INPUT		S1+S3		CONTACTOR	VALVE	VALVE	VALVE	CONTACTOR		VALVE	VALVE	INPUT	INPUT
	FUSE_F1				K1	Y1	Y2+Y2'	Y3	K2		Y4	Y5		FUSE_F2

					Datum	Naam
H						
G				Getek.	06.06.04	MD
F				Gecon.		
E				Type:	DOUBLECHAMBER_D	
D				Span.	24/9	V
C				Fasen	3	~
B				Freq.	50	Hz
A				Tolerantie op vrije maten		
REV	Revisie	Datum	Ini.	volgens DIN 7168 : m		

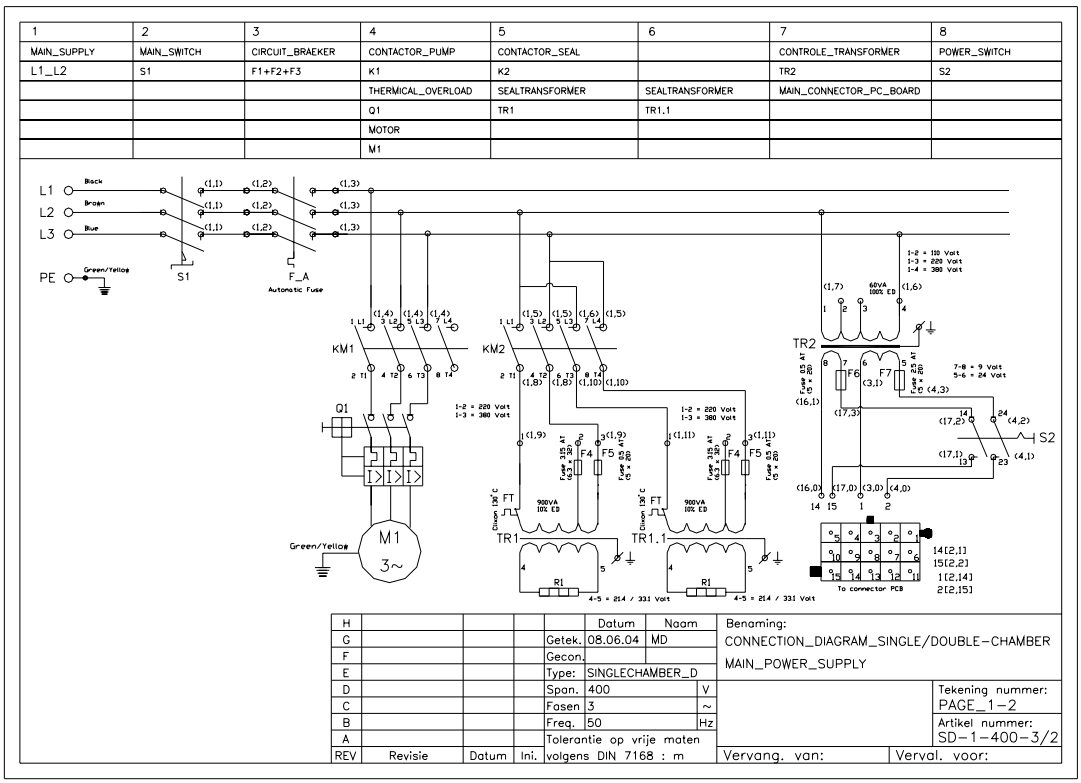
Benaming: CONNECTION_DIAGRAM_DOUBLECHAMBER DIGITAL_PANEL

Tekening nummer: PAGE_2-2

Artikel nummer: DD-2-400-3

Vervang. van: Verval. voor:

Power Circuit Diagram FALCON 2-60/2-70 / POLAR 2-40/2-50/2-75/2-85/2-95



1	2	3	4	5	6	7	8
MAIN_SUPPLY	MAIN_SWITCH	CIRCUIT_BRAEKER	CONTACTOR_PUMP	CONTACTOR_SEAL		CONTROLE_TRANSFORMER	POWER_SWITCH
L1_L2	S1	F1+F2+F3	K1	K2		TR2	S2
			THERMICAL_OVERLOAD	SEALTRANSFORMER	SEALTRANSFORMER	MAIN_CONNECTOR_PC_BOARD	
			Q1	TR1	TR1.1		
			MOTOR				
			M1				

					Datum	Naam
H						
G				Getek.	08.06.04	MD
F				Gecon.		
E				Type:	SINGLECHAMBER_D	
D				Span.	400	V
C				Fasen	3	~
B				Freq.	50	Hz
A				Tolerantie op vrije maten		
REV	Revisie	Datum	Ini.	volgens DIN 7168 : m		

Benaming: CONNECTION_DIAGRAM_SINGLE/DOUBLE-CHAMBER MAIN_POWER_SUPPLY

Tekening nummer: PAGE_1-2

Artikel nummer: SD-1-400-3/2

Vervang. van: Verval. voor:

Diagrams are shown for standard configurations.

