



BWT AQUA
Flex 200-2000
Reservoir

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1. GENERAL INFORMATION

This operating and maintenance manual applies to BWT AQUA Flex 200 – 2,000 liter reservoir.

This manual should be read carefully prior to installation and commissioning of the BWT AQUA Flex reservoir. Correct installation and operation will be a condition for our 12-month warranty.

With its compact and complete design, the BWT AQUA Flex reservoir is easy to install as all internal installations have been pre-assembled and tested in our workshop.

The BWT AQUA Flex reservoir is designed for minimum service and for long and unproblematic operation. This, however, is determined by correct installation and maintenance.

2. EXPLANATION OF WORDS

There will be a few technical explanations in this manual, which we describe below.

Permeate: The treated, totally desalinated water which is produced by the RO-plant and supplied to the BWT AQUA Flex reservoir tank.

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

Raw water: Is the water which is led directly to RO-plant and which must be desalinated in the RO-plant.

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

Membranes: Is the filter of the plant which by high pressure and flow is capable of desalinating the raw water.

RO: The abbreviation for Reverse Osmosis.

Transport pump: Is the pump which transports the treated water from the BWT AQUA Flex reservoir to the consumer.

Level switch: Is a switch, which gives a signal when the RO-plant must either be started or stopped, and it stops the transport pump in case of dry-running of the BWT AQUA Flex reservoir tank.

3. FUNCTIONAL DESCRIPTION

The BWT AQUA Flex reservoir is a tank with built-on level measurement and pump section.

The levels for start and stop respectively for filling of the BWT AQUA Flex reservoir, and the third level protects against dry-running of the transport pump.

The pump section consists of a transport pump which is equipped with a non-return valve at the inlet and a pressure switch and hydrophore at the outlet.

The pressure switch starts the transport pump when the pressure drops, i.e. when there is a request for water, and stops the pump when the pressure increases. The hydrophore equalizes pressure surges at start and stop of the pump. The non-return valve protects air from getting into system.

4. CONNECTION OF THE BWT AQUA FLEX RESERVOIR

4.1. Positioning

The BWT AQUA Flex reservoir must be placed in frost-free surroundings on a level foundation. The foundation shall be able to carry a weight load of 230 – 2,150 kg, depending of the size of the BWT AQUA Flex reservoir. The weight load of any other plants should also be taken into account!

There must be free space at either side of the BWT AQUA Flex reservoir for water installations.

In case of a stoppage, situations may occur where the level in the BWT AQUA Flex reservoir overflows. There must always be a floor drain nearby, located so that the water cannot cause damage.

There must be easy access to the main switch of the plant.

4.2. Water connections

Note! All water connections of the plant shall be installed in compliance with local regulations.

BWT AQUA Flex	Inlet	Outlet
200 litres	14 mm hose / ½" inside / 1" outside	¾" outside thread
600 litres	14 mm hose / ½" inside / 1" outside	¾" outside thread
1,000 litres	14 mm hose / ½" inside / 1" outside	¾" outside thread
2,000 litres	14 mm hose / ½" inside / 1" outside	1" outside thread

If the connection is too small there is a risk of outage on the plant due to lacking water pressure/amount. In general, pressure losses should be minimized.

Important! Totally desalinated water can accelerate corrosion. Therefore, always use corrosion-proof piping for the permeate, e.g. stainless steel or PVC pipe.

4.3. Electric installation

Note! The electric connections must be made in compliance with local regulations. The electric connection to the BWT AQUA Flex BWT AQUA Flex reservoir must be as follows:

Electric connection	BWT AQUA Flex 200, 600, 1000	BWT AQUA Flex 2000
Voltage [V]	1 x 230 V	3 x 400 V + N + PE
Net	TN-S	TN-S
Frequency [Hz]	50 Hz	50 Hz
Power [A]	4.5A	3.0 A
Power consumption [kW]	0.85 kW	1.2 kW

5. START and operation of BWT AQUA Flex reservoir

Note! Check before start-up that all water and electrical connections are made as described in the previous sections and that they are in compliance with local regulations.

For BWT AQUA Flex 200, 600 and 1000 with internal transport pump

The transport pump pressure switch and pressure tank are pre-set in our factory and do not need to be adjusted.

