barnova

INNOVATIVE PRESSURE COMPETENCE

Remote monitoring
Remote control

Technomat

Nova / Duo Nova

- ✓ Constant pressure
- ✓ Deaeration
- ✓ Make-up feed
- ✓ Feed evacuation
- ✓ Temperature measurement
- ✓ Oxygen measurement
- ✓ pH measurement
- ✓ Conductivity measurement

Pressure holding technology & degassing technology

Benefit!

With remote monitoring and remote control you have your system under control everywhere and all the time.

Barnova Technomat
NOVA/DUO NOVA

The constant pressure station that shows what it can do!

Technomat, the automatic pump-controlled compact station, reveals new ways for constant pressure and deaeration in heating and cooling circuits.

Barnova Technomat

✓ Keeps the pressure constant in the system with low-noise centrifugal pumps – even within tight pressure limits

✓ Depressurized operated membrane collecting tank

✓ Deaerates system and refilling water in a controlled manner!

✓ Back feeds refilling water in a controlled manner

✓ Discharges system water in a controlled manner

✓ Monitors in conjunction with the multi-language Barnova SPS control system:
- Membrane rupture
- pH and conductivity
- Temperature and oxygen content of the system retaining water
- Operating states with both time and date particulars
- Warning and malfunction notifications

✓ Transfers all operating states onto control systems

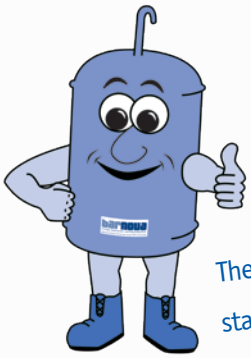
✓ Remote monitoring and control through use of intelligent hardware

✓ Higher operational security through use of a second pressure transducer.

Thanks to its unique compact design, the Barnova Technomat can be installed in both an easy-to-operate and ready-to-operate manner.

In short: “How can air problems be dealt without any manual venting?”
By using the Barnova Technomat!

Reference property item – Skyper high-rise offices, Frankfurt a.M.



Benefit!

The Technomat is the pressure holding station that measures oxygen content, pH value and conductivity depending on the temperature and therefore always knows what it’s doing!

VPN-M2M-NETWORKS

The Barnova VPN solution for remote monitoring, remote control, networking and alarms

With the VPN-M2M-NETWORK you are directly connected to the Barnova SPS. This makes it possible not only to view operating states, warnings and malfunctions, but also to intervene directly. Diagnoses, reconfiguration and resetting parameters can all be done from the convenience of your own home.

✓ Multi-client system, user groups scalable to any level

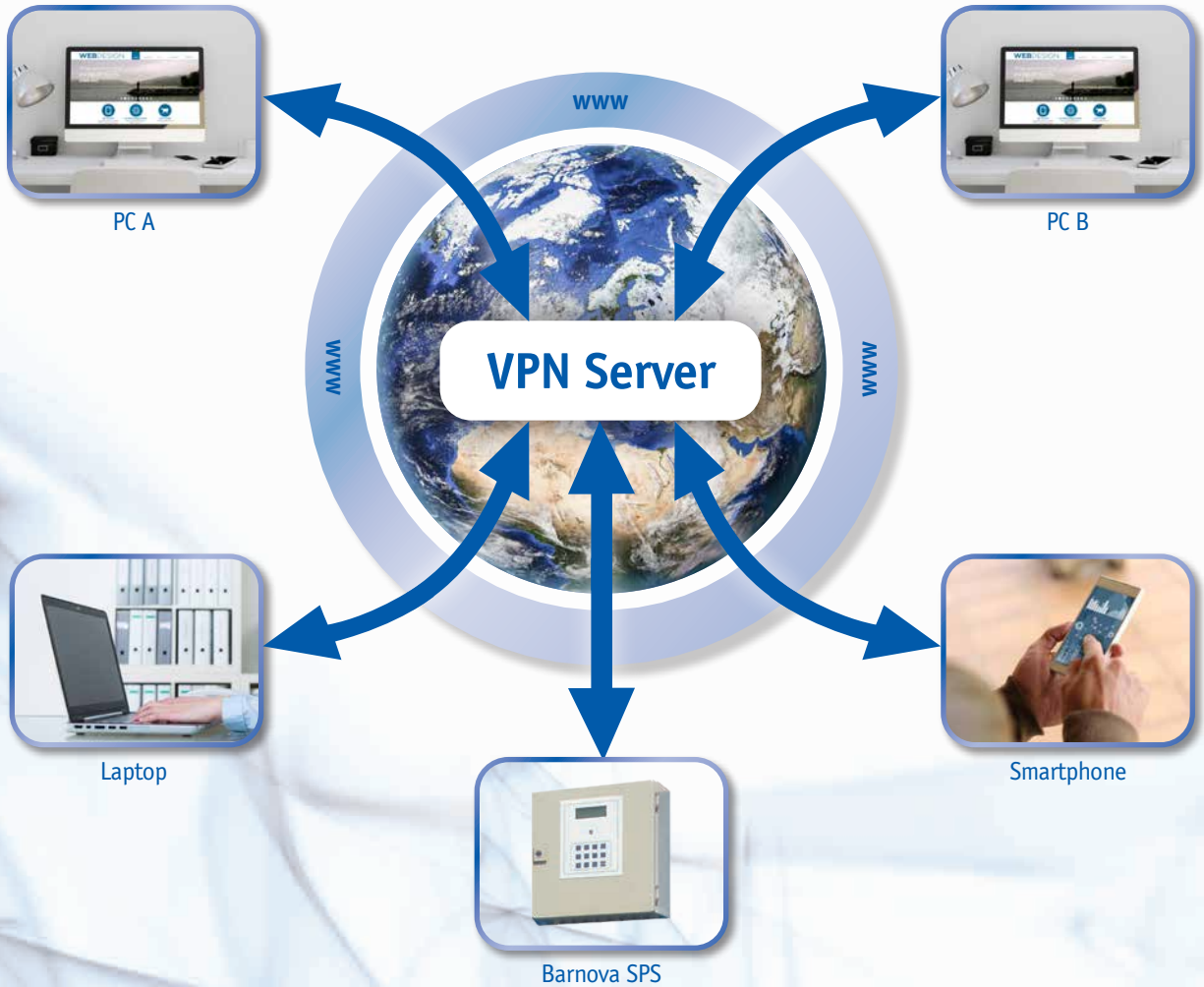
✓ Highest security standards through certificate-based VPN connections and firewall