List of fuses

- Fuses are located where the power enters the component board
- Fuses are been located on transformers (control and seal)
- Two fuses are placed on the control circuit.

Due to different mains voltages and machine models there is a variety of fuse types that can be present in the machine. Refer to the specifications of the relevant component for the correct types and values of fuses for replacement, or contact the supplier.

Caution, to avoid fire and/or other irreparable damage to the machine, replacement fuses must always be of the same type with the same value as the fuses being replaced!!

Voltage

Caution, the maximum allowable voltage fluctuation is ± 10% of the official voltage stated on the machine tag.

ERROR CODES

The controls are programmed with a number of error codes. These error codes are intended to give the user / dealer a clear indication of what the possible cause might be why starting or packaging is not working as expected.

F1: This code indicates that the cycle (cover switch) will be interrupted prematurely.
Example: the cover of the machine closes after starting, but before sufficient vacuum is present to keep the cover closed the operator lets go of the cover. The F1 code will now be shown on the display.
In a time-controlled machine, the time for gassing is set in such a way that the entire chamber is gassed and the cover opened without sealing taking place. Here too the F1 code will immediately be shown on the display.
This message will never be shown directly after the controls are started, but during the course of the cycle.

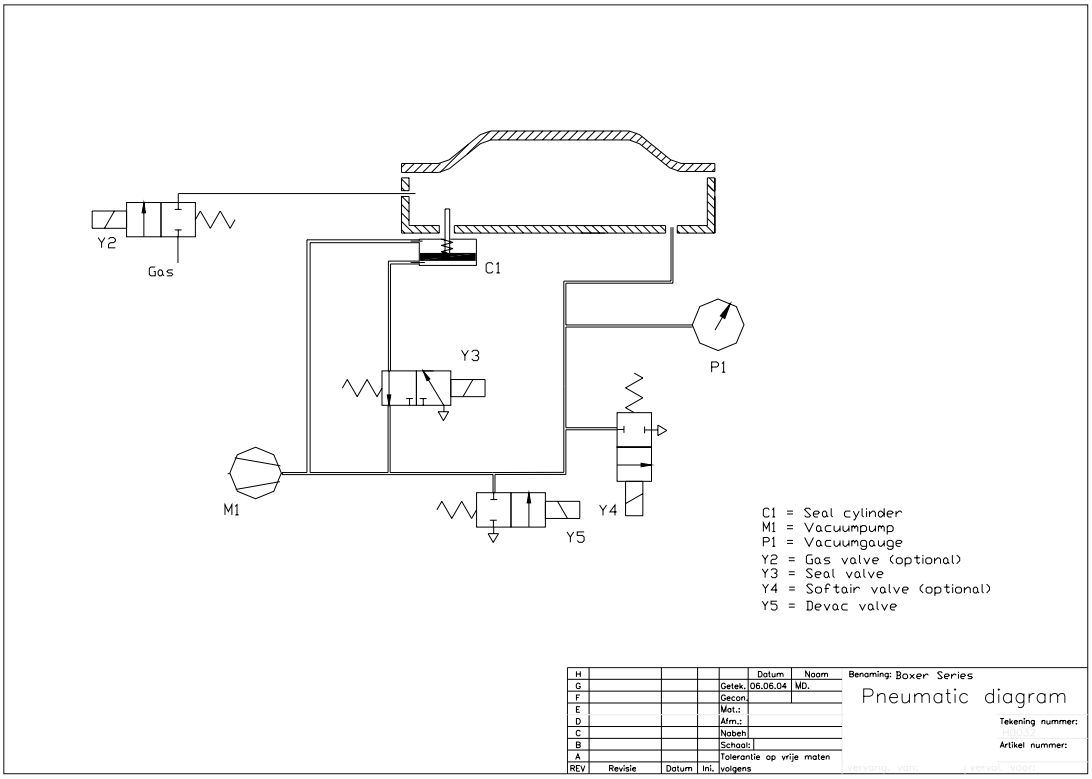
F2: This code indicates that the sensor is not working properly.
When the controls are started, the condition of the sensor is checked. If the feedback data of the sensor are not correct, F2 is shown on the display. This message will be shown directly after the sensor controls are started.

