Instruction and Operation Manual

Drum Filter

Model:

TM1

Version:

V1.0

© Trome 08/02/2023

Inhoud

1. Introduction

To make sure that your TM1 works properly it is essential that you read this manual carefully.

Please follow all instructions, hints and information exactly to avoid any problems with the operation of the TM1.

Should any questions or problems occur which are not mentioned in this manual please contact your representative.

2. Important security information and warnings

This manual should be accessible at any time as it contains important information regarding the installation and operation, as well as for trouble shooting.

We recommend to keep a copy of this manual directly at the location of your filter so that it is available for technicians etc. when needed.

PLEASE NOTE!

Trome BV is not responsible for any damages to the TM1 or injuries which occur due to neglect of the manual and the security notes and instructions contained in it.

3. General information regarding the used pictograms

You will find the following pictograms in this manual and/or on the TM1. These pictograms point to important information or contain warnings. The exact meaning is described below:

	Important information that requires special attention.
	Danger due to electricity.
	Increased risk of damage/injuries for items or persons.
	Danger of injuries due to moving parts.
	Read manual before use.

4. Information regarding your TM1

4.1 Drumfilter

An identification tag is applied on the casing of your TM1. This serial number is a unique number to identify each drumfilter. In case you need extra information or help from our support department, we will ask you for this number.

This number is also written on the QC checklist (Quality Control checklist), see section 4.3

4.2 Controlbox (CB)

An identification tag is applied on the inside of the CB. This serial number is a unique number to identify each CB. In case you need extra information or help from our support department, we will ask you for this number.

4.3 QC checklist

A QC checklist is attached to the TM1. It is mandatory to compare this checklist with the actual condition of each point on the drumfilter. If the actual condition on the filter deviates from the checklist, it is mandatory to inform your representative in order to maintain warranty. Without notice to the contrary, the user agrees to the checklist.

5. EG-Conformity Statement

CE

Manufacturer:	Trome BV Tulpenstraat 9 1840 Londerzeel Belgium
Machine type:	Drum Filter incl. electrical control unit (Model on the ID label)
Guide Lines/Directives:	Machinery Directive EU 2006/42/EC, 98/37/EC Low Voltage Directive 73/23/EEC

Trome herewith confirms the conformity of the product described in this manual with the above mentioned directives and regulations.

Dendermonde, October 2013.

Sven Trossaert, Manager

Wouter Meeus, Manager

6. Modifications on the TM1

Please note that any modification on the TM1 without written approval of Trome or an authorized dealer will result in the immediate expiration of the CE-sign and warranty. Furthermore, Trome will not be responsible for any damages or injuries resulting from these modifications.

7. Spare parts

Only genuine spare parts from Trome or an authorized dealer should be used. Using spare parts from other suppliers/manufacturers will result in the immediate expiration of the CE-sign and warranty. Furthermore, Trome will not be responsible for any damages or injuries resulting from these modifications.

8. Description and functioning of the TM1

A drumfilter TM1 is a mechanical filter which removes waste and other fine particles from the system water via a micro screen (filter screen). The TM1 is able to "monitor" the changes in water levels and to "recognize" when the micro screen needs to be cleaned. Therefore, a TM1 automatically adjusts to the waste intake and only flushes when necessary. The other big advantage of a TM1 is that all detritus such as fish waste, uneaten feed etc. will not remain in the system water. Instead, all waste is flushed out of the water column automatically after a very short period of time.

Function principle:

The (contaminated) water is fed into the TM1 via the inlet pipe. The water enters directly into the drum.

Figure 8.1

The drumfilter is covered with a fine filter mesh (standard 60 micron). Water can only leave the drum by passing through the mesh. All particles larger than 60 micron will remain inside the drum. The clean water leaves the drumfilter's chamber via the outlet pipe and can then pass into the following filtration step.

Figure 8.2

The waste particles trapped inside the drum will slowly clog the filter screen making it more difficult for the water to pass through. Therefore the water level in the drum will slowly rise. Once the water level reaches a certain maximum level, which can be manually adjusted with the level sensor positioned at the inside of the drum, a flushing process is activated by the Controlbox. During the flushing process the drum is rotated by the gear motor while high pressure water is sprayed onto the outside of the filter screen by multiple spray nozzles. The waste particles that were clogging the filter screen are flushed into the waste tray, positioned inside the drumfilter, and leave the TM1 via the waste water outlet.

Figure 8.3

More water can flow again through the cleaned filter screen and the water levels will equal at previous levels. The flushing time can be set in the Controlbox. Due to the use of the water level sensor the filter only flushes when necessary, i.e. when the waste intake reaches certain limits. There is a little delay programmed in the sensor to avoid needless flushing and thus waste of water and energy.

Operation mode:

The drumfilter can be operated in two different modes: the "Auto" and "Service" mode. In the "Auto" mode the drumfilter will work completely automatically as described in the function principle here above. The "Service" mode can be used in maintenance circumstances, for example to change or clean the screens.

9. Transporting and moving the TM1

The TM1 can be transported/moved by a forklift or similar devices while standing on a pallet. To move the filter by hand the inlet and outlet sockets can be used **(Do not use the motor cover or waste outlet socket!).**

10. Installation and connections

The installation should be executed by qualified personnel only.

10.1 Before installation / QC checklist

The TM1 is transported in a wooden pallet box. The box and pallet are made separately and during packaging, the box is placed from above and finally fixed to the pallet. To unpack, just remove the screws near the ground floor that fix the box on the pallet and lift the box.