- 1: Switch the BWT AQUA Flex reservoir ON. Note! The transport pump cannot be started until the reservoir tank of the plant has been completely filled up. Wait for the BWT AQUA Flex reservoir tank to be completely filled.
- 2: Check that the tank level automatically stops the plant when the BWT AQUA Flex reservoir is full. NOTE: Do not touch the level sensor.
- 3: Create a large consumption of permeate and check that the transport pump starts automatically.
- 4: Let the pump operate with a large flow for a 2 min. in order to get any air out of the pump case.
- 5: Check that the pump supplies water and pressure. If the pump does not supply water and pressure, see chapter 6.2: Trouble-shooting.
- 6: When the transport pump is OK, close the consumption of permeate.
- 7: Wait for the transport pump to stop automatically. Note! (on RO reservoir units): The transport pump doesn't stop until 10-30 sec. after the consumption has stopped due to the built-in time delay in the control box.
- 8: The BWT AQUA Flex reservoir unit has now been commissioned and is ready for use.

For BWT AQUA Flex 200, 600, 1000 and 2000 with external transport pump

The transport pump now needs to be bled of air. This is done by filling in permeate through the filling hole placed at the pump head.

- 1: Remove the filling cap on the side of the pump and fill in permeate until it overflows (approx. 3-4 litres).
- 2: Refit the screw cap on the filling hole.
- 3: Switch the BWT AQUA Flex reservoir ON. Note! The transport pump cannot be started until the reservoir tank of the plant has been completely filled up. Wait for the BWT AQUA Flex reservoir tank to be completely filled.
- 4: Check that the tank level automatically stops the plant when the BWT AQUA Flex reservoir is full. NOTE: Do not touch the level sensor.
- 5: Create a large consumption of permeate and check that the transport pump starts automatically.
- 6: Let the pump operate with a large flow for a 2 min. in order to get any air out of the pump case.
- 7: Check whether the pump delivers water and pressure. If the pump do not provides water and pressure, see Section 6.2 Troubleshooting.
- 8: When the transport pump is OK, close the consumption of permeate.
- 9: Wait for the transport pump stops automatically. Note! Transport pump stops first 10-30 sec. after consumption has ceased because of the built-in time delay in the control box.
- 10: The transport pump has now been bled and is ready for operation.

6 ANNEX

6.1 Technical data

BWT AQUA Flex with internal pump		200	600	1000
Reservoir volume	l	200	600	1.000
Transport pump		0,85 kW, 4,5A		
Pump capacity	bar/ (m ³ /h)	3/3		
Reservoir, diameter (A)	mm	Ø510	Ø760	Ø1.000
Unit, height (B)	mm	1.365	1.670	1.670
Unit, width (C)	mm	-	-	-
Inlet pipe connection, height	mm	~1.020	~1.400	~1.400
Discharge pipe connection, height	mm	~1.245	~1.550	~1.550
Permeate inlet, diameter	mm	14	14	14
Permeate discharge, diameter	inches	¾"	¾"	¾"
Weight (empty/full)	kg	30/230	50/650	60/1060
Water temperature (Min./Max.)	°C	5-35		
Pressure switch (PS 2)	bar	¼" -0,2 to 8		
Reservoir material		PE		

BWT AQUA Flex with external pump		200	600	1000	2000
Reservoir volume	l	200	600	1.000	2,000
Transport pump		0.85 kW, 4.5A			1.2kW, 3.0 A
Pump capacity	bar/ (m ³ /h)	3/3* (3/5**)			3/3* (3/5**)
Reservoir, diameter/depth (A)	mm	Ø510	Ø760	Ø1.000	720
Unit, height (B)	mm	1,365	1,670	1,670	2,120
Unit, width (C)	mm	-	-	-	2,070
Inlet pipe connection, height	mm	~1,020	~1,400	~1,400	~1,690
Discharge pipe connection, height	mm	~1,245	~1,550	~1,550	~1,950
Permeate inlet, diameter	mm	14	14	14	32
Permeate discharge, diameter	inches	¾"	¾"	¾"	1"
Weight (empty/full)	kg	50/250	70/670	80/1080	150/2150
Water temperature (Min. /Max.)	°C	5-35			
Pressure switch/ Pressure transmitter (PS 2)	bar	¼" -0,2 to 8/ 0 to 6			
Reservoir material		PE			

