Manual

Purusaqua
Drum filter / Combi filter

Dear Customer

We are honoured that you have chosen for the products of **T**ol **W**ater**T**echniek (hereinafter referred to as TWT). Read this manual carefully so you will use the product correctly and so a correct functioning is guaranteed. If after reading this manual or while using our product you have any questions, please contact your dealer or TWT. We will be happy to help!

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EG declaration

EC declaration of conformity

Manufacturer

Company name:	Tol Watertechniek
Address:	Veldhuisweg 4
Postal code:	8372VH
Place:	Baarlo
Country:	Nederland

Description and identification of the product concerned

Generic name:	Purusaqua® Drum filter / Combi filter
Function:	Filter(system) for treatment of (waste)water
Model:	TRO and BITRO
Type:	TRO-25, TRO-50, TRO-100, BIOTRO-25, BIOTRO-50, BIOTRO-100
Serial number:	See sticker on the machine
Commercial name:	Purusaqua® Drum filter / Combi filter

Compliance

The manufacturer declares that the above-mentioned machinery fulfils all relevant provisions of:

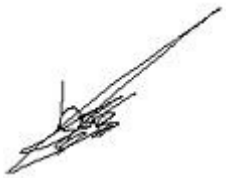
- Machine Directive (2006/42/EC)
- Low Voltage Directive (2006/95/EC)
- EMC Directive (2004/108/EG)

In conjunction with the following harmonized standards and where appropriate other technical standards and specifications:

- EN-ISO 12100:1
- EN-IEC 60204-1

Place:	Baarlo
Identity:	Bas van Tol
Function:	Owner
Date:	10-4-2017

Signature:



1 Safety

1.1 Intended scope

The products described in this manual are intended to be used for the treatment of slightly contaminated water. Water of pools, ponds, aquariums and light industry or similar for example.

The use of these products in a different situation than recommended may result in personal injury and possible premature wear of the equipment.

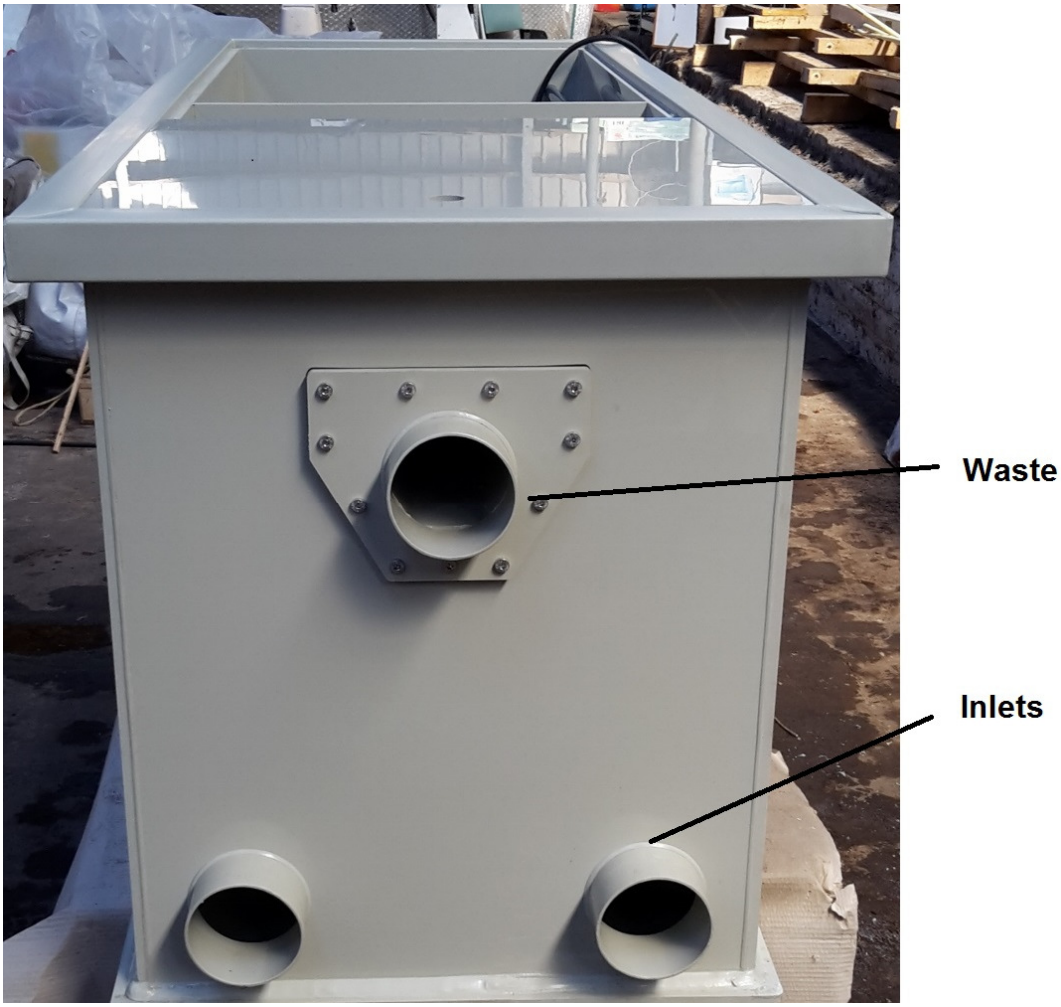
1.2 Risk's in the use of drum filters and combi filters

