Handbook

SEM Compact Breaktank

with Level Control

The specialist for safe & clean swimming water

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Breaktank

07-2024

part.nr.:2502925

EN1717/EN13077

Contents

For information

The Breaktank of SEM water treatment B.V.is a universal breaktank that is specially designed for the supplementation (adding fresh water) of swimming pools. This break tank ensures the necessary interruption between (drinking) water and swimming pool water. Under no circumstances can water flow from the pool back into the water supply network, not even when the pressure on the grid ceases. The SEM Breaktank meets the following standards:

EN1717
Backflow, siphoning and counter pressure are the greatest risks for the quality of drinking water. The new European standard EN1717 is set up to prevent contaminated water entering the distribution network of drinking water.

EN1377
A free outlet type "AB" provides a vertical and permanent interruption between the lowest point of the feed opening and the critical level. The overflow must be non-circular and must be able to discharge the maximum inlet flow rate under error conditions at positive pressure. Backflow of waste water (sewage water) into the drinking water network is therefore also excluded

Belgaqua

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APPAREILS CONFORMEMENT PROTÉGÉS - PROTECTIONS CONFORMES
VIV00782024

Toestel of beveiliging Appareil ou protection Appliance or protection	**Bijvulsystemen voor installaties met water van vreemde herkomst** **Système de remplissage pour installation avec eau d'origine étrangère**
Merk Marque Brand	**SEM**
Type	2502925
Goedgekeurd op Approuvé le Approval date	03/05/2024
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Opmerking Remarque Remark	Drinkwatertechnisch veilig Techniquement sûr pour l'eau de distribution
Bedrijf Société Company	SEM WATERBEHANDELING bv
Adres Adresse Address	De Run 4420 5503 LR Veldhoven (Nederland)
Contact	Gerben op den Buijs

Voor de Coördinatiegroep Waterinstallaties
Pour le Groupe de Coordination Installations d'Eau
On behalf of the Coordination Committee Water Installations

G. De Meulemeester
Belgaqua

The SEM Breaktank can be used for the supplementation of a pool. By default, the SEM break tank is equipped with a universal level control which can measure 1 level. A float switch is supplied to measure the level in the skimmer or measuring tube. The lift pump has a capacity of 5 to 45 l / min at 11 to 28 m and is protected against dry running. The capacity of the break tank is about 0.8 m^3 / hour with the built-in mechanical float to fill the tank. Optionally, a solenoid valve is available which increases the filling capacity to 1.5 m^3 / hour.

The SEM Breaktank is supplied as standard with a mechanical float to fill the tank and the capacity is 0.8m^3 / hour. See attachment accessories and parts.

This manual contains all information to commission and maintain a SEM Breaktank.

Because the maximum make-up capacity depends on the connection size of the water pipe and the required head, there may be differences between the capacities mentioned in this manual and the capacity in your situation.

Warranty limitation

This documentation is provided by SEM Waterbehandeling B.V. She is in no way liable for damage, direct or indirect, caused by the use of this documentation.

No guarantee is given for suitability for any special applications and parameter settings. SEM Water treatment B.V. limited visibility to the replacement of parts or documentation to the extent that the defects are not caused by improper use. For more information see our general delivery and payment conditions. The guarantee period on this product is 1 year after the date of purchase.

Document rights

1. Introduction

The SEM Breaktank has been developed for refilling fresh water (supplementation) in a swimming pool. The water level of the pool is measured with a level switch in eg the buffer, skimmer or level pipe. If the level is too low, the pump will start and fresh water will be added. The construction of the Breaktank is such that swimming pool water can never flow back into the pipeline network (mandatory by the water company). The water supply network must never be operated by a closed system connected to the pool. This must always be done by means of an open connection.

Specifications of the Breaktank:

- Complete interruption between pool and tap water according to European standard;
- Built-in level control for 1 pool.
- Switch-on delay 15 sec. and switch-off delay of 10 sec. for the level control. Both are adjustable. This prevents oscillation of the delivery pump due to wave action in the pool.
- Filling time protection with adjustable maximum filling time. This is to prevent the pool from overflowing.
- Clear display shows status (Run, Standby, Error);
- Simple menu structure (service and setup menu) with LED display and 3 push buttons;
- High Impact Polystyrene (HIPS) reservoir with a capacity of 15 liters;
- Level measurement of the reservoir by means of a pressure sensor. Level is readable in millimeters in service menu.
- Mechanical float ½ "(approx. 0.8 m³ / hour) or solenoid valve ½" to fill the reservoir (approx. 1.5 m³ / hour).
- Low level protection to protect the feed pump against dry running.
- The self-priming feed pump (0.37kW) has a capacity of 5-45 l / min with a head from 10 to 28m (with a counter pressure of 1 bar approx. 2.5 m³ / hour). The pump is equipped with a non-return valve and pressure gauge. Pump is switched with an electronic relay,
- so no danger of sparking or sticking contacts.
- Print is equipped with a relay that switches on water demand. External systems can be connected to this (max 3A / 230V).
- Glass fuse for electronics (250V / 160mA T) and for pump (250V / 3A T)
- Does not overflow circular, 40x140mm;
- Overflow connection ¾ "F;
- Empty connection with plug ½ ".
- Filling connection 1/2 "F PVC;
- Screw connection for all cabling with removable plugs.
- The Breaktank may only be used for cold water applications, maximum water temperature 20 ° c.

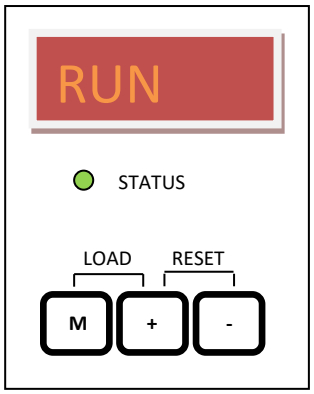
2. Control

The Breaktank works completely automatically. Once in operation, the make-up can only be stopped by shutting down the supply tap if necessary, or by switching off the supply voltage. Of course, the float switch placed in the pool can also be "manually" influenced by placing it higher or lower relative to the water level. This will shift the switching point and will eventually change the level of the bath. The level control is equipped with a switch-on and switch-off delay so that the feed pump can never "shuttle".