✓ Low investment and operating costs

✓ Reduction of travel and personnel costs

✓ Troubleshooting and issue resolution 24/7

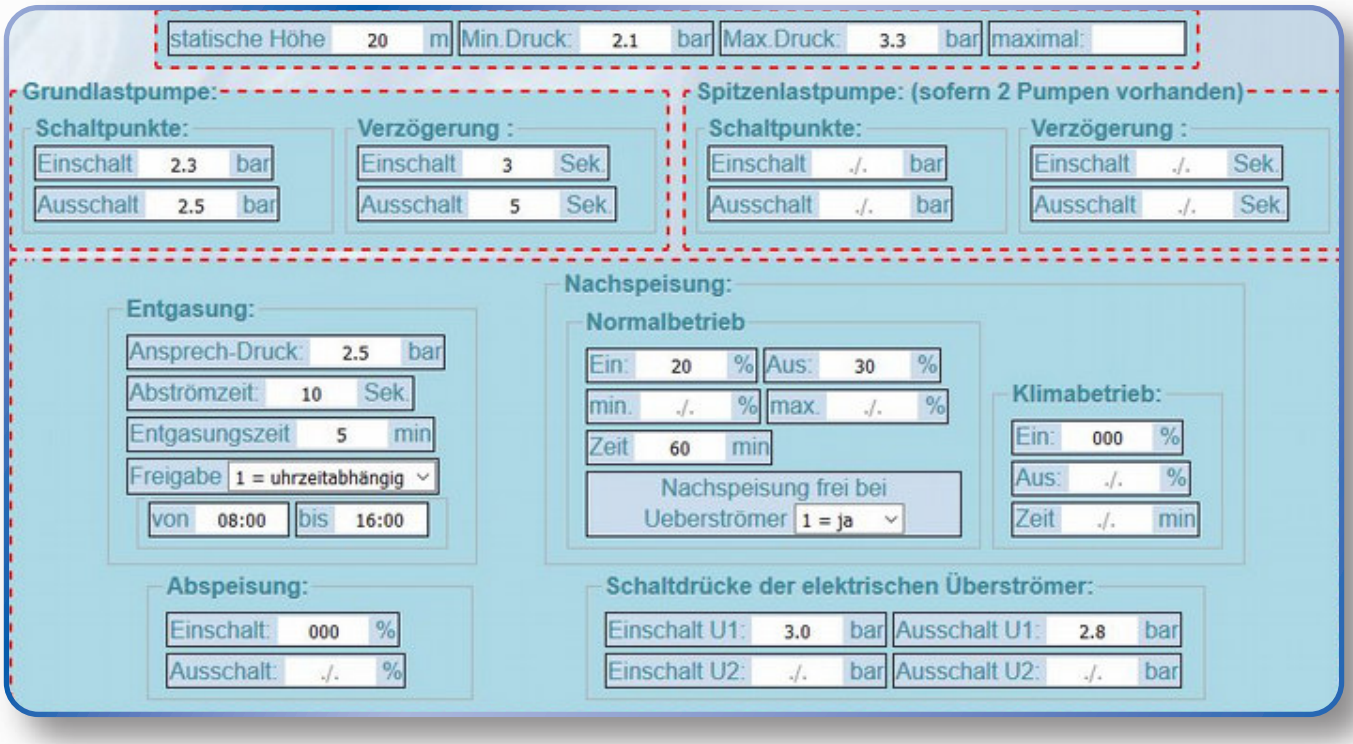
✓ Automatic notification of warnings and/or malfunctions



Barnova remote control, remote monitoring webshots

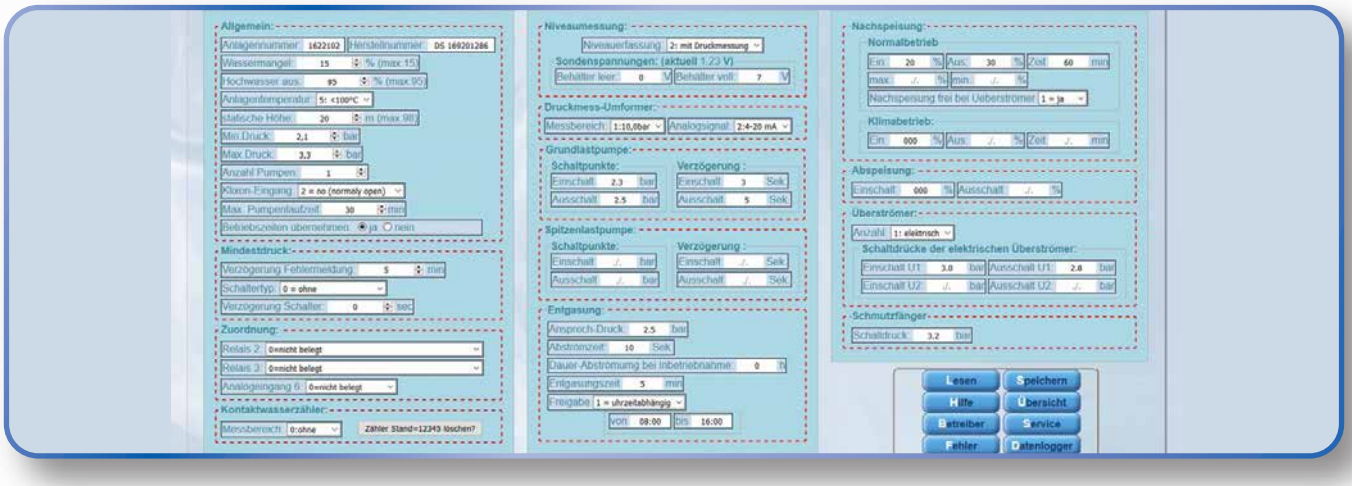
Overview

Operator

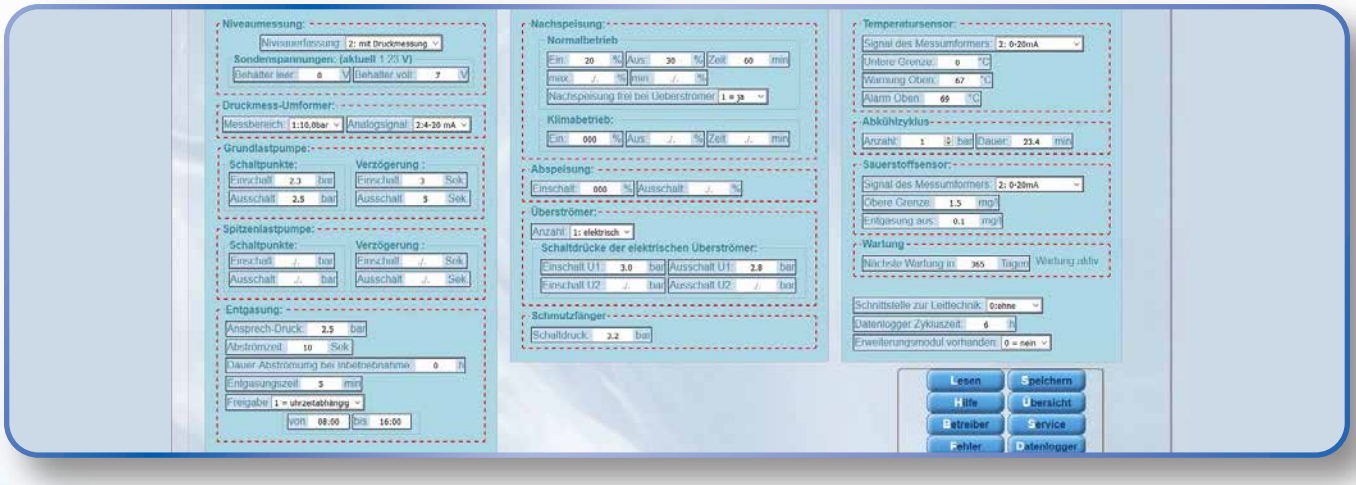


Barnova remote control, remote monitoring webshots

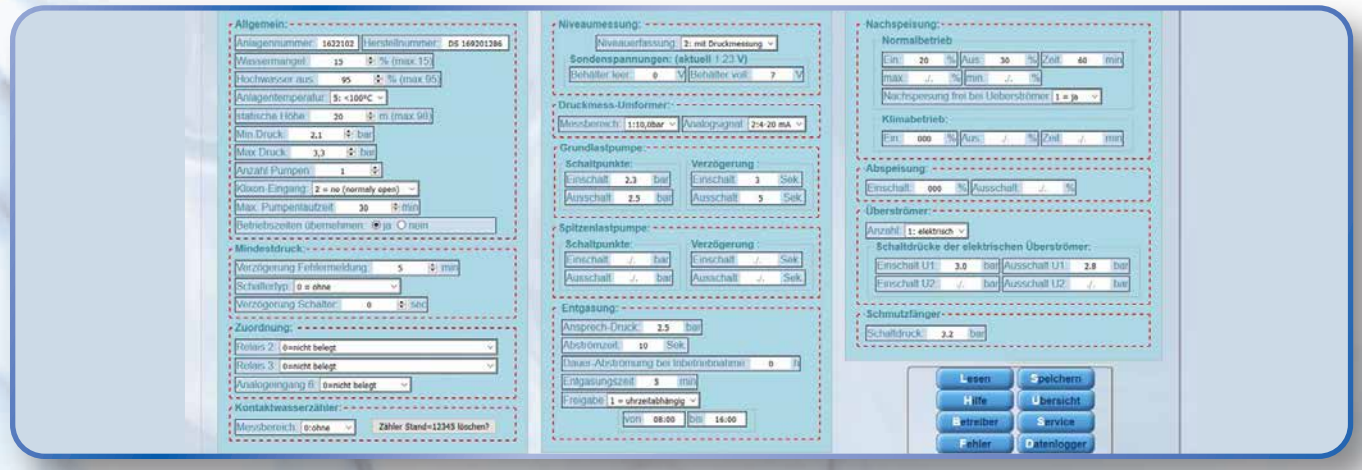
Service menu



Service menu



Data logger



Standard-compliant and technically correct procedure for hot water heating systems under DIN EN 12828.

