Wagner & Co

RATIO HP Buffer Cylinder

Figure 1 Sectional view of the RATIO HP buffer cylinder.

Content

1. General Safety Information

The following safety information is intended to protect you from hazards and dangers that may suddenly occur when the device is handled incorrectly, either deliberately or unknowingly. We differentiate between general safety information, explained on this page, and special safety information, which is mentioned throughout the text of this manual.

1.1 Operator Qualifications

All tasks and activities involving transport, installation, as well as operation and servicing must be performed by qualified technical personnel. We do not assume responsibility or liability for damages resulting from noncompliance with these instructions. Warranty is only valid when the correct installation is certified by an expert.

1.2 Intended Use

Function

The RATIO H buffer cylinder is designed for the following applications:

- Storing of heating water (diffusion tightness of the heating circuits must be ensured).
- Solar heating of heating water via an integrated smooth pipe heat exchanger (only with buffer cylinder types HP G).
- Connection of an electrical immersion heater for electrical heating of the auxiliary heating volume.
- Heating potable water in conjunction with the RATIO-fresh freshwater station.

Application Limits

Due to its design, the RATIO buffer cylinder is not suitable for the storage and heating of potable water.
Please note that the buffer cylinder must not be installed outside and operated only under the permissible environmental and operating conditions (cf. Technical Data, chapter 2).
The buffer cylinder must be filled only with water and must be protected from pressures exceeding 3 bar with a safety valve.
The heat exchanger installed in some models is suitable for operating with solar fluid.

1.3 Standards and Guidelines

- EC Declaration of Conformity
  This solar buffer cylinder was designed and manufactured in accordance with existing laws and regulations of the EU countries.
- Please take care, that the connection to the drinking water supply and the heating system is performed in compliance with local regulations and guidelines and the specifications of your water utility or provider.
- Please also make sure that the electric connection is in accordance to local regulations and specifications of you electroc utility company. The functionality of the safety valve must be checked regularly by lifting up as outlined for example in DIN 4753. The exhaust vent must never be closed or restricted.
- When installing an auxiliary heater, please comply with the information of the device manufacturer as well.

Please make sure to note the relevant national and international standards, such as e.g.:

- EN V 12977-3: Thermal solar installations and components – Part 3: Efficiency tests of storage tanks for solar heating systems.
- DIN 4753: Water heater and water heating systems for potable and operating water.
- DIN 1988: Technical rules for installing potable water systems.
- DVGW 551/552: Potable water heating and conduits: Technical measure to reduce Legionella bacteria growth.

1.4 Signs and Symbols

The following symbols are used throughout this instruction manual. They relate to specific safety information and important additional information. Please observe their meaning.

DANGER – Injuries Possible
The following may occur during assembly or installation: hazardous electrical shock, scalding, bruising/contusions, and other adverse health effects. Please comply with the instructions marked with this symbol in the documentation.

CAUTION –Property Damage Possible
This symbol indicates hazards that may result in damage to components or a significant reduction of the functionality of the system. Please follow the described assembly steps and comply with the sequence of these steps.

NOTE – Additional Information
This symbol indicates useful notes, tips to make work easier, and other information that may help you with the installation or operation

2. Technical Information

2.1 Technical Data

The technical data and sectional drawing and dimensions are depicted in the technical information „RATIO-HP Buffer Cylinder," File No. 11204300.

2.2 Delivery Scope

The buffer cylinder is delivered upright and screwed to a pallet. It is wrapped in foil or bubble wrap to protect it from moisture and impact.
All types are delivered in two pieces: the container (tank) on the pallet and the insulation in a box.
Before assembly, please compare the delivered components with the parts list in Table 1.

Component	Quantity
Wooden pallet 800 x 800 mm (1000 x 1000,1500l)	1 piece
Buffer cylinder, screwed onto pallet	1 piece
Plug OT 1 1/2", galv. steel, used to plug the immersion heater connection socket	1 piece
Tank insulation, consisting of PS lid, circular soft foam disk, two-piece circular floor insulation disk, and soft foam jacket with hook closure strip and PS jacket in two sections	1 piece each
Total weight (with/without heat exchanger, kg) RATIO HP 500, HP 500 G RATIO HP 800, HP 800 G RATIO HP 1000, HP 1000 G RATIO HP 1500, HP 1500 G	 appr. 104 / 144 appr. 130 / 190 appr. 144 / 205 appr. 200 / 270
Foam plugs for the subsequent insulation of unused buffer cylinder connections	9 pieces

Table 1 Delivery scope of the RATIO HP buffer buffer cylinder (parts list).