* CM 3-5, ** CM 5-5

6.2 TROUBLE-SHOOTING

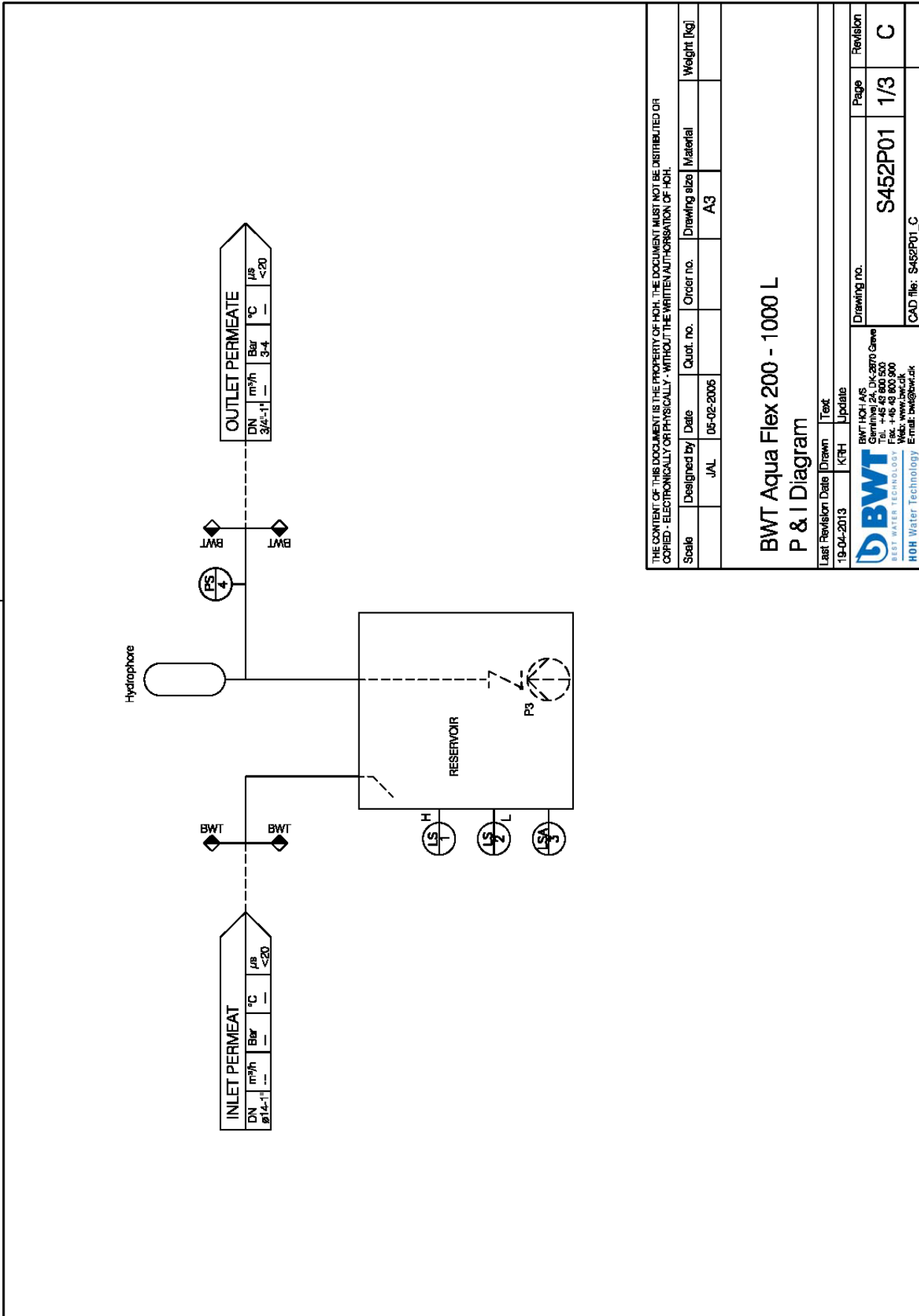
This chapter deals with problems that may occur on the plant. Follow the instructions in the relevant flow diagrams in order to perform a troubleshooting.

