

BWT bestaqua 22 HQ

BWT bestaqua 24 HQ

BWT bestaqua 26 HQ



Fitting and operating instructions 

For You and Planet Blue.

 **BWT**
BEST WATER TECHNOLOGY

Thank you very much for the confidence that you have shown in us by purchasing a BWT appliance.



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1.1 Abbreviations and subject index

Softening:

The water purification process removes the hardness from raw water. Hardness constituents are the portion of calcium and magnesium ions in the water.

External contacts (input/output):

Is the connection for alarm output & remote ON/OFF.

Raw water:

Raw water (usually untreated drinking water) must often be pre-treated (usually softening) and is then useable for the desalination process in the RO device.

RO:

Abbreviation for Reverse Osmosis.

Permeate:

The largely desalinated "pure water" filtered in the RO membranes and generated by reverse osmosis. The characteristic value is the electric conductivity in $\mu\text{S}/\text{cm}$.

Concentrate:

This waste water, which contains the salts and minerals that have been removed from the raw water.

Membranes:

The "filter" of the device which is capable of desalinating the raw water by high pressure and flow.

TDS:

Abbreviation for "Total Dissolved Solids" the total amount of dissolved salts, measured in mg/l .

SDI:

Abbreviation for "Silt Density Index". The "Silt Density Index" is an indicator of the organic contamination of raw water. The measurement system is a filtration process which determines the blocking tendency, measured during 15 min.

Conductivity, electrical conductivity:

Electric conductivity value of the water of the RO unit, the smaller this measured value ($\mu\text{S}/\text{cm}$) the better the water quality in the permeate product.

IOM:

Abbreviation for "Installation and Operating Manual"

Permeate yield (WCF):

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".

Pressure tank operation:

The RO units configuration mode could be set for the pressure tank operation at the range of 2 ... 4 bar.

NO:

Abbreviation for level switch "normally open" (for level queries as ascending normally open contact).

Blending of water inlet:

All devices which are equipped with an electrode-controlled tank level metering, requires a manufacturer's specified conductivity value for the permissible inlet of feed water. The specified inlet of softened water has to be adjusted by blending.

1.2 Scope of delivery

The scope of supply of the RO system BWT bestaqua 22,24,26 HQ is described in the itemized points 1 to 12.



Fig. 1: BWT bestaqua 22,24,26 HQ - Front view of the device



Fig. 2: BWT bestaqua 22,24,26 HQ - Rear view of the device

The scope of delivery of the RO device includes:

Operational controller description:

- 1 OLED display (*monochrome: blue*)
- 2 Function button: ON/OFF and standby
- 3 Function button: Upward
- 4 Function button: Downward
- 5 Function button: Confirmation/OK
- 6 Status/Alarm LED (**green:** ready, working, flushing, pause
red: service, no feed water, alarm)

Connections and service components:

- 7 Electrical wiring with grounded PE mains plug "CEE7"
- 8 Feed water connection 3/4" male thread
- 9 Permeate connection 3/4" male thread with 3/8" female
- 10 Concentrate connection Ø 8mm JG-connection
- 11 Service cap for security valve of the pump

Optionally available, Item no. 824047:

- 12 External contacts (INPUT/OUTPUT), 3-pin, M8 for the communication between RO unit and the external unit for external start-/stop switching (DI) and alarm output (DO).

1.3 Manufacturer

The RO devices BWT bestaqua 22,24,26 HQ are manufactured in the name of:

BWT water + more GmbH

Walter-Simmer-Straße 4

AT-5310 Mondsee

Phone: +43/6232/5011-0

Fax: +43/6232/4058

E-Mail: warewashing@bwt-group.com

1.4 General comments

Following the instructions in this Installation and Operating Manual (IOM) helps the operator to run the reverse osmosis BWT bestaqua 22,24,26 HQ reliably and economically. This Manual (IOM) is part of the device and must be constantly available at the place of operation for all assigned staff members.

1.4.1 Reading of the manual (IOM)

The staff must have read and understood this IOM prior to any work being carried out. A basic precondition for safe working is the adherence to all stated safety and operating instructions.

In addition, the local accident prevention provisions and the general safety provisions effective at the place of operation are applicable. The illustrations in these instructions serve the basic understanding and can deviate from the actual design of the device. Justified claims cannot be derived from the same.

1.4.2 Warranty provisions and disclaimer



Please observe: All of the information and instructions contained in this installation and operating manual were provided in respect of current standards, regulations, prior art and our long term experiences.

BWT excludes any responsibility for damages and for consequential loss due to:

- Non-compliance with the instructions in the manual
- Use not conforming to the intended purpose
- Improper or faulty installation
- Improper initial operation and operation, maintenance
- Use of non-permitted components as well as non-original parts
- Lack of examination in required service and maintenance work
- Damage due to unauthorized modification and technical manipulation

1.4.3 Obligations of the operator

- The installation and operating manual has always to be kept close to and accessible at the RO unit.
- The RO unit must only be used if it works in a technically proper manner and if the safety status is reliable.
- The instructions, notices and advices of the installation and operating manual have to be followed properly.

1.4.4 Licence conditions

The IOM is protected by copyright. Surrendering the manual to any third party, duplication of any kind and form – also in excerpts – as well as the utilisation and/or communication of the content are not permitted without the written consent of the manufacturer. Infringements obligate to pay compensation for damages. Further claims are reserved.

Note: Upon the acquisition of the reverse osmosis, the user receives an exclusive, non-transferrable right of utilisation in respect of the software installed by the manufacturer.

1.4.5 Explanation of listed symbols

This installation and operating manual uses **warnings/symbols!** The warnings/instructions are introduced by signal words to **underline risks**.

Please follow instructions and treat them with maximum importance to avoid any accidents and damages.



Danger: Caused by electric current or voltage!

Always consult a qualified electrician when working on places denoted by this symbol.



Attention: Dangerous spot!

Details or orders and prohibitions to avoid personal injury or extensive damage to property.



Please observe: Underlines useful recommendations and information for an efficient operation free of any interruptions.



Note: Additional information for the operator.

1.5 Operation and safety precaution advices

The following chapter provides an overview of all important operation and safety precaution advices to enable safe operation free of any interruptions. Despite all safety precaution measures, residual risks still remain, particularly in case of improper use and handling. A warranty claim will be denied, if the notices and advices of this installation and operating manual are not respected.

1.5.1 Intended use of device

The device is suitable for the desalination of water in drinking water quality up to max. 30°C and a raw water pressure of max. 4.0bar and can be operated either directly in front of the consumer or additionally it is possible to install an atmospheric pressure tank downstream, to improve peak situations of the user required permeate demands.



ATTENTION: in the pressure tank operation, should be the corresponding flow loss to be considered (see table).



Observe: The feed water quality has to meet the requirements of the technical specifications (see Part 6.1) and must not be exceeded! The pump pressure must not exceed 8.6bar (max. permissible value) and should therefore be readjusted if necessary!

The device shall only be used for its intended purpose, in line with the installation and operating manual and in the environment to which it was intended and designed. Deviations are regarded as “non-intended purpose”.

The intended use also comprises the adherence to the operating, maintenance and upkeep conditions stipulated by the manufacturer.



Attention: The RO unit must be fed with cold water in drinking water quality.

- Every deviation from the intended purpose, e.g. deionisation of feed water of non-drinking water quality, can led to irreversible damages or can cause undesired microbial contamination of the unit.

1.5.2 Permitted mode of operation



Observe: To protect the drinking water, observe the country-specific guidelines for drinking water installations in any work at the RO device.

- Prior to any maintenance work at the drinking water supply system, the device must be separated from the water supply system. Rinse the water pipe sufficiently before reconnecting the device.
- Interrupt the voltage supply of the device and of the terminal equipment prior to assembly (unplug mains plug).



Please observe! Improper and faulty installation of the RO unit can cause material damages.

- Please observe all applicable specific national guidelines and installation regulations (e.g. DIN 1988, EN 1717), general hygiene requirements and technical specifications in order to protect the drinking water.
- Unauthorized reconstruction work as well as technical modifications are prohibited.
- Please avoid any mechanical damages of the RO unit, otherwise the warranty will lapse.
- Please install a shutoff valve in front of the RO device.
- Please use **flexible tubes** according DVGW W543 requirements only.
- Please avoid direct heat sources, e.g. radiators and exposure to sunlight.
- Chemicals, solvents and fumes must not come into contact with the RO unit.
- The installation site must be free of frost and exposure to sunlight.
- Do not use for example, **microbial contaminated feed water** or with **feed water of an uncertain quality or origin**.
- If permeate is used for **food preparation, clean and/or flush downstream users/machines before use**.
- **Avoid unnecessarily long storage times** of the equipment, in order to prevent the risk of microbial contamination.
- The demineralised water (permeate) **may not be used as drinking water**.

1.5.3 Permitted mode of operation



Attention: DANGER due to use deviating from the intended purpose!

Any use beyond the intended purpose and/or any different use of the device can lead to dangerous situations.

Any claims because of damages resulting from any use not corresponding to the intended purpose are excluded.



Please observe:

NEVER operate the device with the housing covers removed.

The complete power supply unit must be replaced in the event of damage to the mains cable.



Observe! For the RO units operation a < 100µm particle filter must always be provided by the customer.



Please use:

- If needed, use protective clothing.
- **Do not use** any aggressive cleaning agents!

1.5.4 Qualified persons and users



Please observe:

Stipulate clear staff responsibilities for operation, set-up, maintenance, repair work!

For installation, commissioning and maintenance/service work, it is mandatory that it be effected by skilled and instructed person. The user has to be trained by a BWT organisation or other authorised person to operate the RO device.

- **Trained and instructed staff:** Was instructed about all possible dangers due to improper use.
- **Qualified persons:** Are able to install, commission and service an RO unit due to their qualification, knowledge and experience in current regulations.

1.5.5 Shutdown periods

The BWT bestaqua 22,24,26 HQ unit is equipped with an programmable interval flush to prevent microbial contamination during long non-service periods. Nevertheless, it is recommended to implement the following measures in case of unfavourable cases.

- We recommend **discarding** the first **5 minutes of permeate** after each long idle periods of non use – e.g. weekends, holidays.
- The RO unit rinses at standstill condition every 2-3 hours automatically, to prevent a microbial contamination.
- Please carry out a replacement of the membrane elements, in longer down times with unplugged mains plug.
- Please consider the individual manual of the external pre-filter.