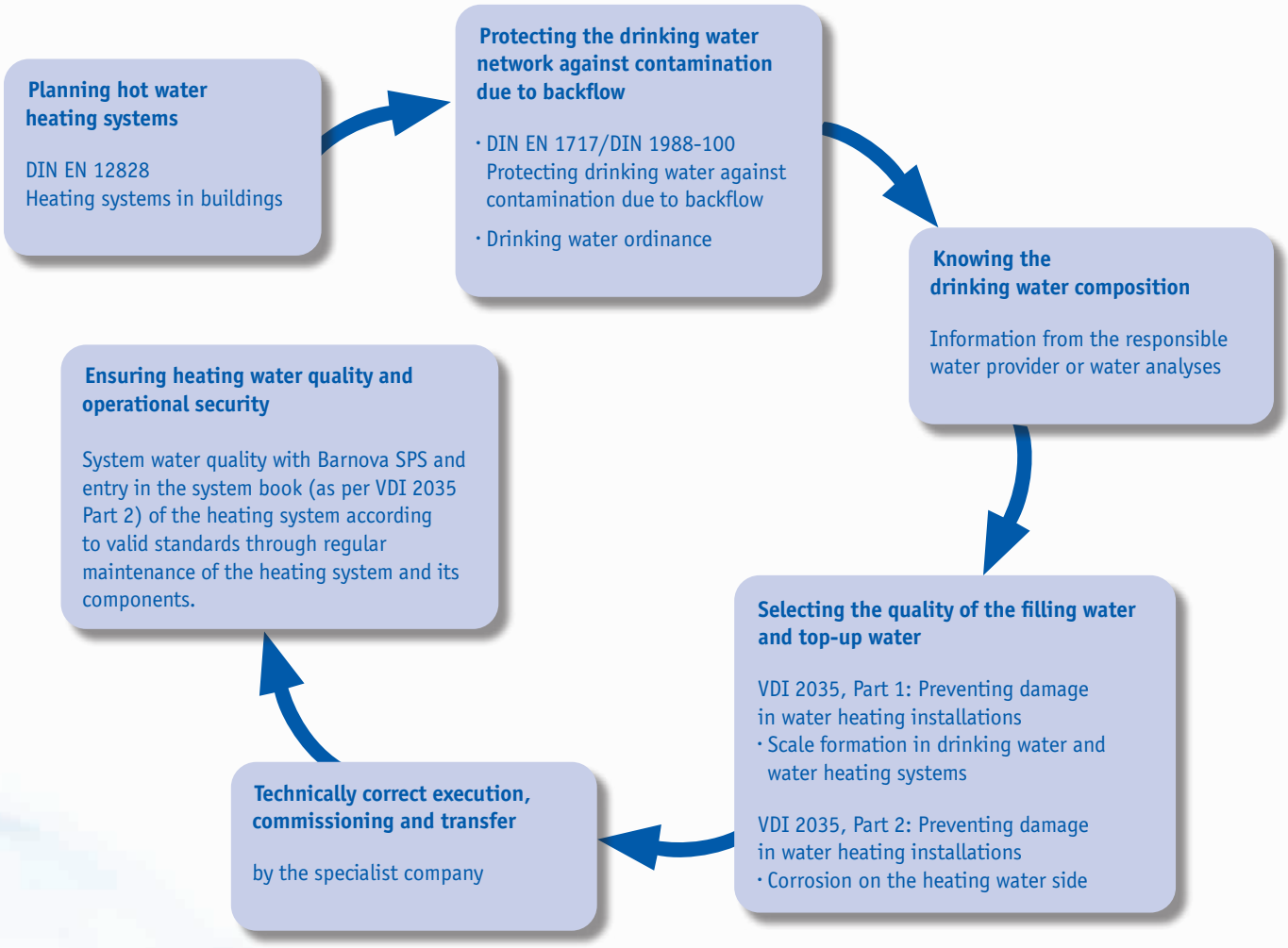
It is absolutely essential to comply with various standards.

- Monitor and improve water quality.
- Avoid corrosion, scale accumulation, heat loss and breakdowns

Standard-compliant steps – from planning to operation

Drinking water is not the same as heating water

Untreated drinking water is of limited use as heating water. The service life of hot water systems and entire heating units is critically impacted by the quality of the heating water.



Guideline Values

Improving water quality, avoiding breakdowns

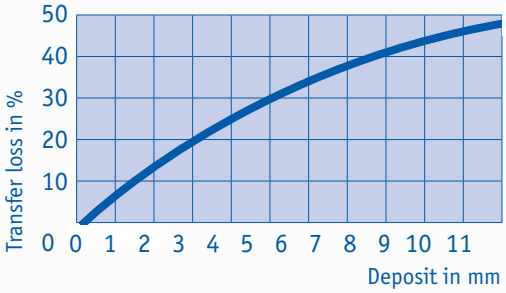
The water quality in heating systems has a significant impact on operational security and efficiency. Poor water quality leads to breakdowns and system damage through deposits and corrosion. Our experience from numerous cases has shown that water quality is not a focus and therefore does not fulfil the respective requirements. Associated with this in many cases are difficulties having warranty claims granted by boiler manufacturers.

The rules define limits for the pH value, hardness, conductivity and oxygen content. **These parameters** have a significant impact on whether deposits, breakdowns and corrosion occur in a system. These values differ depending on whether the system is operated with high or low salt content. The pH value range to be maintained, by contrast, depends heavily on the boiler material. For example, the use of aluminium materials require maintaining a very tight
pH value range (8.2 to 8.5). Therefore, in many cases, the low salt option is preferable, but due to the wide range of factors that could have an impact, we recommend a **technical consultation with our heating water experts for your individual application.**

Water quality requirements are defined in:

- VDI 2035
- AGFW worksheet (“Arbeitblatt”) FW 510
- the requirements of the boiler manufacturers

Just 3 mm of deposits lead to heat loss of 20%



Overview of guideline values

Requirements for the operational mode of the heating network	Low salt content		High salt content
Conductivity at 25 °C (µS/cm)	10–30	30–100	100–1500
Appearance	clear, free of suspended substances		
pH value at 25 °C	9.0–10.0*	9.0–10.5*	9.0–10.5*
Oxygen (mg/l)	< 0.1	< 0.05	< 0.02
Hardness (mmol/l)	< 0.02**	< 0.02**	< 0.02**

* does not apply to the use of aluminium materials (pH 8.2–8.5):
** Amounts to 0.11 dH° > Source: AGFW worksheet FW 510. VDI 2035

Solutions

Requirements

VDI 2035, DIN EN 1717 and DIN 1988-100 must be fulfilled:

Barnova filling

Note:
Pre-installing a backflow preventer is mandatory when filling up heating systems under DIN EN 1717 and DIN 1988-100.