The TM1 should be carefully inspected before installation. Make sure that the packing and the TM1 show no signs of any damage. Check the inside of the TM1 and make sure that there are no remains or items in it.

A **QC checklist** is attached to the TM1. It is **mandatory** to compare this checklist with the actual condition of each point on the drumfilter. If the actual condition on the filter deviates from the checklist, it is mandatory to inform your representative in order **to maintain warranty**. Without notice to the contrary, the user agrees to the checklist.

10.2 Installation and connections

The TM1 needs to be placed on a solid and flat surface. **It is essential that the entire bottom surface is supported (and for example not only the edges).** When the filter has been placed at the desired location it needs to be positioned horizontally by using a spirit level.

The TM1 needs to be placed at a proper location and **it must not be exposed to direct sunlight. The TM1 has to be protected against freezing.** Please make sure that the filter is protected against temperatures below 0°C (32°F). In case the temperature might become lower, the TM1 needs to be covered accordingly.

The inlet and outlet pipes are to be connected to the sockets on the TM1. Make sure that the connected pipes do not create any mechanical load or tension onto the TM1 casing. The connecting pipes should be as straight as possible (use as less elbows as possible). The pipe dimensions should suit the desired flow rates.

The pipe for the wastewater discharge should be installed with a decline of min. 1%!

10.3 Connection of the flushing pump

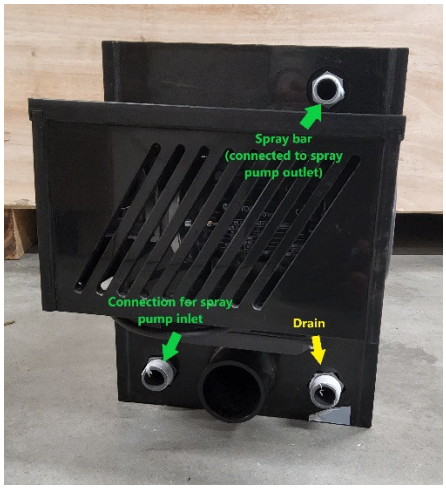


Figure 10.1

Position of the pump: it is advised to place the flushing pump as low as possible, at least **below the water level inside the drum to keep the pump primed**.

Priming of the pump: different types of pumps are used depending on the model. For priming instructions, we refer to the pump manual (included).

The flushing pump can be connected with pipes or suitable high-pressure hoses (included in the connection set, optional). The water inlet of the spray bar has a ¾ inch connector. A hose adaptor or pipe socket can be connected to it. The water outlet of the flushing pump is connected to the spray bar.
The water inlet of the flushing pump is connected to the connector at the bottom of the TM1 chamber (figure 10.1).

11. Installation and connections Controlbox

11.1 General working principle

The Controlbox (CB, figure 11.1) is completely assembled. The Controlbox can be mounted on a wall with the supplied mounting brackets.

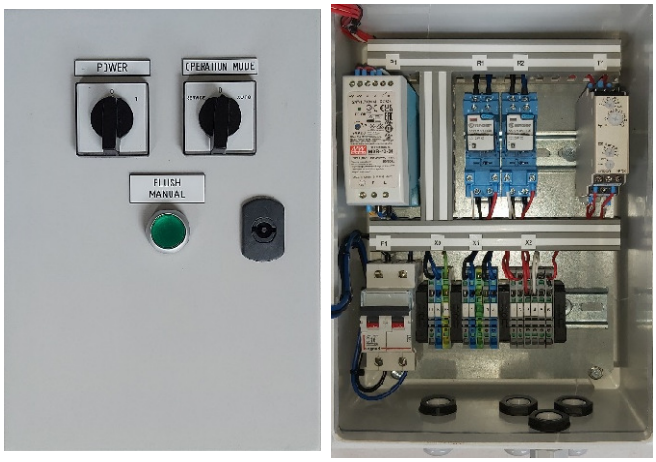


Figure 11.1

S1 : main switch (ON/OFF)
S2 : operation mode switch (SERVICE-0-AUTO)
D1 : manual flush
L1 : Status LED

Auto mode operation:

The main switch S1 is used to power up both Controlbox and drum. LED L1 lights up green. When the switch S2 is in “auto” mode, the drum works automatically. The level sensor detects the water level and flushes when necessary. When an operator wants to flush manually, D1 can be pushed shortly, a flush cycle will be executed.

Service mode operation:

The main switch S1 is used to power up the complete Controlbox and drum. LED L1 lights up green. When the switch S2 is in “service” mode, the drum motor can be manually operated. The level sensor and the spray pump are deactivated and will not function. An operator can turn the drum filter by pushing D1. When D1 is activated, the drum will turn. Releasing D1 stops the drum.

“0” mode operation:

When the switch S2 is in “0” mode, the Controlbox is powered (S1 in ON state) but no action will occur. Pressing D1 or activating the level sensor will not lead to start the flushing. In this operation mode you can the position of the level sensor by the LED’s

on the sensor,… The system will only start working when everything is checked and the “auto” operation mode is selected.

11.2 Connections

As every situation is unique, the CB is not yet connected, the connecting cables are delivered separately. First mount the CB on his definitive position, cut the cables to the correct length and make the connections.
Two types of signal cables (see figure 11.2) are delivered to make the proper connections, see situation sketch of the cable connections diagram (Appendix 1/2).