RP-: This message will be shown when, due to circumstances, the controls are unable to retrieve the programme values. The word ‘circumstances’ means peak tensions or a tension drop during starting. When such a situation occurs, the print will start with this message and go no further. Two options exist now: the machine can be switched off and on again to see if the problem repeats itself or the reprog key can be pressed. By operating the reprog key, the controls will use the factory settings to start. The programme values set by the client will be cancelled as a result.
This message will be shown directly after the controls are started.

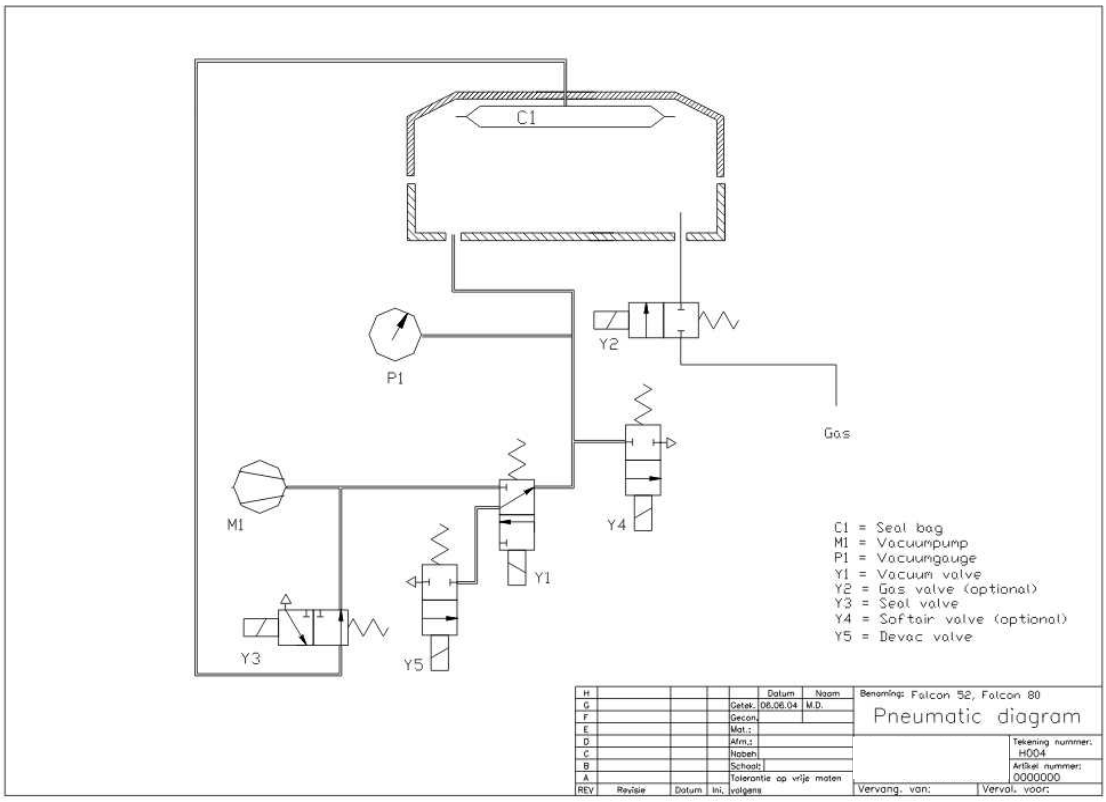
If one or more of the above messages continue to occur regularly or cause a direct problem, we advise you to contact your dealer.

PNEUMATIC DIAGRAMS

BOXER series / MARLIN series



FALCON series / POLAR series



Diagrams are shown for standard configurations.