1.6 Function of the RO unit

A semi-permeable RO membrane separates feed water of a high pressure (approx. 8 bar) into deionised (permeate) and into waste water (concentrate) with a high salinity.

The relation between the produced permeate and feed water is expressed as recovery or **WCF (%)**. The RO is factory set with an WCF value of approx. 40%. With an appropriate water pre-treatment, the operator may install the optionally available "high efficiency" WCF kit.

Optionally available:

Item No. 824039 for BWT bestaqua 22/24 HQ

Item No. 824040 for BWT bestaqua 26 HQ

Devices ON- and OFF switching point:

With pressure tank operation: between 2-4 bar adjustable (Please observe the maximum pump pressure!)

Without pressure tank operation: switching point approx. 2 bar



When installing the optional "high-efficiency" WCF - Kit, the enclosed operation manual must be observed!

After the ending of the last pure water demand the permeate back pressure increases as long as the presetted stop pressure is reached. As the turn-off pressure is reached and after rinsing the membranes, the device assumes the “Ready” stand-by mode.

If a failure occurs, the display shows the error code and the status alarm LED turns into red. If required, the device deactivates itself automatically. **Part 4.2** contains information concerning possible error codes displays and their causes as well as “troubleshooting”.

1.7 Preconditions for the installation

1.7.1 Positioning of the RO/installation requirements

When installing the device, select a location where the device can easily be connected to the water supply network.

A connection to the sewage system and a separate mains socket (230V, 50Hz) must be nearby. Please connect the PE mains plug only to a grounded socket.

The rated **mains power** (see **technical data**) and the requisite **feed water pressure** must be present at all times.

If a pump station is needed for draining, please consider corrosion-resistant materials.

National guidelines and regulations:

Observe all applicable installation regulations, general guidelines, hygiene requirements, and technical specifications.

Frost protection and ambient temperature:

The installation site must be dry and free of frost and ensure the protection of the unit against chemicals, paint, solvents and fumes.

If the mains water is treated with oxidising disinfectants (chlorine, chlorine dioxide, etc.), is necessarily an activated carbon filter to be placed in front of the unit. A < 100µm **particle filter** must always be provided by the customer.

Further pre-treatment is to be determined by the BWT service in dependence on the local feed water quality.

Quality of the pipeline supply:



Please observe: Only **corrosion-resistant material** must be used in the permeate area.

Electrical interference:

The emission of interference (voltage peaks, high-frequency electromagnetic fields, interference voltages, voltage fluctuations ...) by surrounding electrical systems must not exceed the documented maximum values specified in the standard EN 61000-6-4.

1.7.2 Feed water requirements

The RO unit must only be fed with **cold drinking water (maximum 30°C)**, which meets the official requirements for potable water and covers the specification in **table 6.1**.

Data analysis of the feed water in your area:

Every deviation from the intended purpose, e.g. deionisation of non drinking water feed water can led to irreversible damages too human and equipment (e.g. undesired microbial contamination of the RO unit).



Warning: Caused by unsuitable water quality.

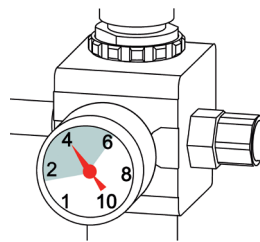
- **The limit values listed in Part 6.1 must not be exceeded.**
- An exceeding of the limit-values by incompatible feed water might cause danger to unwanted sedimentation on the membranes. That influences negatively quality and performance.

1.7.3 Setting the correct operating pressure

A minimum operating pressure is required for the optimum functioning of the unit. Besides, the water pressure should not exceed the maximum permissible pressure.



Attention: The feed water inlet pressure must be **between 2.0 and 4.0 bar** directly guided to the RO.



If the pressure is more than 4.0 bar, install a pressure reducing valve.



If the pressure is lower than 2.0 bar, a pressure booster system must be installed upstream.



Observe: The operation of the RO unit with a pump pressure **of over 8.6bar does not permissible** (otherwise it could appear irreversible damage to the membrane).

We recommend setting the pump pressure in each operating mode to approx 8.1bar!

- It is recommended to install a shut-off valve at the inlet side of the unit, so that the feed water supply may be interrupted for service purposes.
- Customers should install a feed water supply **of at least DN10** to avoid unreliable operation. An undersized inlet causes the danger of an interruption of the operation due to insufficient water pressure or insufficient flow rate, e.g. when rinsing the membranes.
- A pressure-reducing valve can decrease the flow rate negatively.

2.1 Preparation for assembly

Unpacking of the RO unit:

Remove the device from its packaging and check the delivery to see that everything is there and that no damage was caused during transport.

Hydraulic installation:



Please respect the general installation instructions for the preparation of water installations as well as the general hygiene requirements.

- Please read/observe all applicable specifications, operating and safety instructions prior to the installation.
- Please use only approved flexible hoses, according to the DVGW W 543 requirements.
- Please adhere to all dimensions as well as bending radius in the assembly of the flexible tubes and connection sets.
- The BWT bestaqua 22,24,26 HQ device line is to be installed and operated **vertically**.
- The unit may not be connected to the water mains by rigid pipes.
- A hydrophore or a storage tank with a booster pump could be installed in the permeate line between the RO unit and the consumer, if depending on the application a short-term peak flow is required.

Connection to the water pipe:

- The device hoses must be installed in a flexible manner (without any tension) to maintain a safe operation.
- Check all water connections to ensure that they are tight and waterproof.
- Guide the flexible concentrate hose with **“free flow”** condition to the on-side connection of the drain pipe (with a slope of 1%) and fasten it. The **“flexible” hoses must not have any bends or cross-sectional constrictions**. Observe during the installation that the concentrate- and permeate hoses were correctly connected.

Notes for initial operation:

- Connect the RO unit with the electrical power supply (230V, 50Hz). The wall socket has to be earthed.
- Please consider the individual manual of the **external pre-filter**.
- The **water hardness can vary** in different areas.

- **Generally, we recommend the operation with softened feed water** to achieve an extending of the life and reliability of the RO membranes.

⇒ All hoses have been connected and are watertight.



When installing the optional “high-efficiency” WCF - Kit, the enclosed operation manual must be observed!

- Please open the valve for the feed water supply.
 - Connect the RO unit to the power supply (230V/50 Hz).
- ⇒ The functions of the control unit and software configuration are described in **Part 3.1 - 3.6**.
- We recommend that the pump pressure in each operating mode to set at approx. 8.1 bar!
 - Instructions for the WCF kit installation available in **Part 5.3**.
 - **Note: Discard the first produced permeate** during the first **10 minutes** after any new installation/first commissioning or at any membrane replacement.



Note: Please run the RO unit a few days to reach the full performance (WCF and permeate quality).



Note: A drop of temperature by 1°C will reduce the permeate output of the membranes by approx. 3.0%.

Possible installation layout:

- 1 BWT bestaqua 22,24,26 HQ reverse osmosis
- 2 External pre-filter (not included in the delivery)
- 3 Permeate outlet ready for the connection to the consumer/tank
- 4 Stop valve for feed water and permeate hose
- 5 Mains plug, cable length 1.8m
- 6 Concentrate outlet
- 7 Optionally: External contacts (INPUT), start/stop
- 8 Optionally: External contacts (OUTPUT), alarm output

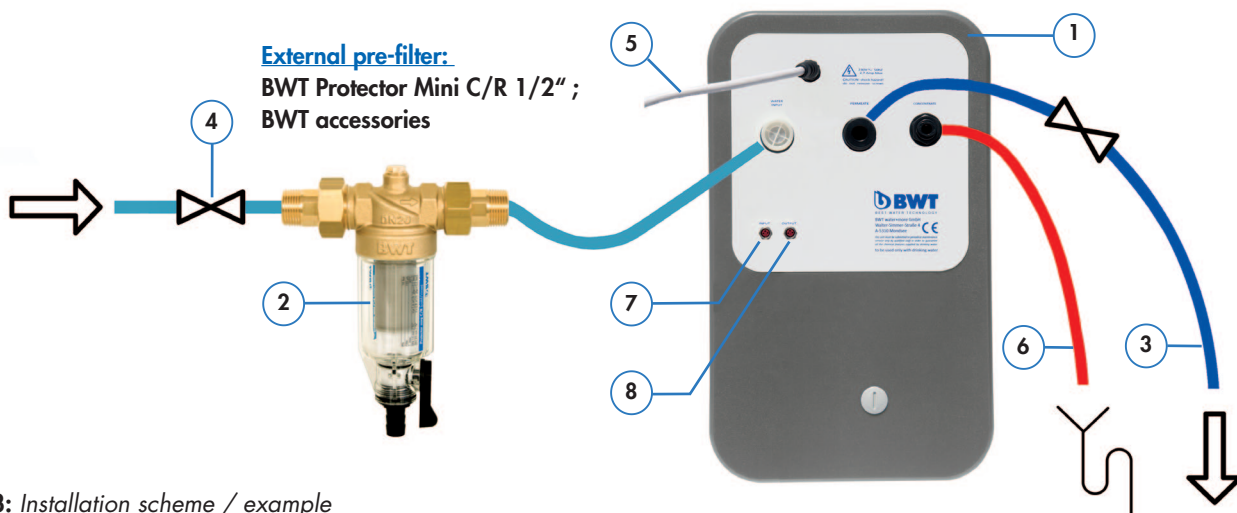


Fig. 3: Installation scheme / example

3.1 Quick operation guide

The BWT bestaqua 22,24,26 HQ devices could be controlled and parameterised with the control unit. The display of the RO unit shows after the starting phase all currently measured operating values.