Note! Please pull ALWAYS the POWER PLUG before connecting the electrical components.

Description of error/fault	Reason for error/fault	Action
<p>Error 1: The reservoir is empty</p>	<ul style="list-style-type: none"> • Low water level 	<ul style="list-style-type: none"> • Check if too many consumers are connected on the BWT AQUA Flex reservoir and switch some off. Let the BWT AQUA Flex reservoir become completely filled up. • Check if the level sensor float is stuck in top of the BWT AQUA Flex reservoir. Carefully push the level sensor float up/down so that it is at permeate level. • Check if the level sensor and/or the level sensor cable are defective. If so, replace. • Check the TP-pump (See Error 1, Error 2 and Error 3). • Check the RO-manual: "Indication: Level low".
<p>Error 2: TP pump doesn't run</p>	<ul style="list-style-type: none"> • Switch is at OFF. 	<ul style="list-style-type: none"> • Turn switch to ON.
	<ul style="list-style-type: none"> • No call for water 	<ul style="list-style-type: none"> • Create water consumption
	<ul style="list-style-type: none"> • Low water level. 	<ul style="list-style-type: none"> • Let the BWT AQUA Flex reservoir become completely filled up and the TP pump will start automatically.
	<ul style="list-style-type: none"> • Pressure switch set incorrectly. 	<ul style="list-style-type: none"> • Set the pressure switch to 4.0 bar (Stop) and 3.0 bar (Start).
	<ul style="list-style-type: none"> • Defective pressure switch. 	<ul style="list-style-type: none"> • Short the pressure switch by making a jumper between the two socket terminals. If the pump only runs when this jumper is connected and there is a request for water, then the pressure switch is defective and must be replaced.
	<ul style="list-style-type: none"> • Defective capacitor. (Only for reservoirs with internal transport pump) 	<ul style="list-style-type: none"> • Open ON/OFF switch (3 - Spare parts drawing) and replace capacitor.
	<ul style="list-style-type: none"> • Defective fuse. 	<ul style="list-style-type: none"> • Check the RO-unit PCB (F3 - PCB) and replace the fuse of the TP pump.
	<ul style="list-style-type: none"> • Defective TP-pump. 	<ul style="list-style-type: none"> • Replace TP-pump.
	<ul style="list-style-type: none"> • The overload relay of the TP-pump is switched off (check RO-control panel). 	<ul style="list-style-type: none"> • Check control panel of the RO unit and switch on the overload relay of the TP-pump.
<ul style="list-style-type: none"> • Defective PCB (check RO unit control box). 	<ul style="list-style-type: none"> • Replace PCB of the RO-unit. 	