Water softening (with blending)

Desalination (with conductivity test)

Filling and replenishing:

Filling and replenishing:

Barnova water treatment WEE

Barnova Topcat

Barnova water treatment WES

Technomat

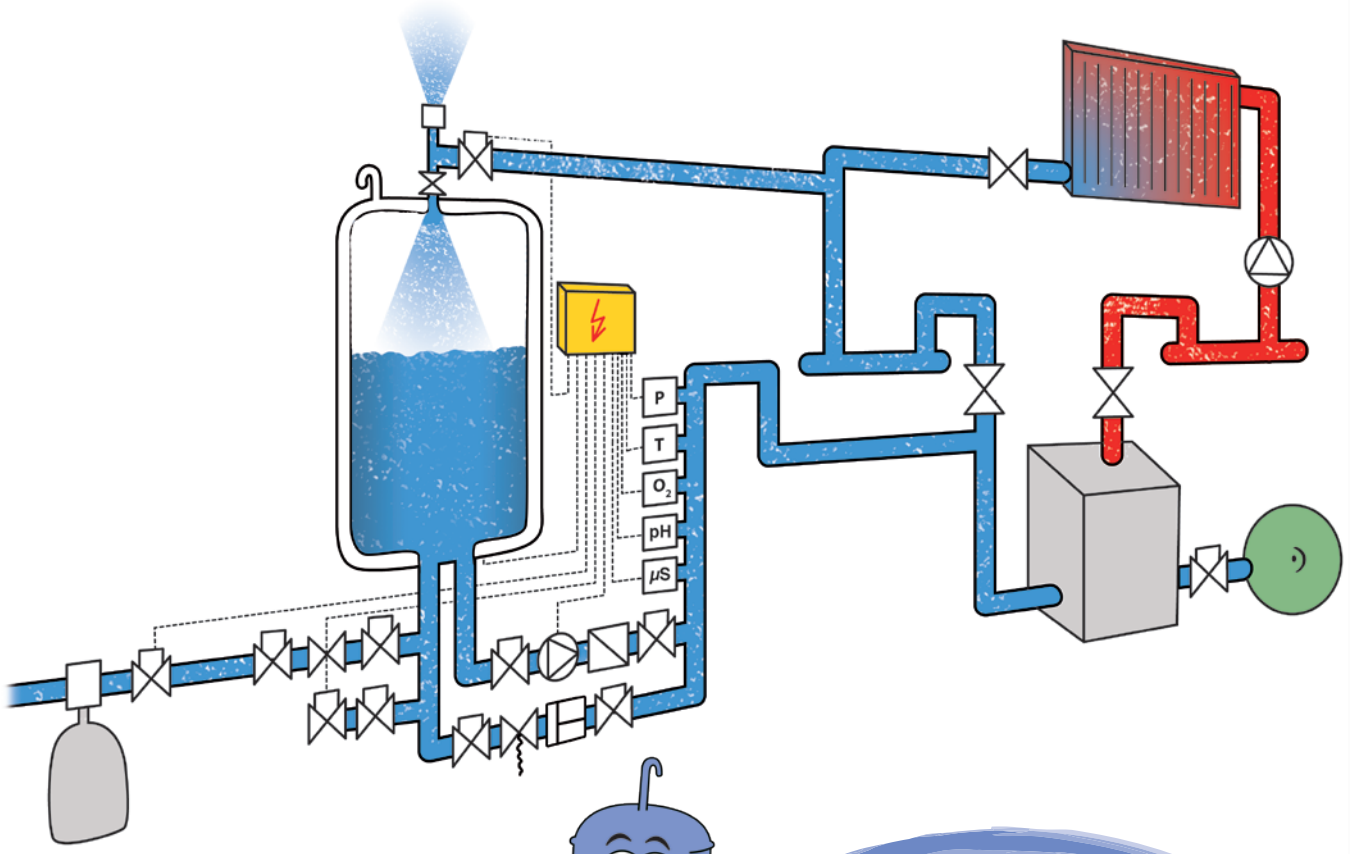
Technocat

Topcat

Service life through optimally treated heating water

The Barnova Technomat Principle

featuring high deaeration efficiency



Benefit!

The Technomat deaerates into the non-water area of the membrane (fizzy bottle effect) rather than into the membrane from below and thus against the static pressure in the tank.

Interaction of intelligent components – from the very beginning:

Technomat –> Füll –> WE –> Topcat

The Barnova WE water softener complies with the VDI 2035 requirements. A membrane rupture signaller constantly monitors the membrane operation. In the heating up stage, the membrane collecting tank takes up the expanding system water via the relief valve (mechanical or electrical) and makes it available again once the pump cools down. Since the membrane separates the system water from the atmosphere, the talk is of an enclosed system.

Tip:

Corrosion and heat loss significantly reduced!

The ideal way to save energy and money!

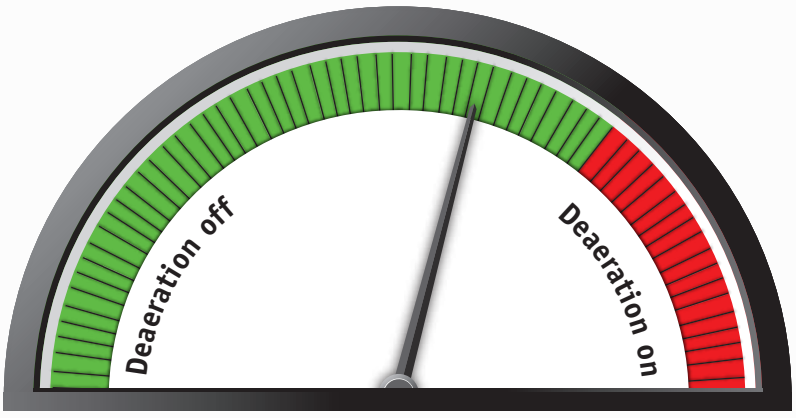
Selective setting of the pumps and relief valves can ensure that the system pressure is kept within the Delta-P range of 0.2 bar. Deaeration is undertaken by a separate solenoid valve which allows some of the main volumetric flow of the system return to flow directly into the non-water area of the membranes. This relief is accompanied by separation of the gases from the system water and discharge via the vent valve. The pump then returns the deaerated system water to the system. This operation is repeated for as long as the interval or constant deaeration cycles last.

The Technomat Füll or Füll K make-up feed ensures that the minimum water level in the tank stays constant and offsets any water and volume losses, which deaeration and leaks could be responsible for, in a quantity-controlled manner. The point of discharging is to stop any overfilling of the collecting tank; this is particularly important should it not be possible to precisely determine the system capacity.

Especially with return temperatures over 70 °C, constant temperature monitoring of the system return flow prevents damage and thus any costs of repair.
The effect of the set value being exceeded is for automatic cooling to protect the system.

The revolutionary oxygen measurement in mg/l is the Barnova Technomat's No. 1 innovation. Deaeration is only activated once the pre-set value is exceeded.

This stops the fluid becoming so corrosive from uncontrolled deaeration that it seeks to again become saturated with gases. By consistently measuring the water's pH levels and conductivity in the system, the prescribed guideline values are continuously kept in check.