2.3 Accessories

The optional accessories are listed in the technical information „RATIO-HP Buffer Cylinder," File No. 11204300.

2.4 Materials Needed On-Site

The following items are required on-site for a complete installation and initial startup of the RATIO buffer cylinder:
- Two ½" KFE cocks for filling/emptying.
- The required installation materials.

The water conducting connections of the RATIO cylinder are equipped with flat sealing connections. Please use only the original soft flat gaskets included with our buffer cylinder connection kits as these are specifically tested for this type of application.

2.5 System Solutions

Different system solutions with connection layout are documented in the technical information „RATIO-HP Buffer Cylinder," File No. 1120. This includes the following:
- with a RATIOfresh freshwater station,
- with a solar installation with return flow increase,
- with a pellet heating boiler,
- with a second potable water cylinder.

3. Assembly

3.1. Setting up the Buffer Cylinder

The cylinder must be installed in a frost-free room with short lines to the consumer.

Please note that installation surface of the site where the cylinder is to be installed is dry and capable of supporting the cylinder's weight.

Use the attached lifting rings at the top and bottom of the cylinder to transport it.

3.2 Connecting the Heating Circuit

The water conducting connections of the RATIO buffer cylinder are equipped with flat sealing connections. Please use only the flat-sealing unions and joints together with the original soft flat gaskets included with our buffer cylinder connection kits as these are specifically tested for this type of application.

Please note that the buffer cylinder must be connected with a safety valve without shutoff mechanism, which protects the tank from pressures greater than 3 bar. The safety lines leading to the safety valve must be sufficiently dimensioned in accordance with local rules and regulations.

Please note that the safety valve within the heating circuit has a blowing-off pressure of no more than 3 bar.

The membrane expansion vessel (MEV) must be dimensioned large enough to absorb the additional heat expansion of the buffer cylinder volume (see table 2).

Blow-off pressure of the heating circuit safety valve	Admiss. pressure	RATIO (additional rates volume of the MEV in liter)			
		500	800	1000	1500
2.5 bar	1.0 bar	70	105	135	170
2.5 bar	1.5 bar	125	200	250	320
3 bar	1.0 bar	55	85	105	135
3 bar	1.5 bar	80	125	155	200

Table 2 Additional volume for expansion vessel in heating circuit.

Figure 2 Remove protective transport film and wrapper, remove insulation of RATIO HP 500 by opening the hook closure and set aside to prevent damage to the insulation.

Figure 3 Unscrew cylinder from pallet and transport to the installation site (weight up to 205 kg!) Turn cylinder so that connections point towards installation wall, tilt and insert inner section of the floor insulation.

Figure 4 Connect filling/emptying cock at the bottom of the buffer cylinder. Use 5/4" connection in upper, dished end of tank, e.g. filling/emptying cock with reduction or cap.

Figure 5 When installing the convection brakes (part of the buffer cylinder connection kit), please consult the assembly instructions included with the kit.

Figure 6 Depending on system solution, connect heating connection pipes with buffer cylinder using flat seals. Cap unused buffer cylinder connections with 5/4" caps.

Figure 7 When integrating the solar installation into the heating system using a return flow increase, please use the optional switching valve kit (Art. No. 130 100 19).

3.3 Connecting the Solar Circuit

Please note: When connecting a solar installation during summer, cylinder temperatures can reach up to 95 °C. Risk of scalding injury!

Figure 8 In case of buffer cylinder with solar heat exchanger: Connect solar circuit with heat exchanger (flow and return). The inlet into the solar circuit heat exchanger is at the top and the outlet at the bottom.