	<ul style="list-style-type: none"> • Float of the level sensor is stuck. 	<ul style="list-style-type: none"> • Push the level sensor float carefully up/down until it is at permeate level.
	<ul style="list-style-type: none"> • Defective level sensor. 	<ul style="list-style-type: none"> • Replace level sensor.
	<ul style="list-style-type: none"> • External stop signal on the TP-pump. 	<ul style="list-style-type: none"> • Read the conductivity meter; if this is $>20 \mu\text{S}/\text{cm}$ it will result in an external stop signal. Re-establish the permeate quality; see chapter 9.2.2 in the RO-manual.
	<ul style="list-style-type: none"> • The thermal fuse in the TP-pump is turned off due to overheating. 	<ul style="list-style-type: none"> • Turn switch to OFF, let the TP-pump cool down and turn the switch back on ON
Error 3: TP-pump is running but no permeate is getting to the consumer	<ul style="list-style-type: none"> • Air in the TP-pump. 	<ul style="list-style-type: none"> • Turn switch to OFF, fill up the TP-pump with permeate and turn switch back to ON. Let the pump run a while with a <u>large flow</u> in order to get the remaining air out of the pump case.
	<ul style="list-style-type: none"> • Low water level. 	<ul style="list-style-type: none"> • Disconnect the consumer. Let the BWT AQUA Flex reservoir become completely filled and the TP-pump will start automatically.
	<ul style="list-style-type: none"> • The motor of the transport pump is running in the wrong direction. 	<ul style="list-style-type: none"> • Check the wiring diagram of the BWT AQUA Flex reservoir and make a correct connection.
Error 4: TP-pump starts and stops	<ul style="list-style-type: none"> • If the piping connection is too small there is a risk of outages on the plant due to lacking water pressure/amount etc. 	<ul style="list-style-type: none"> • Replace the permeate outlet pipe with an outlet pipe with a larger dimension.
	<ul style="list-style-type: none"> • Non-return valve is leaky/defective 	<ul style="list-style-type: none"> • Replace the non-return valve
	<ul style="list-style-type: none"> • The hydrophore is defective or lacking air. 	<ul style="list-style-type: none"> • Replace the hydrophore and set the pre-pressure at 2.7 bar.
	<ul style="list-style-type: none"> • The hydrophore capacity is too small. 	<ul style="list-style-type: none"> • Contact BWT for technical advice.
	<ul style="list-style-type: none"> • Pressure switch set incorrectly. 	<ul style="list-style-type: none"> • Set the pressure switch to 4.0 bar (Stop) and 3.0 bar (Start).
Error 5: The quality of permeate is higher than $20 \mu\text{S}/\text{cm}$	<ul style="list-style-type: none"> • Leaks around the BWT AQUA Flex reservoir and/or impurities inside the reservoir. 	<ul style="list-style-type: none"> • Empty the BWT AQUA Flex reservoir completely and repair the leaks. Fill up with permeate $<20 \mu\text{S}/\text{cm}$ from the RO-unit.

6.3 P&I Diagram BWT AQUA Flex 200-1000



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Scale	Designed by	Date	Quot. no.	Order no.	Drawing size	Material	Weight [kg]
	uAL	05-02-2006			A3		