It is also important that the feed pump always runs with a back pressure of at least 1 bar. This is necessary to let the pump run in its Q / H curve and does not suffer any damage due to overload or cavitation. The pump pressure can be read on the mounted pressure gauge.

2.1 Display and buttons

The SEM Compact Breaktank is equipped with a digital display. The display shows all relevant information.

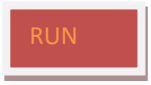


Switch on the power supply:
After switching on the mains voltage, the break tank will show the software version on the display for 3 seconds. Changed settings will always be remembered after a power failure.

Normal operation:

The operating mode is shown on the display, followed by the speed of the pump in%.

StBy = Standby, break tank is standby



RUN= Pump of the break tank is in operation and replenishes the pool

Alarm notifications:

All alarm messages can be reset by pressing + and - at the same time, as soon as the fault has been rectified.

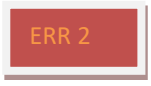
Status light:

The status light is green when the pump is in operation. In the event of a fault, this light will flash red.

● = green, pump in operation

● = red flashing, fault, the fault code on the display indicates the nature of the fault.

ERR1= water level in the break tank is high, tank is running



ERR2= water level in the break tank is low, pump is blocked against running dry.

ERR3= settings in setup menu are incorrect. Adjust the values of HA, HB, HC, LA, Lb or Lc.

ERR5= filling time exceeding level switch 1. Protection to prevent it pool will overflow.

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2.2. Service menu

The service menu is opened by the M button press for > 3 seconds. The decimal point on the right of the display flashes to indicate that the service menu is active. The menu can be followed by a short press on the M button. The service menu is automatically closed after 10 seconds (except in menu options L, i1 and i2)

Menuoption	Description	Explanation
b. xxx	Operating weeks	Number of weeks that the pump has been in operation
u. xxx	Operating hours	Number of hours the pump has been in operation. Parameter 'B' and 'U' together gives the operating time of the pump. (1 week = 168 hours)
S. xxx	Serial number print	Serial number of the control board
L. xxx	Water level (Level)	The water level in the break tank is shown measured in millimeters from the bottom of the tank. *In this mode, the setup menu is not automatically reset after 10 seconds. so that the water level can be followed while performing service work.*
I1. x	Input level switch 1	The input level of the input is displayed 0 = contact open (float up) 1 = contact closed (float down) *In this mode, the service menu is not automatically reset after 10 seconds. so that the input signal can be followed while performing service work.*
I2. x	Input level switch 2	The input level of the input is displayed 0 = contact open (float up) 1 = contact closed (float down) *In this mode, the service menu is not automatically reset after 10 seconds. so that the input signal can be followed while performing service work.* *Input 2 is for optional extensions and not used with the standard versions*

2.3 Setup menu

The setup menu is opened from the service menu. The service menu can be opened to push the the M button >3 seconds. On the right of the display, the decimal point changes from flashing to continuous edges to indicate that the setup menu is active. The menu can be followed with the M button. With + and - buttons can be changed values.

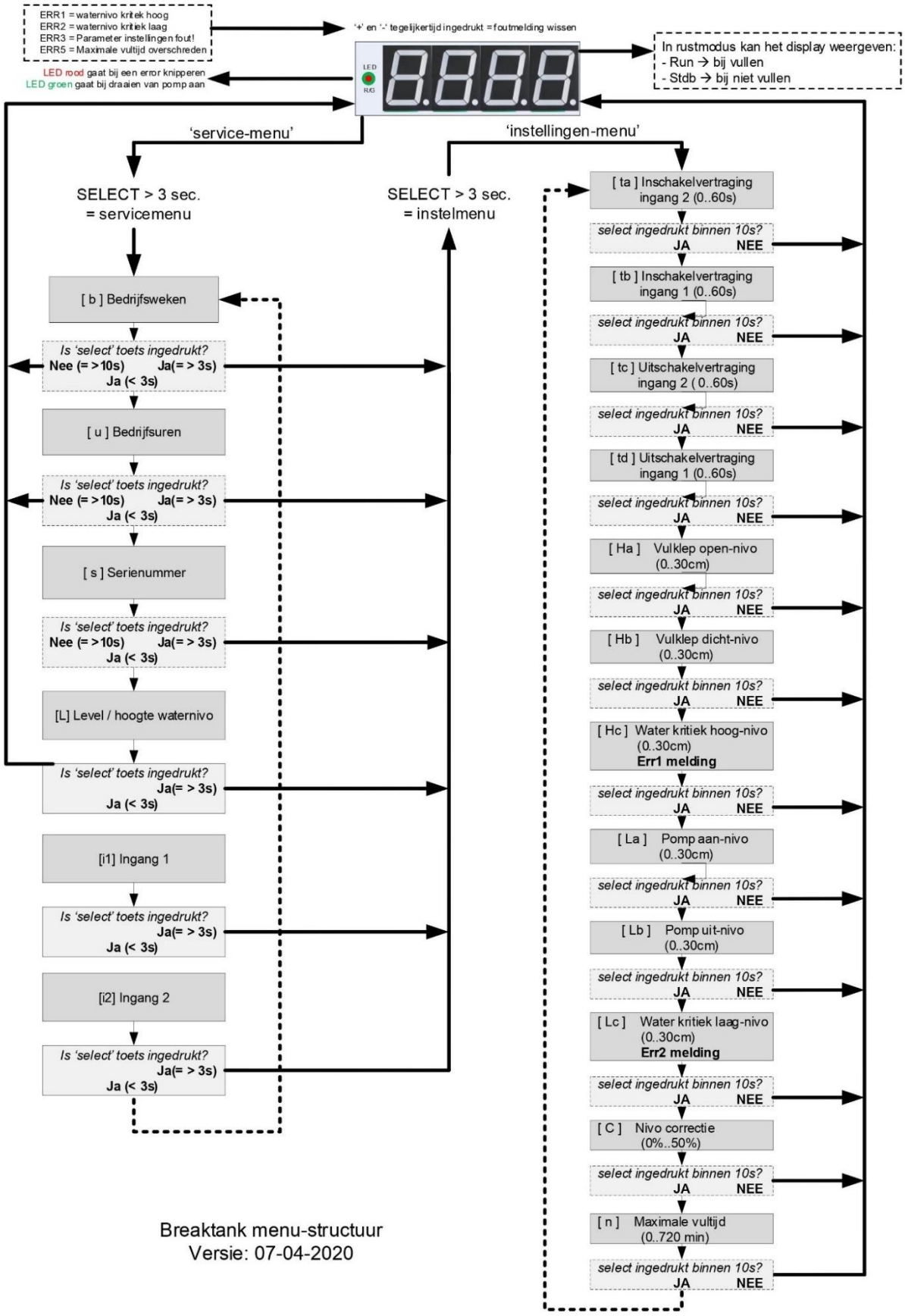
The following parameters are adjustable:

*The * marked parameters are only applicable in combination with options.*

Parameter		Parameters (factory setting)
Ta*	**Switching delay time of Level switch Input 2** The switch on the input must at least have the time parameter 'Ta' closed to open KLEP2. This is a solenoid valve connected to output 2. *This parameter is only applicable if the optional solenoid valve is used.*	t=0..60 s (3)
Tb	**Switching delay time of Level switch Input 1** This is the switch-on delay time of the level switch that measures the level of the pool. The switch at the input must at least have the time parameter 'Tb' closed to start the pump.	t=0..60 s (15)
Tc*	**Switch-off delay time of Level switch Input 2** The switch on the input must at least have the time parameter 'Tc' open to close KLEP2. *This parameter is only applicable if the optional solenoid valve KLEP2 is used.*	t=0..60 s (1)
Td	**Switch-off delay time of Level switch Input 1** This is the switch-off delay time of the level switch that measures the level of the pool. The switch at the input must at least have the time parameter 'Tb' open to switch off the pump.	t=0..0 s(10)
Ha*	**Filling valve open level in mm** At this level the filling valve is opened and the tank is refilled. *This parameter is only applicable if the optional solenoid valve KLEP1 is used.*	Ha=0..30cm (14)
Hb*	**Filling valve close level in mm** At this level the solenoid valve closes and filling stops *This parameter is only applicable if the optional solenoid valve KLEP1 is used.*	Hb=0..30cm (17)
Hc	**Critical high level (alarm message Error 1)** If the level of the tank exceeds the value set here, Error 1 will appear on the display.	Hc=0..30cm (24)
La	**Pump on level (release pump)** The pump is released when the level in the tank is above this set level. There is enough water in the tank to prevent dry running.	La=0..30cm (13)

Lb	**Pump off level (pump block at low waterlevel)** The pump is blocked when the water in the tank comes below this set level. This is to prevent dry running of the pump.	Lb=0..30cm (8)
Lc	**Critical low level (alarm message Error 2)** If the level in the tank falls below the set value set, Error 2 will appear on the display.	Lc=0..30cm(5)
C	**Correction factor level sensor** With this factor the measured value of the level sensor of the tank (pressure sensor) can be corrected. Note: changing this factor influences the operation of the break tank. Only change in consultation with SEM Waterbehandeling B.V.	C=0..50% (10)
N	**Filling time protection (alarm message Error 5)** This is the filling time protection of level switch input 1 (which measures the level of the swimming pool. If level switch input 1 has a low level swimming pool and the pump is filling more than [N] minutes, the break tank will display an ERR 5 message and refilling will be stopped. Note: if the water supply to the breaktank is interrupted and the reservoir becomes empty the pump stops running to prevent dry running. The N timer will also stop as well. Only when there is sufficient water again in the reservoir, the pump will start and the timer will continue counting. The timer is reset every time the swimming pool is at level. This protection prevents it from happening the swimming pool is refilled for too long, due to, for example, a malfunctioning float switch.	N=0-720min (0)

2.4 Schematic representation of menu structure



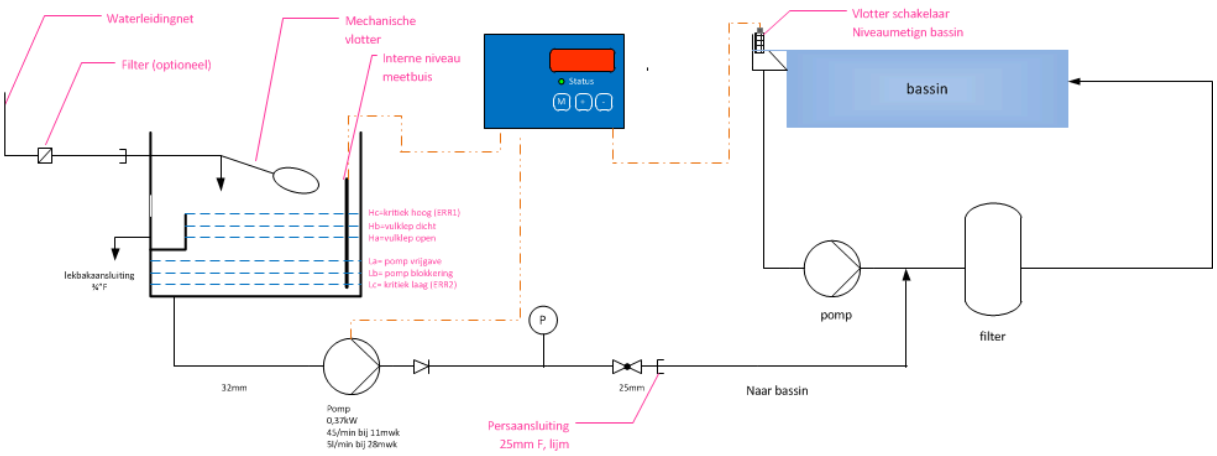
3. Installation guidelines

When unpacking, check the Breaktank for damage, visible defects, etc. caused by transport. Contact SEM WaterTreatment within 4 working days.