Despite the fact that our products are designed in such a way that the risks are minimalized there is always a risk of dangerous situations.
A drum filter contains moving parts. The filters are equipped with safety measures to block the rotation of the drum when the cover is opened. Be sure that this safety measure is functioning at all times. Optionally these filters can be equipped with a build in submerged UVC. When the cover is opened this UVC lamp will be shut off too.

If the drum will rotate, or the optional UVC will light up when the cover is opened, contact your dealer and decommission the filter.

2 Explanation of the product

This chapter describes the connections and the controls of the TRO and BIOTRO filters.



Inlets

These are the connections for the water inlets. By the design of the filter we took a maximum flow of 12,5m³/hr per inlet into account. If you want to use the full flow capacity of the filter be sure to connect all inlets. Also make sure that there are as few as possible knees (bents are better) and obstructions in the pipework.
It is advisable to place valves in the supply pipes so that you can close the water supply if necessary.

Waste

The dirty rinse water is drained via this outlet during a rinse cycle. Be sure that this outlet can flow freely and be sure that there are as few as possible obstructions. When the waste water can't be drained properly the filter will not perform well.

Outlets
The filtrated water exits the filter via these outlet(s)

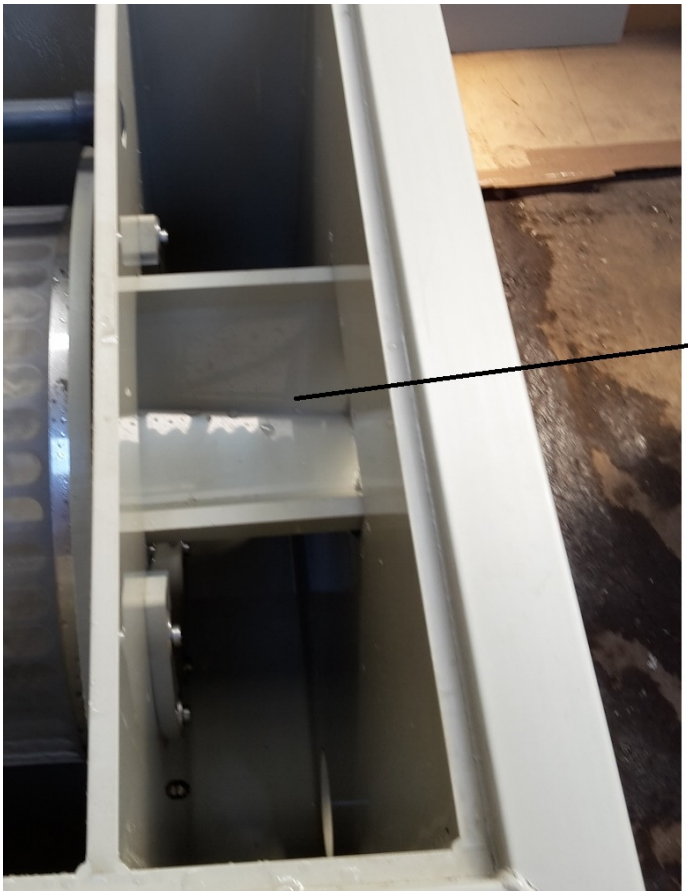
Rinse pump
The suction port of the rinse pump is connected to this connection. In this way the rinse pump is fed with filtered water.
If you want to have the ability to drain the filter then we advise to install a t-piece on this connection. One end of the T-piece is connected to the rinse pump. The other connection is connected to a ball valve.
Via the ball valve the water can be drained.

Spray bar inlet
The outlet port of the rinse pump need to be connected to the spray bar inlet. It is advised to put a fine filter between the outlet port of the pump and the spray bar inlet. This prevents clogging of the nozzles.

Spray bar
The spray bar is used to spray the rinse water onto the filter screen. Check the nozzles for debris/clogging on a regular base.