Specifications

Type

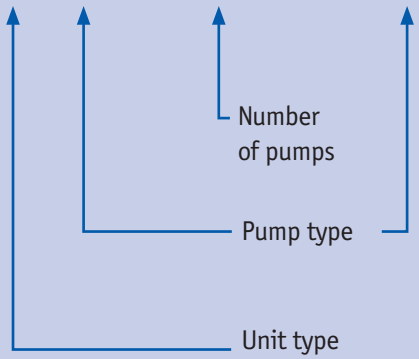
Technomat with CE Marking, constructed and tested in accordance with EU Pressure Equipment Directive 97/23/EC and DIN EN 13831 or AD 2000. Electromagnetic compatibility pursuant to 2004/108 EC Compliant with requirements of the Low-Voltage Directive 2006/95 EC

Areas of application

- hot water heating systems
- up to approx. 12 MW
- max. operating pressure 10.0 bar
- cooling circuit with water mixtures with a glycol concentration of up to 50%
- pursuant to DIN EN 12828
- with temperature control > 105 °C in accordance with Technical Rules for Steam Boilers (TRD) 604 p. 2, EN 12952 and EN 12953
- 72 hours of unsupervised operation
- see DUO PLUS brochure

Barnova Technomat

Nova 3 to Duo Nova 8

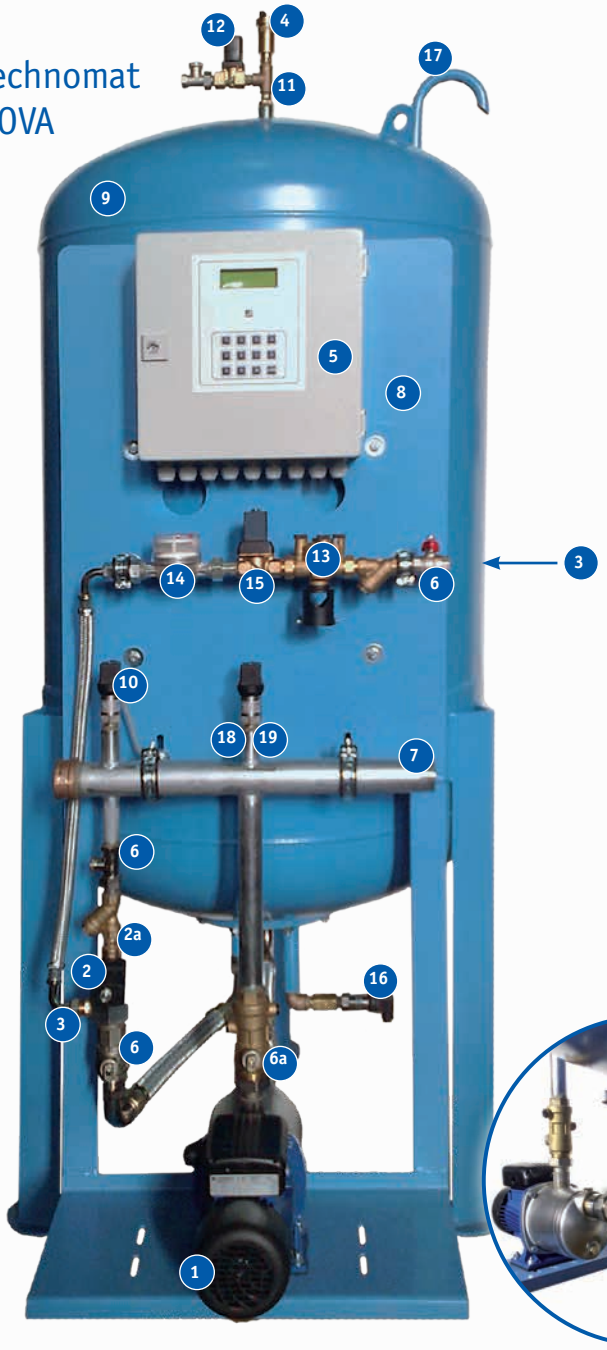


Tip:
More information on our CD!

Electronic particulars and operating parameters

Unit		NOVA3/DUO NOVA3	NOVA5/DUO NOVA5	NOVA7/DUO NOVA7	NOVA8/DUO NOVA8
Temperature range		*70*	*70*	*70*	*70*
KW	Nova	0.51	0.85	1.13	1.1
	Duo Nova	1.02	1.70	2.26	2.2
A	Nova	2.34	3.72	5.09	7.07
	Duo Nova	4.68	7.44	10.18	14.14
Max. permitted operating positive pressure (bar)		10	10	10	10
Max. holding pressure (bar)		2.2	4.4	5.6	8.5
Max. permitted operating temperature (°C)		70	70	70	70
Max. permitted supply temperature (°C)		120	120	120	120
Max. permitted ambient temperature (°C)		0–45	0–45	0–45	0–45
Noise level (approx. dB)		53	53	53	53
Degree of protection		IP54	IP54	IP54	IP54
Electr. connection		230 V/50 Hz	230 V/50 Hz	230 V/50 Hz	230 V/50 Hz

Technomat NOVA



Technomat DUO NOVA

1: Constant pressure pump
2: Relief valve (mechanical or electrical)
2a: Dirt trap
3: Make-up feed connection
4: Deaerating valve
5: Electrical control cabinet
6: Capped ball valve
6a: Capped ball valve with integrated return flow stopper
7: System connection 1 1/2" (can be optionally used left/right)
8: Supporting frame
9: Membrane collecting tank
10: Pressure transmitter
11: Safety valve (when SV of the heat generator > 6.0 bar)
12: Solenoid valve (deaeration)
13: System disconnector
14: Water meter/Contact water meter
15: Solenoid valve (make-up feed)
16: Level detector/sensor or pressure transducer
17: Ventilation and venting elbow
18: Oxygen measurement point/pH measurement
19: Temperature measurement point/Conductivity measurement
20: Drinking water connection

Dimensions

Here you find the dimensions of the diaphragm collecting tanks as basic tank and add-on tank for Barnova TECHNOMAT NOVA / DUO NOVA / DUO PLUS

Applications:

- Water heating systems compliant with DIN EN 12828
- Cooling water networks

Max. operating pressure: - 6.0 bar
Max. diaphragm operating temperature: - 70°C
Connection for NOVA/DUO NOVA: - R 1“ or R 1 “
Connection for Duo Plus: - DN 80 or DN 100
Basic container: - Tank equipment complete with control on the tank, depth about 400 mm, and safety valve and vent
Add-on container: - Container equipment complete with safety valve and vent
Construction: - according to EU Pressure Equipment Directive 97/23 EG with CE mark

6.0 bar / 100°C / colour: blue

Type/ Contents	Diameter (mm)	Height (mm)	Weight (kg)
150	550	1.351	65,0
200	550	1.568	75,0
300	550	2.001	90,0
400	750	1.685	130,0
500	750	1.917	140,0
600	750	2.150	150,0
800	750	2.615	180,0
1.000	1.000	2.111	220,0
1.250	1.000	2.437	280,0
1.600	1.250	2.276	330,0
2.000	1.250	2.608	395,0
2.500	1.250	3.024	450,0
3.000	1.600	2.505	490,0
3.500	1.600	2.759	530,0
4.000	1.600	3.012	590,0
5.000	1.600	3.520	690,0
10.000	1.600	6.710	1.180,0

We reserve the right to make technical changes and special tanks are available on request.

Control System

Standard display

Power On

· Display:

```
Constant pressure unit
--------------------
     barnova gmbh
      Version X.X
```

Standard operation

· Display of the system pressure, tank level and the operating states of the pump(s) (On/Off, Manual/0/ Automatic), make-up feed/discharge, deaeration and the two relief valves

```
System pressure: bar
Level:             %
P1 P2        NS GAS
ÜS1             ÜS2
```

The switchover for Pump 1 is organized by Key 1 for Manual/0/Automatic. The same applies to Pump 2 and Key 2. Malfunction or alarm is indicated on the lowest line should there be a fault. Continuing with Yes.

Any fault is indicated in plain text on the 3rd and 4th lines and can be acknowledged. Continuing with Yes.

· Display of the temperature and oxygen content of the heating water should sensors be fitted

```
Temperature:    °C
Oxygen:       mg/l
pH:
Conductivity:
```

Continuing with Yes.