BWT Aqua Flex 200 - 1000 L
P & I Diagram

Last Revision	Date	Drawn	Text	Update
19-04-2013		KPH		

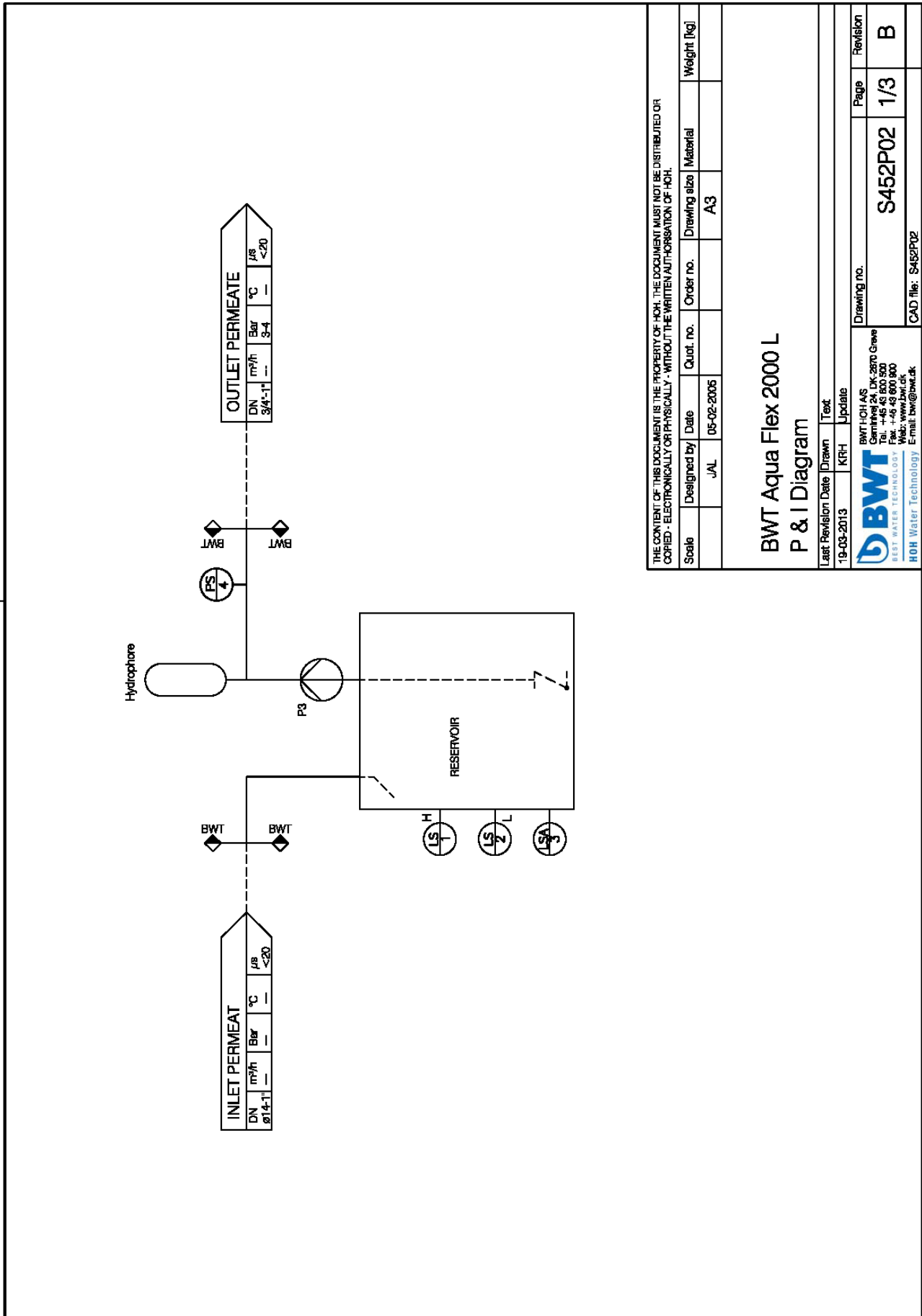
Drawing no.	Page	Revision
S452P01	1/3	C

CAD file: S452P01_C

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6.4 P&I Diagram BWT AQUA Flex 2000 L



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Scale	Designed by	Date	Quot. no.	Order no.	Drawing size	Material	Weight [kg]
	JAL	05-02-2005			A3		