Water level
This connection is used to measure the water level inside the drum. An industrial pressure transmitter is mounted. Don't forget to connect the cable from the control box to the pressure transmitter.

Control box
The control box controls the filter. It takes care of the right rinsing procedure. It also prevents the rotation of the drum when the cover of the filter is opened. A description of the control box can be found in chapter 6.

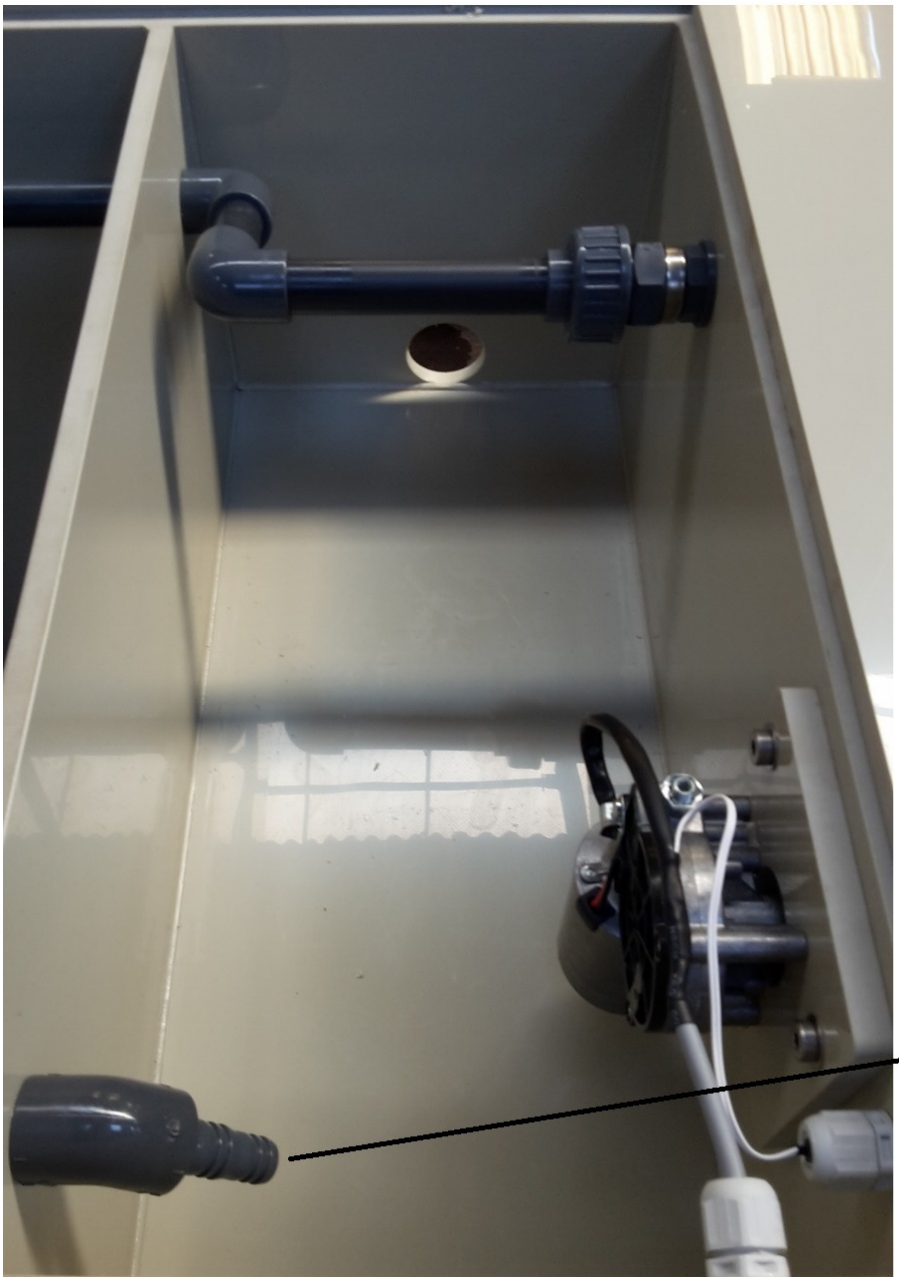


Waste gutter

This is the waste gutter which collect the rinse water and debris during a rinse cycle. The waste gutter should be checked regularly for debris. Especially when there is a lot of blanket weed or leaves in the water the gutter will need to be cleaned regularly.

