



BWT bestaqua 60 - 62
Reverse Osmosis Plant

For You and Planet Blue.

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1 General information

This installation and operating manual (OPM) applies to BWT bestaqua 60-62 total desalination unit.

The OPM contains important information about the correct installation and operation of the BWT bestaqua 60-62:

1. Enclosed "Start-up control"- (section 14.5) shall be completed and filed together with the operating journal.
2. Operating journal shall be updated as described in "Operating journal" (section 14.6).
3. Floor drain must be available in the immediate vicinity of the RO unit.
4. The BWT bestaqua 60-62 unit removes more than 99 % of all salts, and that is why you need to be alert to possible posttreatment with mixed bed or similar, if a better water quality is requested.
5. The authorised agent takes on full responsibility without costs for BWT who, however, grants a 12 months guarantee inclusive of replacement of defective spare parts, on condition that the parts are returned to BWT along with a specification of the fault and stating production month / year (RO unit no.).
6. The warranty becomes invalid, if the RO unit is not commissioned by an authorised BWT service technician.
7. The warranty becomes invalid, if maintenance intervals (Chapter 14.6) are not met.

You should read the OPM carefully before assembling and starting up the RO unit. Correct installation and operation forms the basis of our warranty.

Your BWT bestaqua 60-62 is of a compact design with integrated reservoir tank in order to take up as little space as possible.

With its compact and finished design, your BWT bestaqua 60-62 unit is easy to install since all installations are preassembled and tested in our factory.

Your BWT bestaqua 60-62 unit is furnished with casters. That means that the RO unit can be placed e.g. under a table and pulled out for easy servicing.

Your BWT bestaqua 60-62 unit is furnished with a powerful transport pump which can supply water with a pressure and flow similar to normal waterworks pressure and flow.

Your BWT bestaqua 60-62 unit is designed for minimum maintenance and a long and unproblematic operation. This, however, is on condition that you install and maintain the RO unit correctly.

Always read this OPM before commissioning.

2 Explanation of words

There will be a few technical explanations in this OPM, which is described below.

Feed water: Is the water which is led directly to the BWT bestaqua 60-62 reverse osmosis unit and which must be desalinated.

Permeate: The treated, totally desalinated water which is produced by the BWT bestaqua 60-62 unit and supplied to the reservoir tank.

Concentrate: Is the water that is led to drain. This water contains the salts and minerals that have been removed from the water.

WCF (Recovery): The ratio between the produced pure water (permeate) and the thus required amount of feed water (soft water) is expressed as permeate yield (WCF) or “Water Conversion Factor”.

TDS: The amount of totally dissolved salts measured in (mg/l).

Conductivity: Is the designation of salt concentration of the water, measured in ($\mu\text{S}/\text{cm}$). The lower the value, the better is water quality.

RO: The abbreviation for Reverse Osmosis.

Membrane: Is the filter of the RO unit which by high pressure and flow is capable of desalinating the feed water.

Transport pump (TP-pump): Is the pump which transports the treated water from the RO unit reservoir to the consumer.

High pressure pump (HP-pump): Is the pump which presses feed water through membranes where the feed water is desalinated.

Level switch: Is a switch, which gives a signal when the BWT bestaqua 60-62 unit must either be started or stopped, and it stops the transport pump in case of dryrunning of the reservoir tank.

Pressure transmitter: It transmits pressure value for HP-pump and TP-pump to the control box.

Conductivity transmitter: It transmits value of feed water conductivity and permeate conductivity to the control box.

RobotFlow: Automatically adjustable valve-module (option) ensures optimal use of feed

water depending on the feed water conductivity.

3 Function descriptions

3.1 Permeate production

The water is pressed through the RO membrane by means of a highpressure pump. The permeate is then led to consumption and can e.g. be collected in a reservoir. The concentrate (the water containing the concentrated salts) is led to drain. The relation between permeate/concentrate shall be adjusted manually on the needle valve or automatically if the RO-unit equipped with RobotFlow (optional).

Under normal operating conditions the RO membranes have a long lifespan. But even with a good feed water quality, layers of impurities will, to a certain extent, occur and there will be a slow reduction of the permeate capacity.

4 Positioning of the RO unit

The RO unit must be placed in a nonfreezing environment on an even foundation so that the water in the reservoir does not overflow when the tank is full.

the foundation must be able to stand a load of approx. 80 kg, which is the RO unit weight when full.

The RO unit is furnished with casters, so if you wish to be able to move the RO unit, you should keep the foundation even and solid.

The outside measures of the RO unit are (WxDxH): 350x560x736 mm, but when positioning the RO unit you should consider that the cover shall be demounted during maintenance work. Either you must calculate

with an additional 500 mm in height to be able to lift the cover, or it should be possible to roll the RO unit out for servicing (e.g. place it under a table or similar)

You should also make space on the back of the RO unit for the water installation; especially you should take into account the outlet hose from the RO unit.

The hose may never be bent!

Positioning of the RO unit must be done in a way so that the air intake on the back never gets covered.

There must also be space in front of the RO unit, so that it is possible to freely read the LCD. Also it should be possible to roll out the RO unit in connection with maintenance.

In case of a stoppage, the reservoir may overflow. Therefore there should always be a drain in the immediate vicinity of the RO unit so that the overflowing water does not cause damage.

The following conditions must be fulfilled otherwise is the installation of RO unit on your own risk!

- The floor must decline down towards a functional floor drain from the RO unit.
- The concentrate/overflow water have to flow freely from the RO unit to drain.

5 Water quality

The feed water, which is to be treated in the BWT bestaqua 60-62 unit, must be drinking water quality with maximum 500 mg/l TDS. Max. feed water temperature is 25 °C. The RO unit is adjusted at 10 °C in our factory.

The feed water may maximum contain:

* Fe:	0.05 mg/l
* Mn:	0.02 mg/l
* Cl ₂ :	0.1 mg/l
* Turbidity:	1.0 NTU
* SDI ₁₅ :	3.0
* KMnO ₄ :	10 mg/l

If there are doubts about the feed water composition, a water analysis must be made. The RO unit must be connected to a feed-water pressure of minimum 3 bar and maximum 6 bar. The quality of the treated water will be less than 20 µS/cm at 10 °C.

6 Water connections

Note! All water connections must be in compliance with local regulations.

6.1 Connection of feed water (inlet water)

BWT sell complete assembly kits for BWT bestaqua 60-62.

On the feed water side you must fit a ball valve so that the water may be cut off during maintenance of the RO unit.

Install a ¾" flexible pressure hose on ¾" fitting labeled with "Feed water" at the back of the RO unit. The opposite end shall be connected to the 5µ prefilter witch is connected to feed water supply.

The best operating result is obtained by connecting to minimum ¾" feed-water pipe. That reduces the drop in pressure to the RO unit. With a too small feed-water connection, there will be a risk of outage on the RO unit due to lacking water pressure, e.g. when

rinsing out the membranes at start-up of the RO unit.

6.2 Connection of outlet hose

Start by dismantling the orange plug which is fitted on the drain outlet fitting at the back of the RO unit.

Install the supplied 12 mm plastic hose to outlet.

Note! It is important that the hose is pressed all the way down into the quickfitting (audible "click" will sound when it is connected). The opposite end shall be connected to drain outlet. The hose may not be led down into the outlet water, though, since the water may risk getting sucked back into the RO unit during standstill.

Note! The outlet hose may never be bent or in any other way obstructed, as this would damage the membrane.

6.3 Connection of overflow hose

On the back of the RO unit, on the overflow nozzle, you shall connect a 1" plastic hose to the floor drain or another subjacent drain. This overflow is a safety overflow in case of fault occurs on the level switch of the RO unit and the reservoir tank as a consequence gets filled to overflowing.

6.4 Connection of permeate (treated water)

Fit a 3/4" flexible pressure hose to the fitting labeled PERMEATE at the back of RO unit . The opposite end shall be connected to the consumer of the treated water or pipe connection which is led to consumer of the treated water.

Note! Totally desalinated water may speed up corrosion. Therefore, always use non-corrosive piping for the treated water, e.g. stainless steel or PVC.

7 Electrical connections

Note! The electrical connections must be made in compliance with local regulations.