- Sensor cable (type A, 3m): to connect the sensor with the CB (cable + connector combination).
- Power cable (type C, 5m): to connect the CB with the spray pump. (black connection). The power cable of the motor is already connected on the motor terminals.

C

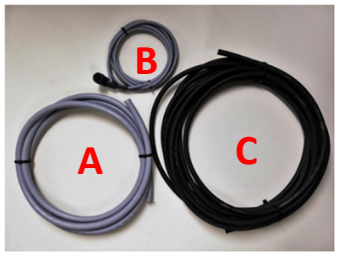


Figure 11.2

For wiring details, we also refer to the electrical wiring diagrams in Appendix 1 for single phase systems 230-240Vac, 50Hz and in Appendix 2 for single phase systems 208Vac, 60Hz.

Wiring of CB (figure 11.3):

- Power supply:
  The standard Controlbox is powered from a single phase power supply. Connect your power supply 1x200-240+N, 50Hz on the terminals X0-L1/N or 1x208Vac, 60Hz on the terminals X0-L1/L2 (depending on the region in the world).

- Power cable between CB and motor/pump:
  The power cables between the Controlbox and motor/pump are included. The cables used are standard 3G1,5 (AWG14) power cable. The motor power cable needs be connected to X1-1/2/PE. The spray pump power cable needs to be connected to X1-3/4/PE.

- Signal cable (type A) between CB and sensor:
  Connect the sensor cable on the X2 terminal strip: X2-1 (brown), X2-4 (yellow) and X2-5 (black). Not for TM1

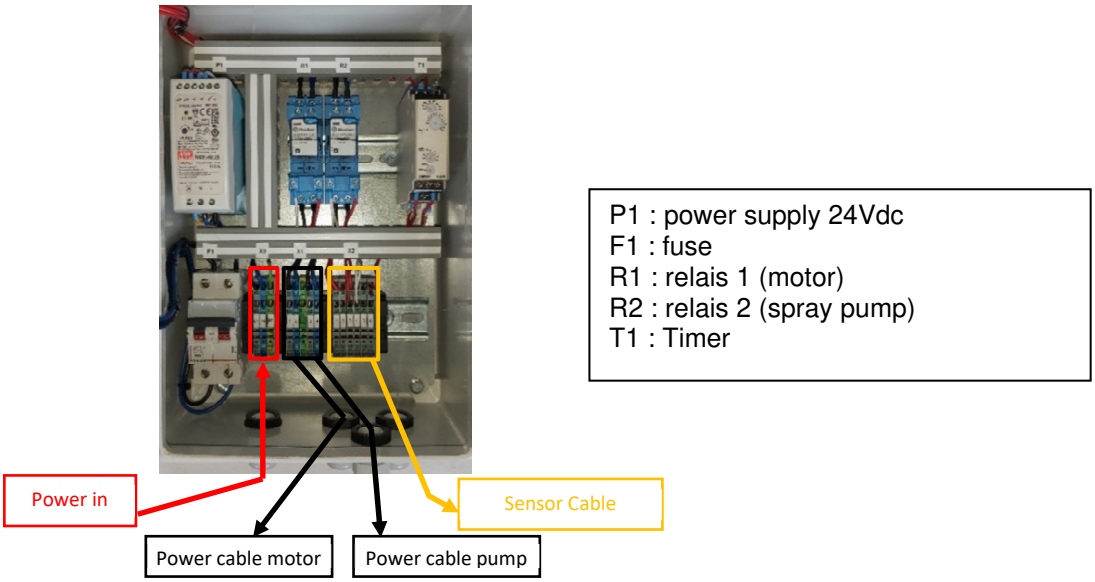


Figure 11.3

11.3 Timer setting

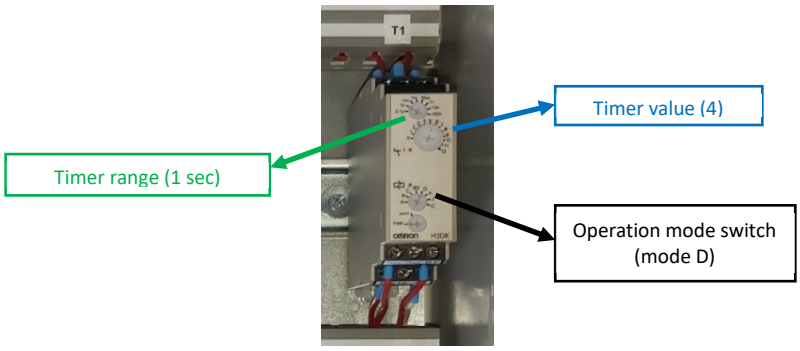


Figure 11.4

The flushing time can be adjusted depending on your situation (figure 11.4, Timer value).

Factory setting of the timer range switch is 1 sec. Factory setting of the timer value (duration of a flushing cycle) is 4 sec. Operating mode switch should always be in position D (signal off delay).

Before starting up and connecting the power supply make sure that the emergency stop button is pushed and the power supply is interrupted until start-up.

PLEASE NOTE:
The control unit is completely installed and ready-to-use. However, it is recommended that a qualified electrician re-checks the power connection. We also recommend connecting the control unit to a circuit breaker for further safety.

12. Start-up

12.1 Before start-up

It is important to re-check all relevant points again. These include:

- Checking all connections (correct position, no leakages etc.)
- Checking all safety devices (motor cover etc.)

12.2 Outlet configuration

The outlet of the TM1 has to be raised with an elbow and/or T-piece or another configuration depending on your situation. This ensures that the filter chamber does not get entirely empty after flushing or during a power failure. **Critical differences in water levels inside and outside of the drum must be avoided**.