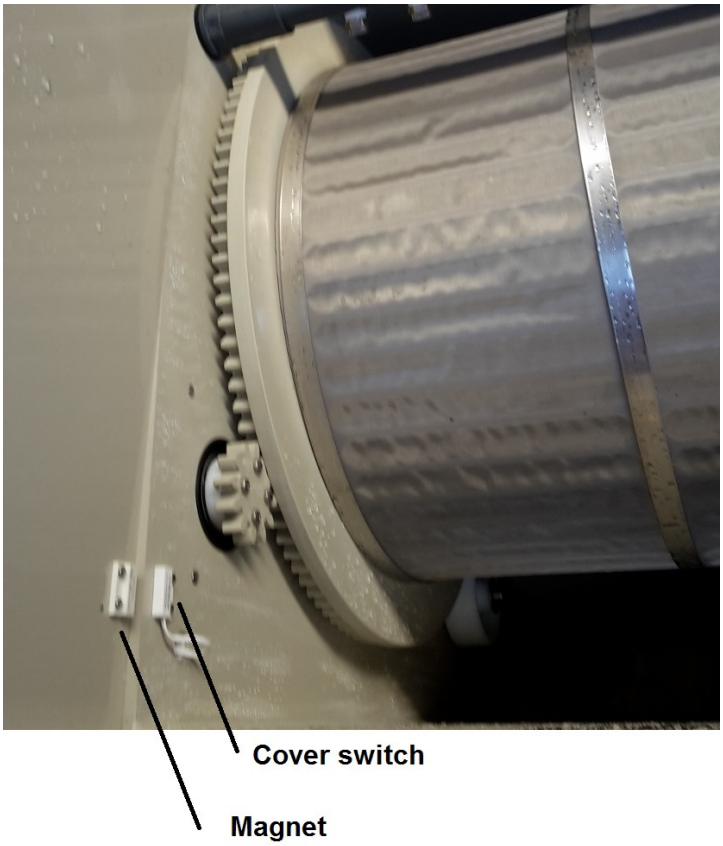
Connector for water level measurement

Upon arrival, the connector for the level measurement is disconnected. Be sure to connect the connector to the pressure sensor before you start using the filter. Otherwise the water level is not measured and the filter will not function properly.



Air inlet (Only BIOTRO)

To this connection an air pump must be connected for aeration of the bio carrier.



Cover switch

The cover of the filter is equipped with a magnet (white part). When the cover is closed the magnet should in front of the cover switch. If this is not the case the filter will not operate properly because the control box will not recognize that the cover is closed.

3 Drum filter (TRO-X models)

In this chapter, the TRO series drum filters are described. The TRO series drum filters exists out of the following types: TRO-25, TRO-50 and the TRO-100.

3.1 Installation of the filter

The filter must be placed on a level and solid surface. The filter must be supported over the whole surface of the bottom plate. Placing the filter on a non-flat surface or a to small baseplate can result in serious damage!

If you want to use the full capacity of the filter, all inlets and outlets must be connected with pipes of sufficient diameter and a minimum of bends.
Keep in mind that long lengths will also cause a reduction in capacity. The inlets and outlets are preferably connected with rubber couplings so that any vibrations of pumps and the like are minimized.

Make sure the control box and the drive motor are protected from full sun and rain. **The filter must be installed in a frost-free area.**

3.1.1 Gravity fed

The water level within the filter when there is no water circulation, must be up to the top of the waste gutter. In such a way that the water is not overflowing into the waste gutter.

3.1.2 Pump fed

To maintain a certain water level inside the filter the outlets of the filter must be equipped with stand pipes.
The distance between the top of the waste gutter and the top of the stand pipe (A in below sketch) is recommended to be 70~100mm. It is advisable to put ball valves in the outlet in order to be able to adjust the water level.

3.2 Commissioning the filter

If you have installed valves in the inlets and / or outlets, open them before using the filter. Also, make sure that the chapter on the control box has been read and understood before starting the filter.
Then you can start the circulation pump. If the filter is properly installed and the lid is properly closed, the water level display will be shown on the display of the control box.

3.3 De-commissioning the filter

If you want to leave the filter out of order but still want to leave it connected, it is very important to ensure that the filter cannot freeze. If the filter is not in a frost-free space, then drain the filter and make sure that the water is also removed from the rinse pump!

3.4 Maintenance

Before performing any maintenance on the filter, always turn off the filter by unplugging the power cord!

Periodically, you will need to clean the filter panels. This is best done with a high-pressure cleaner. Clean the filter panels from a distance using the high-pressure cleaner. Be careful not to damage the filter panels due to a too small distance between the high-pressure cleaner and the filter panel.
If there is an (optional) UVC lamp installed in the filter then cleaning the filter panels will be less frequently needed.