The electrical connection to the BWT bestaqua 60-62 unit must be as follows:

- Voltage: 230 Volt-50 Hz
- Fuse: 10 Amp
- Max. power consumption: 1.5 kW

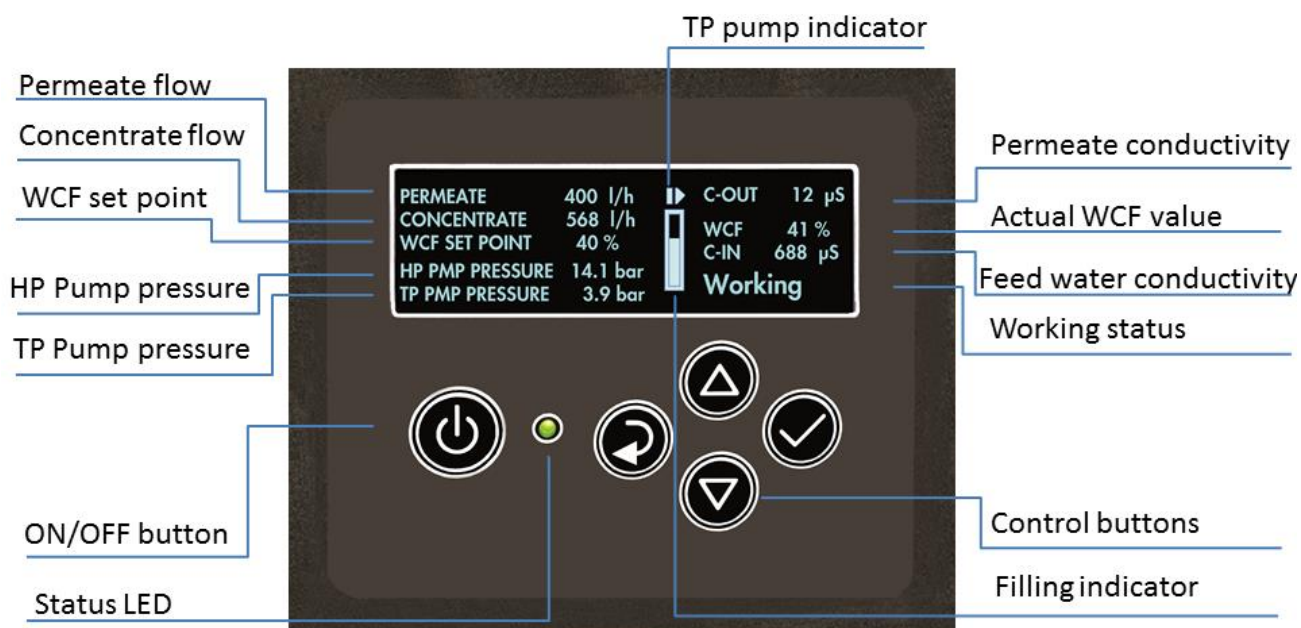
Colour/number-code of power cable:

Blue/2 wire:	N
Brown/1 wire:	L
Yellow/green wire:	PE

If for some reason you need to change the factory-mounted power cable, please cf. Annex -14.2. Wiring Diagrams.

All internal connections in the RO unit like e.g. pump control and level control are pre-assembled in our factory. This means that only the supplied power cable which is connected to the control box must be connected to a power plug.

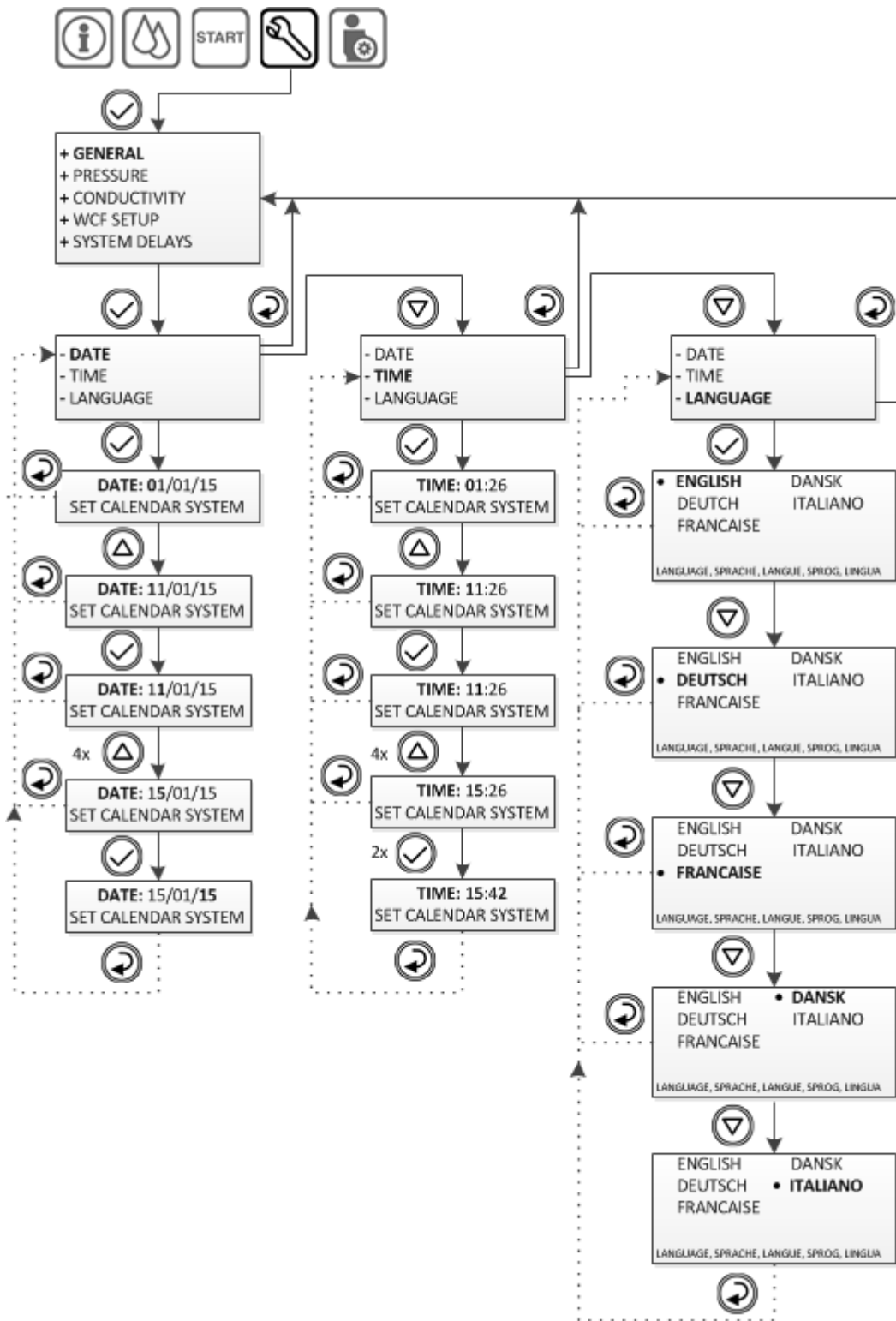
8 Function buttons and display elements



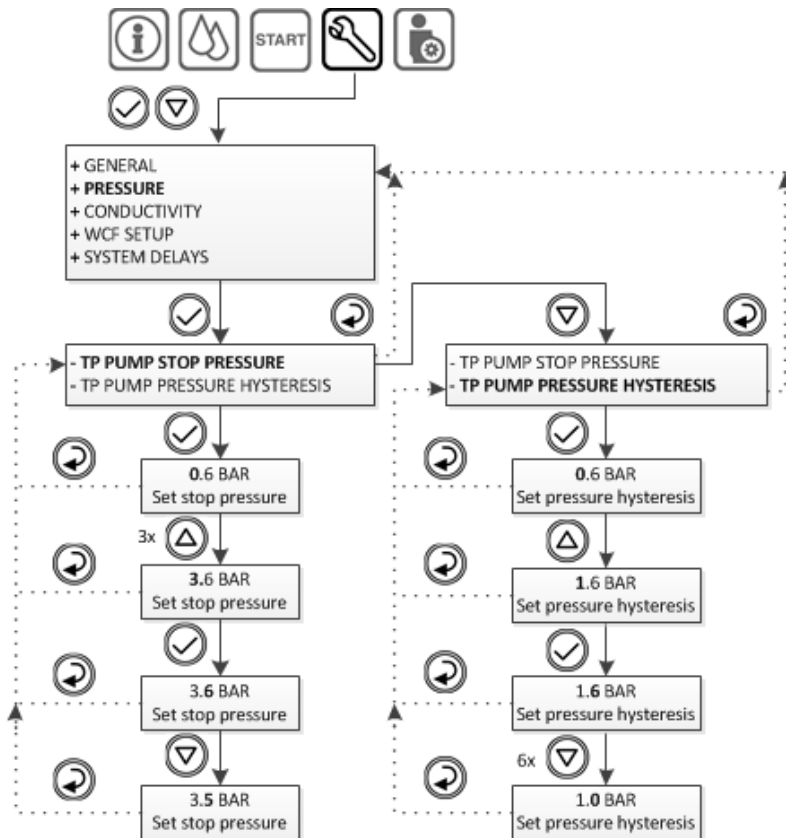
	[ON/OFF] key switches the device from standby to ON/OFF when pressed continuously for 2 sec and performs the reset of the device in case of alarms and/or failures. [ON/OFF] key stop/pauses the RO unit when pressed shortly
	(Arrow up) key scrolls through the menu pages upward / right, increases the value of the parameter presently shown on the display.
	(Arrow down) key Scrolls through the menu pages downward / left, decreases the value of the parameter presently shown on the display.
	Confirmation key - Confirmation of the parameter presently shown on the display.
	Return key - Back to the previous menu or parameter-setting.
LED	LED for operating status and failure indication: The status LED (green/red) shows the status of the device. Please read Annex 12.3 for details.