BWT Aqua Flex 2000 L P & I Diagram

Last Revision	Date	Drawn	Update
19-03-2013		KFH	

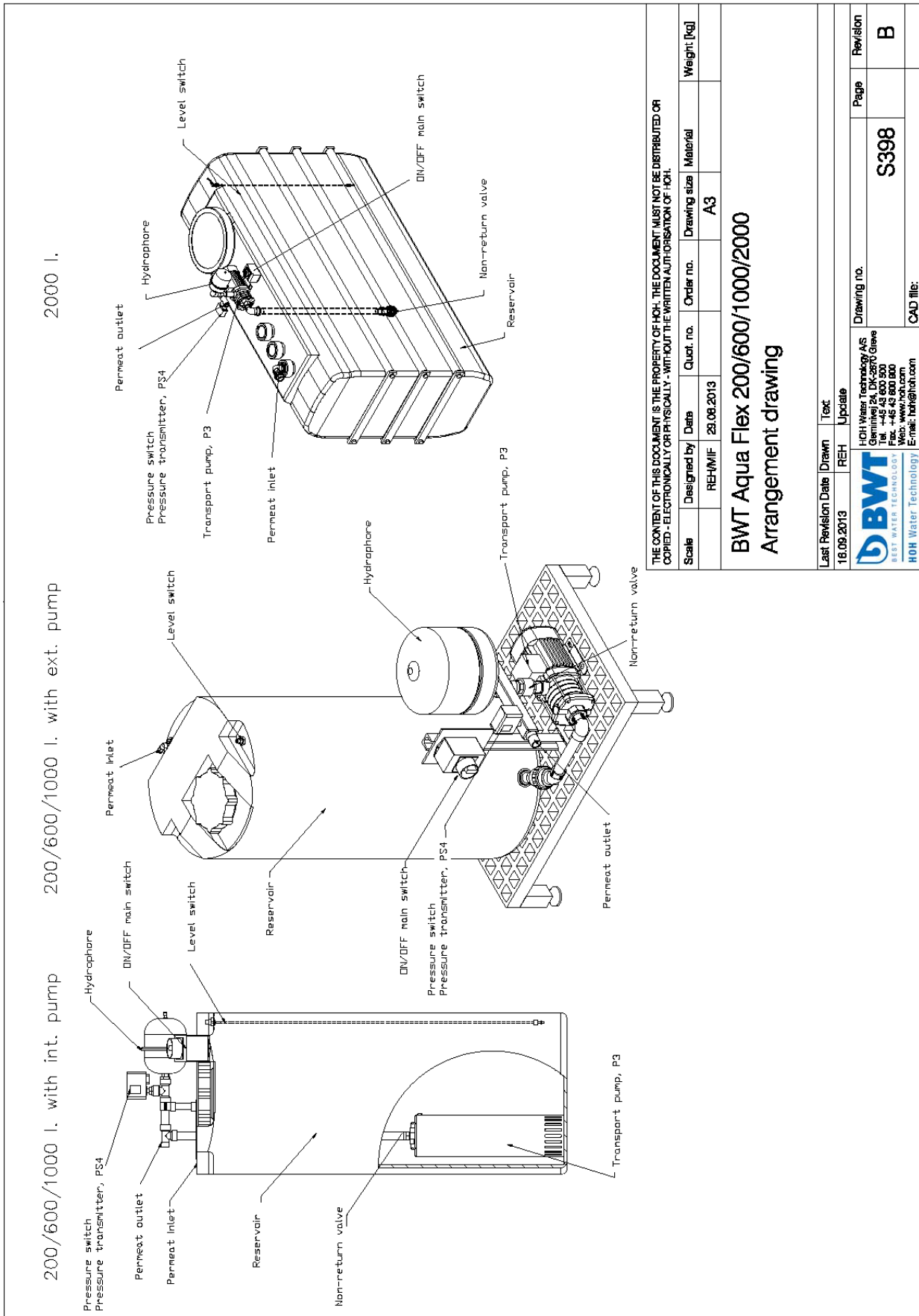
Drawing no.	Page	Revision
S452P02	1/3	B

CAD file: S452P02

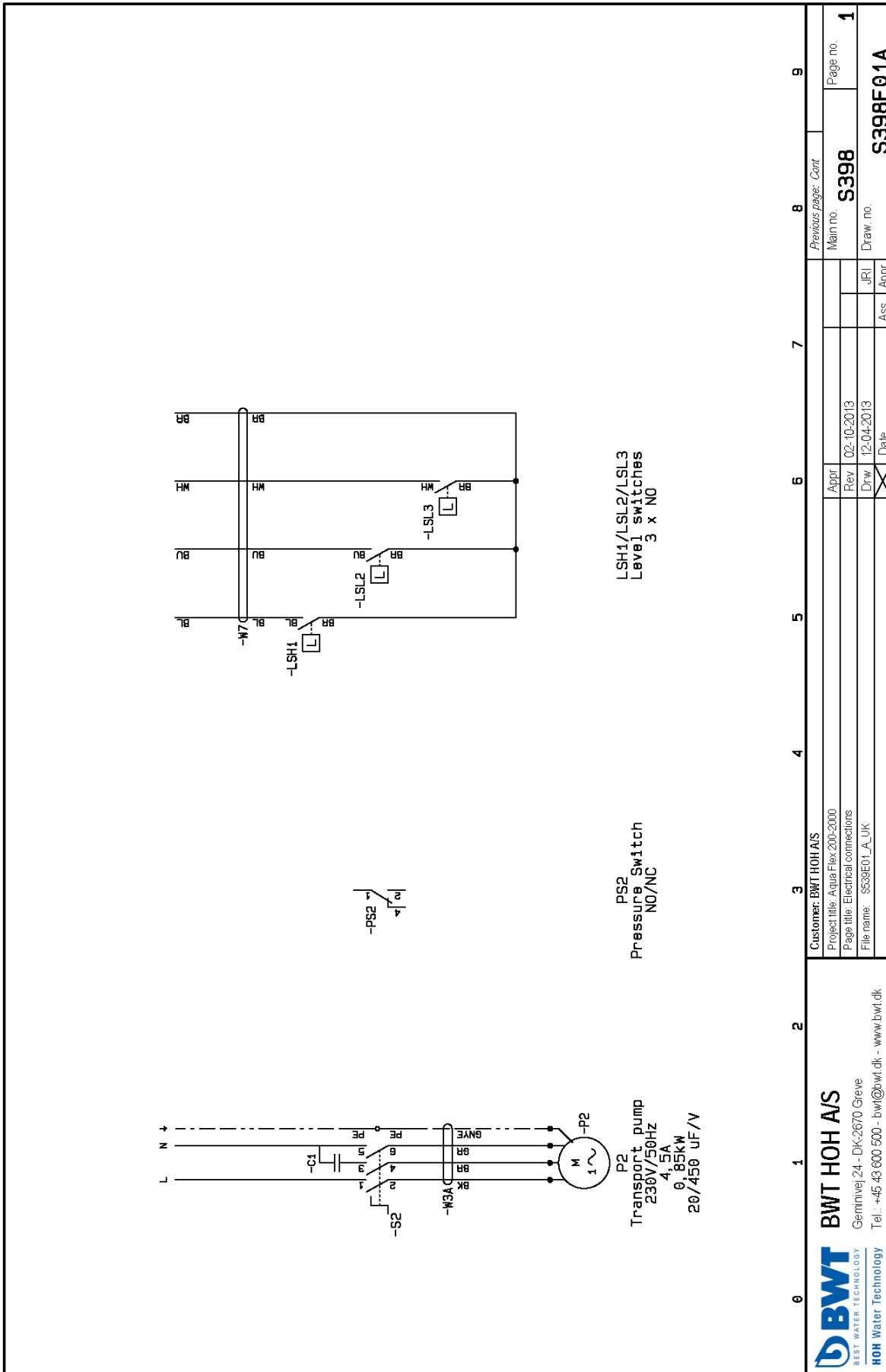
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6.5 Layout drawing