Also check the spray nozzles and the level sensor on clogging / contamination regularly. **BE CAREFULL TO NOT TOUCH THE MEMBRANE of the level sensor!**

3.5 Problems and their solution

The filter doesn't rinse:

- Check if the power cord is connected
- Check if the magnet on the lid is positioned in front of the cover switch
- Check and re-adjust the rinse level
- Check if the control box doesn't show any fault conditions: (overcurrent, etc.)

The optional UVC lamp stays on when the lid of the filter is opened:

- Contact your dealer and unplug the power cord of the UVC from the control box

The water level on the display doesn't change:

- Air is trapped in front of the level sensor, unscrew the level sensor and let the air escape, Then install the level sensor again.

After a rinse cycle the drum keeps rotating while the rinse pump is off:

- The alarm water level setting is set higher as the rinse level setting. The rinse level setting always must be substantially higher as the lalarm water level setting!

Repairs may only be carried out by qualified personnel. Failure to comply will void the warranty.
Maintenance to the filter may only occur if the power plug is taken from the wall outlet.
If your problem is not resolved by following any of the above procedures, contact your dealer or Tol Watertechniek.
is not resolved by following any of the above procedures, contact your dealer or Tol Watertechniek.

3.6 Technical data

	TRO-25	TRO-50	TRO-100
Maximum flow m³/hr (10 mg/l ss*)	25	50	100
Maximum flow m³/hr (25 mg/l ss**)	10	20	40
Maximum water level (cm)	50,5	77,3	77,3
Dimensions LxWxH (cm)	80,2 x 64,4 x 66,4	80,2 94,6 x 92,4	121,8 94,6 x 92,4

*10 mg/l dissolved solids correspond with an average pond
**25 mg/l dissolved solids correspond with the water quality found in aquaculture systems

4 Combi filter (BIOTRO models)

In this chapter, the BIOTRO series combi filters are described. The BIOTRO series filters exists out of the following types: BIOTRO-25, BIOTRO-50 and BIOTRO-100.

4.1 Installation of the filter

The filter must be placed on a level and solid surface. The filter must be supported over the whole surface of the bottom plate. Placing the filter on a non-flat surface or a to small baseplate can result in serious damage!

If you want to use the full capacity of the filter, all inlets and outlets must be connected with pipes of sufficient diameter and a minimum of bends.
Keep in mind that long lengths will also cause a reduction in capacity. The inlets and outlets are preferably connected with rubber couplings so that any vibrations of pumps and the like are minimized.

Make sure the control box and the drive motor are protected from full sun and rain. **The filter must be installed in a frost-free area.**

4.1.1 Gravity fed

The water level within the filter when there is no water circulation, must be up to the top of the waste gutter. In such a way that the water is not overflowing into the waste gutter.

4.1.2 Pump fed

To maintain a certain water level inside the filter the outlets of the filter must be equipped with stand pipes.
The distance between the top of the waste gutter and the top of the stand pipe (A in below sketch) is recommended to be 70~100mm. It is advisable to put ball valves in the outlet in order to be able to adjust the water level.

4.2 Commissioning the filter

If you have installed valves in the inlets and / or outlets, open them before using the filter. Also, make sure that the chapter on the control box has been read and understood before starting the filter.
Then you can start the circulation pump. If the filter is properly installed and the lid is properly closed, the water level display will be shown on the display of the control box.

The bio carrier must be added in stages. Initially, we recommend to put 30% of the (optional) supplied material in the filter.
Only when it moves completely and well can you gradually add the rest of the filter material.
It may take several weeks before the filter material moves well.

4.3 De-commissioning the filter

If you want to leave the filter out of order but still want to leave it connected, it is very important to ensure that the filter cannot freeze. If the filter is not in a frost-free space, then drain the filter and make sure that the water is also removed from the rinse pump!

4.4 Maintenance

Before performing any maintenance on the filter, always turn off the filter by unplugging the power cord!

Periodically, you will need to clean the filter panels. This is best done with a high-pressure cleaner. Clean the filter panels from a distance using the high-pressure cleaner. Be careful not to damage the filter panels due to a too small distance between the high-pressure cleaner and the filter panel.
If there is an (optional) UVC lamp installed in the filter then cleaning the filter panels will be less frequently needed.

Also check the spray nozzles and the level sensor on clogging / contamination regularly. **BE CAREFULL TO NOT TOUCH THE MEMBRANE of the level sensor!**

4.5 Problems and their solution

The filter doesn't rinse:
- Check if the power cord is connected
- Check if the magnet on the lid is positioned in front of the cover switch
- Check and re-adjust the rinse level
- Check if the control box doesn't show any fault conditions: (overcurrent, etc.)