12.3 Setting the level sensor and outlet

In order to use the maximal capacity (and thus minimal water consumption) of the filter, the level sensor is to be set as high as possible without water going over the overflow at the moment a cleaning cycle is triggered. Important to know: the measuring point is 15mm above the end of the sensor.

The T-piece (or elbow with pipe) at the outlet needs to be positioned so that the difference in water levels inside and outside the drum at the moment a cleaning cycle is initiated, is **±10 cm**. **This avoids too much strain on the gears etc. due to the weight of the water inside the drum.**

However, the position of the sensor is adjustable in case your situation requires this (figure 12.1 and 12.2). The outlet configuration should be adjusted in order to have the ±10 cm level difference again.

Figure 12.1

Figure 12.2

The exact position of the level sensor and the outlet configuration can only be set when water is flowing through the TM1. To start up, activate the circuit breaker, unlock the emergency stop button, turn the power switch S1 in position “1”, the operation switch S2 in “auto” and start the water pump of your system. Re-adjust the position of the level sensor if needed and re-adjust the position of the outlet configuration accordingly.

Stay away from the moving gears to prevent injuries!

Check whether the flushing works and that the nozzles are not plugged. If you find plugged nozzles push the emergency stop button and remove the nozzles from the nozzle holder as explained under section 14.1. Once the cleaned nozzles are back into position, unlock the emergency stop button.

Check whether the spray water goes into the waste tray. If this is not the case, the angle of the nozzles needs to be adjusted. Call your representative for assistance.

12.4 “Teaching” of the sensor.

Figure 12.3

The sensor is factory set for normal operation. This special setting can only be done by an I/O link software package. A manual teach by the customer overrides the factory settings and can have influence on the proper working of the sensor.

The sensor manual is included in the sensor packaging and the most important sections can be found in Appendix 3.
Extra information about the level sensor can be found on the following link: LI5132 - Sensor for point level detection - ifm

Important to know: the measuring point is 15mm above the end of the sensor.

In the first days after the start-up it is recommended to check the nozzles on a daily basis and clean them if necessary.

Check whether the cleaning and flushing process works, and the filter operates according to its application.

In case the flow rate of the system is changed, you might have to reposition the level sensor and outlet configuration.

13. Operation

13.1 Drumfilter ready

When the drumfilter is powered up, switch S1 in “1” position, the green LED L1 will light up.

13.2 Drumfilter in normal working conditions

When the drumfilter starts to flush, activation by sensor or manual flush button D1, the drum motor will start up and the spray pump is also activated.

When the sensor is deactivated (or D1 is released) the drum will keep flushing during the flush time. This time is defined for optimal cleaning of the screens. This flush time is adjustable on the timer T1 (timer value). **Please consult your representative before changing**.

After the flush time, the motor and spray pump are stopped. The system is ready for a new cycle.

14. Maintenance

Before doing any maintenance works the emergency stop button has to be pushed and the power supply has to be interrupted! Failing to do so might result in damages or injuries!

To do simple maintenance tasks, put the drumfilter in “service” using the operation mode switch S2 (figure 14.1).

Figure 14.1

14.1 Cleaning the screens

Biofilm will grow on the microscreen and it is eventually inevitable that after a certain period of time (dependent on solid concentration, temperature,…) the biofilm growth will impair the frow rate through the microscreen. This will lead to an increased flushing frequency.

The microscreen can be cleaned by using vitamin C (ascorbic acid), which is readily available in drugstores, pharmacists,… Make a solution of 10 grams/liter and spray it onto the microscreen. After a few minutes (3-5) the screens can be rinsed and should be free of biofilm.

This cleaning can be done without removing the screens if the time between 2 cleaning cycles is 3-5 minutes. In case this time is too short, the screens can be replaced and cleaning can be done after removing the screens. Please make sure the screens are hydrated/wet before applying the vitamin C solution. The best result is obtained by submerging the screens in the vitamin C solution.

14.2 Spray nozzles

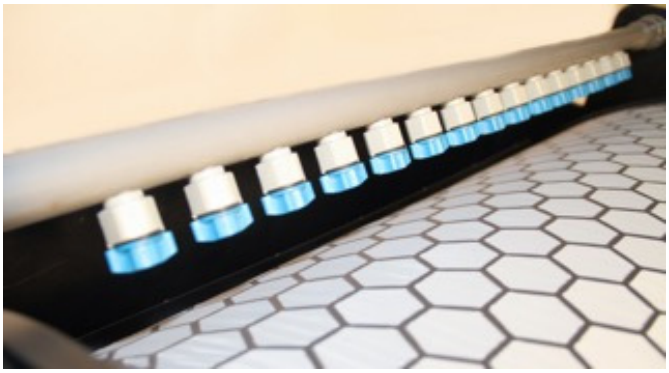


Figure 14.2

It might happen that one or more nozzles get plugged. This results in poor cleaning of the filter screen. Should a nozzle be plugged you can clean it with a tooth brush.

Please do not use any hard or sharp objects like cutter knifes or steel brushes as they would damage the nozzles.

Spray nozzles will wear out: the nozzle opening will become larger which leads to a less efficient cleaning of the screen and subsequent a higher cleaning frequency and water consumption. It is advised to check the nozzles at least once per year and replace in due time.