3.1 Hydronic installation

- Place the Breaktank on a flat surface or use the optional wall mounting bracket. Preferably in the vicinity of a wall socket (230V), a cold water faucet and a sewer connection.
- It is recommended to provide the water supply with a shut-off valve and 500u filter. The connection size of the water supply is 1/2 "F.
- The connection dimension on the discharge side of the break tank is 25 mm F Glue sleeve.
- The rectangular overflow opening may not be closed.
- The free outlet connection ¾ "F can be connected to a sewer with a 32 mm pipe.
- The drain (drain) connection has a ½ "plug. This allows the tank to be emptied.
- The installation example below gives a good idea of how the break tank can be connected to the circulation system. Always ensure that fresh water is added to the filter, but after the measuring point of the automation (W.H.V.B.Z requirement)

The overflow must always have a free range. The overflow may never be closed. The breaktank will no longer function properly when the overflow is closed.



3.2 Elektrical installation

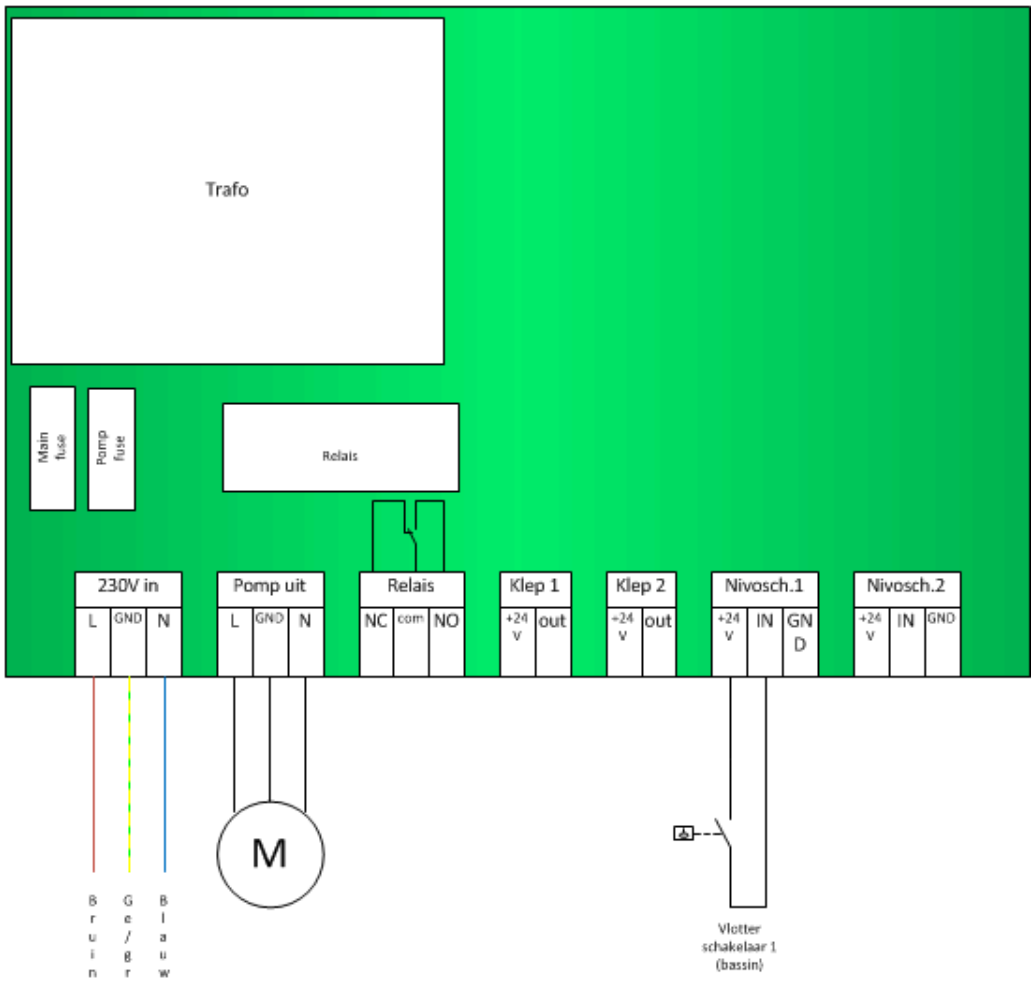
The SEM Breaktank works on 230V / 50Hz. This tension is life-threatening. Leave the work on the electrical installation to the professional.

- Provide a wall socket near the Breaktank. Since the break tank is often located in a damp room (such as boiler houses and engine rooms), it is wise to choose a spray-free type. It is recommended to connect the Breaktank behind an earth leakage switch.

- If necessary, the wall socket can be switched off by means of protection contacts of, for example, flowmeters and / or thermal contacts of the swimming pool pumps, etc.

- Use signal cable of at least 2x0.22 mm for the control signal of the float switch. The maximum cable length may be 50m.

- A connection for two solenoid valves (24Vdc / 8W) has been prepared on the terminal block, for example:
  - 1x solenoid valve: option large capacity (connect to terminal VALVE 1 + 24V and OUT)
  - 1x solenoid valve: option n.t. with this model (connection to terminal KLEP2 + 24V and OUT)
  - 1x relay contact that switches on water demand, ie as soon as the pump is switched on.