· Display of the figures of both the pressure sensors, if two sensors are present, and the ongoing active sensor

```
Pressure s. 1:     bar
Pressure s. 2:     bar
Active:
Switchover    with 1/2
```

Press Key 1 to switch over to Sensor 1 as the active sensor; press Key 2 to switch over to Sensor 2. Continuing with Key Yes.

· Display of the values of both the level sensors, if two sensors are present, and the ongoing active sensor

```
Level s.1:          %
Level s.2:          %
Active:
Switchover   with 1/2
```

Press Key 1 to switch over to Sensor 1 as the active sensor; press Key 2 to switch over to Sensor 2. Continuing with Key Yes.

· Display of the pump running times (for one or two pumps), the remaining running time for the pumps and the water meter reading (if set in the service menu)

```
Pump 1:                    h
Pump 2:                    h
Remaining running time:m
Water meter:               l
```

Continuing with Yes.

· Display of unit and maker's Nos.

```
U-number:**0000000**
M-number:**0000000**
```

Continuing with Yes.

· Display of the service phone numbers

```
      barnova gmbh
  # Service numbers #
Tel 1: 02754/21251-0
Tel 2: 0171/1961237
```

· Display of the actual date and time

```
Date
Time

Change with 'No'
```

Continuing with Yes, with No the actual time can now be inputted.

· Start/Stop of constant deaeration
The constant outflow – if not running – can be started with the following step (the time set for the constant outflow is displayed):

```
    Constant outflow
        Start??
Time:                 h
YES                  NO
```

The constant outflow – if already running – can be stopped using the following step. In addition, the remaining time of the constant outflow is displayed:

```
Constant outflow
in operation
Time remaining:        h
JA=Continue      NO=Stop
```

Yes or No takes you back to the Start menu.

Altering the Parameter menu

The programming switches are in the electrical control cabinet on the PCB and in the standard position are at "LEFT to TOP and RIGHT to BOTTOM". Switching to "LEFT to BOTTOM" gets you to Programming Mode 1 = Operator. The approach for this as well as the scope for setting and display of the control are as follows:

Start display

```
Programming mode  *1*
1: Operator
2: Service
3: Malfunction memory
4: Data logger
```

1. Parameterization by operator (1) without password blocking

The menus displayed are conditional upon the settings as laid down by Service!

- Language setting

```
Language:        **_**
0:German
1:English
```

- Setting the static height as well as the minimum and maximum pressure

```
Static height        m
Min.Pressure:        b
Max.Pressure:        b
maximum:             m
```

The 4th line has the standards for the parameters to be currently entered (cursor flashes)

- Setting the time delay for the fault notification – Minimum pressure not reached

```
Delays
Min.Pressure:      min
Range: 0..30
0 = no delay
```

- Setting the switch-on and switch-off pressures of the basic load pump

```
Switch points
Base load pump
Cut-in pressure bar
Cut-out pressure bar
```

- Using two pumps results in the switch-on and switch-off pressures of the peak load pump now being set

```
Switch points
Peak load pump
Cut-in pressure      bar
Cut-out pressure     bar
```

- Setting the delay times for the basic load pump

```
Delay basic load p.
Switch on          sec.
Switch off         sec.
Range:     0..20 sec.
```

- Using two pumps results in the delay times for the peak load pump now being set

```
Delay peak  load p.
Switch on          sec.
Switch off         sec.
Range:     0..20 sec.
```

- Setting the response pressure for deaeration (deaeration response pressure is equivalent to the MIN pressure)

```
Deaeration
Response press: bar

00.0: without deaeration
```

- Setting the outflow and deaeration times

- Setting whether deaeration operates as a function of time (0 = constantly, 1 = as a function of time)

```
Deaeration time


Release  0/1
```

- Setting the make-up feed as a % of the tank filling level

```
Make-up f..      On %
Make-up f..     Off %
Minimum            %
Maximum            %
```

- Setting the maximum make-up feed time

```
Make-up f..      On %
Make-up f..     Off %
Make-up f..  Time min
Maximum       240 min
```

- Blocking the make-up feed given non-closed relief valves

```
Make-up feed unobstructed
    with relief valve
        **    **
0 = No    1 = Yes
```

- Settings of the make-up feed for air-conditioning operations as a % of the tank filling level and maximum make-up feed time

```
Air-cond. op.
Make-up f..      On %
Make-up f..     Off %
Make-up f..  Time min
```

- Settings for discharge as a % of the tank filling level

```
Discharging
Switch on:          %
Switch off:         %
0 = No discharging
```

- When switch-on level = 0%, then there is no discharging
- Inputting the switch-off level is then automatically skipped

Setting conditions:

- Switch-on level must be greater than that for make-up feed off
- The switch-on level must be under or at the same level for high water
- The switch-off level must be under the switch-on level
- The switch-off level must be greater than that for make-up feed off
- Setting the switching pressures for the electrical relief valves

```
Switch on U1      bar
Switch off U1     bar
Switch on U2      bar
Switch off U2     bar
```

The switch-on pressure must be between Max-pressure and Value for pump off!

Switching the left switch upwards takes you to the standard display.

Then this image appears

```
Please wait..
BNHD V00514 01.10.07
```

You get back to the start image.

Service menu, Password-protected

Contains all the relevant data set at the factory and documented in the test and acceptance inspection record.

Memory menu Password-protected

All alterations in the Parameter menu as well as warning and alarm notifications with time and date display are documented here; the same applies to the data logger which saves all the operating states.

Tip:

Detailed information in the installation and operating instructions

Proportioning of the membrane collecting tank

$$V_e = n \frac{V_a}{100}$$

$$V_v = 0{,}5 \frac{V_a}{100}$$

$$V_n = \frac{(V_e + V_v)}{0{,}9}$$

V_a = Water content of the unit

V_e = Expansion volume

V_v = Water reservoir

V_n = Nominal capacity

Example of calculation:

kW = 850

STB = 105 °C

VL = 110 °C

RL = 70 °C

Static height = 35 m

SV = 5 bar

V_a not known

100% radiators

Water content of the Unit V_a with approximate values (Ltr./KW)

Heating systems	Supply temperature				
	70 °C	80 °C	90 °C	100 °C	110 °C
Convectors	9.5	7.5	6.0	5.0	4.0
Ventilating systems	12.5	10.0	8.0	6.5	5.5
Panel-type radiators	14.5	11.0	9.0	7.5	6.5
Radiators	22.0	17.0	13.5	11.0	9.5

Expansion coefficient

Expansion factors n in % and the evaporating pressure pD in bar positive pressure								
°C	n	pD	°C	n	pD	°C	n	pD
20	0.14	-	60	1.68	-	105	4.74	0.21
30	0.40	-	70	2.25	-	110	5.16	0.50
40	0.75	-	80	2.89	-	115	5.59	0.70
50	1.18	-	90	3.58	-	120	6.03	1.00
55	1.42	-	100	4.34	-	130	6.97	1.70

$Q = 850 \times 0{,}85 = 722{,}50$ l/h $= 0{,}7225$ m³/h

$$V_e = 5{,}16 \frac{(9{,}5 \times 850)}{100} = 416{,}67 \text{ Ltr.}$$

$$V_v = 0{,}5 \frac{8{,}075}{100} = 40{,}38 \text{ Ltr.}$$

$$V_n = \frac{(416{,}67 + 40{,}38)}{0{,}9} = 507{,}8 \text{ Ltr.}$$

Chosen: NOVA 5-600

Special-purpose pressure appliances up to 400 MW with control unit and membrane collecting tank for temperatures > 105 °C, for hot water installations in keeping with TRD 604 Sheet 2, EN 12952/EN 12953 for BOB 72h can be supplied in whatever size involving individual planning according to specific customer requirements.

Selection

Selection and ordering particulars

The optimum use of the Technomat Nova and Duo Nova constant pressure stations is to be selected as a function of the p0 minimum operating pressure, the unit's rated thermal output and the V_n nominal volume of the membrane collecting tank.