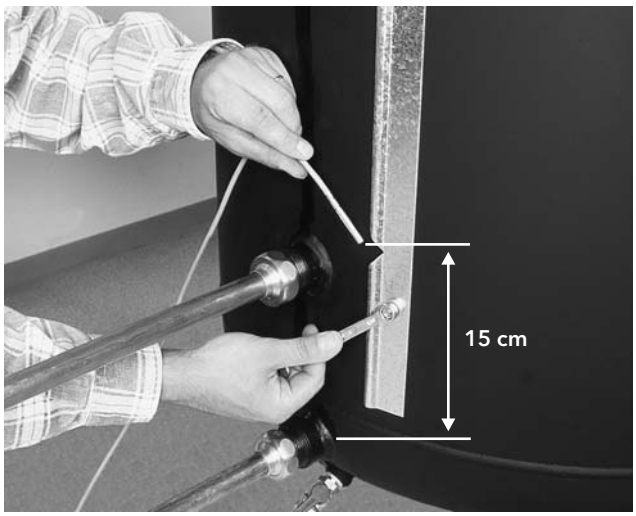

Figure 9 When storing heat with the solar heat exchanger, the temperature sensor must be attached to the solar controller approx. 15 cm above the solar return connection.

3.4 Connecting the Immersion Heater

The optionally available immersion heater can be sealed with hemp (union IT R 1 1/2"). Please consult the additional information listed in the assembly manual of the immersion heater.

Figure 10 Option: If needed, install electrical auxiliary heating. Please consult the information included with the immersion heater to ensure the auxiliary heater is installed correctly.

3.5 Attaching the insulation

The buffer cylinder insulation consists of PU foam with a laminated polystyrene cover layer and hook closure.
The properties of plastics are subject to significant temperature fluctuations! The higher the ambient temperature, the more flexible the PU foam, and due to the shrinkage behavior of the PVC cover layer, these must be applied at least at room temperature.
In case of polystyrene, the breakage tendency drops with a rising temperature.

Do not install insulation below 20 °C and allow insulation stored at cold temperatures to reach room temperature before installing.

After setting up the buffer cylinder and before connecting potable water, circulation, and heating lines, the insulation must be applied at the installation location. Two persons are necessary for the installation of the insulation.
We recommend to carry out pressure testing and rinsing before installing the insulation. See advice in chapter 4.

During installation:

- Place insulation loosely around buffer cylinder and press into place opposite the row of connections.
- Adjust the insulation by tapping with the flat of your hand, i.e., tap or stroke from the rear in the direction of the hook closure until the rows of the hook closure are lined up properly and can be closed by applying slight pressure.
- Make sure the heat insulation is properly positioned next to the wall of the storage tank.
- Retighten the hook closure starting at the top until the heat insulation fits tightly against the cylinder.

Please do not use tools or tightening straps and do not close the hook closure by force. This could damage the insulation and diminish its effectiveness.

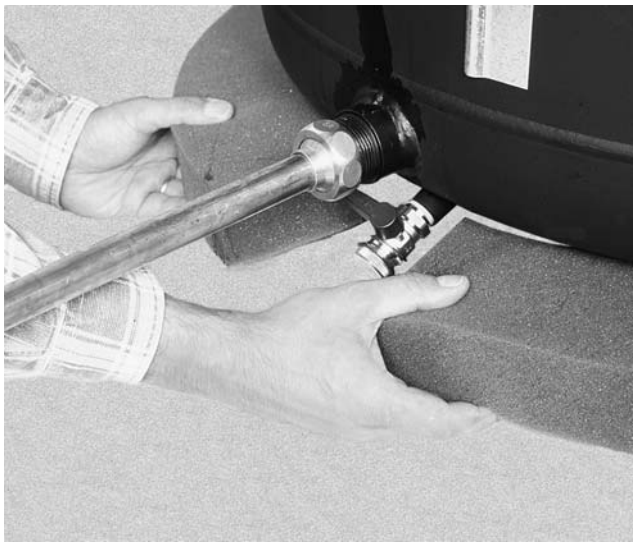

Figure 11 First, place insulating ring around the bottom of the buffer cylinder.

Figure 12 Then close the rear hook closure (opposite to the connections) of the jacket insulation. This may require the use of an assembly tool (Art. No. 130 00 239) or secure hook strip into place with screws.