3.2 Function keys and display elements

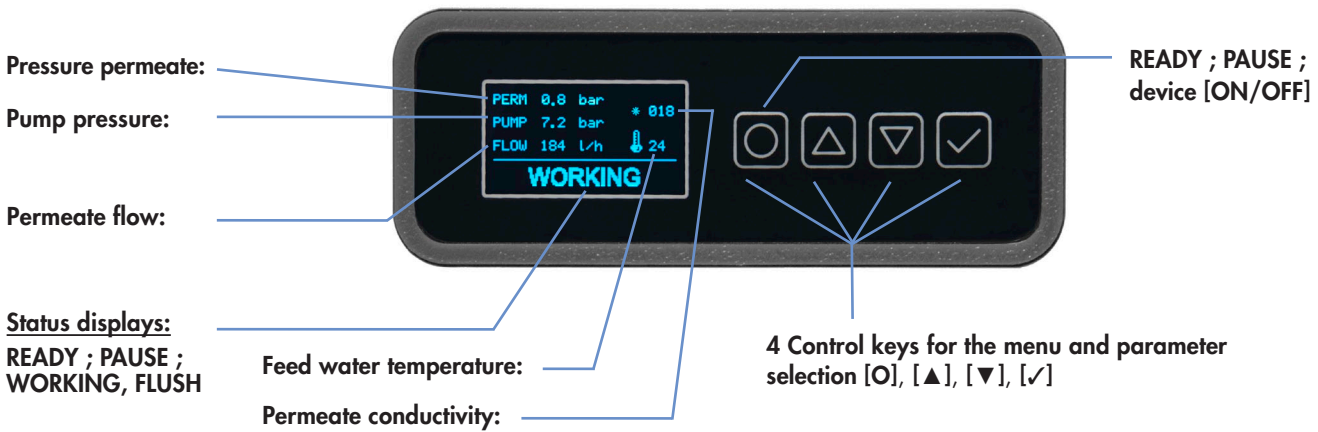


Fig. 4: Display: with activated detail menu



By pressing the **[ON/OFF] button** the device switches from **Ready** to **Pause** or **ON/OFF**.



[▲] (Arrow up) button Scrolls through the menu pages **upward** or increases the value of the parameter presently shown on the display.



[▼] (Arrow down) button Scrolls through the menu pages **downward** or decreases the value of the parameter presently shown on the display.



[✓] Confirmation button Confirmation of the parameter presently shown on the display and performs partially (analogy to each of the units mode) a reset in case of alarms and/or failures.

General status:

µS/ppm: When the RO unit is in production, the value of **conductivity** in » **µS** « or **TDS** in » **ppm** « can be shown, with the activation of the detail screen by tapping the arrow keys.

ready: **“READY”** for a new consumption demand. In the online mode the unit starts automatically when the permeate pressure falls below the presetted starting pressure.

pause: RO unit stops the permeate production.
Observe: The unit doesn't start in case of a new emerging permeate demand.

Only in the mode **“PAUSE”** is your RO unit programmable.

working: RO unit is in production ... **“WORKING”**.
By pressing the **[ON/OFF] button** the production is interrupted and the **“PAUSE”** message appears, by a repeated pressing the production start again.

flush: The RO unit rinses ... **“FLUSH”** and switches after that automatically to the operating step **“READY”**.


Optionally available, Item no. 824047:

“EXT. PAUSE”: The RO unit can be equipped with the additional *I/O installation kit*, started and stopped due to the triggering of an external NO potential free signal.

3.3 Switching the device ON and OFF

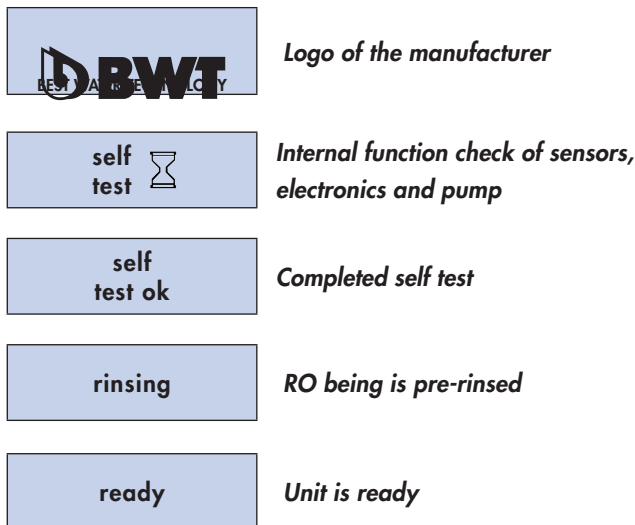
Switching the device ON:

To activate the device, it has to be correctly connected to the power- and water supply.


 The device is activated by pressing the [ON/OFF] button and starts immediately (approx. 2sec) if an permeate demand is detected (thereby pressure dependent).

Subsequently the **autotest mode** starts and the device is routinely checked, rinsed and filled with feed water.

Automatic start sequence of device:



3.4 Menu display of the activated system

 **Note:** In the operating mode "working/WORKING" starts and stops the unit in accordance with the request signal (min./max. permeate pressure) or the optional remote ON / OFF. The units display indicates the operating status "working":

⇨ Press the arrow keys to call up the detailed overview screen.

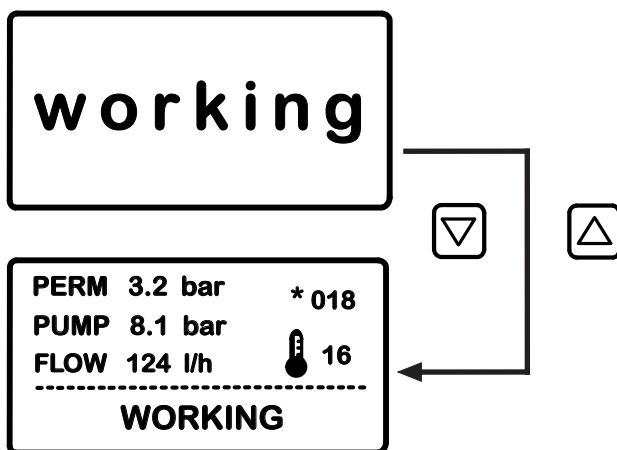




Fig. 5: The display is in operating status "WORKING", the stop pressure (signal) has not been reached yet.


Interrupting the production:

 **Brief pressing** of the [ON/OFF] button, the device switches to "PAUSE". The device restarts after pressing the [O] button and is immediately available for operation.


Switching the unit OFF (only possible during operation):

 For a complete deactivation of the device please press the [ON/OFF] button for about 2s.

Switching on again of the unit:

 By pressing the [ON / OFF] button for about (2s), the device starts the automatic start sequence as it is immediately into the production mode (see **part 3.3**).

Comments on the display:

 **Note:** The display switches OFF after about 120s. Just before stand-by switching into the black display the following text is shown: "DISPLAY OFF". A brief pressing of any key re-activates the display.

PAUSE / "Offline mode":

In the pause status, the unit is programmable, but doesn't switch into production (no processing of inlet pressure- signals / or optional remote-controlled ON-OFF signals). The units control display shows the operating status "pause".

⇨ Press the arrow keys to call up the detailed overview screen.

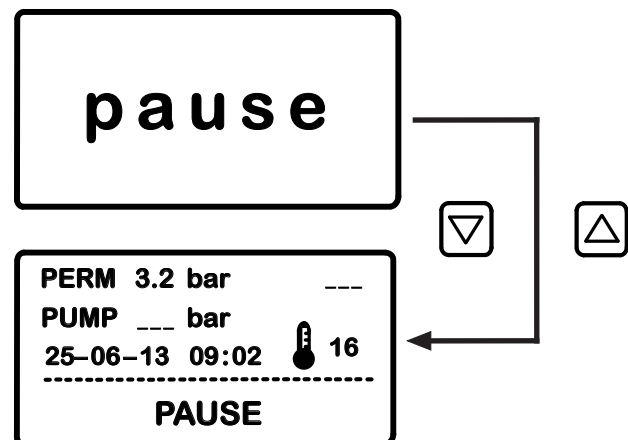


Fig. 6: Display shows "PAUSE" and the RO unit is therefore programmable.

FLUSH / flushing process step after stop:

In the operating status **"flush/FLUSH"** start the flushing procedure of the RO membranes with permeate run after each stop. The units control display shows the operating status **"flush"**.

READY to start (waiting of the start signal):

With the display of the operating status **"ready/READY"** the RO unit indicates that it is permanently able for operation, but need a signal of a permeate demand to start the production within the status **"working"**. The display shows the operating status **"ready"**:

⇒ Press the arrow keys to call up the detailed overview screen.

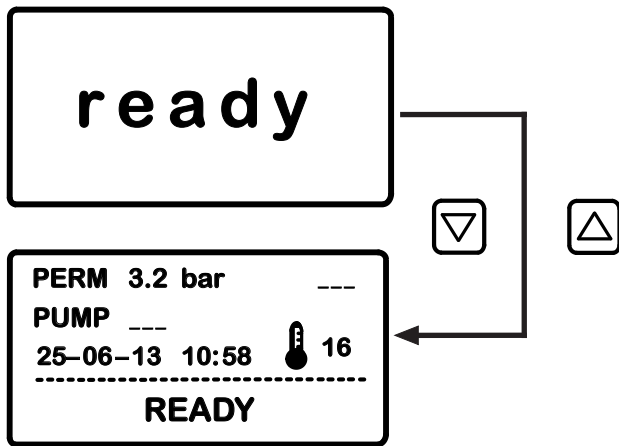


Fig. 8: Display shows the status **"READY"** and is operational.

3.5 Setting of the water quality with the blending valve

By using the integrated blending valve it is possible to increase the permeate conductivity with the partly mixing of feed water. An blending is required, depending on end usage. The adjusting screw (S) is located inside the unit, see Fig. 9. The setting can be changed with a flat screwdriver. The needed conductivity value (setpoint) can be read out on the display.

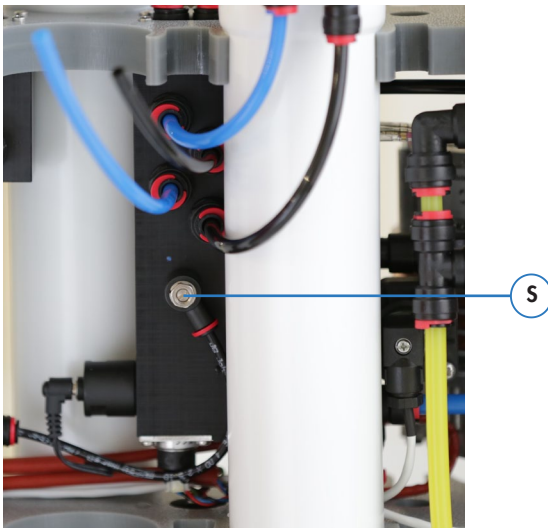


Fig. 9: Adjusting screw (S) for defined blending

EXT. PAUSE / (remote pause in OPTION):

When the RO unit displays **"remote pause/EXT. PAUSE"** the RO unit is interlocked by the external control. The external remote controller detects no incoming signal of a permeate demand (of an NO-level switch). In this case no production can take place and the operating status **"remote pause"** is shown on the RO display.

⇒ Press the arrow keys to call up the detailed overview screen.