	TP pump is delivering permeate
	TP pump is paused and waiting until the reservoir is filled
	TP pump is paused but ready to deliver permeate
	TP pump is paused by External Stop

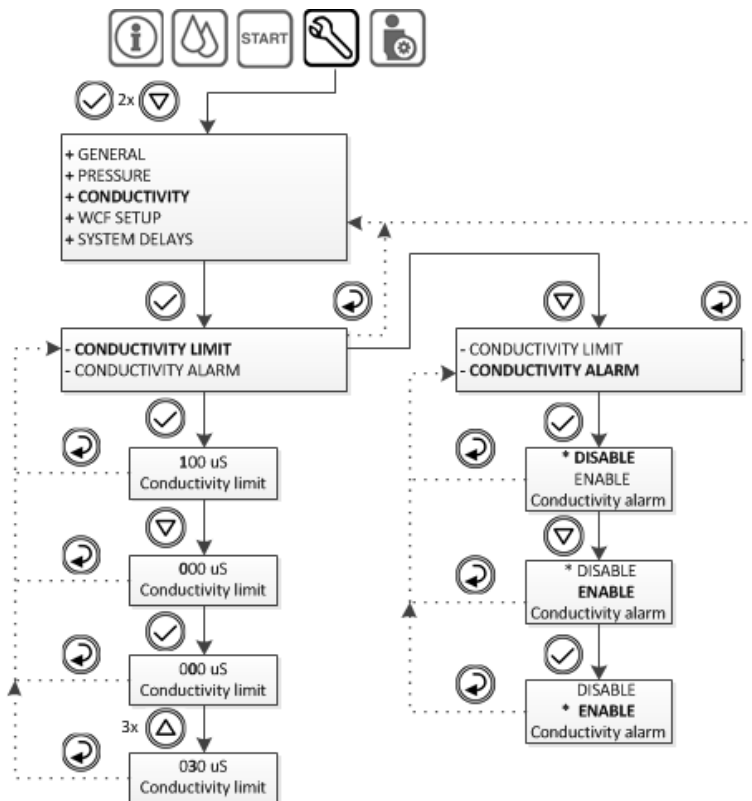
8.1 Menu: Settings / GENERAL



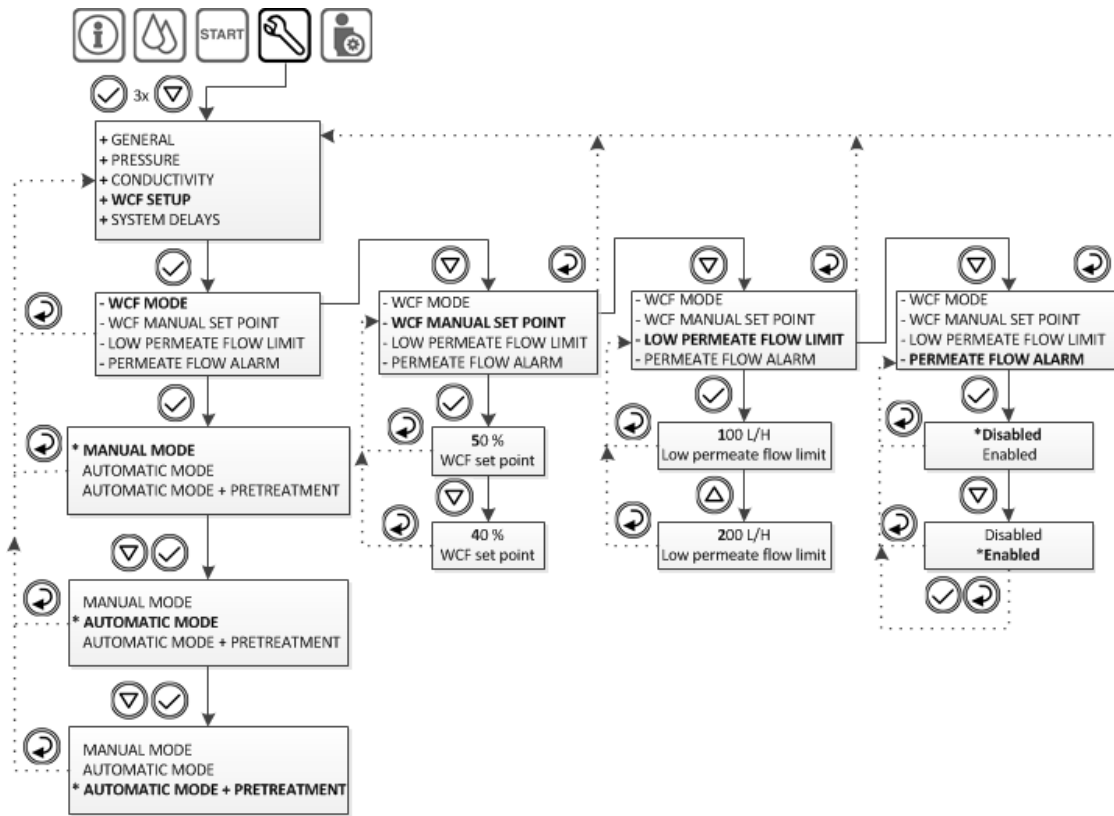
8.2 Menu: Settings / Pressure



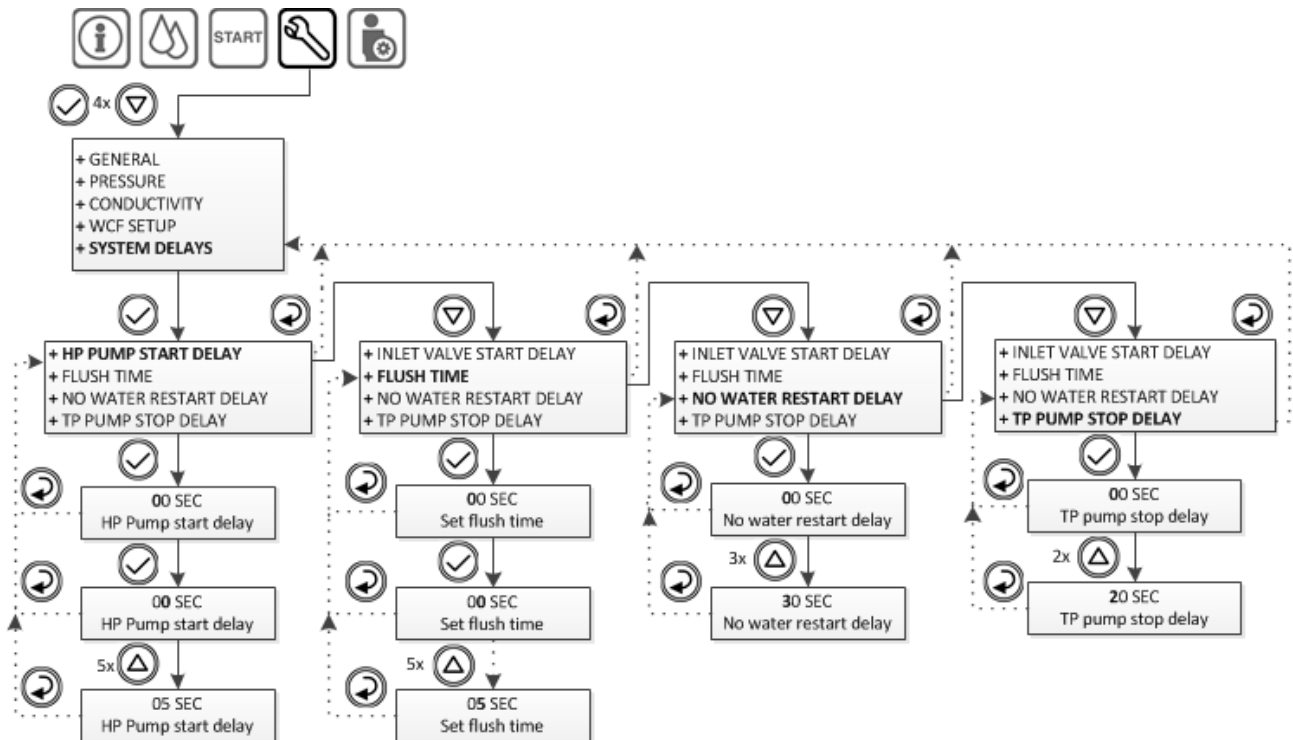
8.3 Menu: Settings / Conductivity



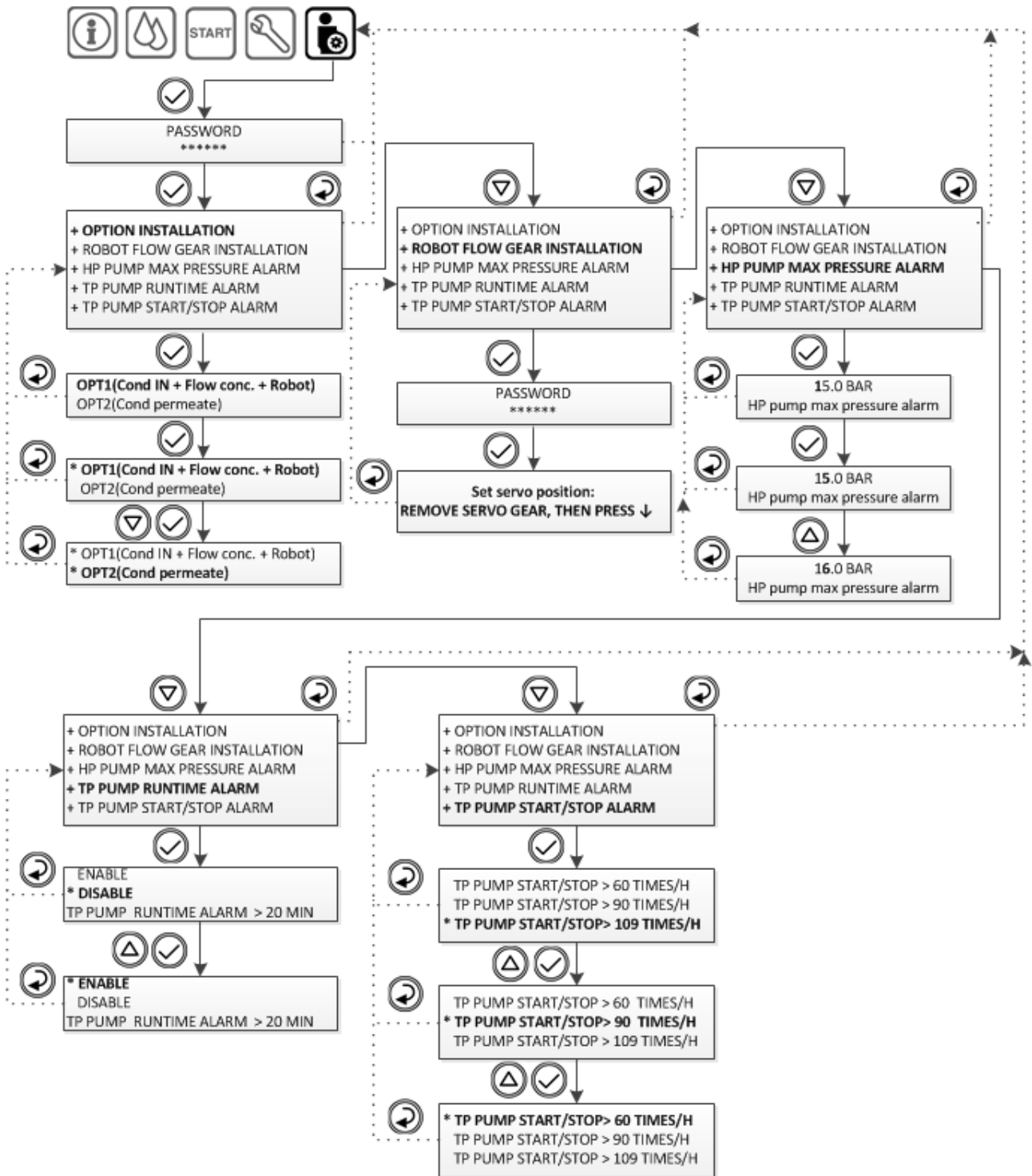
8.4 Menu: Settings / WCF Setup



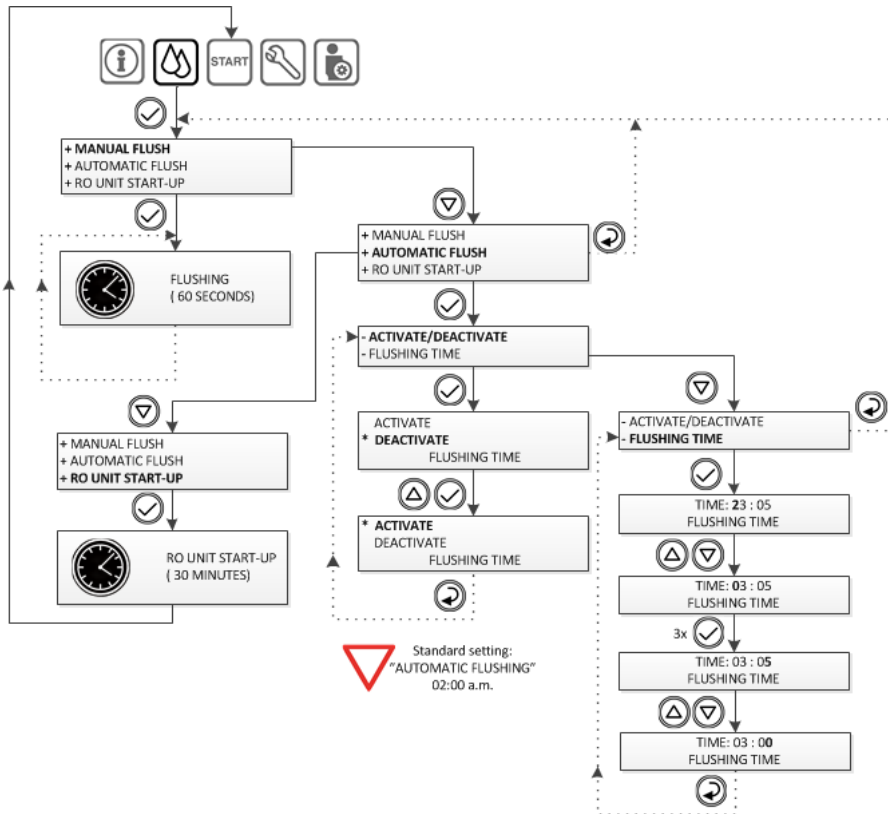
8.5 Menu: Settings / System delays



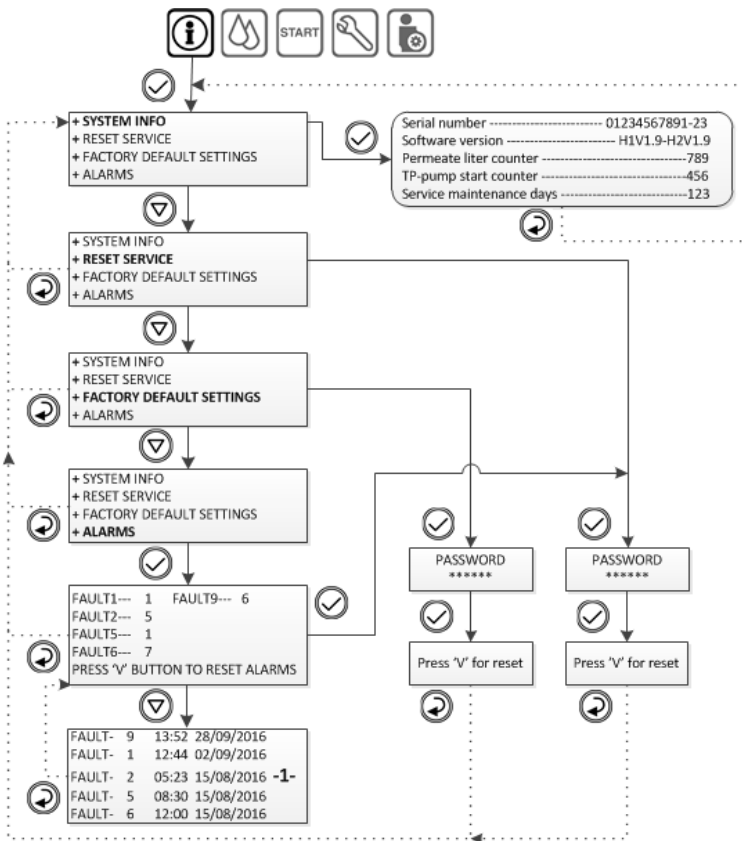
8.6 Menu: Installation (password protected)



8.7 Menu: MAINTENANCE



8.8 Menu: INFO



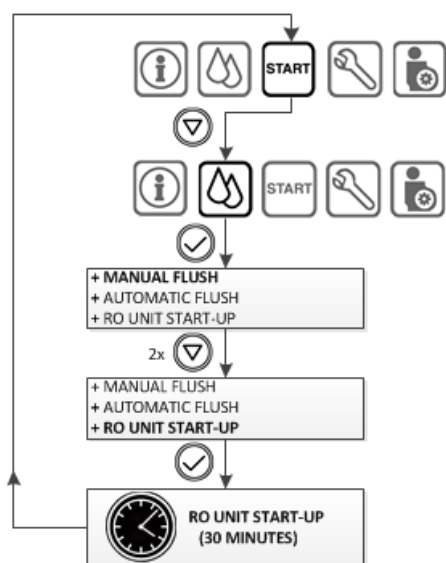
9 Start-up of the RO unit

Read section below carefully before starting up the RO unit.

When the RO-unit starts up the first time, the enclosed "Start-up control" scheme must be filled during start-up and be archived with the operating journal.

Start up procedure for the RO-unit

1. Check prior to start-up that all water and electrical connections are made as described in previous sections and in compliance with local regulations.
2. Open the feed-water supply.
3. Check that all water connections are tight.
4. Only for **LT** models: Open the concentrate valve (V06) completely and close the recirculation valve (V03).
5. Connect power cable and push power button on LCD panel. BWT bestaqua 60 will automatically run sensor control test and then you will see the operational menu.
6. Follow steps below to initiate rinse of membranes with feed water.



Note! If tank is full then membrane rinse procedure will stop.