The optional UVC lamp stays on when the lid of the filter is opened:
- Contact your dealer and unplug the power cord of the UVC from the control box

The water level on the display doesn't change:
- Air is trapped in front of the level sensor, unscrew the level sensor and let the air escape, Then install the level sensor again.

The filter material (barely) moves:
- Added to much bio carrier in one time
- Too low air flow
- Too high water flow

After a rinse cycle the drum keeps rotating while the rinse pump is off:
- The low water level setting is set higher as the rinse level setting. The rinse level setting always must be substantially higher as the low water level setting!

Repairs may only be carried out by qualified personnel. Failure to comply will void the warranty.
Maintenance to the filter may only occur if the power plug is taken from the wall outlet.
If your problem is not resolved by following any of the above procedures, contact your dealer or Tol Watertechniek.

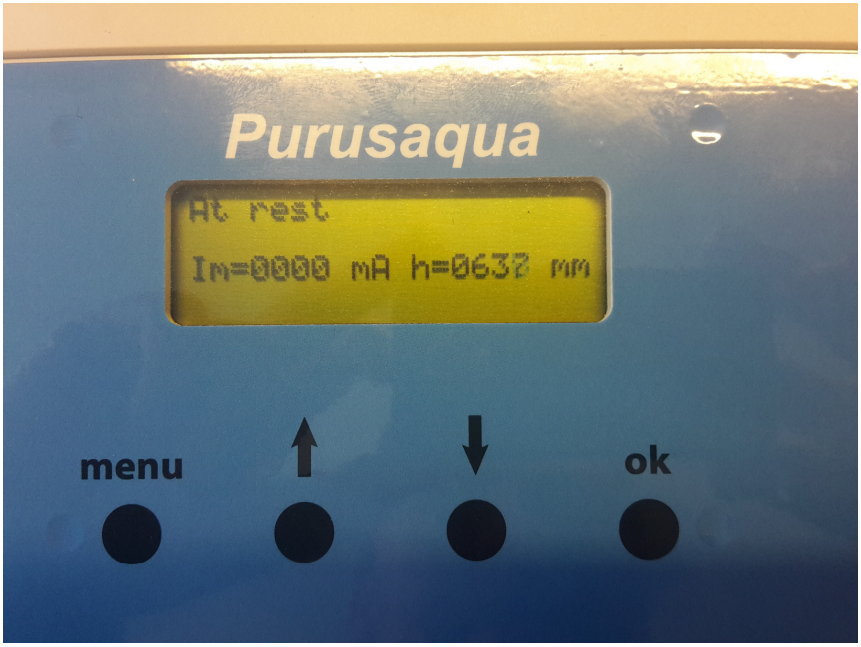
4.6 Technical data

	BIOTRO-25	BIOTRO-50	BIOTRO-100
Maximum flow m³/hr (10 mg/l ss*)	25	50	100
Maximum flow m³/hr (25 mg/l ss**)	10	20	40
Recommended air flow	100 l/min	300 l/min	400 l/min
Effective bio chamber volume	290 litres	860 litres	1130 litres
Maximum food capacity (Kaldness)	0,85 kg/day	2,5 kg/day	3,3 kg/day
Maximum food capacity (Biochip)***	4,2 kg/day	12,6 kg/day	16,6 kg/day
Maximum water level (cm)	58	76	76
Dimensions LxWxH (cm)	190 x 71 x 77	235 x 98 x 94	325 x 98 x 94

*10 mg/l dissolved solids correspond with an average pond
**25 mg/l dissolved solids correspond with the water quality found in aquaculture systems
*** When Biochip is used the maximum flow is 25% of the rated flow @ 10mg/l ss

5 Control box

5.1 Explanation of the controls



Display (green screen)
The display shows the actual status of the control box and filter. In the image above the filter is in rest and the water level within the filter is 637mm.

Menu button
If the menu button is pressed the menu of the control box is activated. Settings and can be reviewed and adjusted in the menu. By pressing the menu button again, the menu is left.

↑ Scroll button "up"
The up button is used to navigate through the menu and to adjust settings. The setpoint and calibration parameters can be adjusted with this button.

↓ Scroll button "down"
The down button is used to navigate through the menu and to adjust settings. The setpoint and calibration parameters can be adjusted with this button.

Ok button
The Ok button is used to select a menu item or to confirm a setting.

5.2 Explanation of the display lines

5.2.1 First line

The first line of the display shows the status of the filter. The following messages can occur:

At Rest
The filter is functioning normal, the circulation pump and optional UVC are On.

Lid open
The lid of the filter is open. The circulation pump is On but the UVC lamp is turned Off and rinsing is prohibited.

Rinsing
The filter is performing a rinse cycle. The display shows the remaining rinse time in seconds and the speed of the drum as a percentage.