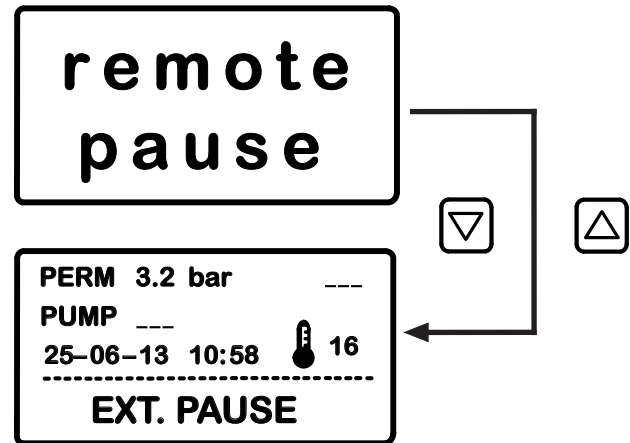


Fig. 9: The display shows **"EXT. PAUSE"** and is remotely controlled of an external device control.

3.6 Option: External I/O installation kit

All RO alarms can be transferred as an common alarm to an external control. The optional **"external Input and Output kit"** enables the use of the potential-free NO contact to activate the remote On-/Off switching of the RO units installable alarm output.

The **external I/O kit** is upgradable as an additional install option.

External I/O installation KIT Order no.: 824047

3.7 Device settings/visualisation

Note: All of the programmable settings described in Part 3.7 can only be accessed and activated in the "PAUSE" mode.

Visualisation of the menu screens/displays:

Note: The illustrations in the software schemes serve for a better overview and are subsequently described. In each menu screen the **blue light bar** highlights the **current active menu item** or **value set**.

AUTO RINSE	ACTIVE
SERVICE	INACTIVE
FLUSH TIME	INACTIVE
SETUP	INACTIVE
EXIT	

3.8 Main menu

The menu consists of 4 selectable menu items in which the subsequent settings may be effected:

AUTO RINSE:

- Mode for automatic flushing.

SERVICE:

- Settings of setpoint- and limit values for service purpose.

FLUSH TIME:

- Setting of flush time after the completion of permeate production

SETUP:

- General device settings (date, time, language, limit values, operating mode).

The recommended target values of all settings are documented in the form "Form for set values of BWT bestaqua 22,24,26 HQ" (see Part 7.1).

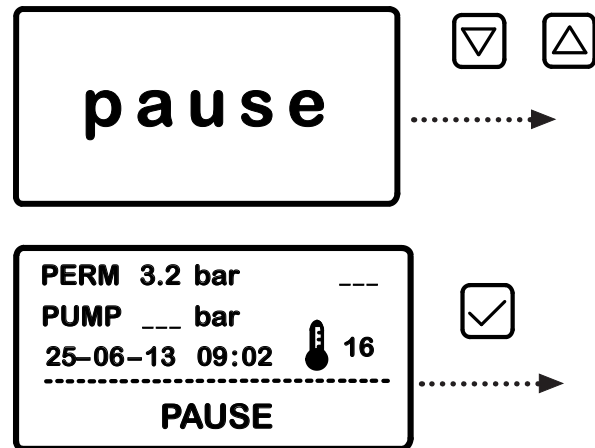
Document the parameters after you have set all of the data at the device.

Please use the template at the end of the operating instructions.

3.8.1 Menu: SETUP

General settings:

Note: The change in the programming menu is available from both the main screen "pause" as well as from the detail overview display "PAUSE".



⇒ Confirm with the [✓] button to shift into the programming menu.

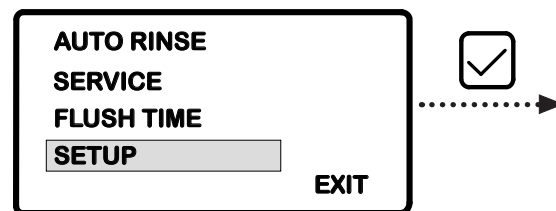


Fig. 10: Main selection menu: "SETUP"

The "SETUP" selection menu appears:

⇒ The menu item "DATE" is active.

DATE / TIME	Date ; time
CONDUCTIVITY / TDS	Conductivity value / TDS (ppm)
OPERATION MODE	Pressure tank operation: Yes/No
LANGUAGE	Setting of the menu language
BACK	Quit menu and return to selection menu

Fig. 11: Display of the activated "SETUP" menu.

Perform the general settings of the "SETUP" selection menu in accordance to: Fig. 12, Fig. 13, Fig. 14.

The description of the parameter setting "FLUSH TIME" is given at Fig. 14.