Note! Only for BWT bestaqua 60 **LT**: After 30 minutes' rinse the RO unit will automatically start to produce permeate if there is consumption. But the technician can use flowmeter from 451409006 "RO commissioning box" to adjust flowrate of permeate and concentrate (Chapter 10.1 and 10.2) according to the specific RO unit model.

Note! Only for BWT bestaqua 60 **HQ**: After 30 minutes' rinse the RO unit will automatically start to produce permeate if there is consumption. Only flow of permeate has to be adjusted on recirculation valve according to the specific RO unit model (Chapter 10.2).

7. When the reservoir is full let the transport pump operate with a large flow for 2 min. in order to deaerate it

REMEMBER! Under all given conditions, the following must be complied with:

- Permeate amount: max RO unit capacity [l/h], 10-25°C according to Table 1
- Operating pressure: 13.5-14.5 bar
- Maximum pressure: 16 bar

Permeate amount and max. pressure may never exceed above mentioned as it would cause damage to the membrane.

9.1 Adjustment of concentrate outlet amount

Important! Read the entire section 10.1 and 10.2 before adjustment is commenced.

RO-units equipped with RoboFlow will automatically adjust recovery/outlet amount to the optimal setting.

In the RO-units without RobotFlow the outlet amount must be adjusted manually, and the suitable outlet amount on your RO unit depends on the feed water quality. A too high water recovery will damage the membranes. On condition that the feed water complies with the quality requirements, the RO unit can operate with a recovery rate of 40 %. With softened feed water, you may obtain a recovery of 70-80 % dependent on the amount of organic material in the water.

Finally, the recovery affects the conductivity of the permeate. That means that if a retention greater than 99 % is requested, the recovery can be adjusted at a lower level. Please note that the retention rate of 99 % applies by 75% recovery. Contact BWT or the supplier of your RO unit to decide which outlet amount is suitable for your water.

An easy way of checking the outlet amount of the RO unit is:

$$\text{Outletamount (l/h)} = \frac{100 \times \text{permeatecapacity (l/h)}}{\text{recovery(\%)}} - \text{permeatecapacity (l/h)}$$

RO-model	Permeate capacity (l/h) at 10 °C	Outlet amount (l/h)	
		Ground water (40% recovery)	With antiscaling (75% recovery)
60	160	240	53
61	250	375	83
62	400	600	133

Table 1: WCF at 10 °C

Eg.: BWT bestaqua 62 with 40% recovery:

$$\text{Outletamount} = \frac{100 \times 400}{40} - 400 = 600 \text{ l/h}$$

When the requested amount of outlet water has been obtained, tighten the lock nuts on the outlet valve so that it is locked. It is important to check the outlet amount after the lock nut has been tightened to make sure that the valve has not moved. The lock nut must be tightened.

Important! The outlet valve must be locked on the prescribed outlet amounts. If the needle valve is closed so that the outlet amount is reduced, then the membranes will become damaged.

9.2 Adjustment of recirculation amount

RO-units equipped with RoboFlow will automatically adjust recirculation/permeate amount to the optimal setting.

In the RO-units without RobotFlow the recirculation amount must be adjusted manually by loosening lock nut on the recirculation valve. Adjust the permeate amount at maximum 160-400 l/h for BWT bestaqua 60-62 at a temp. of 10-25 °C.

If the temp. is below 10 °C, the capacity will be 3 % below normal capacity for every degree under 10 °C.

If e.g. the feed-water temp. is 8 °C, for an BWT bestaqua 60 it means that the permeate capacity is 6 % below the normal 160 l/h, i.e. 151 l/h. At the same time make sure that the high pressure pump pressure does not exceed 15 bar incl. the feed water pressure from the water supply.

The normal pressure indicated on the screen in order to obtain normal permeate capacity will be approx. 13.5-14.5 bar.

When the requested pressure and permeate capacities have been obtained, check again if the outlet amount has been adjusted correctly.

When both valves have been adjusted, they shall be locked with the lock nuts. Please take care not to move the valve when you tighten the lock nut.

NB! When the valves have been locked, the RO unit shall be started and stopped 4-5 times and then the flow shall be checked again; the valves are re-adjusted if necessary.

Now check that the quality of the treated water on the permeate hose; the conductivity shall be below 20 $\mu\text{S}/\text{cm}$ (conductivity meter is available as accessory). If the water quality is below 20 $\mu\text{S}/\text{cm}$ it is OK and the hose can be led back to the hole in the reservoir tank.

The 32 litre reservoir tank now will be filled up with treated water $<20 \mu\text{S}/\text{cm}$.

Write the operating data in the enclosed operating journal (see section – 14.6 Operating journal).

9.3 Start-up of transportpump (model LT & HQ)

When the reservoir is full let the transport pump operate with a large flow for 2 min. in order to deaerate it. Note that transport pumpe is controlled by a pressure transmitter. When pressure is more than 3.8 bar (adjustable) then transportpump stops. If hysteresis 1.0 bar(adjustable), the transport pump will start when pressure dropps to 2.8 bar.

9.4 Use of manual by-pass

Furthermore the RO unit is furnished with a manual by-pass for feed water, i.e. if the RO unit for some reason experiences disturbances,

this valve can be opened and you will have feed water on the outlet for consumption. **IMPORTANT!** When the RO unit is restarted, you must remember to close the by-pass valve again, otherwise you will get a mix of permeate and feed water on the outlet.

10 Automatic functions

The BWT bestaqua 60-62 unit is equipped with a control box which has following built-in control functions:

- Level switch for start/stop of high-pressure pump
- Indication of low level and stop of transport pump
- Solenoid valve controls feed water inlet
- Solenoid valve controls forward flush
- Pressure transmitter for start/stop of transport pump
- Alarm will go off when feed water pressure drops below 0.5 bar for a self-chosen time periode
- Alarm will go off if permeate capacity dropps below self chosen flow limit (service recommended)
- Alarm will go off if the high pressure is too high, for preventing pump damages
- Stop of TP and HP pump is delayed by selfchosen periode.
- ROBOTFLOW for optimal use of water and easy installation (Option).
- Alarm will go off if transport pump has been running for more than 20 min
- Stop of pump is delayed by 20/30 seconds.

11 Maintenance and troubleshooting

11.1 Maintenance

The BWT bestaqua 60-62 unit is produced and designed for a minimum of servicing and maintenance. However, there are certain functions which should be checked regularly. Maintenance intervals should be performed once a week – read section 14.6 Operating Journal.

11.2 Replacement of membranes

Read through the entire section 12 before replacement of membranes are started.

Switch off the power.

Disassemble the plastic hoses located on the top of the stainless pressure vessel

Note: how the hoses is connected, since it is important that the hoses be refitted in the same way!

The hoses can be pulled out by pushing the ring placed on the push-in fitting; if pushed all the way down, the hose can be pulled out.

Dismount the U-lock located at the end of the pressure vessel. (The U-lock holds the membrane end-plate in place). Remove the split pin from the U-lock and pull the lock out of the pressure vessel.

The end-plate can now be pulled out of the pressure vessel by wriggling the end-plate from side to side and simultaneously pulling upwards.

Now pull the membrane out of the pressure vessel.

Note! at which end the large black V-cup seal is situated on the outside of the membrane. When the new membrane is fitted, this V-cup seal must be fitted at the same end of the membrane as the old one, i.e. if the V-cup seal is at the top of the pressure vessel., the V-cup seal of the new membrane must also be installed so that the V-cup seal has to be placed at the top when the membrane is fitted inside the pressure vessel.

When the membrane has been replaced and the end plate has been refitted with the U-lock inserted, remount all hoses.

Note! The hose must be pressed hard in to push-in fitting until it clicks.

When all connections have been refitted and end-plates are securely locked with the U-lock, the RO unit must be restarted.

Follow steps which are described in chapter "10. Start up of the RO unit"

Write in the operating journal:


1. Date of replacement of membranes
2. New capacity of RO unit
3. Water quality ($\mu\text{S}/\text{cm}$)
4. RO unit operating pressure
5. Feed water pressure
6. Feed water temperature

11.3 Overview of the Status- and Alarm LED

Status and alarm:	LED colour / indication:	Description of the unit status:
Ready/Working	● green / lit	Ready for new permeate demand/ Normal operation
Alarm	● red / lit	Indication of a failure event
RO unit is OFF	○ Off	Power off

Reset of alarms by the customer: Observe: In any case of a failure with a permanently red lighting LED the operator must check the RO unit and if necessary switch it off. In case of an off switching the operator has to wait briefly (approx. 30s) before turning the RO unit on again.

11.4 Troubleshooting

Please observe: If your reverse osmosis is not performing as it should, please run through the alarm messages below. In the case of a fault, repair work may only be carried out by an expert (call BWT SERVICE technician). When Alarm sound press on  to see Alarm details.