Wait for level adjust
The filter has performed a rinse cycle but the water level has not risen far enough during the rinse. The system is now in a waiting mode. The circulation pump and optional UV lamp are still on.
If the water level rises, the system will resume normal operation. If the water level drops further, the system will switch to "circulation pause" mode.

If the water level does not rise above the rinse level and does not fall below the low water level within 5 minutes, the system will go into failure mode.

Circulation pause
The system switches Off the circulation pump to allow the water level to rise to above the rinse level. The display shows the remaining time.

Alarm, Ok = Reset
The system is in alarm, the circulation pump and UV are off. The fault contact has been activated.

5.2.2 Second line

On the 2nd line of the filter, only the message "Low water low" can be found. This is the case if the water level falls below the set alarm level for low water.

5.2.3 Third line

The 3rd line shows the actual motor current and the actual water level.

5.2.4 Fourth line

The 4th line is used to scroll through the menu for viewing and setting parameters.
By default, this line is empty, as soon as you press "Menu", the menu appears. See the following section for an explanation of the menu.

5.3 Explanation of the menu structure

Via the menu settings and parameters can be checked and adjusted. If u press the “Menu” button once then the menu will be shown on the 4th line of the display.
With the ↑ and ↓ buttons you can scroll through the menu items. With the “Ok” button a parameter can be selected. When a parameter is selected a black digit occurs on the display. Now the value of the selected parameter can be altered by the ↑ and ↓ buttons. When the “Ok” button is pressed the new setting is confirmed and you will return to the menu.

5.4 Explanation of the menu parameters

This chapter describes the menu parameters.

Max motor cur
This parameter is used to set the maximum allowed motor current. This is used for the protection of the drive motor.

Motor timeout
The motor timeout sets the time in second for which a too high motor current may occur. When the over current exceeds this time, the system will malfunction.

Motor cool time
This parameter is used to set the cooldown time of the motor after an overcurrent occurred.

Rinse time
Here you can set the desired rinse time of the drum.

Drum speed
The drum speed is used to set the desired drum speed in percentage. If this parameter is set to 50% for example, the drum rotates at 50% of its maximum speed.

Circ. pause time
This is the time in the mode “Circulation pause” to give the water level time to rise.

Rinse level
This parameter sets the desired rinse level in millimetres. The value of this parameter should be chosen lower as the maximum water level in the drum when the circulation pump is On!

Alarm level
This setting is used to activate the alarm water level warning

Rinse Hyst.
A hysteresis is used for the rinse level to prevent jittering. This parameter sets the hysteresis in millimetres.

Low Hyst.
Same as rinse hyst. But then applied on the low water level

Last interval
Shows the time (in minutes) between the most recent rinse cycle and the rinse cycle before that.

1 last iv
Shows between the 1 last rinse interval and the rinse cycle before that.

2 last iv
Shows the time between the 2 last rinse interval and the one before.

No of boots
Shows the number of reboots of the control box.

Language
With this parameter the language can be changed
0 = Dutch
1 = English
2 = German
3 = French

Pumped
This show the current working modus of the filter. If Pumped is “0” then if is configured for gravity operation. If Pumped is “1” then it is configured for pump fed operation.

5.5 Alarm messages

5.5.1 Alarm 1

Alarm 1 occurs when the current protection of the drive motor is activated. This can be caused by:

- an incorrect setting of the max motor current
- to much force needed to rotate the drum (blocked)
- defective drive motor

5.5.2 Alarm 2

Alarm 2 indicates a low water level alarm. This happens when the actual water level is lower as the set value of low water level.

5.5.3 Alarm 3

Alarm 3 is activated when it takes too long after a rinse cycle for the water level too rise. After a rinse cycle the water level should rise because the screen is clean and water can pass easily.
If the water level doesn’t rise after a rinse cycle then it can mean that there is not enough feed of water due to a clogged pipe for example.

5.6 Factory settings

5.6.1 Gravity

Parameter	TRO-25	TRO-50	TRO-100	BITRO-25	BITRO-50	BITRO-100
Max motor cur.	1250	2000	4000	1250	2000	4000
Motor timeout	3	3	3	3	3	3
Motor cooldown	30	30	30	30	30	30
Rinse time	10	10	10	10	10	10
Drum speeds	100	100	100	100	100	100
Circ. Pause time	30	30	30	30	30	30
Rinse level	420	600	600	420	600	600
Low water level	350	500	500	350	500	500
Rinse hysteresis	10	10	10	10	10	10
Low hysteresis	10	10	10	10	10	10