How to replace a spray nozzle: Put the drumfilter in service mode by selecting “service” on S2. Fix the grey nozzle holder with a wrench nr 23 (figure 14.2). Remove the blue nozzle from the nozzle holder by turning it counter-clock-wise (¼ turn). Be

careful when taking out the nozzle and make sure the seals do not fall into the TM1. Place a new nozzle in the grey nozzle holder and lock it by turning clock-wise (¼ turn). Use the operation mode switch S2 to put the Controlbox back in “auto” mode.

14.3 Filter screen

The mesh is fixed onto the supporting structure, isolating damages too the mesh within one cell. In many cases damaged mesh can be closed using an inert sealant/mounting glue.

In case the filter screen needs to be replaced, it can be changed easily. To change the screen, put the operation mode switch S2 on the CB in the “service” mode. By pushing on the manual flush button D1 you can drive the motor to put the drum in the right position to work on. (figure 14.3).

Figure 14.3

Remove the screws of the bars on both sides of the screen and remove the bars (figure 14.4). The filter segment can be taken out by grabbing the segment with 2 hands, 1 hand on the left side and 1 hand on the right side, and pulling (some force is needed) until it pops out of the slot. Then the segment is easily removed out of the other slot. (figure 14.5 and 14.6).

Figure 14.4

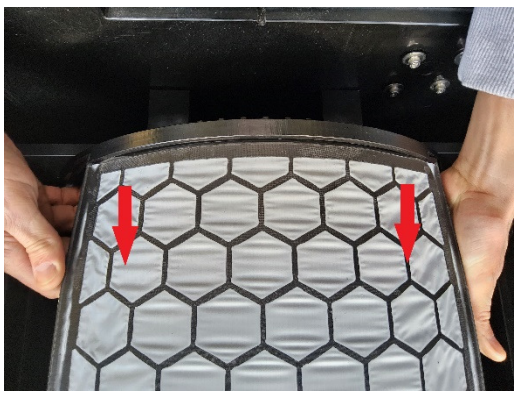


Figure 14.5

Figure 14.6

The new screen segment can now be placed by the reverse manipulations (figures 14.7/14.8/14.9): grab the new segment on both sides, bent it a little and place it in the slot on one side. Bent the screen (some force is needed) until it pops into the other slot. Reposition the bars and thighten the screws.

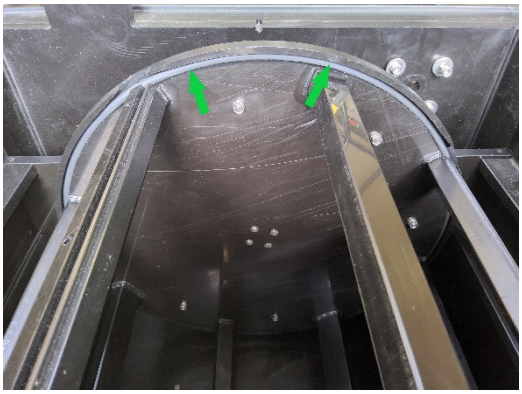


Figure 14.7

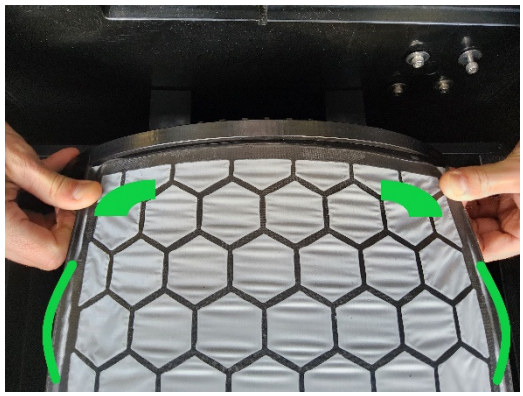


Figure 14.8

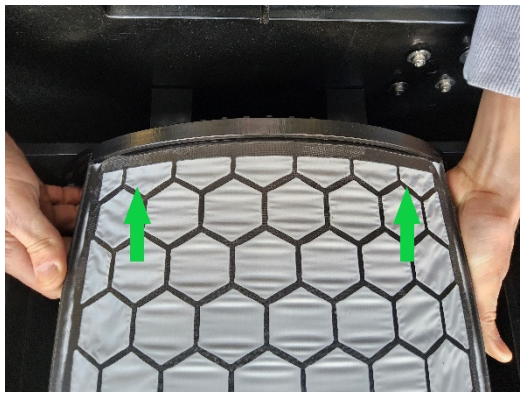


Figure 14.9

When tightening the screws please make sure that you don not “overturn” them, especially in case an electrical tool is used (use position 7 for a 10,5V electrical screw driver with 18 steps or equivalent). Stop turning the screws when you feel a resistance (manual).

Use the operation mode switch S2 to put the Controlbox back in “auto” mode.

14.4 Drum sealing

A rubber sealing (figure 14.10) prevents that water loaded with particles leaks from the inside of the drum into the clean water compartment. The friction of the rotating drum will wear out the sealing and in time leakage might occur. **It is advised to check the sealing at least once per year and replace in due time.** For instructions on seal replacement, please contact your representative.