3.3 Commissioning

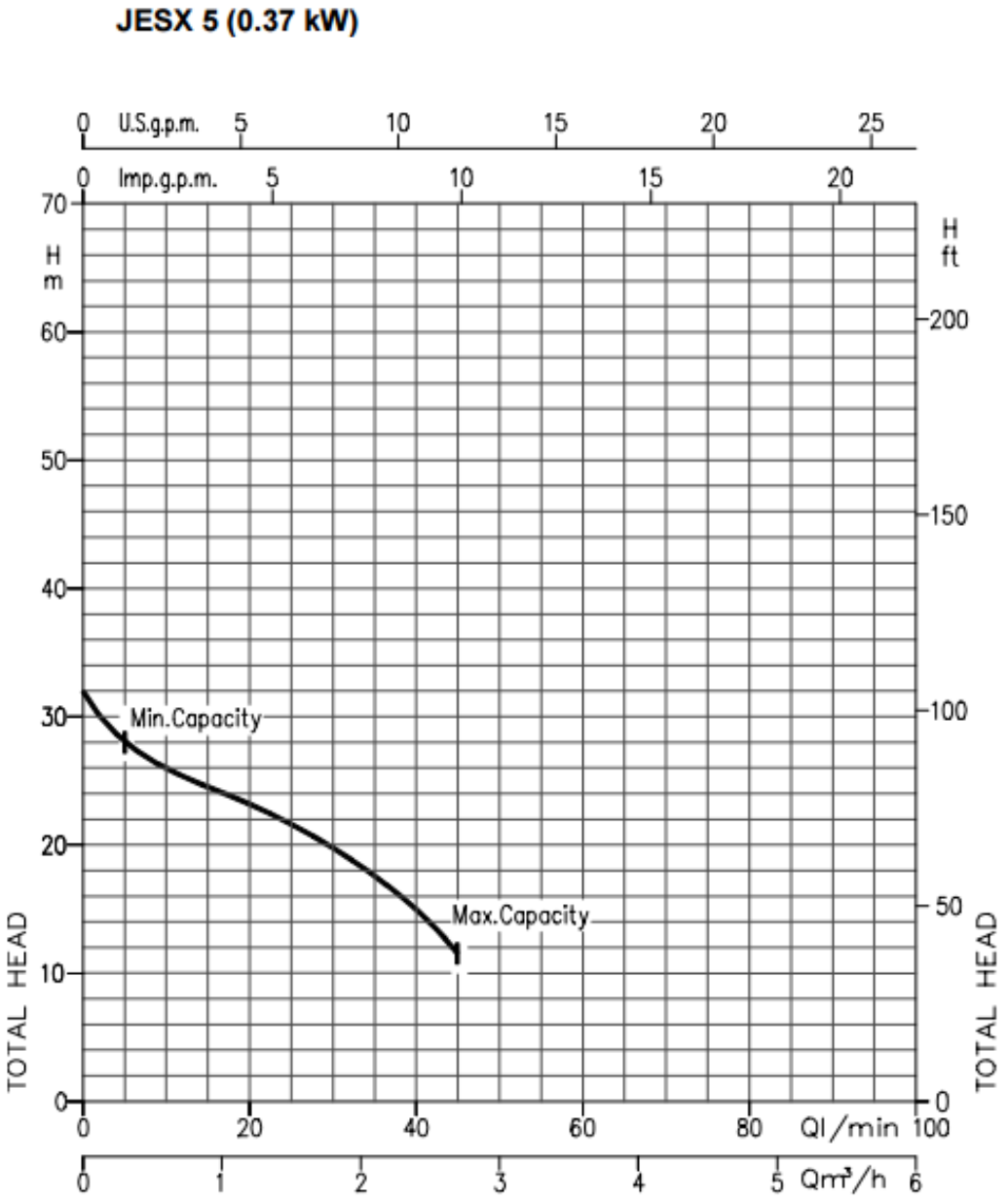
- Check the level of measuring hose that is placed in the reservoir. This can be shifted by transport. The hose must be placed at the bottom.
- The pump is below water level and does not need to be filled manually. However, the filler cap can be loosened for a moment to allow the air to escape. The pump will then self-aspirate.
- Switch on the mains voltage. The display shows the software version for 3 seconds.
- Open the water supply to the tank, the tank will fill up until the high level is reached.
- Check in the service menu whether the tank is filled to 210mm (+/- 5mm). If the level measurement does not indicate 210mm (+/- 5mm) for a filled container, the measuring hose must be pulled fully upwards, above the water level and re-inserted into the holder. This is a calibration of the measuring system. If the level is still not 210mm (+/- 5mm), please contact SEM Waterbehandeling B.V. After this check the break tank is ready for use.
- If the level switch in the pool is "interrogative" (float down, contact closed) then after a delay of 15 sec. the pump will start running. If the float of the level switch goes up (float up, contact open), the pump will switch off after a switch-off delay of 10 seconds. stop. (factory settings)
- If the reservoir is empty, the pump will also switch off (low level reservoir, Lb = 8cm). Only after the level has risen again above La = 14cm, it will be released again for use, making sure that the pump is not damaged by running dry.
- Adjust the flow of the pump until the pressure gauge indicates at least 1 bar.

Pay attention:
- Never allow the pump to run dry, always bleed when commissioning.

- It is best to adjust the tap on the pump so that the tank is barely emptied faster by the pump than that it is filled by the filling connection.

- In the event of frost, the tank and the pump must be completely drained to prevent damage due to freezing.Let op:

Characteristics of the feed pump Compact break tank



POMPTYPE		VERMOGEN		AMPERAGE		Q = CAPACITEIT									
230 V	230/400 V	KW	HP	1 Ph	3 Ph	L/MIN	0	10	20	30	40	45	50	60	70	75
50 Hz	50 Hz					M³/H	0	0,6	1,2	1,8	2,4	2,7	3	3,6	4,2	4,5
						H = OPVOERHOOGTE IN METERS										
JESXM 5	JESX 5	0,37	0,5	2,1	0,85		32	28	23	20	15	11,5	-	-	-	-
JESXM 6	JESX 6	0,45	0,6	2,4	1,1		36	31,5	26	22	17	13,5	-	-	-	-
JESXM 8	JESX 8	0,6	0,8	3	1,3		42	37	29	25	20	16	-	-	-	-

3.4 Setting parameters

- The following parameters are set as standard on the PLC unit at the factory:
  - Ta= 3
  - Tb=15
  - Tc=1
  - Td=10
  - Ha=14
  - Hb=17
  - Hc=22
  - La=13
  - Lb=8
  - Lc=5
  - N=0

All factory settings are suitable for normal use. As wished, the parameters can be set differently (see par. 2.4)

4. Maintenance and service

In normal use, the break tank requires little maintenance. A few points of interest:

- After being installed or drained, the delivery pump must be vented. To do this, remove the drain plug from the filler opening at the top of the pump housing. After the pump housing has been completely filled, the pump can be switched on. Never let the pump run dry!