Whilst the minimum operating pressure determines the required pump pressure, the thermal output does the same for the quantity conveyed.

The nominal capacity of the membrane collecting tank is determined by the water content of the unit and the corresponding operating temperatures.

Thermal output	kW
Safety temperature STB	°C
Supply temperature	°C
Return temperature	°C
Static height	m
Response pressure of safety valve	bar

Calculation of the pumping capacity (Q volumetric flow)

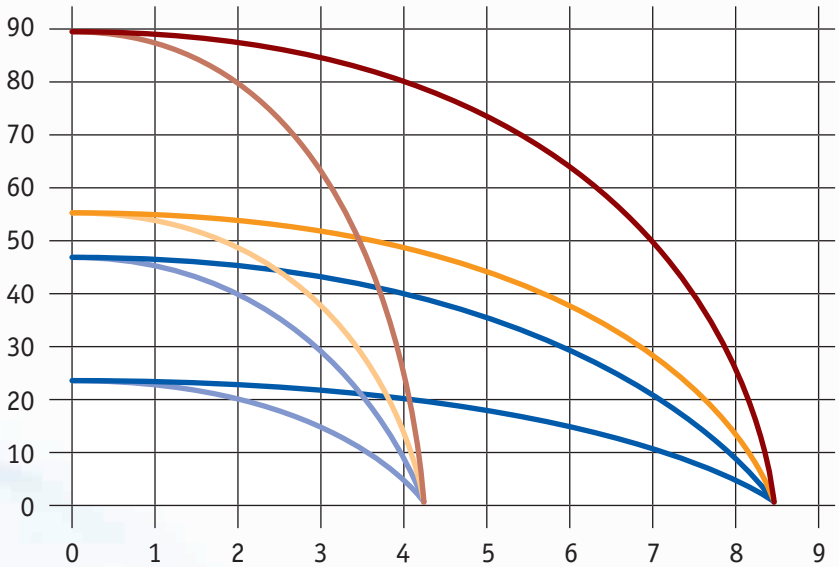
Heating systems: Output (kW) x 0.85 $\quad \frac{I}{hkW} = \frac{I}{h}$

Cooling systems: Output (kW) x 0.35 $\quad \frac{I}{\quad} = \frac{I}{\quad}$

Tip:
Proportioning and design programme on our CD

Characteristics – Nova/Duo Nova

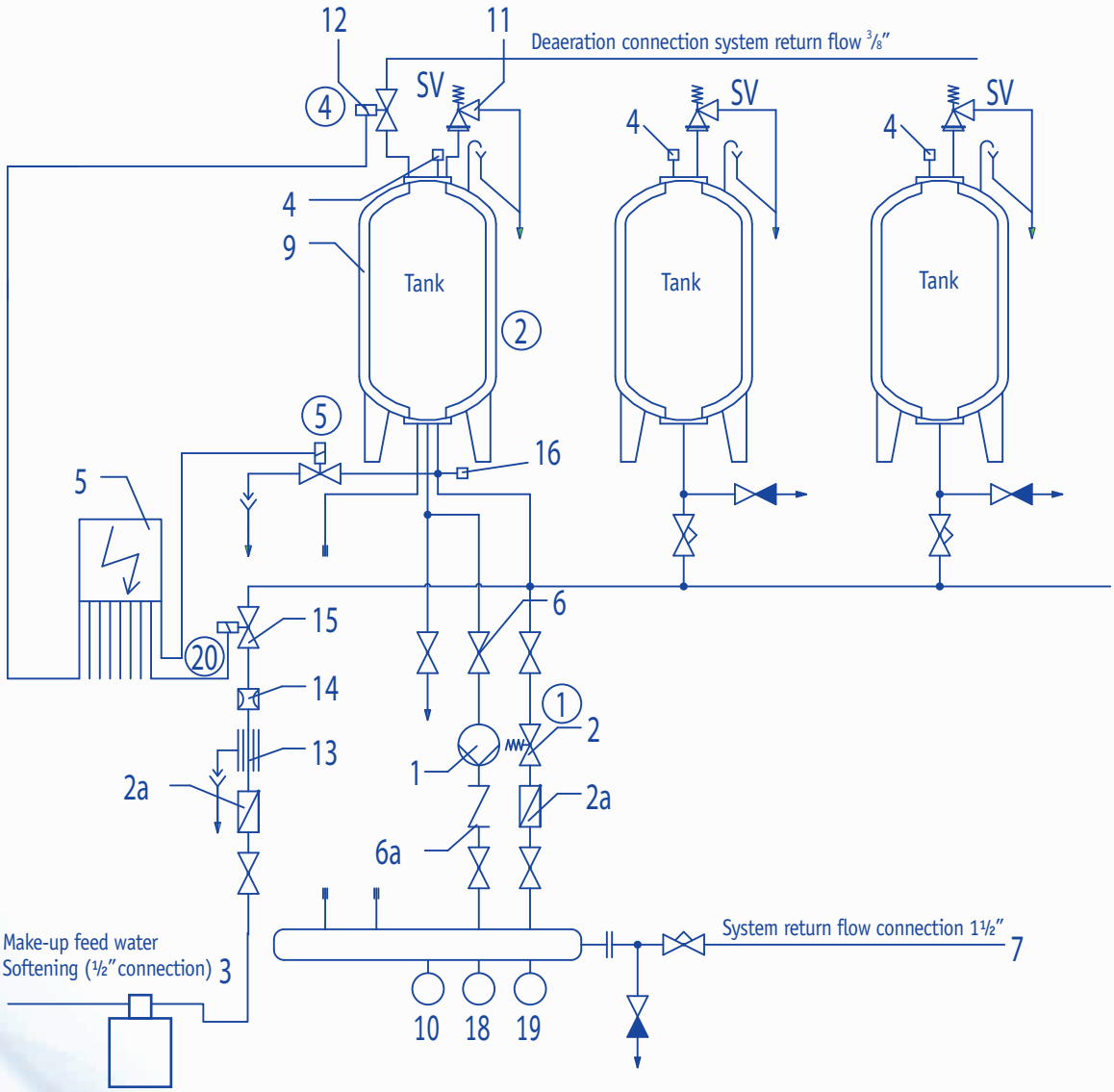
Static height (m)