Alarm / malfunction list:	Possible reasons:	Acknowledgement:
FAULT 1: BUS ERROR	<ul style="list-style-type: none"> Check if cable between LCD panel and control box is broken 	➤ Replace cable
FAULT 2: CONDUCTIVITY is too high > xxx μ S/cm “	<ul style="list-style-type: none"> Presettled alarm limit has been exceeded Fluctuating feed water quality RO membranes defective 	<ul style="list-style-type: none"> ➤ Increase of the alarm limit value, if not possible module change
FAULT 3: HP PRESSURE TRANSMITTER ERROR	<ul style="list-style-type: none"> Pressure sensor defective (permeate) Cable defective (wire rupture) 	➤ Replacement of pressure sensor/Multiblock
FAULT 4: TP PRESSURE TRANSMITTER ERROR	<ul style="list-style-type: none"> Pressure sensor defective Cable defective (wire rupture) 	➤ Replacement of pressure sensor/Multiblock
FAULT 5: HP OVER PRESSURE	<ul style="list-style-type: none"> Permeate/concentrate flow adjusted correct 	➤ Open recirculation valve until pressure is below 1.5 bar
FAULT 6: PERMEATE FLOW ALARM	<ul style="list-style-type: none"> Presettled alarm limit has been exceeded 	<ul style="list-style-type: none"> ➤ Increase of the alarm limit value ➤ Replace membranes
FAULT 7: HP FUSE BURNED	<ul style="list-style-type: none"> Pump defective (fuse protection) Motor fault, check operating parameters Pump is mechanically blocked or damaged HP Pump fuse is burned 	➤ Replace fuse
FAULT 8: TP FUSE BURNED	<ul style="list-style-type: none"> TP Pump fuse is burned 	➤ Replace fuse
FAULT 9: NO WATER ALARM	<ul style="list-style-type: none"> No water supply due to closed shut-off valves or other closings at the inlet No pressure at the water supply Pre-filter is blocked Water inlet pressure too low 	<ul style="list-style-type: none"> ➤ Open the main stop valves and if necessary check the water supply ➤ Replace the pre-filter if necessary ➤ Observe the operating instructions of the external pre-filter. ➤ Check that the water supply pressure is between 3.0 to 6.0 bar.
FAULT 10: TP RUNTIME ALARM	<ul style="list-style-type: none"> TP pump has been running continuously more than 20 min 	➤ Check if permeate hose/pipe is leaking
FAULT 11: INLET CONDUCTIVITY ALARM	<ul style="list-style-type: none"> INLET CONDUCTIVITY is too low 	➤ Check and replace conductivity sensor/Multiblock
FAULT 12: TOO MANY START/STOP	<ul style="list-style-type: none"> TP pump have started/stopped more than 60 / 90 / 109 times/hour 	➤ Check if pressure vessel is pre-presset to 2.9 bar
FAULT 13: INLET FLOW WATER TOO LOW	<ul style="list-style-type: none"> The pressure is >0.5 bar and HP-pump has tried to start more than 7 times the last 10 minutes. But minimum working pressure of 7 bar (HP -pump pressure + inlet pressure) cannot be maintained. 	<ul style="list-style-type: none"> ➤ 5μ pre-filter is clogged and must be replaced ➤ Inlet hose is bent ➤ Inlet solenoid valve is defective and must be replaced

12 Technical specifications

BWT bestaqua	units	60HQ	61HQ	62HQ	60LT	61LT	62LT
Performance							
Nominal capacity, 10 °C *	l/h	160	250	400	160	250	400
Nominal capacity, 15 °C *	l/h	180	275	400	180	275	400
Permeate conductivity (max.)	µS/cm	< 20			< 20		
Salt retention rate	%	> 99			>99		
Permeate output WCF ** (min...max.)	%	40...80 (automatic setting)			40...75 (manual setting)		
Transport pump flow at 3 bar	m ³ /h	3			3		
Permeate reservoir volume	l	37		34	37		34
Feed water							
Dynamic feed water pressure at 1000 l/h (min... max.)	bar	3...6			3...6		
Temperature feed water / ambient (min... max.)	°C	5...25 / 5...35			5...25 / 5...35		
Features							
Conductivity transmitter - permeate		Integrated			Integrated		
Conductivity transmitter - feed water		Integrated			Not available		
Flow transmitter - permeate		Integrated			Integrated		
Flow transmitter - concentrate		Integrated			Not available		
ROBOTflow, automatic adjustment of WCF/recovery		Integrated			Not available		
Manual by-pass		Integrated			Integrated		
Connections & dimensions							
Protection class	IP	54			54		
Electrical connection / fuse protection	V/Hz/A	230 / 50 / 10			230 / 50 / 10		
Electrical consumption (operation / standby)	W	1500/ 4			1500/ 4		
Electrical consumption for permeate production	kW/ m ³	< 4.1	< 2.7	< 1.9	< 4.1	< 2.7	< 1.9
Hydraulic connections (feed water/permeate/concentrate/overflow)		¾ " / ¾" / 12mm /25mm			¾ " / ¾" / 12mm /25mm		
Dimensions (width x depth x height)	mm	350 x 560 x 736			350 x 560 x 736		
Weight (dry)	kg	50		55	50		55

* Feed water in drinking water quality of: 10°C / 15°C, 3 bar, TDS ≤ 500 mg/l ± 15%, SDI ≤ 3.0, oxidants (Fe and Mn) ≤ 0.05 mg/l.

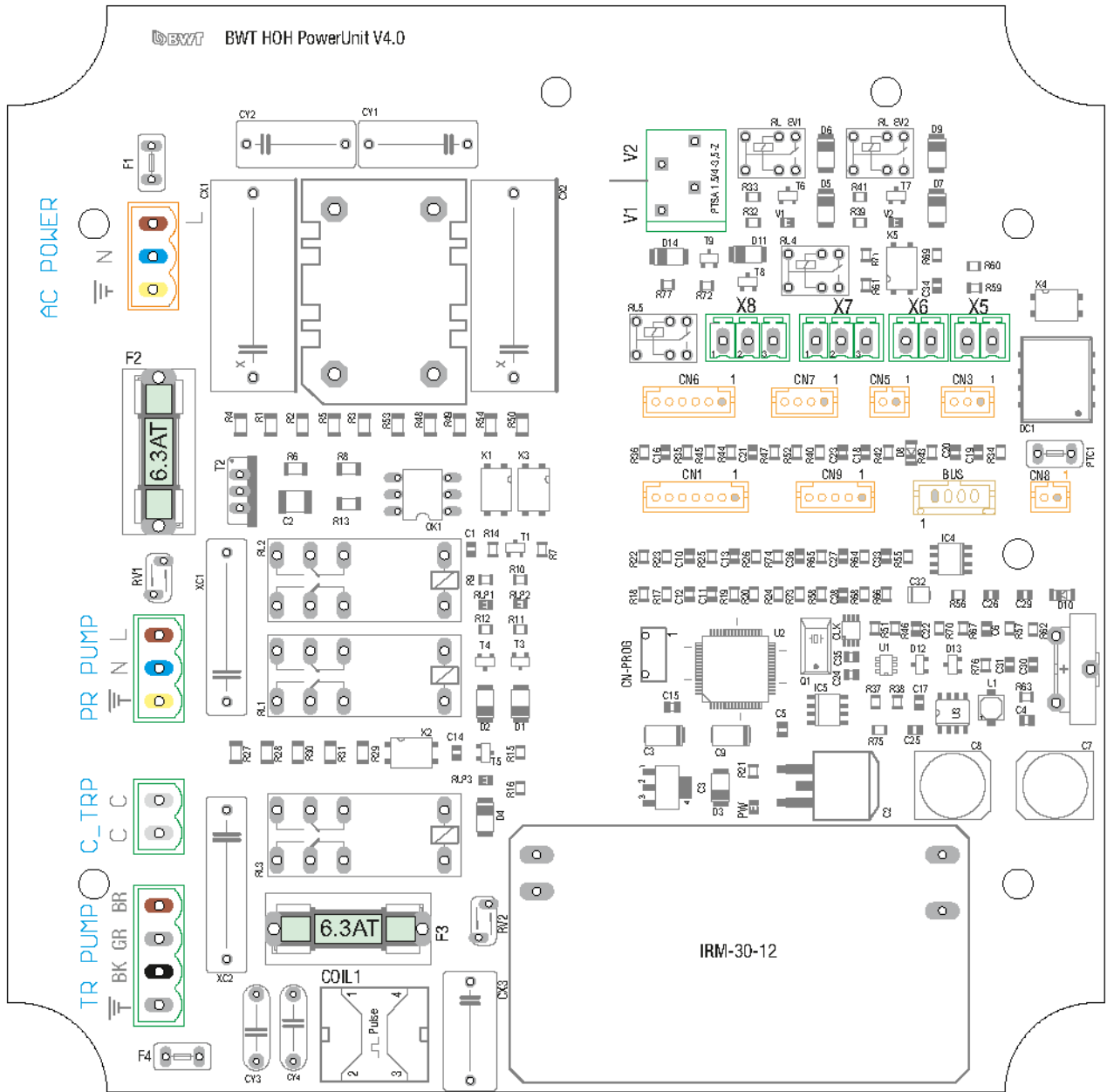
** Calculated by pre-treated feed water quality with max TDS ≤ 500 mg/l (5 µm pre-fiter + pre-treatment: softening or anti-scaling) Attention should be paid to local installation instructions, general guidelines, general hygiene conditions and technical data.