PROBLEM SOLVING

PROBLEM	CAUSE	SOLUTION
Machine does not work	• The plug is not plugged into the wall socket. • The main fuse is burnt. • The ON/OFF switch's contact block has come loose. • The circuit board fuse is burnt.	• Plug the plug into the wall socket. • Replace the fuse (Ensure the correct value). • Check this and if necessary re-fasten it. • Disassemble the front panel and replace the fuse.
Machine does not work Control panel is on	• The control transformer fuse is burnt. • The micro switch which is activated when the lid is closed needs adjustment or is faulty. • There is an internal malfunction.	• Check this and if necessary replace it. • The micro switch must be properly adjusted or replaced • Consult supplier.
Transparent lid does not open automatically	• The gas spring is faulty	• Consult the supplier.
Final vacuum is insufficient	• The set vacuum time is too short. • There is too little oil in the vacuum pump. • The extraction hole at the back of the vacuum chamber is partially covered by the vacuum bag during vacuuming. • The lid gasket is worn. • The oil is contaminated. • The oil exhaust filter is saturated.	• Extend the vacuum time. • Check the oil level and fill up if necessary (Note the type and quantity). • Place the vacuum bag closer to the sealing bar. • Replace the lid gasket. • Replace the oil (Note the type & amount). • Replace the oil exhaust filter / Consult the supplier. .
The machine builds up a vacuum slowly	• The pump's extraction filter is blocked. • The oil exhaust filter is saturated.	• Consult the supplier. • Replace the oil exhaust filter / Consult the supplier.

PROBLEM	CAUSE	SOLUTION
The vacuum bag is not properly and/or correctly sealed.	• The vacuum bag is being placed correctly on the sealing bar. • The sealing time is too long or too short. • The silicone rubber in on the silicone holder is damaged or worn. • The teflon tape is damaged. • The inside of the vacuum bag opening is contaminated. • There is too much gas in the package.	• Place the vacuum bag neatly and smoothly on the sealing bar. Ensure that the opening of the bag is always within the vacuum chamber. • Adjust the sealing time longer or shorter. • Replace the silicone rubber. • Replace the teflon tape • Clean the vacuum bag's opening. • Check this by setting the gas function to the OFF position.
The amount of gas in the vacuum bag is insufficient (optional).	• The gas bottle is empty or nearly empty. • The gas bottle is still closed. • Gas flush time is too long or too short. • The gas flush pressure is incorrectly set.	• Replace the gas bottle. • Check if the valve on the gas bottle is closed. If so, open it. • Shorten or extend the gas flush time. • Check if the manometer or the secondary pressure of the gas is set to 1 atmosphere (1-ATO). **WARNING!** The pressure of the gas mixture may never be more than 1 atmosphere/ATO.

In the case of other problems or questions contact the supplier

DIGITAL TIME CONTROL FACTORY SETTINGS

Program	0**	1	2	3	4	5	6	7	8	9
Vacuum time	30	25	20	15	10	30	25	20	20	15
Gas flush time*	OFF	OFF	OFF	OFF	OFF	5	5	10	15	15
Sealing time	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Soft-air time*	3	3	2	2	2	OFF	OFF	2	OFF	OFF

* **Only applicable if the machine is equipped with the options in question.**
If the machine is not equipped with the gas flush system and/or soft air ventilation then these options will not be available on the control panel.

** **Program 0 cannot be modified**

DIGITAL SENSOR CONTROL FACTORY SETTINGS

Program	0**	1	2	3	4	5	6	7	8	9
Final vacuum pressure %	99	90	99	99	99	80	90	50	90	60
Vacuum plus time	15	OFF	15	10	10	OFF	OFF	OFF	OFF	OFF
Final vacuum pressure % after gas flush*	OFF	OFF	80	70	60	50	80	OFF	80	30
Sealing time	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Soft-air time*	3	3	2	2	2	OFF	OFF	2	OFF	OFF

* **Only applicable if the machine is equipped with the options in question.**
If the machine is not equipped with the gassing system and/or soft air ventilating then these options will not be available on the operating panel.

** **Program 0 cannot be modified**

CUSTOMER SETTINGS TO BE FILLED IN

Program	0	1	2	3	4	5	6	7	8	9
Vacuum time Final vacuum pressure %	99									
Vacuum plus time	15									
Gas flush time* Final vacuum pressure % after gassing*	OFF									
Sealing time*	2.5									
Soft-air time*	3									

REMARKS ON SPECIAL APPLICATIONS

MACHINE WITH GAS FLUSH SYSTEM (if applicable)

If the machine is equipped with the gassing system then the following remarks are important :

NEVER USE GAS MIXTURES WITH MORE THAN 20% OXYGEN AND OR OTHER EXPLOSIVE GASSES. THIS COULD CAUSE FATAL EXPLOSIONS.