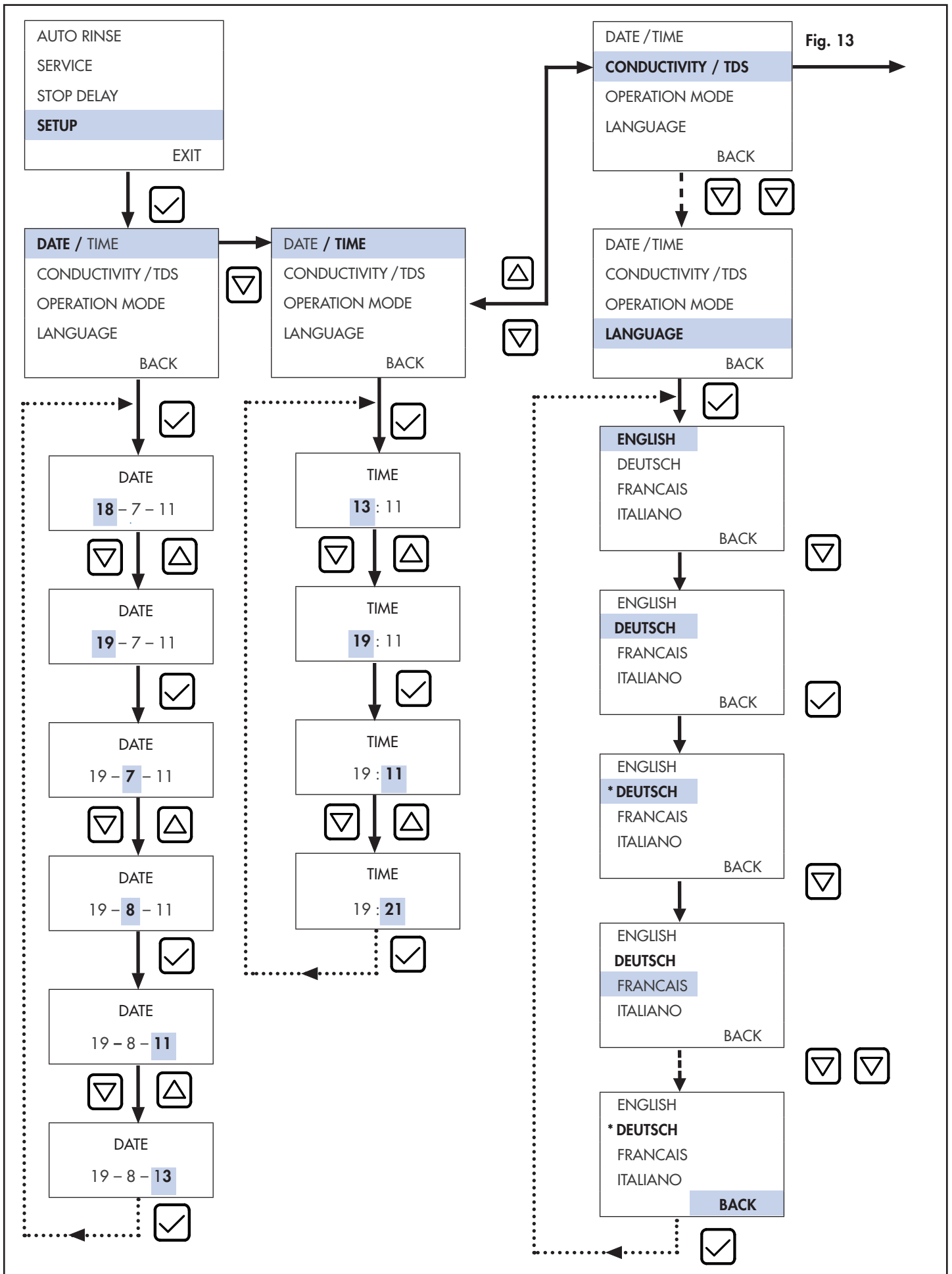


Fig. 12: Programming procedure: "SETUP" – Example scheme

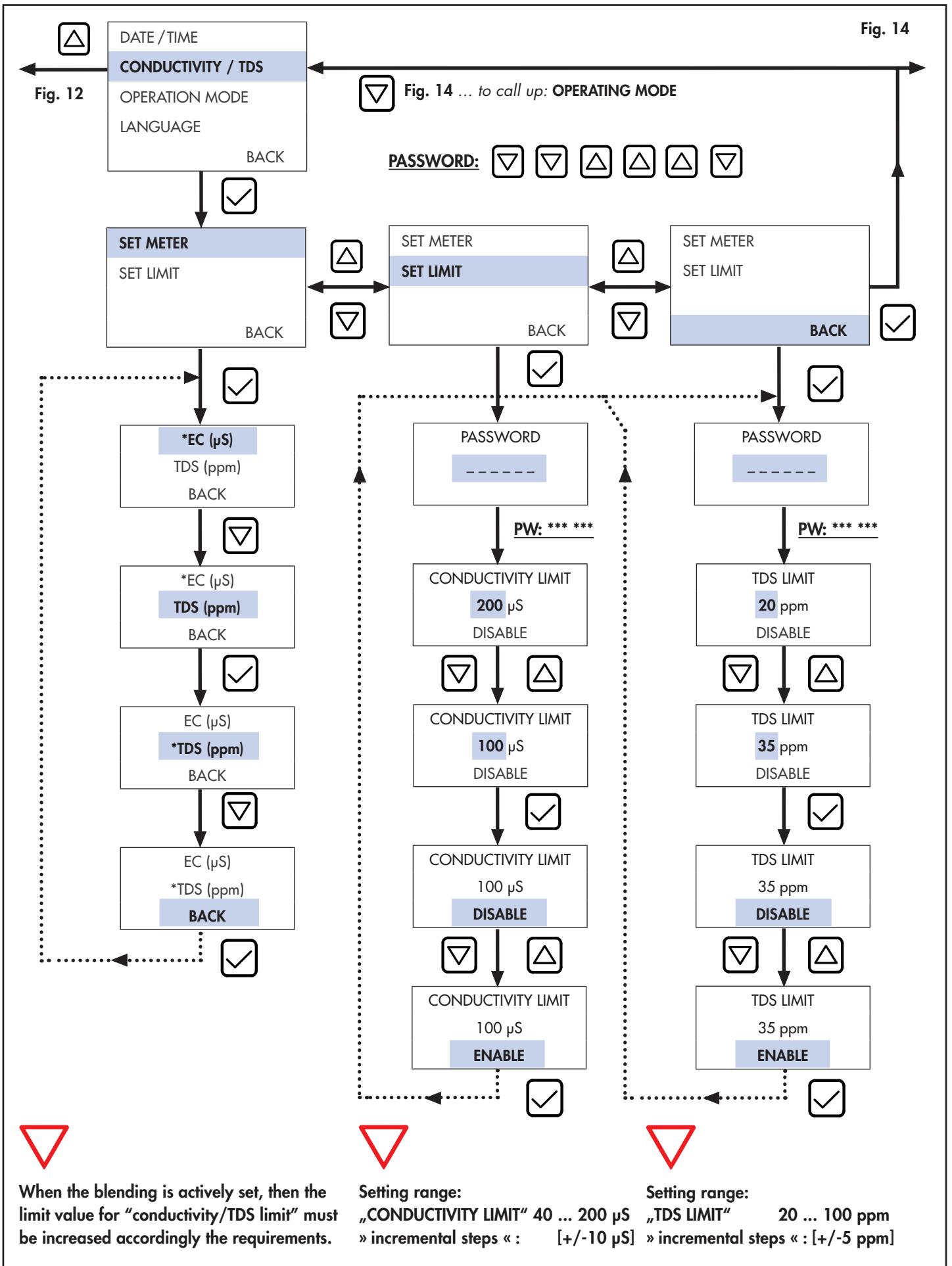


Fig. 13: Programming procedure: CONDUCTIVITY / TDS (Electric conductivity value/Total Dissolved Solids)

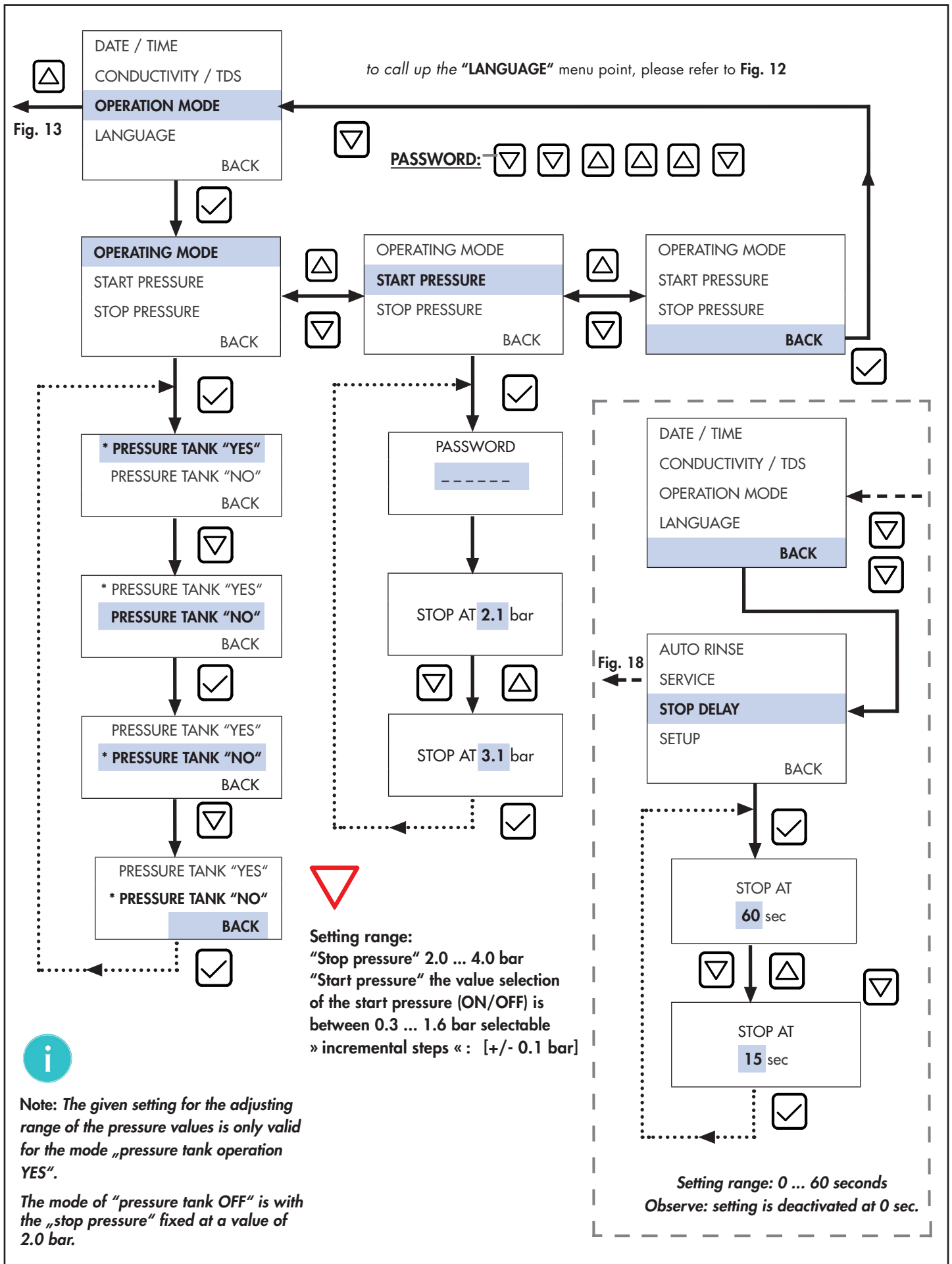


Fig. 14: Programming procedure: "OPERATION MODE", "STOP PRESSURE" and "FLUSH TIME" – Example scheme

3.8.2 Menu: SERVICE

• **Settings of SERVICE parameter:**

⇒ Press the arrow keys to call up the menu screen.

⇒ The main selection menu appears with "SERVICE" being activated.

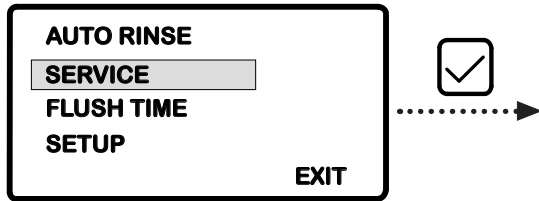


Fig. 15: Main selection menu: "SERVICE"

1. Menu level (selection menu "SERVICE ")

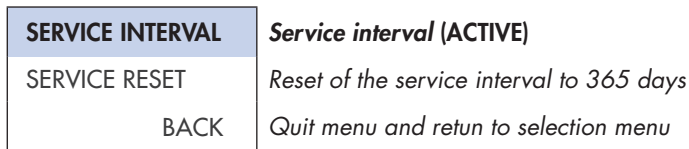


Fig. 15a: Menu Level 1: "SERVICE"

Perform the settings of the "SERVICE INTERVAL" selection menu in accordance with Fig. 16.

PASSWORD ENTRY:

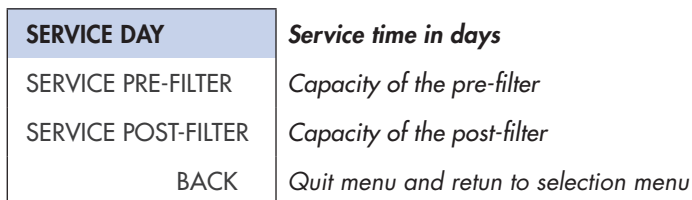


Fig. 15b: Menu Level 2: "SERVICE settings"



Note: The menu "SERVICE INTERVAL" is secured by a password. Please contact the BWT service, in case of a change of the system settings.

The current servicecounter of the service interval " *** days " is accessible via the mode "ready" by pressing the [✓] button.



With a present counter value of "0 days" the message: "SERVICE IN:" and an audible signal appears, to remember the user of the next maintenance.



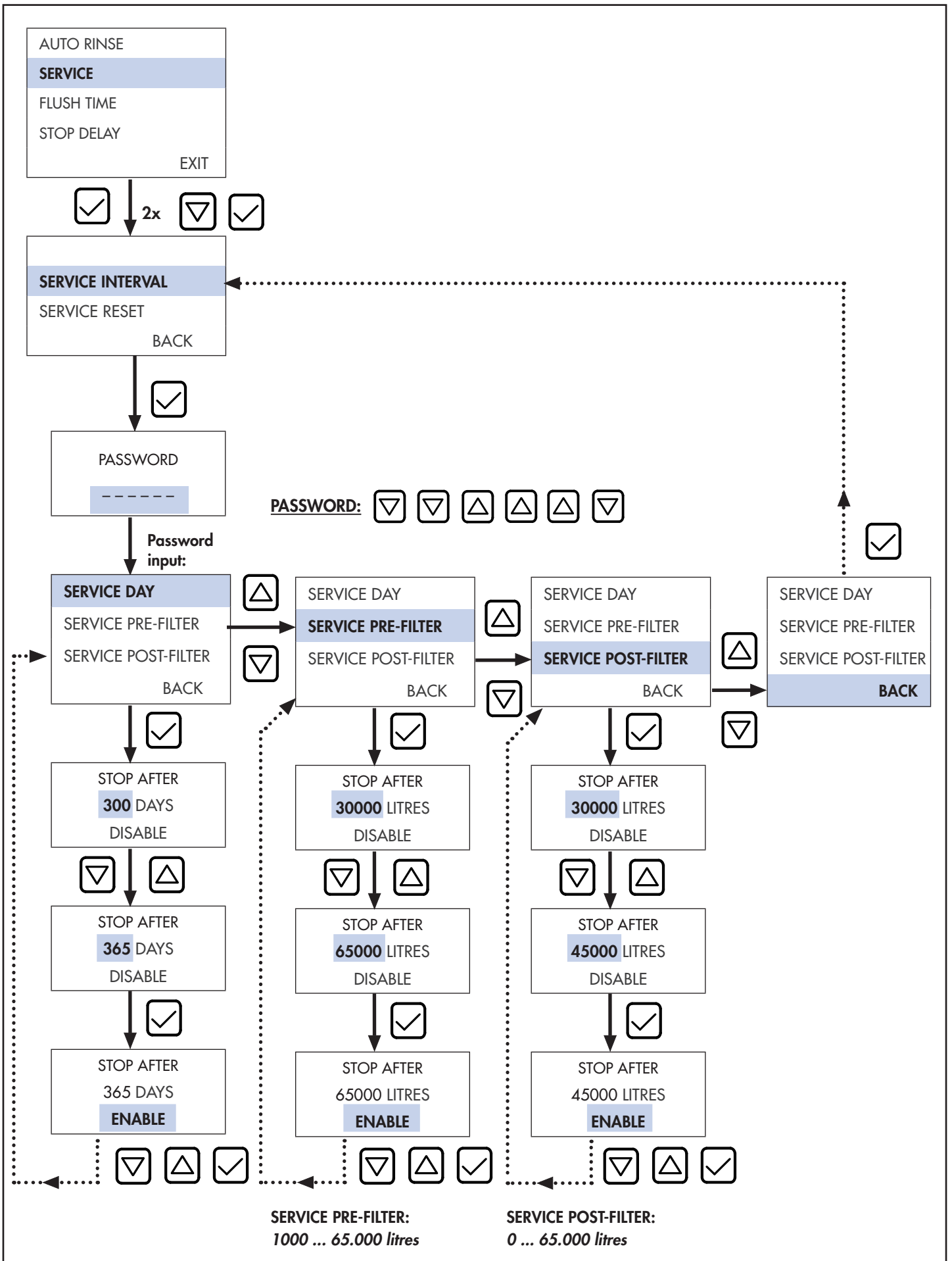
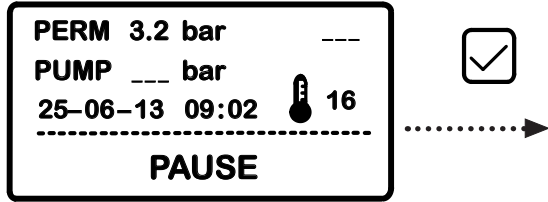