13 Appendix



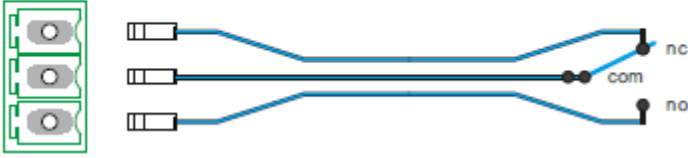
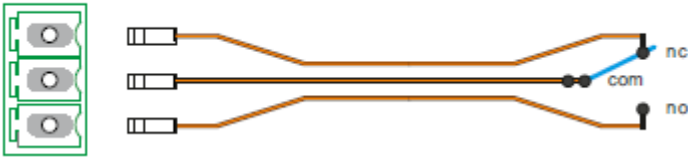
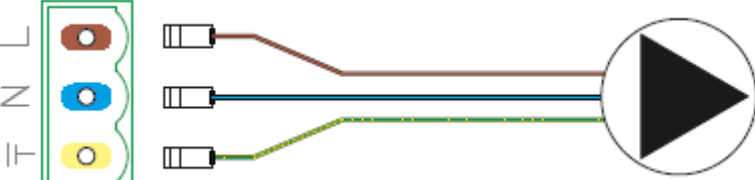

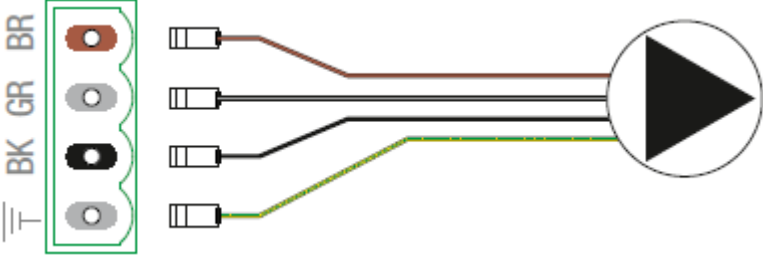
13.1 Preset standard values for BWT bestaqua 60, 61 and 62

Parameter:	Interval and unit:	Default values:
DATE	[Day /month / year]	Actual date
TIME	[Timer : minutter]	Actual time
LANGUAGE	EN, DK, DE, IT, FR	EN
CONDUCTIVITY LIMIT	0-190 μ S	40
CONDUCTIVITY ALARM	Enabled/disabled	Enabled
PERMEATE LOW FLOW LIMIT	100-390	100
PERMEATE LOW ALARM	Enabled/disabled	Disabled
WCF manual	40-75 %	40-75 %
WCF MIN/MAX WITH TREATMENT	40-80%	automatic
WCF MIN/MAX WITHOUT TREATMENT	40-75 %	automatic
WCF mode	Manual Automatic Automatic+pretreatment	Manual
WCF manual set point	40-75	40%
TP-PUMP STOP PRESSURE	2.0-4.0 BAR	3.8
TP-PUMP PRESSURE HYSTERESIS	0.5-1.9 BAR	1.0
TP-PUMP STOP TIME DELAY	20-60 sec	20
TP pump runtime alarm > 20 min	Enabled/disabled	Enabled
TP pump start/stop	60 / 90 / 109	60 times/hour
FLUSHTIME (FORWARD FLUSH)	0-30 sec	5
AUTOMATIC RINSING	Enabled/disabled	Enabled
RINSING HOUR	TIME: 23:30-3.00	02:00 a.m.
NO WATER RESTART DELAY	0-99 sec	30
HP-PUMP START TIME DELAY	0-60 sec	5
MAX HP-PUMP PRESSURE Alarm	13.0-19.9 BAR	16.0

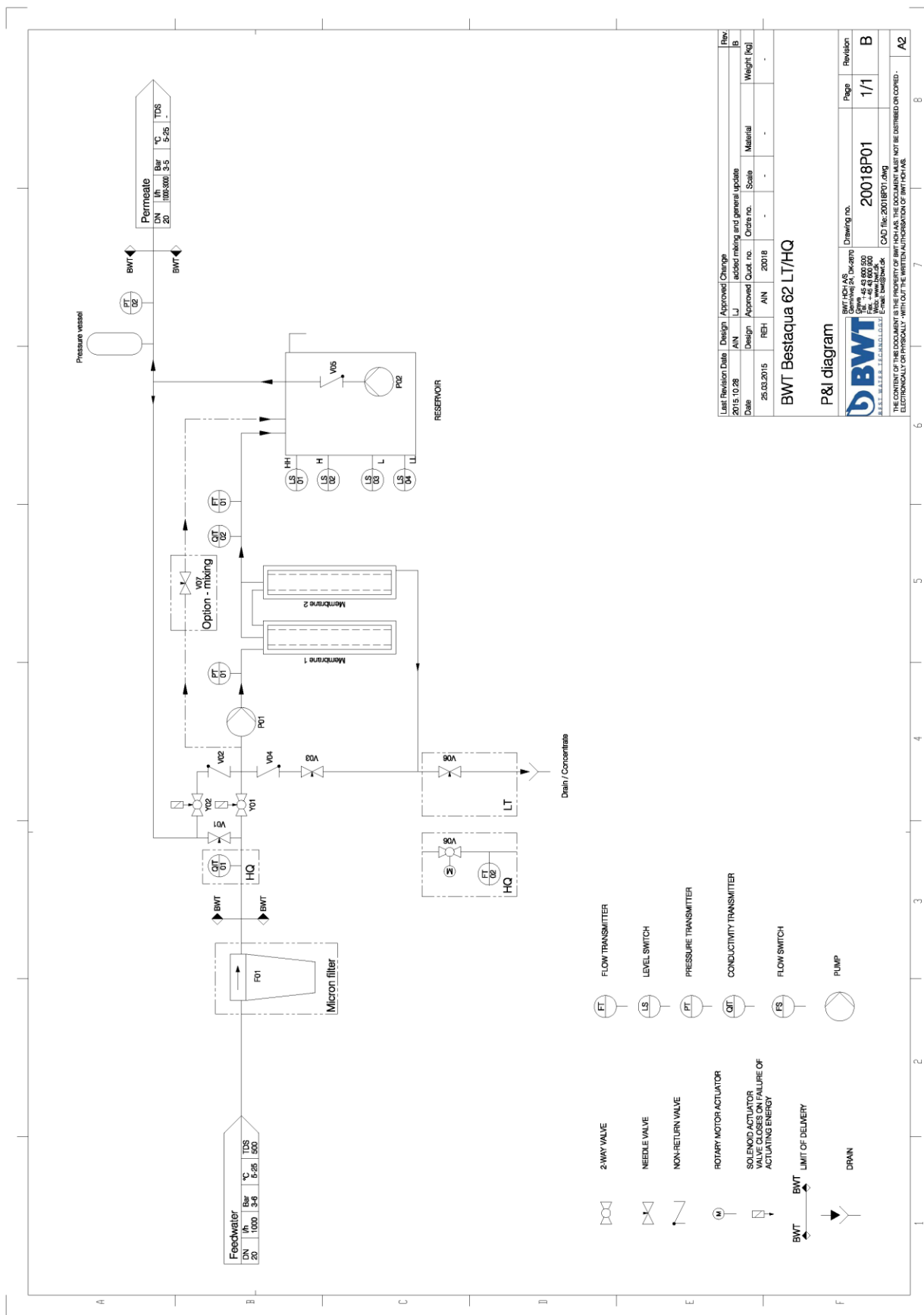
13.2 Wiring diagram



	<p>1) LS/ Level switch</p>
	<p>2) V06/ Servomotor</p>
	<p>3) QUIT01/ Inlet conductivity</p>
	<p>4) PT01/HP pump sensor 5) PT02/TP pump sensor</p>
	<p>6) FT02/ Concentrate flowmeter</p>
	<p>7) QUIT02/ Permeate conductivity</p>
	<p>8) FT01/ Permeate flowmeter</p>
	<p>9) LCD console</p>
	<p>10) Y02 / Flush solenoid valve 11) Y01 / Inlet solenoid valve</p>

<p>X5</p> 	<p>Input 1 External WCF switch</p>
<p>X6</p> 	<p>Input 2 External stop TP pump</p>
<p>X7</p> 	<p>Output 1 Reservoir is full/empty</p>
<p>X8</p> 	<p>Output 2 Alarm</p>
<p>L N PE</p> 	<p>HP pump</p>
<p>C_TRP</p> 	<p>TP pump capacitor</p>
<p>BR GR BK PE</p> 	<p>TP pump</p>

13.3 PI-diagram



13.4 Arrangement drawing

13.4.1 Arrangement drawing: BWT bestaqua 62HQ

Control panel
Kontrolpanel
Steuerung

736

350

Manual bypass valve
Manuel bypass ventili
Manuellen Bypass-Ventil

LT-model note

560

Feed Water inlet 3/4"
Råvand tilgang 3/4"
Rohwasser Einlass 3/4"

Permeat outlet 3/4"
Permeat afgang 3/4"
Permeat Auslass 3/4"

Overflow nozzle Ø25
Overløbsstuds Ø25
Überlaufstutzen Ø25

Concentrate drain Ø12
Koncentrat afløb Ø12
Konzentrat Auslass Ø12

Power cable
Stromkabel
Stromkabel

LT-model note

Concentrate adjustment
Koncentrat justering
Konzentrat Verstellung

Recirculation adjustment
Recirkulation justering
Rezirkulation Verstellung

Last Revision Date	Design	Approved	Change	Rev.
Date	Design	Approved	Quot. no.	Order no.
	AIN		20018	1:5
			Scale	Material
				Weight [kg]
BWT bestaqua 62 HQ Übersichtszeichnung für den Installateur Arrangement Drawing/Arrangementsteigning				
		Drawing no. 20018M01 / 1/1 Revision A		
BWT HOH A/S DK-270 Greve Tel. +45 43 650 500 Fax +45 43 650 501 Web: www.bwt.dk Email: bwt@bwt.dk				
CAD file: S:\20000-20999\20018 - BWT - Bestaqua_60-61-62 - BWT-DK_MIT11_1egning\p02_MekansK20018M01				
THE CONTENT OF THIS DOCUMENT IS THE PROPERTY OF BWT HOH A/S. THE DOCUMENT MUST NOT BE DISTRIBUTED OR COPIED - ELECTRICALLY OR PHYSICALLY - WITH OUT THE WRITTEN AUTHORIZATION OF BWT HOH A/S.				