Figure 14.10

15. Technical Specifications

DIMENSIONS:		TM1	TM2	TM3	TM4	TM5
Dimensions Casing :	Lenght (mm)	715	765	830	1180	990
	Width (mm)	300	605	830	830	1110
	Height (mm)	410	595	825	825	1180
Dimensions Drum :	Diameter (mm)	238	400	650	650	980
	Lenght (mm)	340	300	350	700	725
Filter screen :	Total Surface Area - TSA (m²)	0,25	0,38	0,71	1,43	2,23
	Effective Surface Area - ESA (m²)	0,11	0,17	0,34	0,66	1,12
	Standard Mesh Size (µm)	60	60	60	60	60
Standard Flow Rate - SFR (m³/h) :		5 - 7	15 - 20	30 - 40	60 - 75	120 - 140
Ratio ESA to SFR		0,023 - 0,015	0,011 - 0,0084	0,011 - 0,0084	0,011 - 0,0088	0,011 - 0,009
Process integration :	Inlet (mm)	1 x Ø63	1 x Ø110	1 x Ø160	1 x Ø200	1 x Ø250
	Outlet (mm)	1 x Ø75	1 x Ø110	1 x Ø160	1 x Ø200	1 x Ø250
	Waste water outlet (mm)	1 x Ø50	1 x Ø110	1 x Ø110	1 x Ø110	1 x Ø110

ELECTRICAL SPECIFICATIONS:

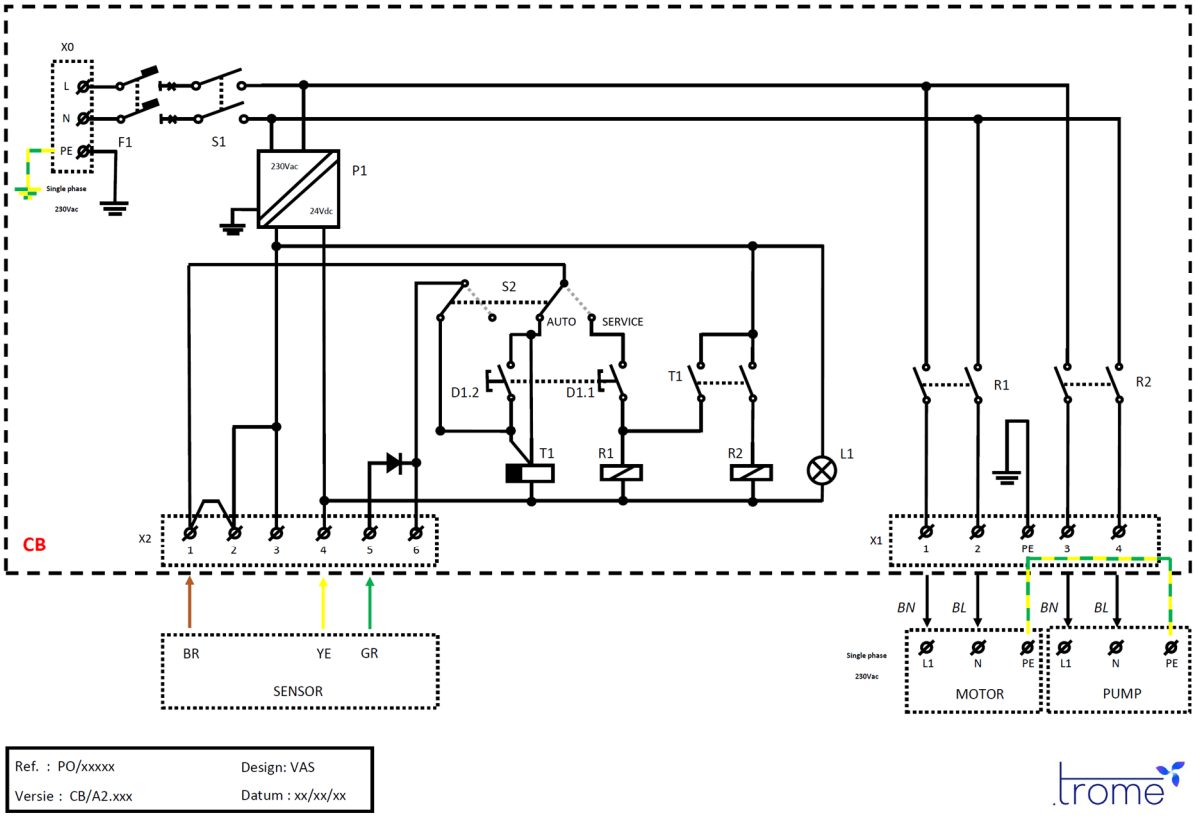
Connection :	1 phase / 200-240Vac	Std	Std	Option	Option	Option
	3 phase / 380/480Vac	Option	Option	Std	Std	Std
Voltage	1 phase	200-240Vac (50Hz/60Hz)				
	3 phase	380/480Vac (50Hz/60Hz)				
Motor (kW)		0,18	0,18	0,55	0,55	0,55

MATERIAL SPECIFICATIONS:

HDPE	Casing / Filter drum / Support screen / Waste water tray / ...
POM	Drum gear / Drive gear / Bearings
PP	Spray Nozzles
Nylon	Mesh
Stainless Steel 316	Drive Axis / screws