NOVA 8
DUO NOVA 8
NOVA 7
DUO NOVA 7
NOVA 5
DUO NOVA 5
NOVA 3
DUO NOVA 3

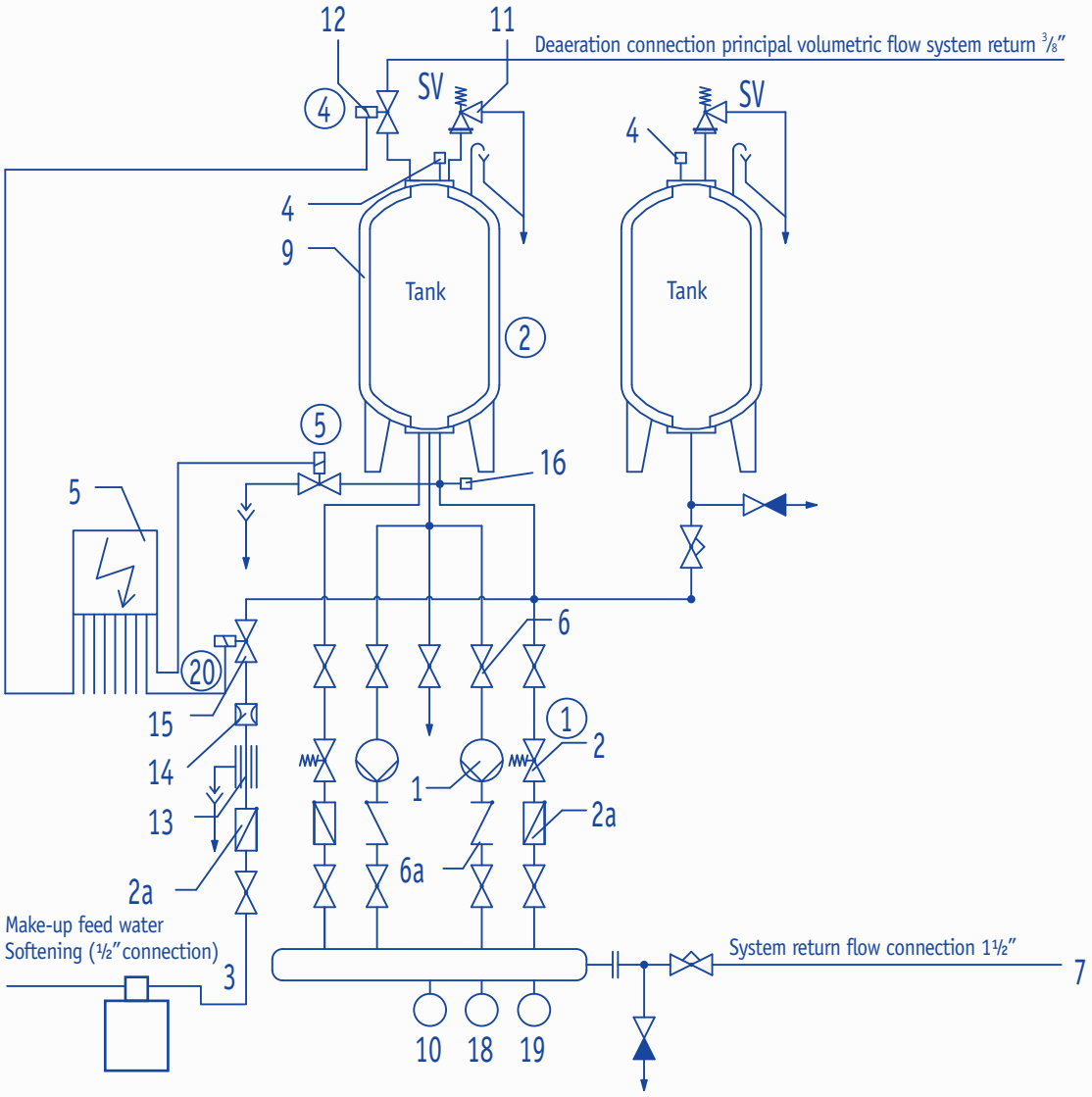
Q volumetric flow (m^3/h)

Flow sheet - Nova



1: Constant pressure pump
2: Relief valve
2a: Dirt trap
3: Make-up feed connection
4: Deaerating valve
5: Electrical control cabinet
6: Capped ball valve
6a: Capped ball valve with integrated return flow stopper
7: System connection (can be optionally used left/right)
8: Supporting frame
9: Membrane collecting tank
10: Pressure transmitter
11: Safety valve (when SV of the heat generator < 6.0 bar)
12: Solenoid valve (deaeration)
13: System disconnector
14: Water meter/Contact water meter
15: Solenoid valve (make-up feed)
16: Level detector/sensor or pressure transducer
17: Ventilation and venting elbow
18: Oxygen measurement point
19: Temperature measurement point
20: Drinking water connection

Flow sheet - Duo Nova



1: Constant pressure pump
2: Relief valve
2a: Dirt trap
3: Make-up feed connection
4: Deaerating valve
5: Electrical control cabinet
6: Capped ball valve
6a: Capped ball valve with integrated return flow stopper
7: System connection (can be optionally used left/right)
8: Supporting frame
9: Membrane collecting tank
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14: Water meter/Contact water meter
15: Solenoid valve (make-up feed)
16: Level detector/sensor or pressure transducer
17: Ventilation and venting elbow
18: Oxygen measurement point
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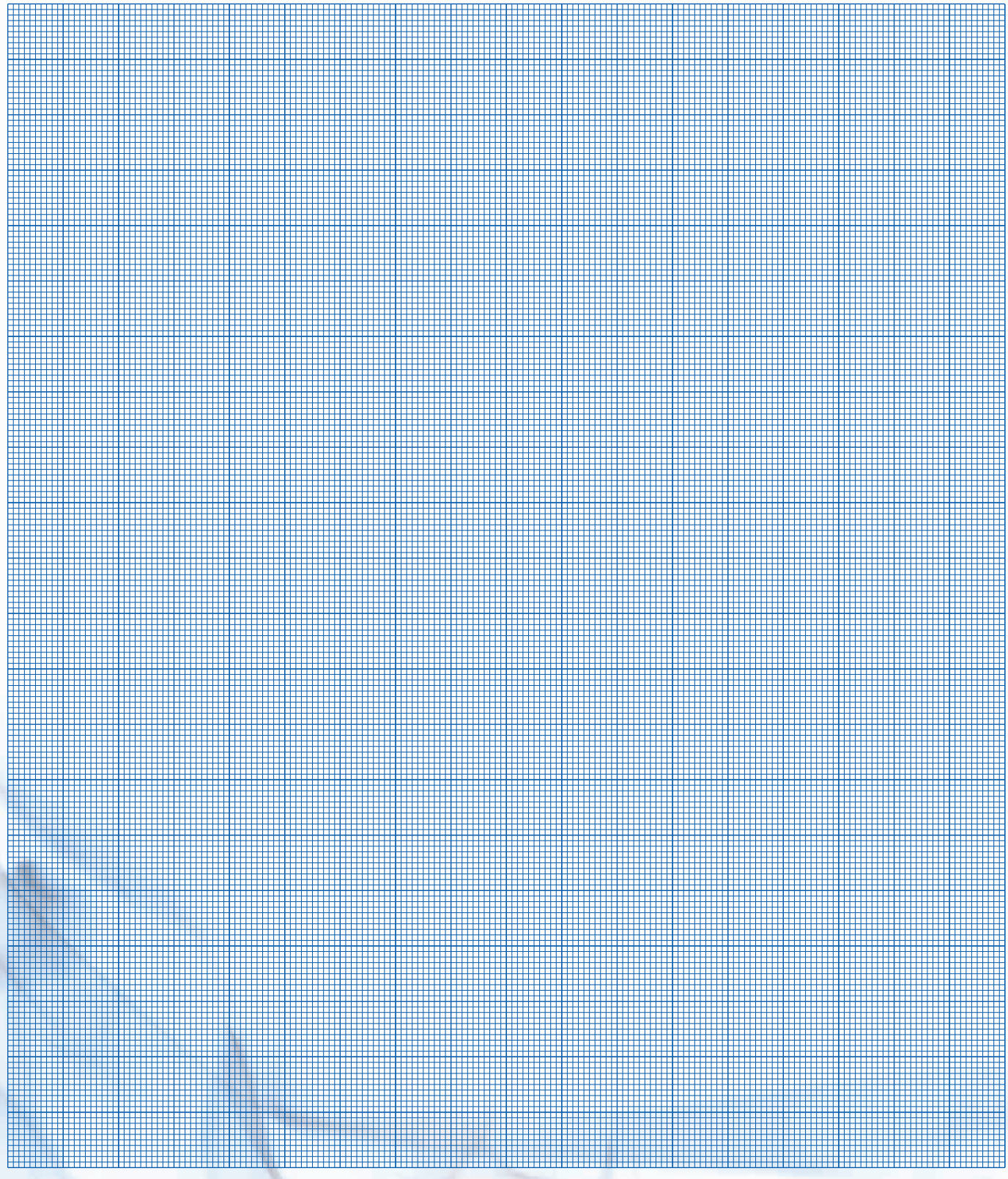
Notes:



Notes:

barnova

INNOVATIVE PRESSURE COMPETENCE

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