13.5 Start-up control

Start-up control sheet			
The Start-up control sheet must be completed and filed together with the Operating journal.			
Name of customer:		Plant number:	Work-sheet number:
Test of feed water			
Temperature [°C]:	Conductivity [$\mu\text{S}/\text{cm}$]:	Hardness [°dH]:	Feed water pressure [bar]:
Softening unit			
If "no" skip this section		<input type="checkbox"/> YES	<input type="checkbox"/> NO
Type of softening unit:		Hardness [°dH] after softening:	
Tick if "yes"			
<input type="checkbox"/> Time-controlled	<input type="checkbox"/> Quantity-controlled	<input type="checkbox"/> Dimensioned correctly for RO	
<input type="checkbox"/> New	<input type="checkbox"/> Old	<input type="checkbox"/> Unit and salt valve set to the correct hardness	
Antiscaling unit			
If "no" skip this section		<input type="checkbox"/> YES	<input type="checkbox"/> NO
Type of antiscaling unit:			
Tick if "yes"			
<input type="checkbox"/> Dosing pump is OK		<input type="checkbox"/> Level switch is OK	
Reverse osmosis unit			
Type of RO unit:		HP-pump pressure [bar]:	Recirculation flow [l/h]:
Permeate flow [l/h]:	Concentrate flow [l/h]:	TP-pump pressure, permeate [bar]:	Conductivity, permeate [$\mu\text{S}/\text{cm}$]:
<input type="checkbox"/> Direction, HP-pump is OK		<input type="checkbox"/> Level switch, start/stop of HP-pump is OK	
External permeate tank			
<input type="checkbox"/> Pre-pressured hydrophore is OK		<input type="checkbox"/> Pressure switch start/stop, TP-pump is OK	
<input type="checkbox"/> Level switch have the right length for the plant		<input type="checkbox"/> Drainage protection, TP-pump is OK	
Status on start-up			
<input type="checkbox"/> Start-up by BWT		<input type="checkbox"/> Start-up by dealer, specify dealer _____	
Problems on start-up			
<input type="checkbox"/> YES, there were problems at start-up		<input type="checkbox"/> NO, there were no problems at start-up	
In case of problems, please fill in the problem report			
Problem report			
Can the problem be related to the manufacturing?			
<input type="checkbox"/> YES, the problem can be related to the manufacturing		<input type="checkbox"/> NO, the problem cannot be related to the manufacturing	
Can the problem be related to the plant or the installation?			
<input type="checkbox"/> YES, the problem only concerns the plant		<input type="checkbox"/> YES, the problem only concerns the installation	
<input type="checkbox"/> YES, the problem concerns both the plant and the installation		<input type="checkbox"/> NO, the problem does not concerns the plant or the installation	
The plant - we mean only the part of the whole installation which was delivered by BWT (i.e only the plant). The installation - we mean the piping etc. leading to the plant.			
Can the problem be related to the sales department?			
<input type="checkbox"/> YES, the customer was misinformed		<input type="checkbox"/> NO, the customer had been well-informed	
Description, please describe the problem:			
Signature			
Name/initials of technician:		Date:	Time consumption for the start-up [hours]:

13.8 Spare part list

Position No.	BWT bestaqua 60, 61 and 62	Spare part No.	Recommended spare parts	Recommended replacement frequency
1	High-pressure motor	451202495		
2	High-pressure pump	451202490		
3	Coupling for HP pump	451202485		
4	Transport pump	454100070		
5	Check valve ½"	200729004		
6	Pressure tank	451404571	1	3-5 year
7	Manifold block LT	421090680		
8	Manifold block HQ	421090690		
9	Level switch	451404488	1	5 year
10	Flowtransmitter	453012100		
11	Conductivity sensor, permeate	452536012		
12	Control box	451406000		
13	Controller (LCD)	451406010		
14	Cables bestaqua 60	409029300		
15 a	Cables for LT	409029310		
15 b	Cables for HQ	409029320		
16	Capacitor 20 µF (TP pump)	750001270	1	
17	Capacitor 16 µF (HP pump)	750001860	1	
18	Fuse 6,3A			
19	Membrane	451404980	1	1 year
20	Membrane HF	451404965	1	1 year
21	V-Cup seal for membrane	451404208		
22	Membrane O-ring			
23	End plate bottom	451404108	1	3-5 years
24	End plate top	451404107	1	3-5 years
25	O-ring outside	451202212	8	2 year
26	O-ring inside	451404215	8	2 year
27	Lock for u-lock	451202121		
28	Hose feed water	451404189	1	3 year
29	Hose permeate	451404188	1	3 year
30	Push-in fitting, 12x½", elbow	454091012	1	3 year
31	Push-in fitting, 12x½", base	454065013	1	3 year
32	Push-in fitting, 12x½", transition	454060012	1	3 year
33	Push-in fitting, 12x½", sleeve	454061212	1	3 year
34	Push-in fitting, 12x12, elbow	454090012	1	3 year
35	Push-in fitting, 12x12x12, tee	454095012	1	3 year
36	Hose Ø12	454001032	3m	3 year

	Options / accessories			
	BWT Aquaflex 38 (extra 38l tank)	421094010		
41	Water feedthrough for BWT aquaflex 38	451202270		
	BWT CRU 38 (concentrate reusable unit)	421090200		
	Complete installation kit	656525125		
	RO comissioning toolbox	451409006		
	Pre-filter housing 7", 3/4", complete	321400017		
	For-filter, hus DUO 7", 3/4", complete	321400027		
	Pre-filter cartridge 7", 5µm	321413070	2	½ year
	Pre-filter cartridge 7", 25µm carbon	321413077	2	½ year
	Spanner for filter housing	321417107		
	Center ring for 7" filter	321407007		
	Hose 3/4" 1500mm, straight	656513030		
	Hose 3/4" 1500mm, 90°	656513035		

13.9 Disposal

The packaging is to be taken to a local waste disposal site if no longer required. The packaging comprises of environmentally-friendly materials that can be used as secondary raw materials.



The device, including accessories and batteries, is not to be thrown into the household waste. EU legislation in Member States requires electrical and electronic equipment to be collected separately from unsorted municipal waste so that it may be recycled.

In Denmark and several other countries, BWT itself assumes responsibility for the return and conformant disposal of its electronic and electrical products. These products may not be placed with household waste or brought to collection centres run by local public disposal operations – not even by small commercial operators.

For disposal in Denmark and in the other member nations of the European Economic Area (EEA), please contact our local BWT service technicians or our Service Center in Greve, Denmark:

BWT HOH A/S
Geminivej 24
DK-2670 Greve

In countries that are not members of the European Economic Area (EEA) or where no BWT subsidiaries or dealerships are located, please contact your local authorities or a commercial disposal operator.

Remove the batteries and hand them in to a collection point prior to disposal/scraping of the device.

BWT, its affiliates, subsidiaries, dealers and distributors will not take back equipment contaminated with hazardous materials (ABC contamination) – neither for repair nor disposal. Please refer to our web site (www.bwt-group.com) for more detailed information regarding addresses for repair service or disposal of your device.

13.10 Declaration of Conformity**EC Declaration of Conformity for Machinery****Directive 2006/42/EC, Annex II, A****Low Voltage Directive****EMC Directive**

BWT HOH A/S

Geminivej 24 - DK-2670 Greve

tel.: +45 43 600 500 - fax: +45 43 600 900

bwt@bwt.dk - www.bwt.dk

herewith declares that:

BWT bestaqua 60LT, 60HQ, 61LT, 61HQ, 62LT, 62HQ

- is in conformity with the provisions of the Machinery Directive (directive 2006/42/EC)
- is in conformity with the provisions of the following other EC directives
- Low Voltage Directive (2006/95/EC)
- EMC Directive (2004/108/EC)

- Place: Greve, Denmark

- Date: 21-09-2016

Lars Jensen
Head of Product Management



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