- Make sure that the feed pump always works with a minimum back pressure of 1 bar. This is to keep the pump running in its Q / H curve and to prevent damage to seal and impeller.

- The float switch is in a R.V.S. basket built. This is to prevent faults from pollution. However, grease deposits and small dirt particles can still affect the operation of the float switch (especially when mounting in a skimmer, for example). From time to time the float should therefore be inspected.

- Spare parts are always available at SEM Waterbehandeling BV

- The operating hours of the pump can be read in the service menu.

5. Failures

If the pump is not working or not working properly, check the following points to determine whether or not repair is needed:

Failure	Possible solution	Solution
Err 1, tank runs over	Tank is running, level in tank too high. Mechanical float in the tank is blocked or does not work properly	Release float or check rubber sealing ring in the float shut off system (loosen the red swivel)
Err 2, level critacal low	Tank leaks or loses water (faster than tank can be filled) or is drained empty.	Check the tank for leaks. Check the tank for siphoning (can occur if tank is placed higher than pool level)
Err 3, parameter settings H and L incorrect	Settings entered incorrectly	Check settings in setup menu
Err 5, parameter N is exceeded	Filling time protection is set too critically	Check settings in setup menu
	Float in swimming pool does not work.	Check the float switch can move freely.
The pump runs but there is no flow, no Error 2 on display.	Suction pipe is blocked or leaking	Check the suction pipe of the pump (inlet blocked)
	The discharge side of the pump is blocked (by valve)	Release the pressure side or open the valve.
No reading on the display	There is no mains voltage. Fuse defective	Check the mains voltage using voltage finder or multimeter. Check the fuse.
	Breaktank control defective	Replace the control print
Well display readout, but pump does not work	Reservoir is empty. Fuse of the pump is defective	Make sure the reservoir is filled. Check the pump fuse.
Bath is not refilled, break tank in order	Float in swimming pool does not work.	Check float. In service menu, view parameter 1 or change it from 1 to 0 or vice versa when moving the float switch. If not, replace the cabling or float.

In case of other malfunctions contact SEM Water Treatment Technical Department.

Equipment that is contaminated with chemicals or toxic substances that are hazardous to health is not considered by SEM Water Treatment!

6. Technical specifications

SEM Breaktank part.number.:2502925		
	Capacity	0,8m³/h (mech. fload) or 1,5m³/h (Selonoid valve)
	Pressure hight	11,5 - 28,5 m.w.k.
	Voltage	230V 50Hz
	kW	0,40kW
	Connection watersupply	1/2"F
	Connection overflow	¾”
	Connection empty tank	½”
	Housing	Reservoir: HIPS Control box: IP 55 PVC
	Permissible water temperature	Max 20°C.
	Input level sensor	Potential free contact (control voltage 24Vdc)
	Settings and interference displays	d.m.v. LED display
	Control function	3 push buttons
	Connection extra selonoid valve(s)	24Vdc/8W 1
	Elektrical connection	Screw terminals max 1,5mm^2
	Dimensions (lxbxh)	500 x 340 x 450 mm
	Weight	10 kg

7.Spare parts

Article	Description	Partnumber
	**Pump for breaktank, type JESXM 5 230V/0,37kW**	5305010
	**Float switch SEM (switch) with 10m cable**	6022011
	**Selonoid valve ½”**	3113012
	**Mechanical float 3/8”**	7212100
	**Option large filling capacity (1,5m3 /h) with connection materials**	2502805
	**Option break tank: anti siphon protection with connection materials**	2502808
	**Mounting bracket (powdercoated) for Compact breaktank**	2502935
	**Brass strainer with 3/4" connection F**	7122034

8. Mouting and installation guidelines options

The control box of the break tank is prepared for expanding the break tank with an option:

- Break tank option: large capacity (1.5 m³ / hour) (part.no .: 2502805);
- Option anti-siphon protection: (part.no: 2502808)

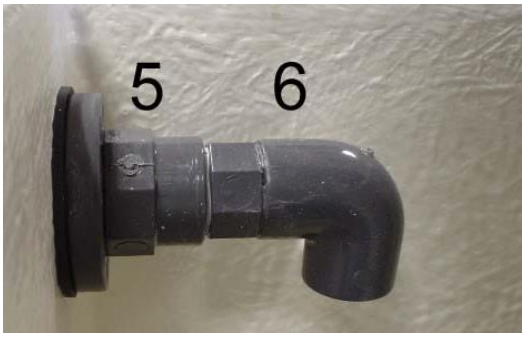
8.1 Mounting the large capacity option (1.5m³ / hour)

- The option "large capacity" is installed to increase the filling capacity of the Breaktank. The standard mounted mechanical float has a capacity of about 800 l / hour. This also limits the maximum capacity of the Breaktank at 800 l / h. By replacing this float valve with a solenoid valve ½ "the filling capacity is increased to about 1500 l / h. The installation of this option is as follows:

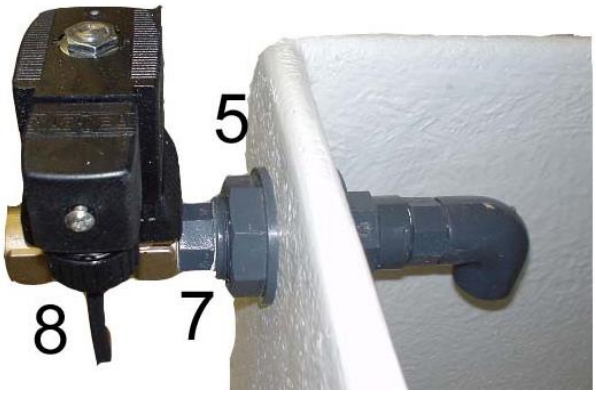
- Open the packaging of the option package and check whether the following components are present:

- Disassemble the mechanical float (see photo below) by holding the float housing (4) and unscrewing the swivel (3). The float house can now be removed. Unscrew the threaded connection (2) from the PVC insert screw (1).