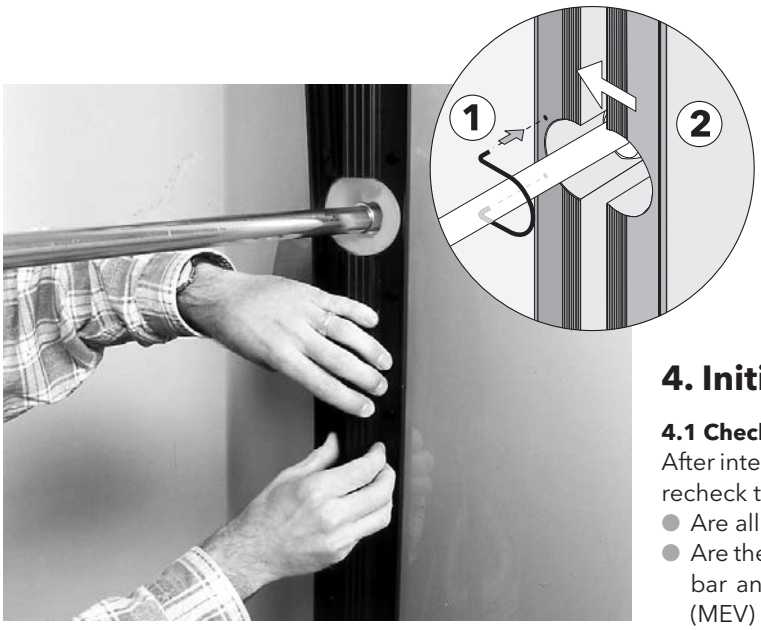

Figure 13 Close insulation with front hook closure. First snap into the weakest groove position and then alternately retighten.

Figure 14 Insert upper circular insulation panel and attach lid.

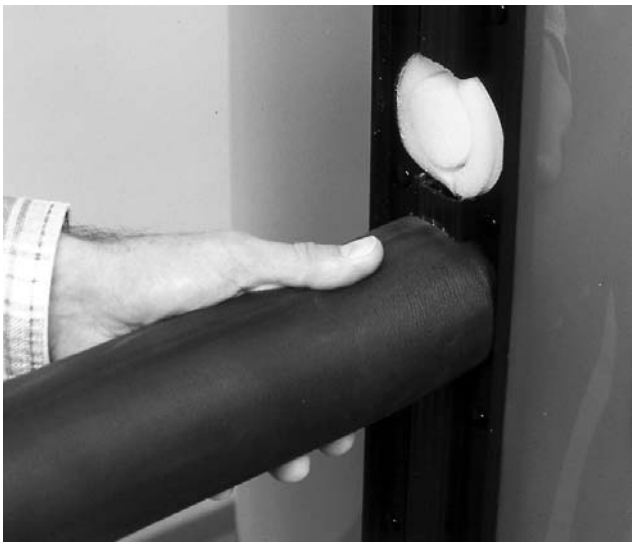

Figure 15 Insulate connected pipes and press down insulating tubes firmly onto the insulation of the storage tank. Insert foam plugs into unused connections.

Wire hook - *Mounting support for insulations of cylinders up to 500 l volume. Clasp the wire hook into the gap, to fix the insulation. Now push the right side of the insulation such that it clinges closely to the cylinder and the hook closure is snaped into place. Before the pipe insulation is installed the wire hook must be removed and should be stored at the customers vor later usage.*

4. Initial Startup

4.1 Checking the Installation

After integrating the buffer cylinder into the system, please recheck the following items:

- Are all components installed correctly?
- Are the safety elements installed? Is a safety valve with 3 bar and – if needed – a pressure maintenance device (MEV) installed?
- Are all screw connections installed with the original flange seals and tightened sufficiently?
- Are all electrical connections installed correctly and in accordance with rules and regulations?
- Are the temperature sensors in the right position? Please check plausibility of the values.

4.2 Filling, Venting, and Checking Pressure

Carry out a pressure test after the installation is complete. Please note that the test pressure may not exceed 3 bar.
Filling the buffer cylinder (fig. 16) can take between 30 minutes and two hours depending on water pressure and size of buffer cylinder!
Check all connections and flanges for leaks after applying the test pressure (fig. 17). Retighten if necessary.
Heat the content of the buffer cylinder, e.g. by switching on the connected heating boiler, and monitor the operating pressure while doing so. The safety valve must be triggered once the overpressure reaches approx. 2.7 bar.

4.3 Flushing the System

Production residue (occasionally rust and scale) remains in the piping and the inside of the solar heat exchanger of the buffer cylinder (with type G) in spite of a careful post-production cleaning. This residue can cause malfunctions and damage when operating the system. The entire system must therefore be flushed before initial startup.
Sediment collectors must also be installed in the system at suitable points to collect any subsequent particles that may be flushed out later.