Fig. 16: Programming procedure: "SERVICE INTERVALL" – Example scheme

3.8.3 Menu: AUTO RINSE

⇒ Press the arrow keys to call up the detailed overview screen.

⇒ Select the detail item "PAUSE" and confirm with [✓] button to shift into the programming menu.



⇒ The unit is in the selection menu at the menu item "RINSE".

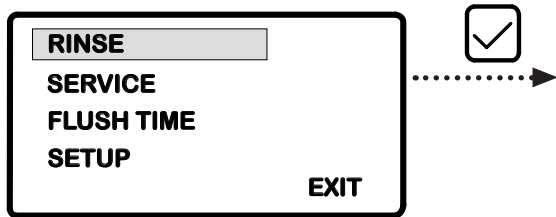


Fig. 17: Main selection menu: "RINSE"

The following operational parameters may be set in the "RINSE" selection menu Fig. 18:

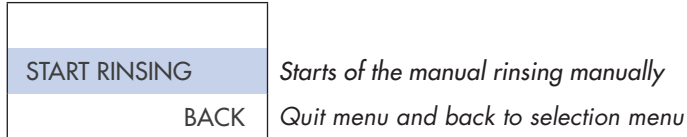


Fig. 18: Menu Level 1: "RINSE"

Automatic rinsing:

If the device is in READY mode, than it flush every 3 hours.

Manual rinsing:

ATTENTION: The manual flushing begins immediately (analogue of internal time set).

The RO unit begins the rinsing immediately after the selection "START RINSING". The hygienic flushing reduces the risks of downtime contamination.

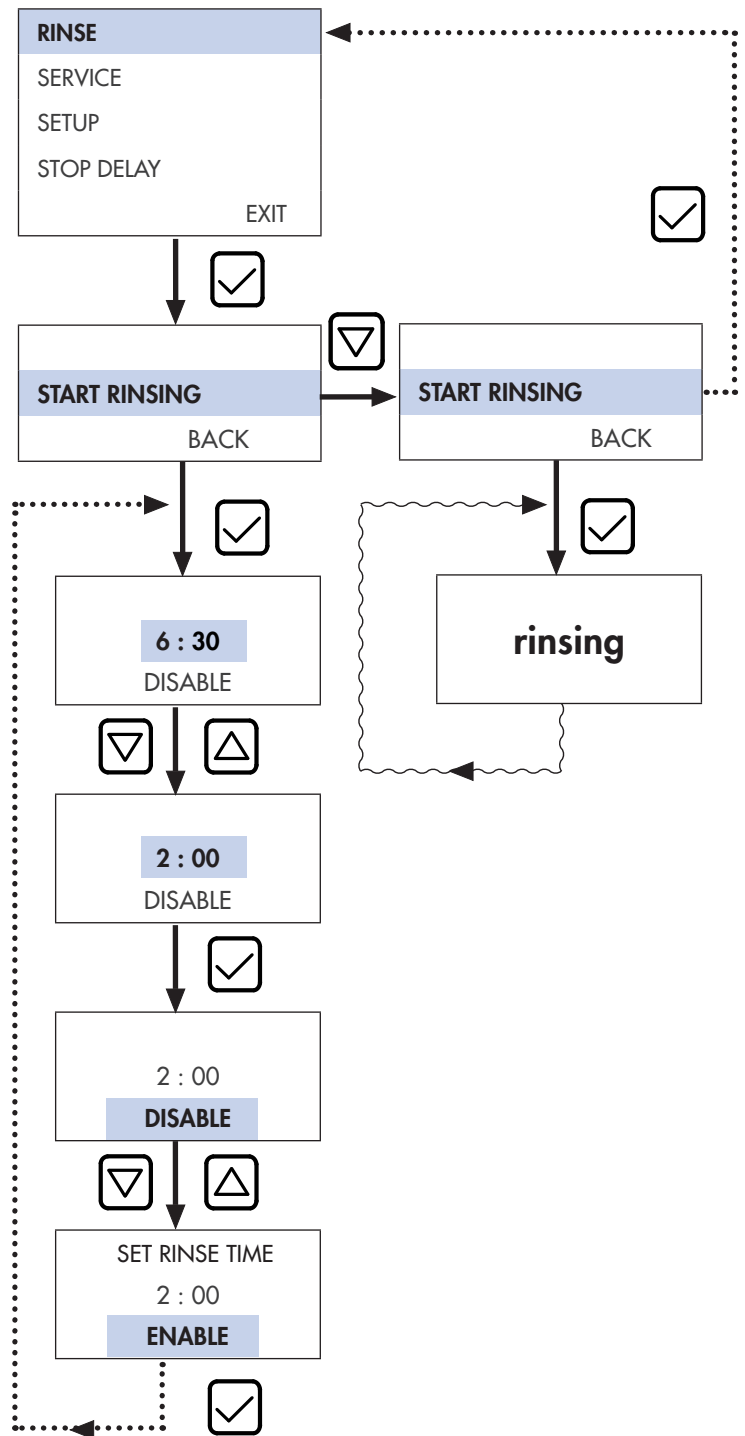



Fig. 19: Programming procedure: "RINSE"


4.1 Overview of the Status- and Alarm LED

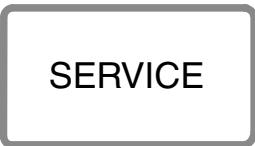

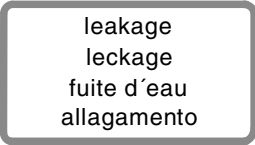
Status and alarm:	LED colour / indication:	Description of the unit status:
<i>ready/READY</i>	● green / flashing	Ready for new permeate demand
<i>working/WORKING (production)</i>	● green / lights up	Unit produces permeate (pure water)
<i>flush/FLUSH (rinsing)</i>	● green / lights up	Rinsing
PAUSE/ EXT. PAUSE	● green / flashing	Unit are in the PAUSE mode
<i>External pause (Option)</i>	● green / flashing	PAUSE mode via an external control (installation option)
<i>Service (maintenance)</i>	● red / lights up	RO requires service, please contact customer service
Alarm	● red / lights up	Indication of a failure event
<i>Unit OFF (without current)</i>	○ Off ...	Unit is off-line

Reset of alarms by the customer:


 **Observe:** In any case of a failure with a permanently red lightning LED, the operator must check the RO unit and if necessary switch it off (unplug the mains plug) and have to wait briefly (approx. 10s) before turning on the RO unit again.

4.2 Trouble shooting guide

 **Observe:** In case of a failure of the unit will read out an error code on the display. Please read each given error code text and resolve them with the descriptions from the following list.

Alarm / malfunction list:	Possible reasons:	Acknowledgement:
 <p>1: "SERVICE"</p>	<ul style="list-style-type: none"> • Carrying out service work 	<ul style="list-style-type: none"> ⇒ Call SERVICE team ⇒ Repair defect parts
 <p>2: "Water shortage"</p>	<ul style="list-style-type: none"> • No water supply due to closed shut-off valves or other closings at the inlet • Technical defect • Pre-filter is blocked • Technical defect 	<ul style="list-style-type: none"> ⇒ Check the shut-off valves and open it if necessary check the water supply (2-4 bar) ⇒ Check the filter and replace if necessary. ⇒ Observe the operating instructions of the external pre-filter. ⇒ Unplug the mains plug and connect the mains plug after 5 seconds. ⇒ Call SERVICE team
 <p>3: "leakage" (continuous warning sound)</p>	<ul style="list-style-type: none"> • Water leaks from the device 	<ul style="list-style-type: none"> ⇒ Separate the unit from the power-supply and the water network ⇒ Call SERVICE team

4.2 Trouble shooting guide

 **Please observe:** If your reverse osmosis is not performing as it should, please run through the **alarm messages** below. In the event of a fault, repair work may only be carried out by an expert (SERVICE technician).