- Now mount in the pipe bend with ½ "M in the tank grommet (5) (see photo below). Use Teflon tape for this.

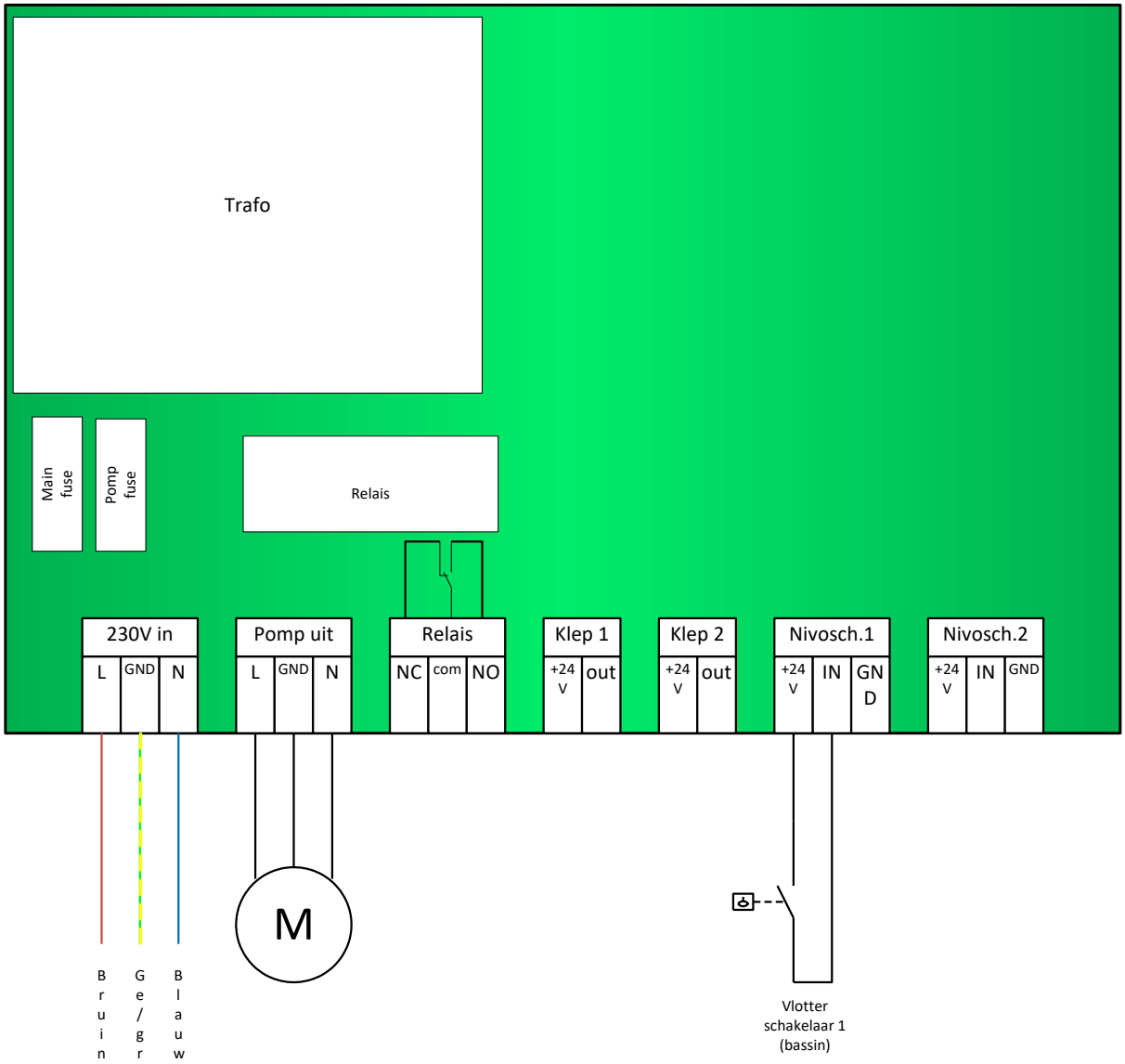


- Now mount the solenoid valve (8) on the outside of the Breaktank (8) using the double nipple (7) on the tank duct (5) (see photo below). Provide the double nipple with teflon tape.



The SEM Breaktank works on 230V / 50Hz. This tension is life-threatening. Leave the work on the electrical installation to the professional.

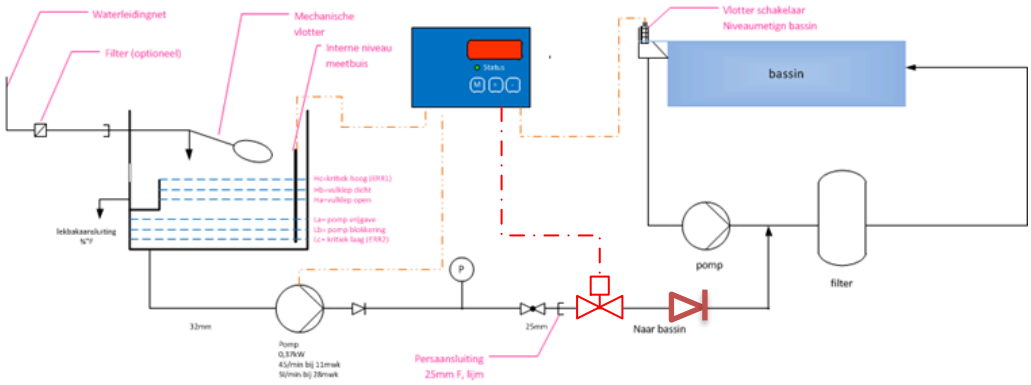
- Now connect the wiring of the solenoid valve to the terminals KLEP1 (+ 24V + brown) and OUT (- blue) of the control box. See also the connection diagram below.
- The Breaktank can now be put into operation. Possibly the parameters Ha and Hb can be adjusted. These are already correct from the factory.