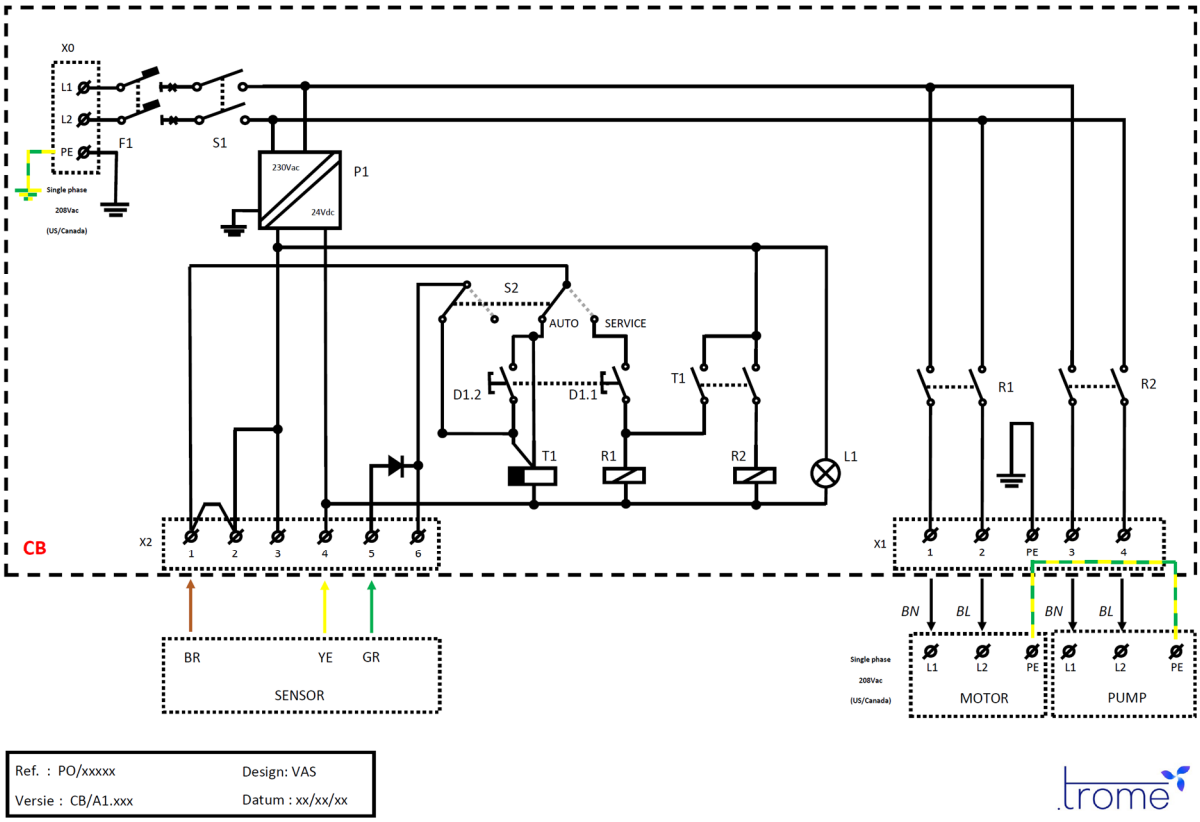
16. Appendix

Appendix 1: Electrical wiring diagram CB (single phase 230-240Vac – L/N)



Ref. : PO/xxxxx	Design: VAS
Versie : CB/A2.xxx	Datum : xx/xx/xx

Appendix 2: Electrical wiring diagram CB (single phase 208Vac - L1/L2)

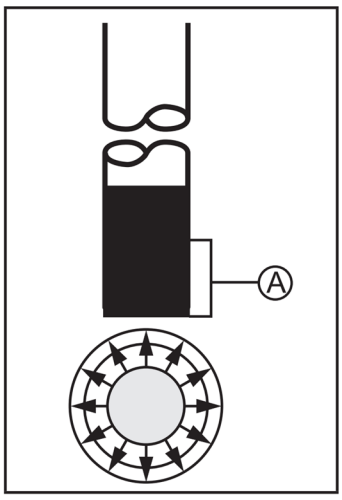


Ref. : PO/xxxxx	Design: VAS
Versie : CB/A1.xxx	Datum : xx/xx/xx

Appendix 3: Sensor Manual

The unit operates with radial detection characteristics. Therefore media below the active zone (A) are not detected.

When the unit is perfectly adjusted, the presence of certain media can be detected while build-up or foam is suppressed.



A: Active zone (28 mm)

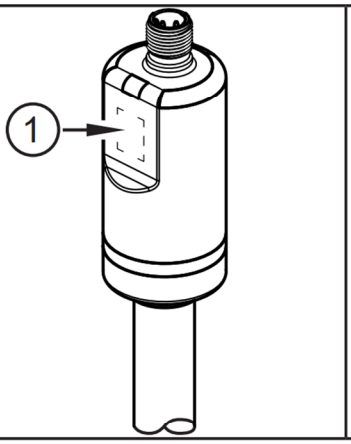


Fig. 1: view of the unit
1: inductive teach button

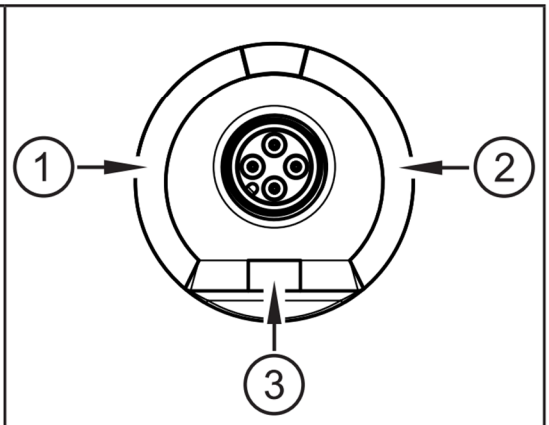


Fig. 2: top view
1: LED1 (yellow) = switching status OUT1
2: LED2 (yellow) = switching status OUT1 (OUT2)
3: LED3 (green) = operating status

On delivery, the two yellow LEDs (LED1 and LED2) indicate the switching status of output OUT1. This can be configured via IO-Link (→ 9.2.4).