6.6 Electrical connections



6.7 Spare parts list AQUA Flex

Pos. Nr.	BWT AQUA Flex 200, 600, 1000, 2000	Recommended spare parts	Spare part No.	Recommended replacement frequency
1A	200 l reservoir		401526055	
1B	600 l reservoir		401526056	
1C	1,000 l reservoir		401526057	
1D	2,000 l reservoir		401526053	
2A	Internal transport pump (BWT AQUA Flex 200, 600, 1000)		454100070	
2B	External transport pump CME 3-5		454100900	
2C	External transport pump CM 3-5		454100950	
2D	External transport pump (BWT AQUA Flex 2000)		454100960	
3	Main switch		750001580	
4A	Hydrophore 2.0 liter		451404577	3-5 years
4B	Hydrophore 11.0 liter		451404576	3-5 år
5	Pressure switch	1	451202803	
5B	Pressure transmitter		452330000	
6A	Level switch (BWT AQUA Flex 200)	1	451404490	5 years
6B	Level switch (BWT AQUA Flex 600, 1000, 2000)	1	451404440	5 years
7	½"x14 mm elbow	1	454090013	3 years
8A	¾" Non-return valve (BWT AQUA Flex 200, 600, 1000)		200729006	
8B	1½" Non-return valve (BWT AQUA Flex 2000)		200726010	
	Miscellaneous			
	20 µF Capacitor (Internal transport pump, BWT AQUA Flex 200/600/1000)	1	750001270	
	Cable for level switch		451404470	

6.8 Spare Parts Drawing

200/600/1.000 l. with int. pump

200/600/1.000 l. with ext. pump

2000 l.

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Scale	Designed by	Date	Quot. no.	Order no.	Drawing size	Material	Weight [kg]
	REH/MIF	29.08.2013			A3		

BWT Aqua Flex 200/600/1000/2000 Spare parts drawings

Last Revision Date	Drawn	Text	Drawing no.	Page	Revision
16.09.2013	REH	Update			
			S398		B

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 CAD file:

6.9 Declaration of Conformity

**EC DECLARATION OF CONFORMITY FOR MACHINERY
DIRECTIVE 2006/42/EC, ANNEX II, A
LOW VOLTAGE DIRECTIVE
EMC DIRECTIVE**



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herewith declares that:

BWT AQUA Flex 200, 600, 1000 and 2000

- 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: 13-03-2013

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