Alarm / malfunction list:	Possible reasons:	Acknowledgement:
<div style="border: 1px solid black; padding: 10px; text-align: center; width: fit-content; margin: 0 auto;">FAULT 1</div> <p>4: "FAULT 1: Pump defective"</p>	<ul style="list-style-type: none"> • Pump doesn't start 	<p>⇒ Call SERVICE team</p>
<div style="border: 1px solid black; padding: 10px; text-align: center; width: fit-content; margin: 0 auto;">FAULT 2</div> <p>5: "FAULT 2: Pump defective"</p>	<ul style="list-style-type: none"> • Pump doesn't start 	<p>⇒ Call SERVICE team ⇒ Replacement of pump motor</p>
<div style="border: 1px solid black; padding: 10px; text-align: center; width: fit-content; margin: 0 auto;">FAULT 3</div> <p>6: "FAULT 3: Pressure sensor permeate"</p>	<ul style="list-style-type: none"> • The pumps pressure sensor is defective 	<p>⇒ Call SERVICE team</p>
<div style="border: 1px solid black; padding: 10px; text-align: center; width: fit-content; margin: 0 auto;">FAULT 4</div> <p>7: "FAULT 4: Pressure sensor pump"</p>	<ul style="list-style-type: none"> • Pressure sensor defective • Cable connection defective or improper (wire rupture) 	<p>⇒ Call SERVICE team ⇒ Replacement of pressure sensor</p>
<div style="border: 1px solid black; padding: 10px; text-align: center; width: fit-content; margin: 0 auto;">FAULT 5</div> <p>8: "FAULT 5: Temperature sensor"</p>	<ul style="list-style-type: none"> • Temperature sensor defective 	<p>⇒ Call SERVICE team ⇒ Replacement of temperature sensor</p>
<div style="border: 1px solid black; padding: 10px; text-align: center; width: fit-content; margin: 0 auto;">CONDUCTIVITY/TDS > LIMIT</div> <p>9: "FAULT 6: CONDUCTIVITY is too high > xx µS/cm"</p>	<ul style="list-style-type: none"> • Presetted alarm limit has been exceeded • Fluctuating feed water quality • High water temperatures • RO membranes defective 	<p>⇒ Check of alarm limit value - Check of alarm limit value - If water bleeding was activated either increase the limit value of conductivity or shut down the blending. ⇒ Please check the pre-treatment of the feed water. ⇒ Replacement of the RO membranes ⇒ Call SERVICE team</p>

5.1 Maintenance and wearing parts

You have purchased a product that is durable and easy to service. However, all technical equipment requires regular servicing in order to guarantee optimal functionality.

If the product malfunctions during the warranty period, contact your contract partner, the installation company, and quote the unit type and serial number (see technical specifications or the type plate on the unit).

Please exchange the wearing parts in the specified maintenance intervals:

-  **Please observe!**
 - In order to safeguard unobjectionable functioning and optimum water quality, **maintenance** is to be performed at **regular intervals** by our authorized service technicians, **at least however, once a year**.
-  **✓ Consider as well the instruction manual of the external installed pre-filter.**
 - ✓ Prior to working on electric components and a opened housing, **ensure carefully that the device is deactivated and without feed water flow also the mains plug must be unplugged to ensure zero potential.**
 - ✓ **Any maintenance work should include a check of the unit of the connecting lines.**



Note: The replacement of the wearing parts must be effected by **authorized compartment staff**.

Exchange of wearing parts:

Maintenance work:

- ✓ General visual inspection
- ✓ Check of tightness
- ✓ Cleaning with a moist cloth
- ✓ Conductivity (value displayed by RO)
- ✓ Pump pressure 7.6 to 8.4 bar

We recommend adjusting the pump pressure in each operating mode set to approx 8.1 bar!

- Conductivity (value of measuring device)
- Exchange of the external pre-filter insert (Protector Mini [Option])
- Exchange RO membrane elements
- Water hardness test

Responsible:

Customer
Customer
Customer
Customer

Customer
Customer, service

Customer, service
Service
Service

Recommended maintenance interval:

Weekly
Weekly
As required
Weekly

Weekly
At least, once a year
At least, 2 times a year
At least, once a year
At least, once a year

 **Please observe:** According to BGV A3 (VBG4), the electrical safety check is to be conducted every 4 years.

The BWT bestaqua 22,24,26 HQ devices have been designed in compliance with the "Pressure Equipment Directive" 97/23/EC of 29th May 2007. Therefore, it meets the requirements of Article 3, Section 3, and is consequently manufactured and assembled in accordance with applicable good engineering practice.

The BWT bestaqua 22,24,26 HQ devices do not receive a CE mark in accordance with Article 15 of Directive 97/23/EC. However, the attached EC declaration of incorporation is applicable.

5.2 Cleaning

Clean the reverse osmosis device only with a **moist cloth** and **mild detergents**.

Use cloths without any fibres!

For the protection of the surface of the device, **please do not use:** bleaches, solvents, alcohol.

5.4 Replacement of membrane element

In dependence of the feed water quality and the pre-treatment salts (predominantly limescale) can be deposited on the membrane and impair the performance (volume flow) of the membrane and the quality of the permeate.

If the permeate volume flow declines or the conductivity in the permeate rises, the membrane element has to be exchanged. **However, this is required latest after 12 months in any case.**

► **The exchange must be performed by an authorized service technician.**

Please record in case of a membrane exchange:

- ✓ 1. Date of membrane exchange:
- ✓ 2. Permeate L/H (display):
- ✓ 3. Permeate ($\mu\text{S}/\text{cm}$) (display):
- ✓ 4. Pump pressure max. 8 bar! (display):
- ✓ 5. Feed water temperature (display):
- ✓ 6. Feed water pressure (pressure gauge external):
- ✓ 7. Measurement of the input water hardness $^{\circ}\text{dH}$ (with hardness test set):

5.5 Disposal



Procedure:

The BWT bestaqua 22,24,26 HQ devices consists of various materials which need to be disposed of properly.



- ✓ Please order the manufacturer customer service by your contractor for and environmentally compliant disposal. Please do not throw used batteries into household waste.
- ✓ Disposal of any electrical parts should only be carried out at authorised WEEE recycling centres (EN 2002/96/EC). The respective local regulations for disposal of electronic devices have to be observed.

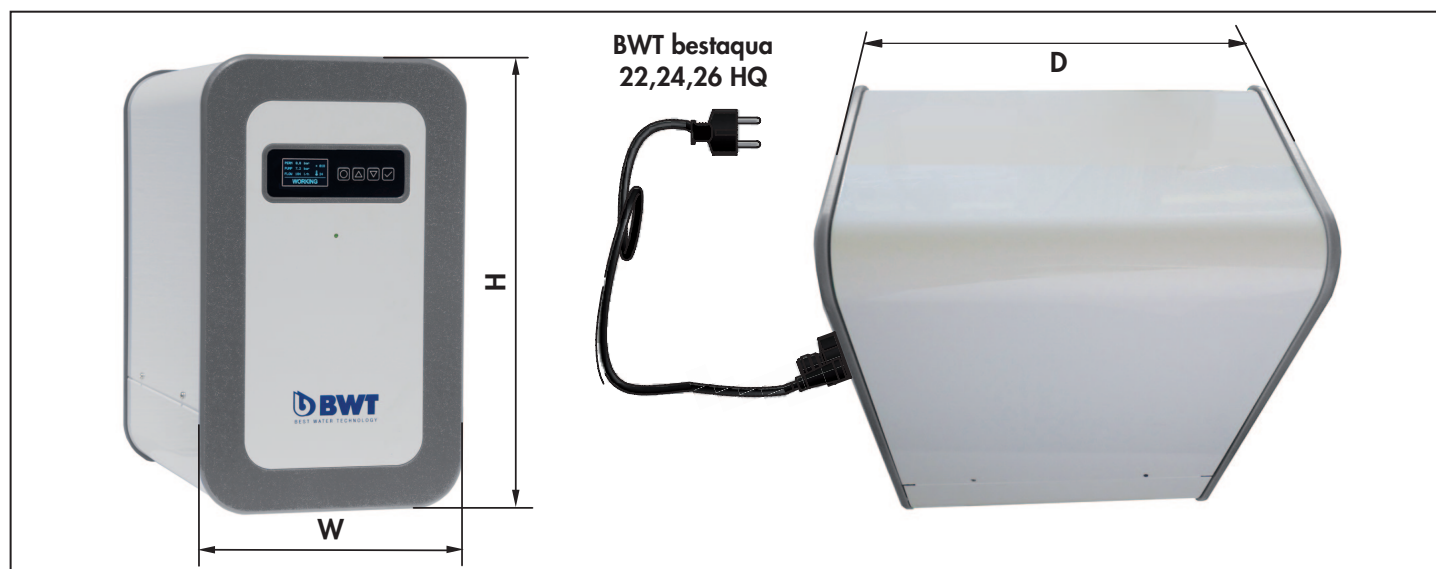
6.1 Technical data BWT bestaqua 22,24,26 HQ

Technical data BWT bestaqua 22,24,26 HQ				
BWT bestaqua (vertical)		22	24	26
Nominal capacity ^{*1)} (output flow rate)	l/h	60	120	180
Salt retention rate	%	> 95	> 95	> 95
Permeate output/yield (WCF) ^{*2)}	%	40 ... 60	40 ... 60	40 ... 60
Feed water flow (inlet)	l/h	≥ 100 ... 150	≥ 200 ... 400	≥ 267 ... 533
Concentrate flow (drain)	l/h	≥ 40 ... 90	≥ 80 ... 280	≥ 107 ... 373
Feed water pressure	bar	2.0 ... 6.0	2.0 ... 6.0	2.0 ... 6.0
Feed water, ambient temperature (min./max.)	°C	5 ... 30 / 5 ... 40	5 ... 30 / 5 ... 40	5 ... 30 / 5 ... 40
Iron and manganese (Fe+Mn)	mg/l	< 0.05	< 0.05	< 0.05
Silica (SiO ₂)	mg/l	< 15	< 15	< 15
Salt level, Total Dissolved Solids (TDS)	mg/l	< 500	< 500	< 500
Silt Density Index (SDI)	%/min	< 3	< 3	< 3
Oxidants	mg/l	< 0.05	< 0.05	< 0.05
Protection class	IP	54	54	54
Electrical connection / fuse protection	V/Hz/A	230 / 50 / 10	230 / 50 / 10	230 / 50 / 10
Electric power consumption (operation / standby)	W	375 / < 3	375 / < 3	475 / < 3
Type of valve		230VAC	230VAC	230VAC
Standard of connector (grounded PE mains plug)		Three-pin "CEE7"	Three-pin "CEE7"	Three-pin "CEE7"
Feed water, permeate, concentrate connection	inch/inch/mm	3/4" male thread / 3/4" male and 8 mm female		
Dimensions: Width, depth, height (W x D x H)	mm	230 x 250 x 380	230 x 335 x 380	230 x 425 x 380
Weight	kg	17	21	24
Order No. (BWT water + more GmbH / AT)		821020/RS61M01A00	821018/RS53M01A00	821019/RS54M01A00




Note: The nominal flow is calculated with following drinking water conditions:

- ^{*1)} During operation, the actual nominal flow rate may deviate slightly from the flow rate indicated in the table due to fluctuations of input water quality, the flow pressure, the water inlet temperature as well as permeate counter pressure (e.g.: with pressure tank operation or larger permeate delivery heights).
- ^{*2)} For normal operation the manufacturer recommends the inlet of softened feed water.
- ^{*3)} The RO unit is factory preset with a WCF by approx. 40%. With an appropriate water treatment it is ready for the use for higher permeate yields with the optional "high-efficiency WCF kit".
(Item no. 824039 for BWT bestaqua 22/24 HQ, Item no. 824040 for BWT bestaqua 26 HQ)



7.1 Form for set values of BWT bestaqua 22,24,26 HQ

 **Note:** Please copy a blank page of these form. Then fill out the following table at every initial and further installation and archive the data-sheet.