5.3 Features of the unit

- The unit versions are offered with different probe lengths.
- Point level selectable by the installation length (→ 6).
- Parameter setting using the teach button (→ 9.1) or via IO-Link (→ 9.2).
- The unit has two switching outputs:
  - Output OUT1 is assigned to the process value "Level".
  - Output OUT2 can be assigned to the process value "Level" or "Temperature".
- Adjustment function (empty and full adjustment) to the medium to be detected.
- Defined state in case of a fault (→ 9.2.4)

9.1 Parameter setting via the teach button

The teach button can be used to unlock the unit in a first step (→ 9.1.1) and then to adjust the unit sensitivity.

The unit sensitivity is adjusted by carrying out an empty adjustment and / or a full adjustment (→ 9.1.2) and (→ 9.1.2).

The switching thresholds (set point and reset point) are automatically defined with the adjustment procedure.

The teach operation only has an effect on the process value "level" while always affecting both outputs (OUT1 and OUT2).

All other parameter settings can only be made via IO-Link (→ 9.2).

Actuating the teach button: (→ 8)

The unit is locked at the beginning of operation and after 120 s of inactivity (operating hurdle to avoid unintentional input of incorrect values).

9.1.1 Unlock unit

▶ Actuate the teach button for at least 10 s.

> The green LED3 flashes during these 10 s at approx.1 Hz. The expiry of the 10 s is acknowledged with a double flash (at approx. 2 Hz).

▶ Release the teach button (remove metal object).

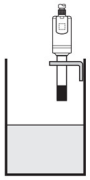
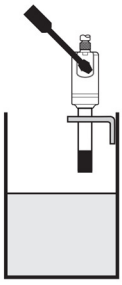
> The green LED is lit permanently.
The unit is now unlocked.

After 120 s of inactivity, the unit locks itself again automatically. Parameterisation can only be performed within this period.

The green LED will flash as signal if you try to perform operations while the unit is locked. The unit remains locked if the teach button is released before 10 s have expired.

9.1.2 Set for empty tank condition

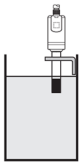
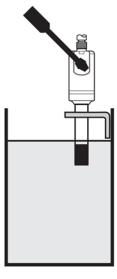
By performing the empty adjustment, the unit is adjusted to the empty tank and the installation conditions (e.g. the distance to the tank wall / structures in the tank). Previous adjustment operations are deleted. By performing the empty adjustment, the unit is adjusted to maximum sensitivity which is particularly suitable for media with a low dielectric constant (e.g. oils).

1		▶ Empty the tank. In case the unit is used as a level switch or overflow prevention: Empty the tank until the medium is at least 20 mm below the end of the probe.
2		▶ Unlock the unit (→ 9.1.1)
3		▶ Actuate the teach button for at least 1 s / not longer than 4 s. > First, the green LED3 goes out briefly, then the two yellow LEDs flash slowly after 1 s (at approx.1 Hz). ▶ Release the teach button (remove metal object). > Successful completion of the empty adjustment is acknowledged with a double flash of the green LED (at approx. 2 Hz). While the unit is in factory setting, both yellow LEDs are off. > The unit is ready for operation. While the unit is in factory setting, output 1 (OUT1) is set to normally open and output 2 (OUT2) to normally closed.

9.1.3 Set for full tank condition

In case of aqueous media, in particular those where deposits or soiling are to be expected, the empty adjustment is not necessary and a full adjustment can be carried out immediately.

Where an empty adjustment has been carried out for aqueous media, it must be followed by a full adjustment to achieve a perfect adjustment of the unit sensitivity to the medium.

1		▶ Fill the tank until the active zone (A → 6.3) is completely covered.
2		▶ Unlock the unit (→ 9.1.1)
3		▶ Actuate the teach button for at least 4 s / not longer than 7 s. > First, the green LED3 goes out briefly, then the two yellow LEDs start flashing slowly after 1 s (at approx. 1 Hz) before flashing quickly after 4 s (at approx. 2 Hz). ▶ Release the teach button (remove metal object). > Successful completion of the full adjustment is acknowledged with a double flash of the green LED (at approx. 2 Hz). While the unit is in factory setting, both yellow LEDs are lit. > The unit is ready for operation. While the unit is in factory setting, output 1 (OUT1) is set to normally open and output 2 (OUT2) to normally closed.

10.3 Operating indication by LEDs

The following indications refer to the factory settings. In this state OUT1 = Hno and OUT2 = Hnc.
Both yellow LEDs (LED1 and LED2, → 8) indicate the switching status of output OUT1.

Operating status	**LED1 (yellow)** (OUT1)	**LED2 (yellow)** (OUT1)	**LED3 (green)** (Operating voltage)
Unit ready for operation, no medium detected	OFF	OFF	ON
Unit ready for operation, medium detected	ON	ON	ON
No operating voltage / operating voltage too low	OFF	OFF	OFF
Short circuit OUT1	flashes at 4 Hz		ON
Short circuit OUT2	flashes at 4 Hz		ON
Error / failure	OFF	OFF	flashes at 8 Hz
Visual indication for localisation	1 Hz double flashing		ON
Teach operation	(→ 9.1)		
Fault during the teach operation	8 Hz yellow/green flashing for 2 s		
Teach with locked unit (→ 9.1.1)	X	X	flashes at 1 Hz

X: according to level