4.4 Settings on Boiler and Solar Controller

The RATIO buffer cylinder is designed and approved only for temperatures up to max. 95 °C. Please make sure this max. temperature is not exceeded when the buffer cylinder is charged when making changes to the setpoints and other settings at boiler and/or solar controller.
If the buffer cylinder is used in conjunction with the RATIO-fresh freshwater station to heat potable water, the auxiliary heating of the stand-by section (upper part of the cylinder) is controlled from the heating control unit. Please consult the assembly instructions of the controller manufacturer to install the auxiliary heating sensor.
If the buffer cylinder is operated in conjunction with a solar installation with the return flow increase enabled, we recommend the use of the solar controller SUNGO SL or SXL

since these controllers already feature preprogrammed system solutions that render tedious setup and configuration unnecessary.

4.5. Venting the System
After commissioning the heating system, vent the cylinder once again (fig. 23), so that any air still remaining in the pipes can be eliminated. Then place the insulation lid back on the cylinder.

4.6 Complete the acceptance report
Correct commissioning must be certified in the acceptance report by an expert and countersign by the endcustomer, so that in case of complaint you can claim under the guarantee.

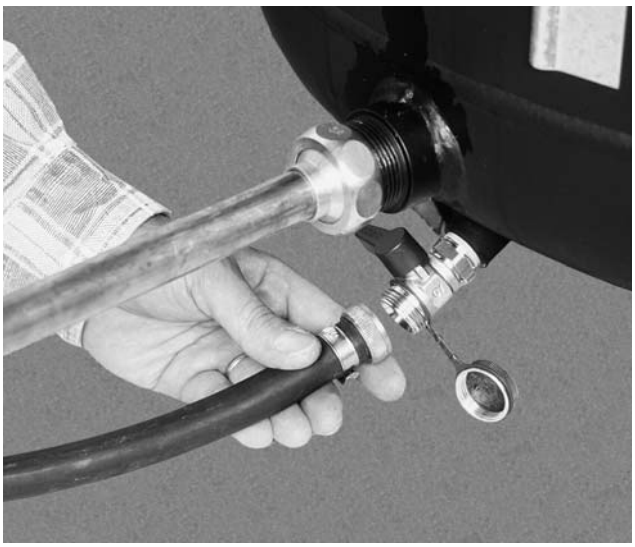

Figure 16 For the initial startup, connect filling/emptying cock with hose at bottom of storage tank and allow water to flow into the cylinder. Then open filling/emptying cock at the top where the cover is to allow air to escape.

Figure 17 Check all connections and flanges for leaks after applying the test pressure.

5. Notes for Operators

Please note that the max. temperature in the buffer cylinder may not exceed 95 °C. Make sure the correct setpoints and limit values are set on solar controller and boiler controller (comply with max. boiler temperature).

Please note that the buffer cylinder must be serviced regularly (at least every 2 years) by an accordingly trained technician. We recommend entering into a maintenance contract.

The regular service and maintenance must be certified on the acceptance and inspection record by a technically trained person to ensure that a warranty claim can be filed should this become necessary.

6. Troubleshooting

Problems may occur in connection with operating the buffer cylinder even when carefully constructed and installed. Some of the possible problems are here explained in more detail.

Leaks
The flat gaskets to be used when assembling the pipe connections and adapters are made from soft fiber material and are ideally suited for long-term use in applications where pressures and high temperatures exist. However, the sealant settles after a few months of operating the system. Minor leaks may then occur if the pipe screw joints are not tightened sufficiently upon installation.
It is therefore required to retighten these screw connections after several weeks of operation.

7. Maintenance and Care

The buffer cylinder must be cleaned and serviced at least every two years.

- Are there visible leaks on the tank or the screwed connections? Check for traces of lime or moist spots on the insulation. Check all connections and retighten if necessary.
- Is the safety valve of the heating circuit still functional and safe to operate?
- Venting the storage tank, see individual steps in Chapter „Initial Startup."
- Fill out and sign the service and maintenance record.

Please note that the flat gaskets in pipe connections and flanges are considered wearing parts and must be replaced every time the connections are opened. This is to ensure that leaks do not occur once the sealant has settled.
The solar installation and the buffer cylinder must be serviced every two years.

1. Venting the cylinder. Individual steps in Chapter „Initial Startup."
2. Fill out the service and maintenance record.

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