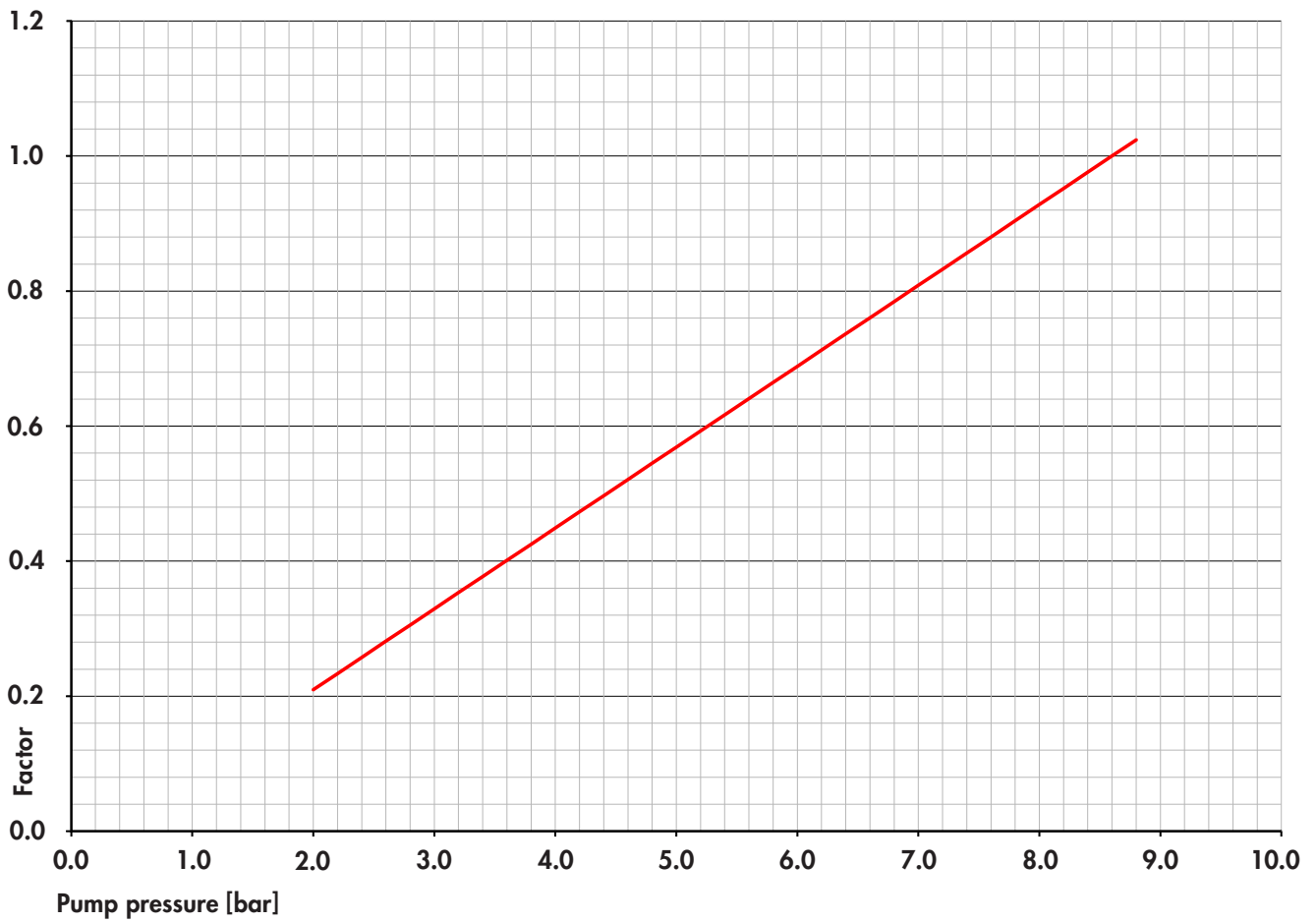
Date of installation: / /	Service technician:
Customer:		
Model / serial number:		

Observe: The settings 1-3 may be changed by the customer & the settings 4-9 only by an authorized service technician.

Parameter:	Value set at installation:	Description:
DATE:	[Day / month / year]	Current date
TIME:	[Hours : minutes]	Current time
LANGUAGE:	<i>Language selection</i>	<i>Active language: English</i>
Start- / stop pressure setting: (PRESSURE TANK OPERATION)	bar	Pressure tank „YES“: switch-off point 2-4 bar; Switch 0.3-1.6 bar and below the switch-off point; Pressure tank „NO“: with switch-off point 2 bar
STOP PRESSURE:	bar	Online: P _{max} = 4.0 bar, Offline: P _{max} = 2.0 bar
Membrane flushing (FLUSH TIME):	Seconds	0 ... 60s (default setting 15s)
CONDUCTIVITY LIMIT:	µS/cm	Default setting: 200 µS/cm
CONDUCTIVITY ALARM:	Deactivated / <u>ENABLE</u>	Default setting: "ENABLE"
<u>MAX PUMP PRESSURE:</u>	<i>internal: 8 ... 13 bar</i>	<i>Default setting: 9 bar</i>
Setting of blending	e.g.: steamer 70µS	Factory setting: no blending
Actual software version:	FOR BWT SERVICE	Only for BWT Service technicians

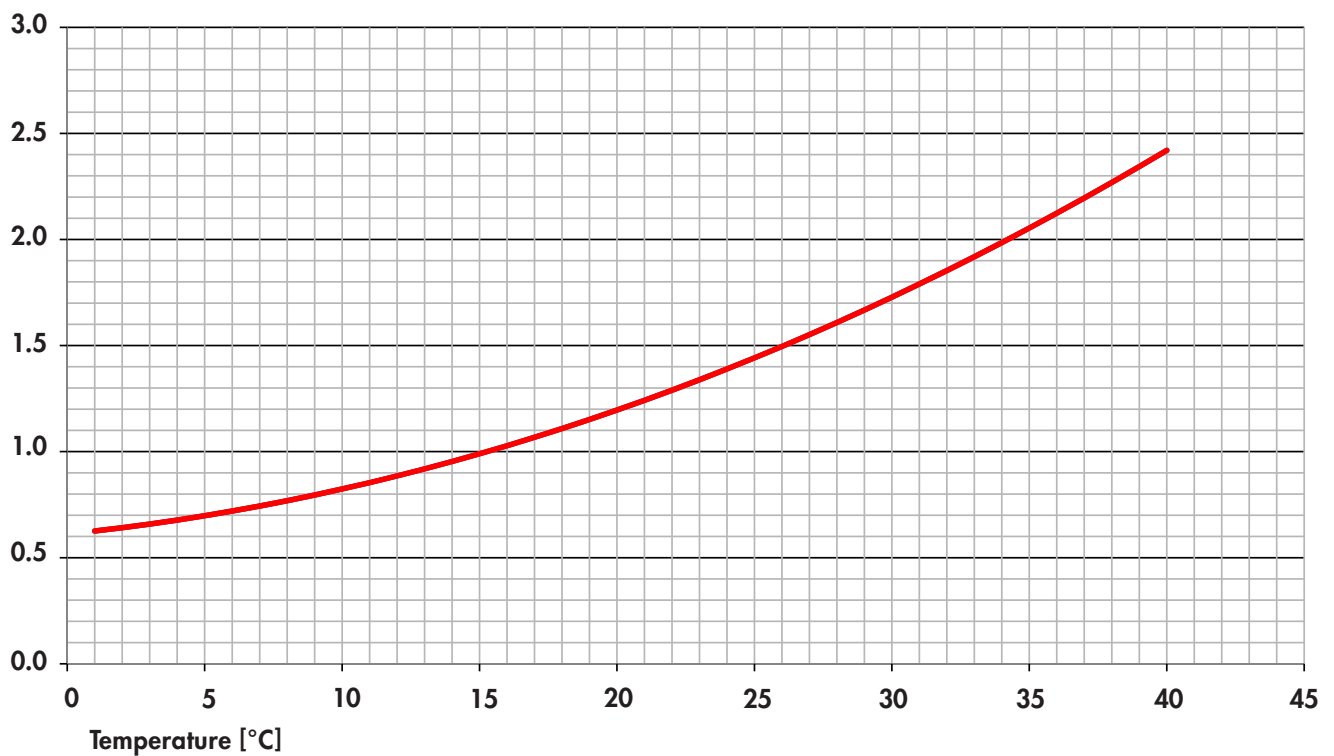
6.2 Diagrams with characteristic curves

Power depending on the pump pressure



Factor

Permeate temperature dependence



CE Declaration of conformity

EG Konformitätserklärung / Certificat de conformité CE

The company **BWT water + more GmbH** declares, that the **reverse osmosis device** with the following specifications:

Trade name of product:	Model:	Order No.
• BWT bestaqua	22 HQ	821020
• BWT bestaqua	24 HQ	821018
• BWT bestaqua	26 HQ	821019

with a **serial number higher than:** see rating plate & technical specifications

and with a order No.: see rating plate & technical specifications

have been **designed, manufactured** and **assembled** according to the following **EC Directives (guidelines):**

2004/108/EC Guideline for electromagnetic compatibility (EMC)

2006/95/EC "Low Voltage Directive" 2006/95/EC

the following harmonised guidelines were applied:

EN 61000-6-1, EN 61000-6-3, EN 60335

The following national guidelines were applied:

- **ÖVGW** Guideline for drinking water hygiene, scope of law in Austria
- **DVGW** Guideline for drinking water hygiene, scope of law in in Germany

Manufacturer: BWT water + more GmbH, Walter-Simmer-Straße 4,
A-5310 Mondsee, Phone: + 43 (0) 6232 5011 - 0

Mondsee, February 2015
Place, date / Ort, Datum / Lieu, date



Dr. Monique Bissen

Head of R&D Austria
Leitung F&E Österreich / Direction R&D Autriche

BWT – The Company

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Händlerstempel (DE)

 **BWT**

water + more