NEVER USE SEPARATE GAS BOTTLES WITH A MIXER WHEREBY ONE OF THE BOTTLES IS ONLY FILLED WITH OXYGEN. MALFUNCTIONING OF THE MIXER OR IF THE OTHER BOTTLE WERE TO BE EMPTY COULD CAUSE FATAL EXPLOSIONS.

All guarantees and/or liability expire in the case of accidents and/or damage caused by using oxygen or other explosive gasses.

The maximum gas pressure that can be set in the packaging is 35% (-0.35 bar on the vacuum meter). This means that there is 65% gas and 35% vacuum (under pressure) in the packaging. If a higher gas pressure results in insufficient seal quality contact the supplier or Henkelman BV for more information about connecting external seal pressure.

Henkelman recommends checking the pressure and amount of gas in the gas bottles regularly. Ensure that the gas bottle(s) is(are) correctly anchored. Always turn off the main cock on the gas bottle if the machine is not in operation or if the gas flush function is not active.

PACKAGING LIQUID PRODUCTS

The machines can be also used for packaging liquid products like soups or sauces. In this process the vacuum process must be carefully monitored (only possible with transparent lid or lid with inspection window). The [STOP VACUUM] key must be pressed as soon as bubbles appear in the product; the saturation point (same as boiling point) has then been reached.

Settings for programs for packaging liquid products can best be programmed using automatic programming (see page 19-20).

The saturation point of liquids is reached at a certain ratio line of low pressures and high temperatures (see the example table for water below). The saturation point will be reached sooner in the vacuum process when packaging liquids with a high temperature (the amount of vacuum will therefore be less).

Henkelman recommends therefore to first cool liquid products before packaging. By so doing an optimal vacuum can be achieved for the product.

Saturation point of water – relation between the pressure and temperature of the water

Vacuum pressure [mbar]	1000	800	600	400	200	100	50	20	10	5	2
Boiling Point Temperature [°C]	100	94	86	76	60	45	33	18	7	-2	-13

A handy tip when packaging liquid products is to use a liquid insert plate so that the product remains at the bottom of the packaging during the vacuuming process and there is less risk of liquid splashing out of the packaging. Contact the supplier for more information about the liquid insert plate.

EXTERNAL VACUUMING OF FOOD CONTAINERS (if applicable)

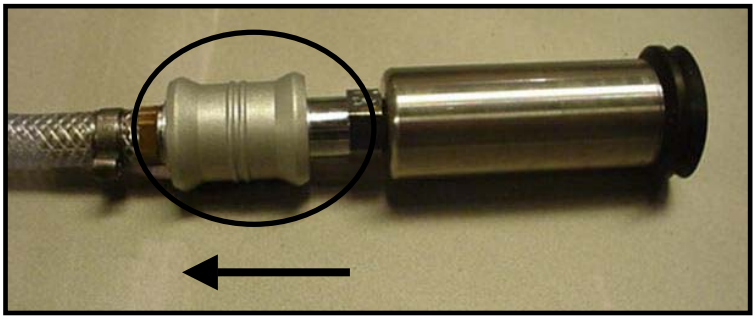
The BOXER and MARLIN series can be equipped with an option for externally vacuuming special food containers. This system can vacuum special containers for longer storage life of the (food) products in the dish. The container has a special lid with valve. Contact the supplier for more information about the containers. The system for the machine consists of a hose with vacuum applicator.

Operation External Vacuuming Food Containers

1. Start the machine

2. Place the hose connector over the extraction opening of the vacuum chamber of the machine





3. Check that the sliding valve on the vacuum applicator is on the side of the hose (closed position).

4. Press the PROG 0-9 Key until [E] (External Vacuuming) appears on the small display.

5. Place the vacuum applicator over the valve of the container and slide the sliding valve towards the lid to open the valve.

6. Pres the + Key. The vacuum pump starts to run and the container is vacuumed.

7. When the vacuum meter reaches –1 then the container is fully vacuumed.

8. Press the – Key to stop the vacuum pump

9. The vacuum applicator can now be removed from the lid by sliding back the sliding valve.

10. The container is now ready for storage and/or stock.

11. If the machine needs to be used for normal applications then the hose can be removed from the extraction opening and the required program chosen using the PROG 0-9 Key.

MAINTENANCE SCHEDULE / NOTES

Date	Carried out by whom?	What done ?	Remarks ?

Removal tools front panel

With every machine we ship-out we enclose two special tools to make it possible to remove the front panel.
The tools slide in the slots at the bottom side of the front panel.
Now lift it a little and pull it towards you.