5.6.2 Pump fed

Parameter	TRO-25	TRO-50	TRO-100	BITRO-25	BITRO-50	BITRO-100
Max motor cur.	1250	2000	4000	1250	2000	4000
Motor timeout	3	3	3	3	3	3
Motor cooldown	30	30	30	30	30	30
Rinse time	10	10	10	10	10	10
Drum speeds	100	100	100	100	100	100
Circ. Pause time	30	30	30	30	30	30
Rinse level	495	675	675	405	675	675
Low water level	520	700	700	520	700	700
Rinse hysteresis	10	10	10	10	10	10
Low hysteresis	10	10	10	10	10	10

5.7 Technical details

	Drum control
Max switching power circ. pump	1500W
Max switching power UV	500W
Max switching power rinse pomp	1200W
Max water level	100cm
Voltage	230V 50Hz
Length	302 mm
Width	232 mm
Height	110 mm

6 Options

6.1 Internal rinse pump

Both the drum and combi filters larger as the 25m³ models can be delivered with an internal rinse pump. This saves space because no external rinse pump is needed. It also reduces noise during rinsing.

6.1.1 Installation

Upon delivery the rinse pump is already installed. The only thing the user should do is connecting the power cord of the rinse pump (connected to the black box) onto the control box “rinse” power socket.
Don’t forget to switch on the red power switch on the black box of the pump.

6.1.2 Maintenance

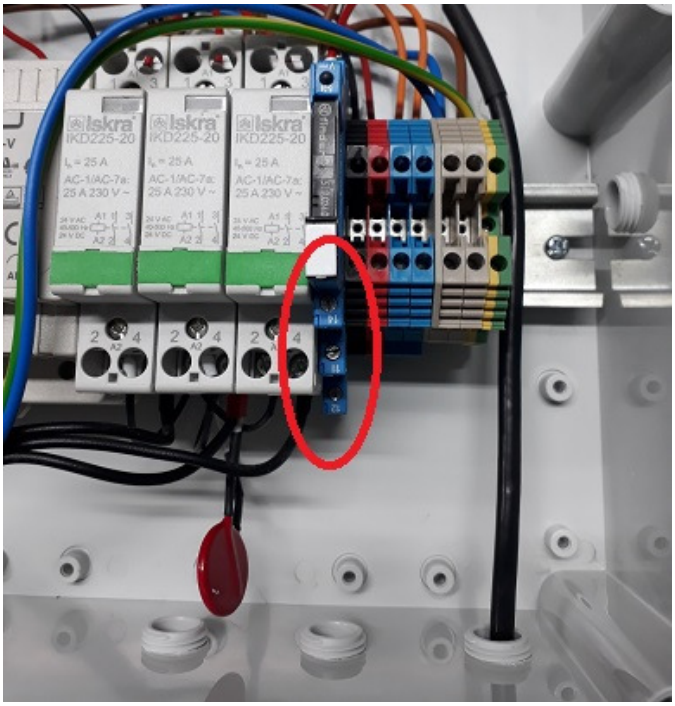
Periodically the suction filter at the bottom of the rinse pump must be cleaned. To do this the PVC coupling should be disconnected. Also the cable gland on the outside of the filter which is used for the power cable of the pump, should be loosened.
Now you can pull out the rinse pump and clean the suction filter on the bottom of the pump. Once it is cleaned the pump can be put back in place by inserting it into the manchet inside the filter.

6.2 Alarm relay

The control box can be equipped with an relay which is activated in case of an alarm. This can be used for a signal beacon or to connect the alarm contact to a SCADA system..

6.2.1 Installation

The relay is equipped with a potential free NO/NC contact. Connections can be made directly to the relay contacts.



7 Warranty determination

Our products come with one year warranty, defects caused by the manufacturing process within the warranty period will be repaired free of charge. The following aspects are not covered by the guarantee. Defects in our products caused by:

General

- not following the guidelines given in this manual.
- incidents or deliberate destruction of the product.
- changes made to the products by the customer.
- natural disasters such as floods, hurricanes, etc.
- not able to submit purchase bill or warranty bill.
- placing the product in a non-suited environment (direct sunlight, rain, etc)

The cost for sending the product to the service point are for the customer. If the repair is under warranty, the costs for returning the goods are on our behalf. In all other cases, all shipping costs must be paid by the customer. TWT and its dealers are not responsible for damage caused by the use of our products.

8 Disclaimer

TWT has written this manual with advice to the best of intentions. However, TWT does not accept any liability with regard to this manual, nor for the application of our products in whatever form or nature whatsoever.

TWT reserves the right to change the information in this manual without prior notice. All photos in this manual are designed to serve as explanation element, the pictures may differ from the real product.

9 Contact information

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