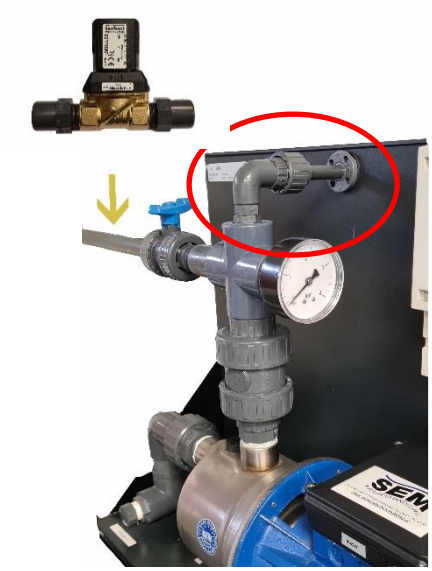
8.2 Mounting option: anti-siphon protection

If the break tank is mounted higher than the swimming pool level, there is a possibility of siphoning if there is no back pressure in the filter system (for example if the filter pump fails, in the event of a power failure). To prevent siphoning from occurring, a solenoid valve can be installed in the pressure line of the break tank. This solenoid valve only opens when the break tank pump is in operation to add water to the bath. The valve is supplied including point pieces. An accessory is also included to allow some of the water to flow back to the tank. This protects the pump against overheating.

- Install the valve in the pressure pipe of the break tank with the supplied accessories, directly after the valve. See the diagram below:
- Install a the check valve after the solenoid valve to prevent backflow.

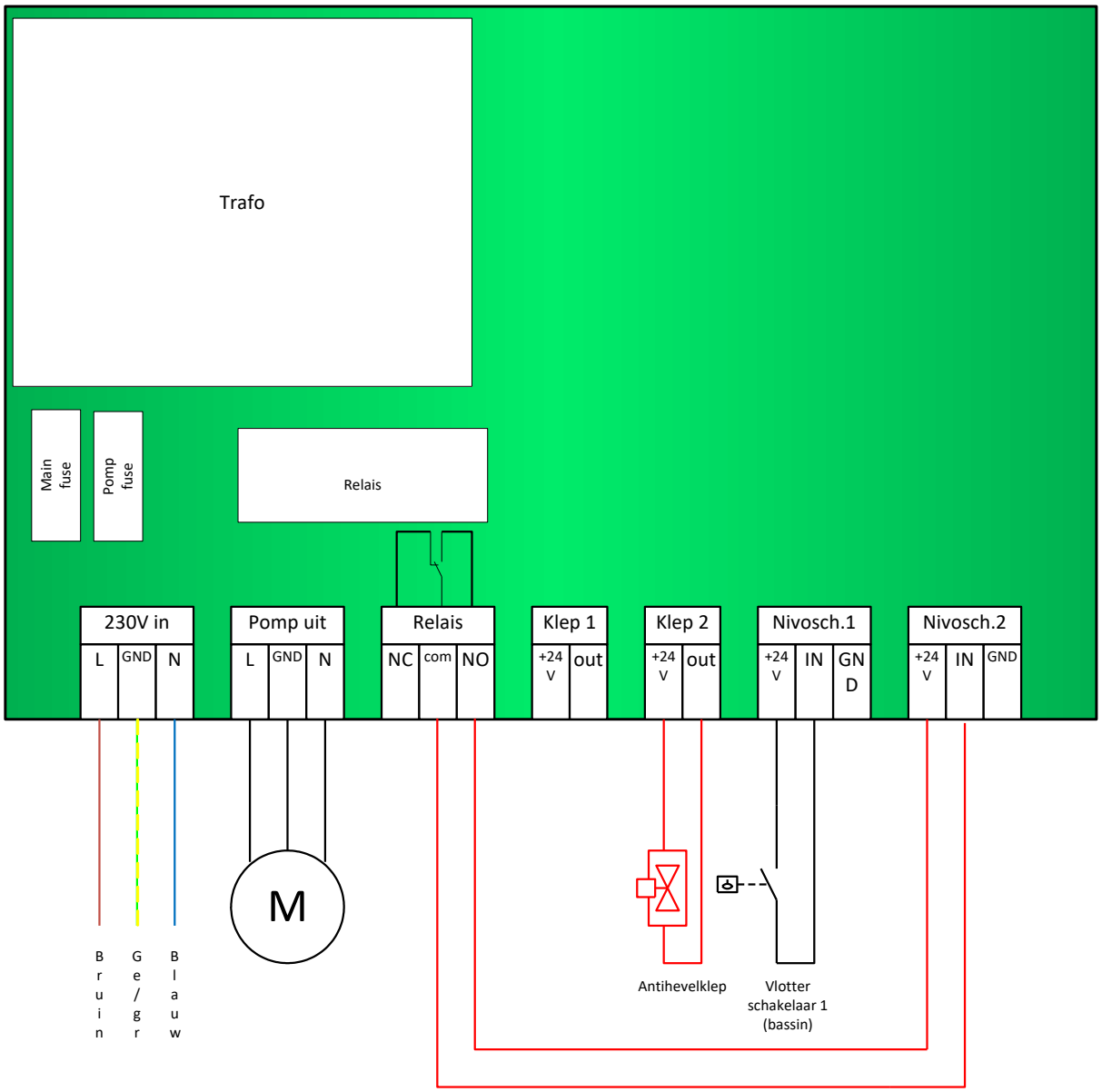


- Install the accessories for the overflow to the break tank (see red circle). To do this, remove the cap plug (1/4”). Drill a hole (27mm) in the wall of the break tank and mount the lead-through and the elbow piece. The solenoid valve can be mounted at the location of the yellow arrow, or on another part of the pipe, after the valve.



- Mount the outlet part on the inside of the break tank.

- Connect the valve to the terminal strip on output VALVE2, brown to terminal +24V, blue to terminal OUT
- Make a jumper between the RELAY and LEVEL 2 terminals according to the diagram below.
    - o From RELAY, terminal COM to Level 2 terminal IN
    - o From RELAY, terminal NO to LEVEL 2. terminal +24Vc



Notes: