PRESSURISATION RANGE

PRESSURE TOP UP UNITS AND EXPANSION VESSELS



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Grundfos Pressurisation Equipment

The demand for having the most efficient circulation systems is steadily increasing and at Grundfos we are always striving to provide products and solutions that exceed our customers' expectations. Grundfos' advanced technological pumping systems and solutions reduce energy consumption and at the same time provide businesses with real economic savings and CO2 reductions.

Grundfos pressurisation equipment provides solutions to improve the overall performance and efficiency of heating and cooling installations. The key benefits of these products are to ensure that the fluid in the system is free from air and that system pressure is maintained, ensuring that the system runs at maximum efficiency. Our equipment improves reliability, saves energy, reduces maintenance costs and extends the life of the system.

Pressurisation

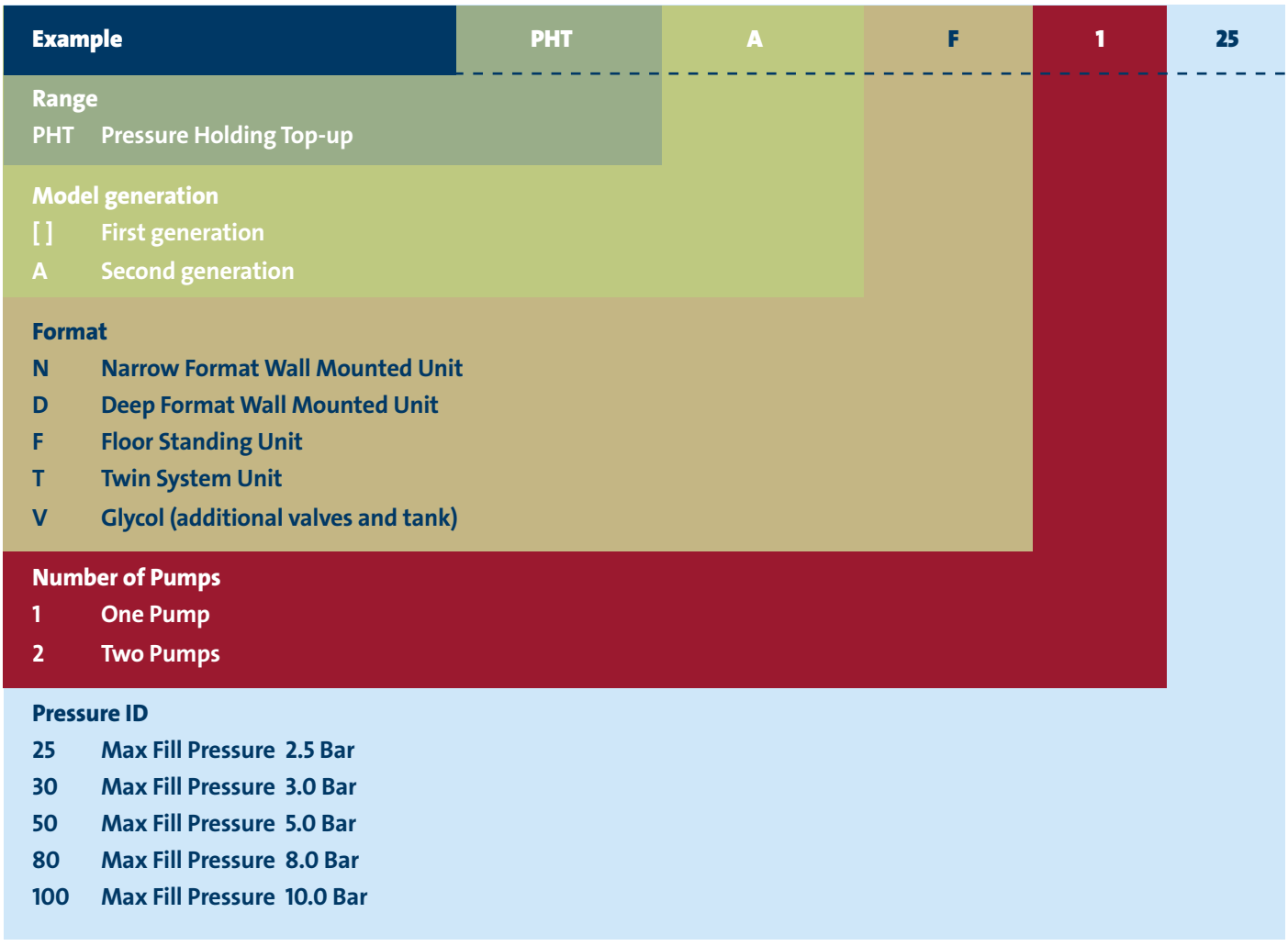
There are a number of advantages of using a more modern closed heating/cooling system as opposed to a traditional open system with a feed and expansion tank. The water used in sealed systems is constantly being reused, as a result the dissolved air is taken care of and exposed steel in traditional vessels is not subject to continued corrosion. Closed systems also do not require heavy roof top tanks and the associated pipework; therefore water loss due to evaporation is greatly reduced.

Closed systems also reduce installation cost. Their higher flow temperatures and greater temperature drops reduce the systems water circulation needs, enabling a smaller pump and pipes to be used. This combined with replacing the conventional header tank, associated pipework and lagging, leads to considerable savings.

Range Structure

The Grundfos pressure top-up portfolio offers a choice of formats and pump number and are available to match a variety of fill pressures.

Type Key



Mini Monopress and Mini Duopress Product introduction and Description

The Mini Pressurisation Unit is a compact wall mounted unit housing either one or two small pressurisation pumps and associated control equipment for connecting to small heating or cooling installations within large domestic dwellings or small industrial/commercial installations.



Standard Features

- powder coated casing
- front mounted system pressure gauge
- make-up tank complete with system filling valve assembly
- 0.7 to 2.5 bar pressure pump
- pressure control switch
- control circuit fuse, terminals and all necessary wiring to achieve the correct operation
- single (Monopress) or twin (Duopress) pump versions available

Suitable connections are provided to allow system makeup, tank overflow and connection to the system pipe work as well as electrical terminals for connecting the single phase, live, neutral and earth supply.

The **Mini Pressurisation unit** connection to the mains water is provided by a WRAS approved filling valve suitable for use with potable water. Complies to WRC byelaw 11 regulation.

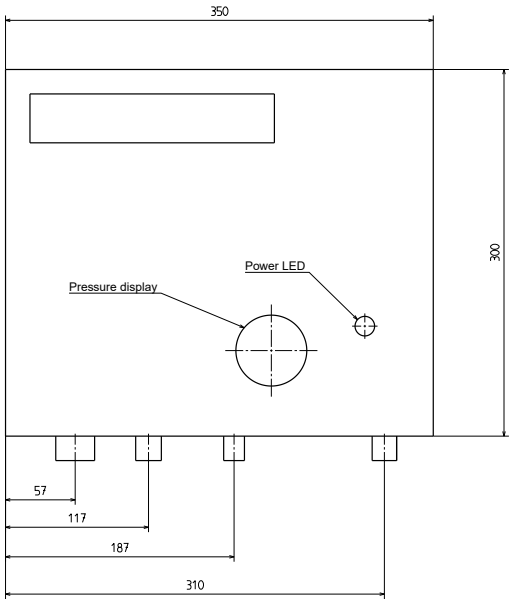
Operation

The pump is controlled directly by the control pressure switch. The control pressure switch has an adjustment for the cut-in pressure setting. The differential pressure setting is fixed at approximately 0.4 bar. The pump is stopped when the pressure is 0.4 bar above the cut-in pressure.

The twin pump **Mini Duopress** has a manual pump selector switch for selecting the duty pump. The duty pump must be changed over manually.

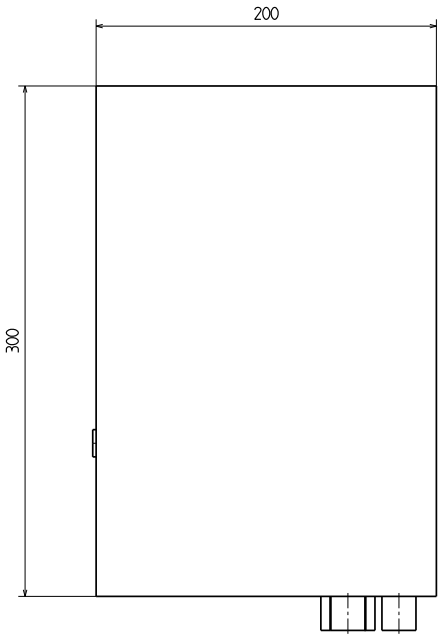
Maximum / Minimum Operating Conditions

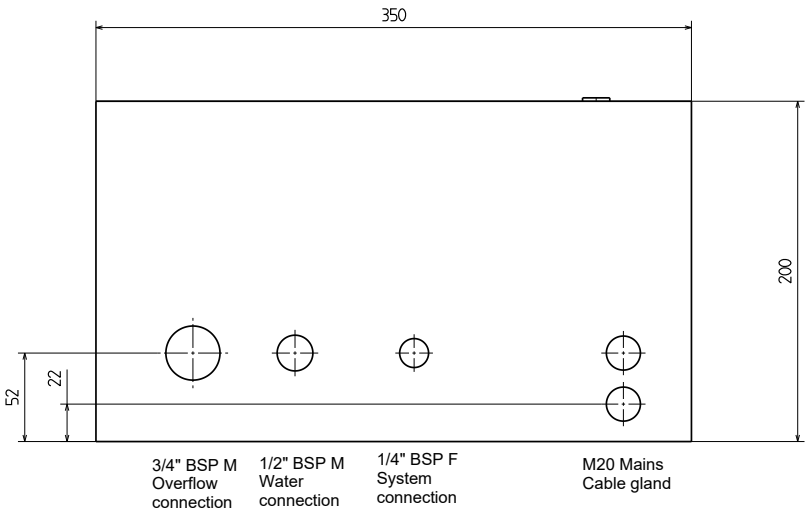
Electrical Supply: 230 v +10/-6 %
Fuse Protection: 2 A
Noise Level: <65 dB(A)
Liquid Temperature Range: +3°C to +40 °C
Usage: Indoor
Ambient Temperature: up to +40 °C
Relative Humidity: up to 95 % non-condensing
Max Inlet pressure: 6 bar
Generated Pressure: 2.5 bar



Mini Pressurisation Range Table

Product Name	Pressure switch	Pump Qty	Max cold fill (bar)	Power consumtion (W) (per pump)	Product Code
MINI MONOPRESS	CONTROL	1	2.5	25	MMP50801
MINI MONOPRESS	CONTROL + HI & LOW	1	2.5	25	MMP50802
MINI DUOPRESS	CONTROL + HI & LOW	2	2.5	25	MDP50802





Product Name	Dimensions (mm)			Connections (mm)			Break tank capacity (l)	Dry weight kg
	Width	Depth	Height	System	Mains	Drain		
MINI MONOPRESS	350	200	300	1/4"	1/2"	3/4"	4.5	8.5
MINI DUOPRESS	350	200	300	1/4"	1/2"	3/4"	4.5	11

PHT A - Pressure Holding Top-up Range

With a combination of reliable pumps, advanced control and a choice of external communication protocols, the new PHT A range of pressurisation units from Grundfos delivers peace of mind, energy efficiency and maximum system availability. Part of the extensive portfolio of packaged pump sets available from Grundfos, these intelligent systems are suitable for use in a wide range of residential, commercial and industrial applications.

Specifically created to efficiently maintain the required water pressure in sealed heating and cooling systems, the PHT A range comprises an advanced pressure monitoring system, reliable, energy efficient pumps and a break tank that incorporates a category 5 A/B air gap, preserving the integrity of the mains water supply while minimising space requirements.

To ease set-up, management and maintenance, set points and alarms can be changed via a simple but secure user interface combined with a local status display. This is enhanced by advanced component monitoring and reporting, and a choice of output communications protocols to provide diagnostic and remote status indication.

Pressure holding top-up units should be combined with a suitable expansion vessel (see page 17)

Selection

PHT A top-up equipment is selected against the required top-up pressure and in some cases the expected delivery flow rate required for top-up.

For convenience, wall mounted or floor standing formats can be chosen and in many cases the option to specify a second pump for duty assist and partial redundancy is available.

When two systems are needed, the twin system T-series provides the solution with minimal space requirements, while when glycol is present in the medium being pumped the PHT A V offers an automatic glycol mixing solution.

Location

The PHT A should be installed on the return header of the system on the suction side of the circulating pump.

The point of connection will be treated as the system neutral point, and the system expansion vessel should also be located at this connection.

Common Range Data

Unit Rating	PN10
Electrical Requirements	230V, 50Hz, 1 Phase
Noise Output	<75 dbA
Fluid Category Protection	5 AB Weir Overflow Air Gap

Required access for examination and service:

- minimum of 50 cm above all units
- minimum of 50 cm to the system connection side of all units
- minimum of 100 cm at the front of the units

PHT A N-Series

The A N-Series is narrow format wall mounted unit with a 2 litre break tank and is suitable for large residential or small commercial applications (guide maximum system volume up to 2500 litres).



Standard Features

- Simple, security coded user interface
- Event logging
- Low water sensor
- Durable powder coated enclosure

Maximum Operating Conditions

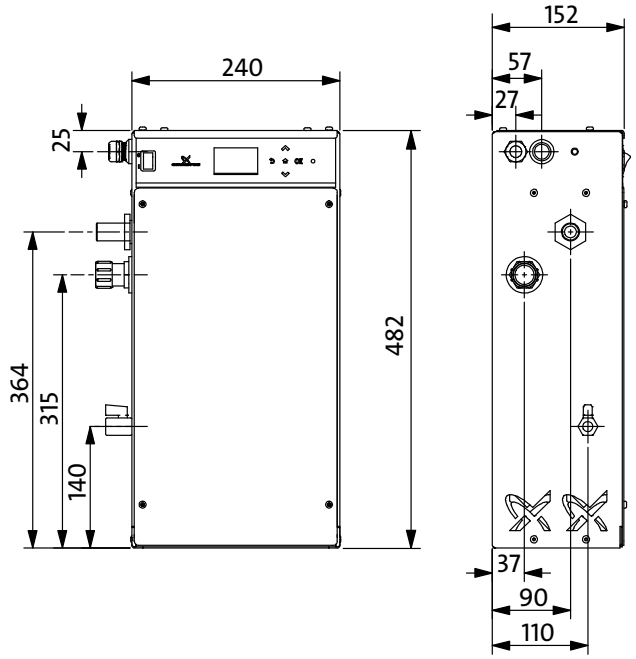
- Maximum system temperature 85°C
- Ambient temperature up to 40°C
- Relative humidity 95% non-condensing

Options

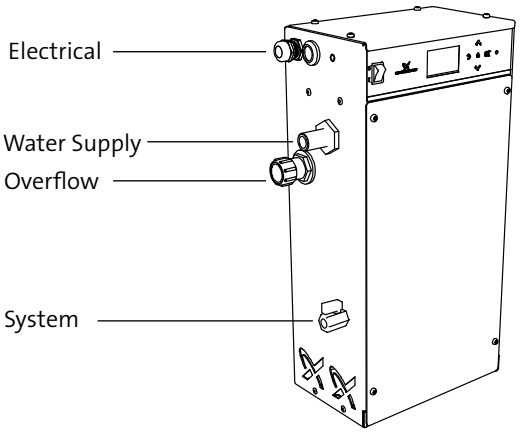
- Single or twin pump versions
- High water level sensor
- BACnet or MODBUS communications via Grundfos CIM

Product Name	Pump Qty	Max Cold Fill Pressure (bar)	Power Consumption (W)	Full Load Current (amps)	Dry Weight (Kg)	Product Code
PHT A N130	1	3	28	0.12	12	99264904
PHT A N230	2	3	28	0.12	13	99264947

Dimensions



Connections



Break Tank Capacity	Dimensions (mm)			Connections		
	Width	Depth	Height	System	Mains Supply	Drain
2 Litre	240	152	482	1/4"	1/2"	3/4"

PHT A D-Series (single pump units)

The D-Series is a deeper format wall mounted pressurisation unit with a 3.6 litre break tank.



Standard Features

- Simple, security coded user interface
- Event logging
- Low water level sensor
- Durable powder coated enclosure

Maximum Operating Conditions

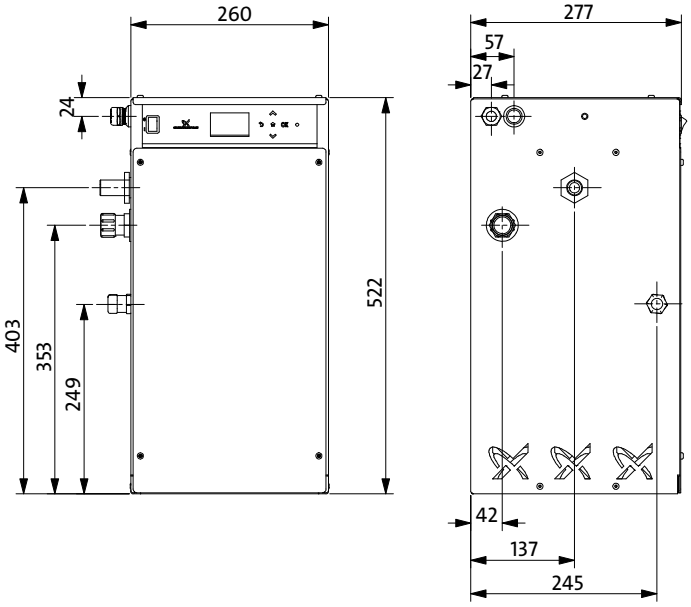
- Maximum system temperature 85°C
- Ambient temperature up to 40°C
- Relative humidity 95% non-condensing

Options

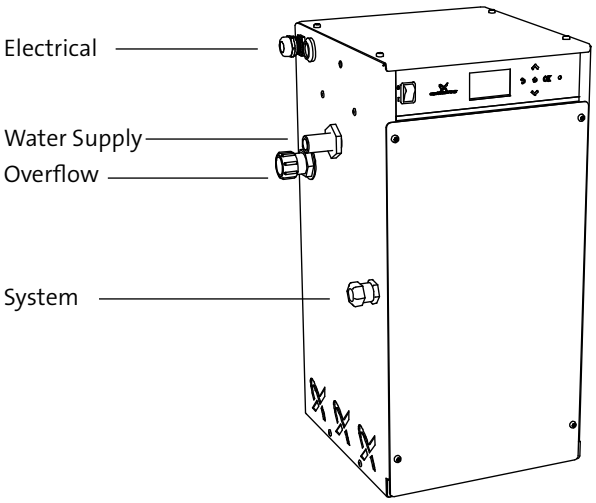
- High water level sensor
- BACnet or MODBUS communications via Grundfos CIM

Product Name	Pump Qty	Max Cold Fill Pressure (bar)	Power Consumption (KW)	Full Load Current (amps)	Dry Weight (Kg)	Product Code
PHT A D125	1	2.5	0.41	1.83	20	99264948
PHT A D150	1	5	0.9	3.94	21	99264949

Dimensions



Connections



Break Tank Capacity	Pump Qty	Dimensions (mm)			Connections		
		Width	Depth	Height	System	Mains Supply	Drain
3.6 Litre	1	260	277	522	1/2"	1/2"	3/4"

PHT A D-Series (twin pump units)

The D-Series is a deeper format wall mounted pressurisation unit with a 3.6 litre break tank. Twin pumps for duty and standby with automatic switchover.



Standard Features

- Simple, security coded user interface
- Event logging
- Low water level sensor
- Durable powder coated enclosure

Maximum Operating Conditions

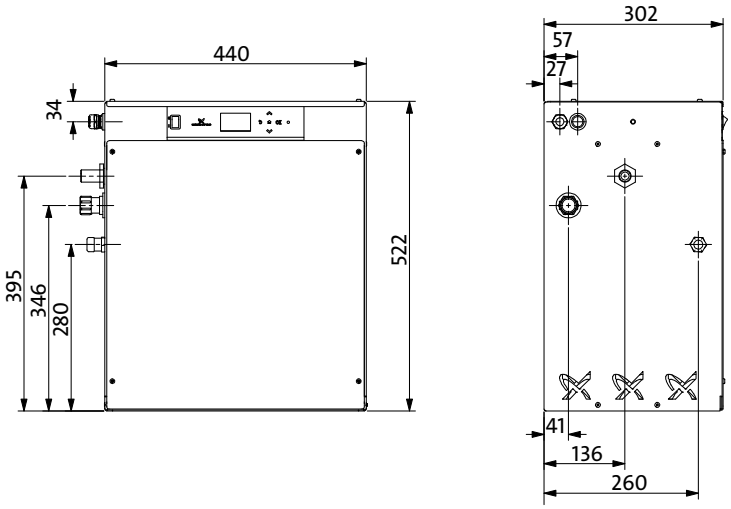
- Maximum system temperature 85°C
- Ambient temperature up to 40°C
- Relative humidity 95% non-condensing

Options

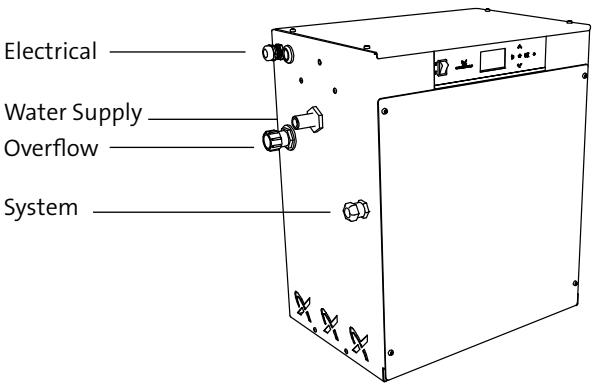
- High water level sensor
- BACnet or MODBUS communications via Grundfos CIM

Product Name	Pump Qty	Max Cold Fill Pressure (bar)	Power Consumption (kW)	Full Load Current (amps)	Dry Weight (Kg)	Product Code
PHT A D225	2	2.5	0.41	1.83	29	99264951
PHT A D250	2	5	0.9	3.94	30	99264952

Dimensions



Connections



Break Tank Capacity	Dimensions (mm)			Connections		
	Width	Depth	Height	System	Mains Supply	Drain
3.6 Litre	440	302	522	½"	½"	¾"

PHT A F-Series

The F-Series is a floor standing top-up pressurisation unit with a 17.5 litre break tank, for use in medium sized commercial systems.



Standard Features

- Simple, security coded user interface
- Event logging
- Low water level sensor
- Durable powder coated enclosure

Maximum Operating Conditions

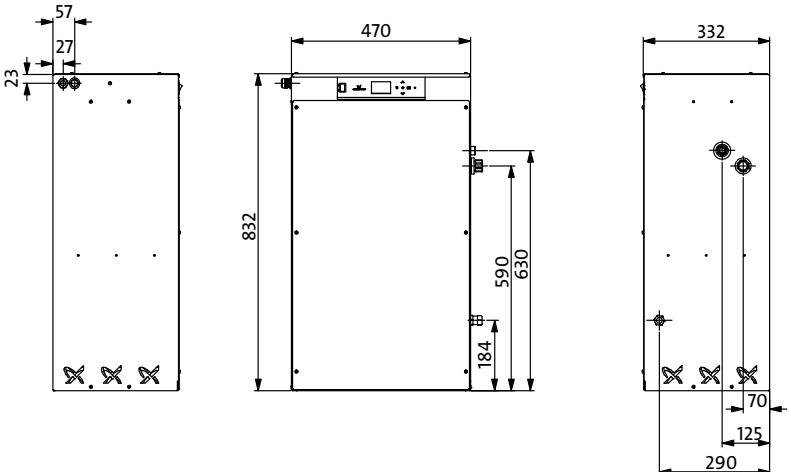
- Maximum system temperature 85°C
- Ambient temperature up to 40°C
- Relative humidity 95% non-condensing

Options

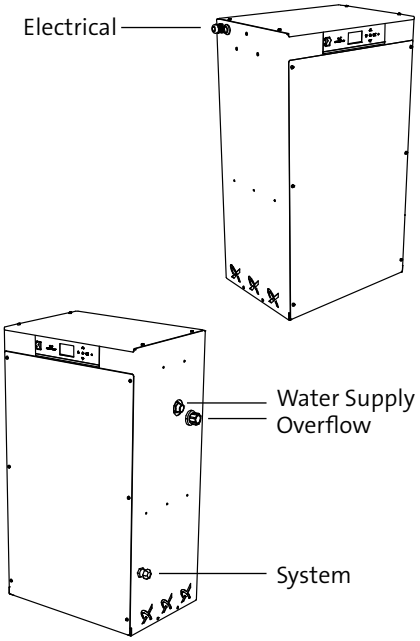
- Single or twin pump versions
- High water level sensor
- BACnet or MODBUS communications via Grundfos CIM

Product Name	Pump Qty	Max Cold Fill Pressure (bar)	Power Consumption (KW)	Full Load Current (amps)	Dry Weight (Kg)	Product Code
PHT A F 125	1	2.5	0.41	1.83	31	99264963
PHT A F 225	2	2.5	0.41	1.83	38	99264966
PHT A F 150	1	5	0.9	3.94	32	99264964
PHT A F 250	2	5	0.9	3.94	39	9964967
PHT A F 180	1	8	1.15	5.2	37	99264964
PHT A F 280	2	8	1.15	5.2	46	99264968

Dimensions



Connections



Break Tank Capacity	Dimensions (mm)			Connections		
	Width	Depth	Height	System	Mains Supply	Drain
17.5 Litre	470	332	832	½"	½"	¾"

PHT A T-Series

The twin system T-Series is ideal where space restrictions make it beneficial to locate two systems in a single enclosure. Floor standing, this system combines two top-up pressurisation units with a single 17.5 litre break tank.



Standard Features

- Simple, security coded user interface
- Event logging
- Low water sensor
- Durable powder coated enclosure
- WRAS approved components

Maximum Operating Conditions

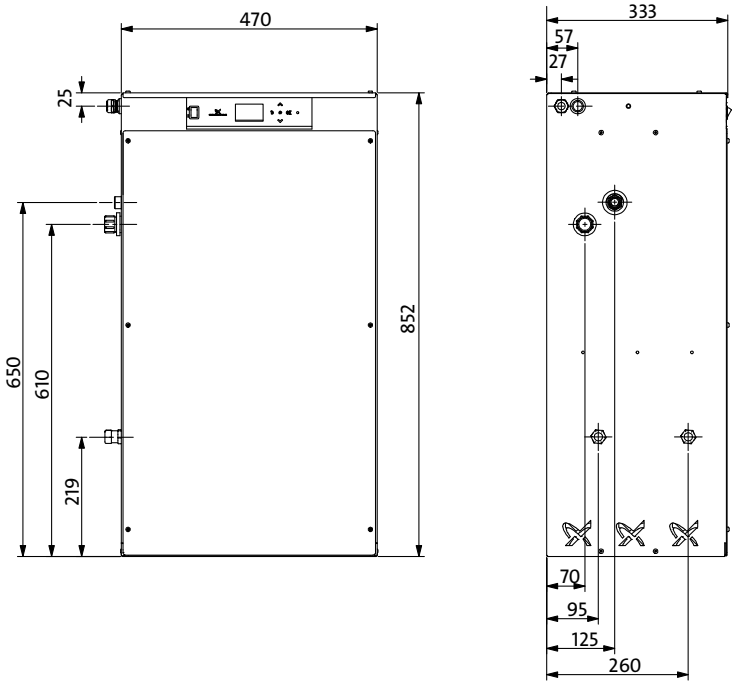
- Maximum system temperature 85°C
- Ambient temperature up to 40°C
- Relative humidity 95% non-condensing

Options

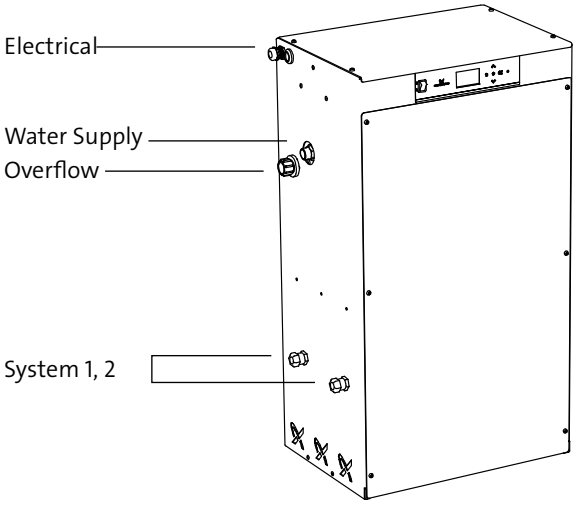
- High water level sensor
- BACnet or MODBUS communications via Grundfos CIM

Product Name	Pump Qty	Max Cold Fill Pressure (bar)	Power Consumption (KW)	Full Load Current (amps)	Dry Weight (Kg)	Product Code
PHT A T225	2	2.5	0.41	1.83	41	99264969
PHT A T250	2	5	0.9	3.94	42	99264970

Dimensions



Connections



Break Tank Capacity	Dimensions (mm)			Connections		
	Width	Depth	Height	System	Mains Supply	Drain
17.5 Litre	470	333	850	2 x ½"	½"	¾"

PHT A V-Series

The V-Series is a floor standing, glycol mixing top-up pressurisation unit. Each time the V-Series tops up the system with water, it also automatically adds glycol from a dedicated tank at a predetermined rate, reducing manual intervention and maximising system protection.



Standard Features

- Simple, security coded user interface
- Event logging
- Low water sensor
- Durable powder coated enclosure

Maximum Operating Conditions

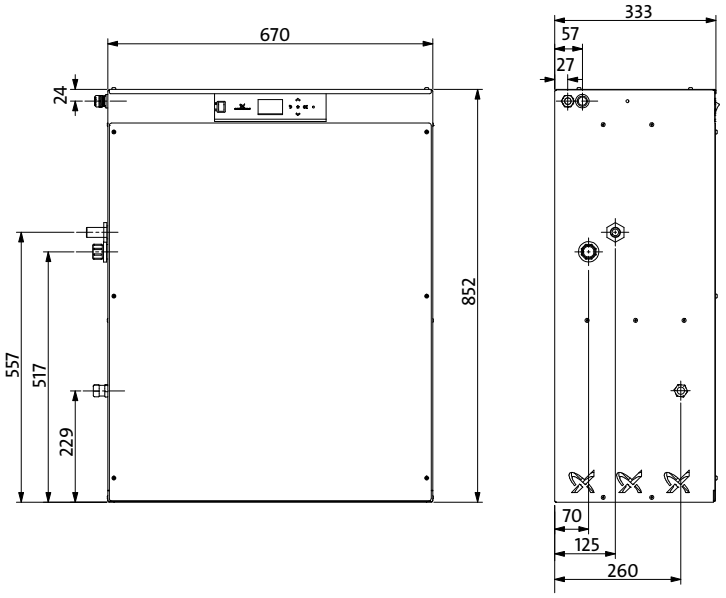
- Maximum system temperature 85°C
- Ambient temperature up to 40°C
- Relative humidity 95% non-condensing

Options

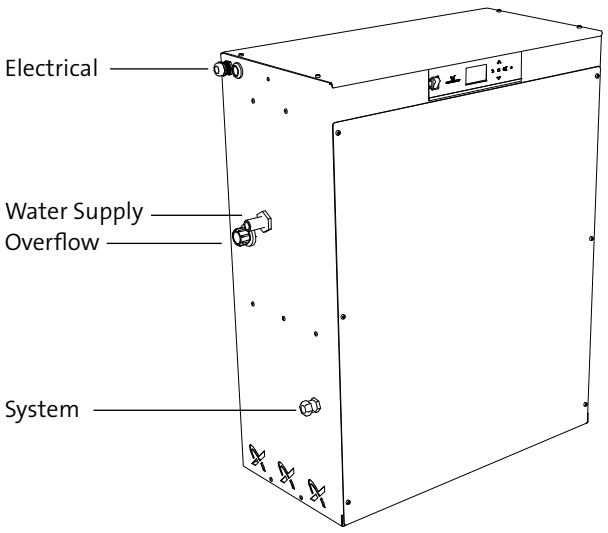
- High water level sensor
- BACnet or MODBUS communications via Grundfos CIM

Product Name	Pump Qty	Max Cold Fill Pressure (bar)	Power Consumption (KW)	Full Load Current (amps)	Dry Weight (Kg)	Product Code
PHT A V225	2	2.5	0.41	1.83	56	99264977
PHT A V250	2	5	0.9	3.94	58	99264979

Dimensions



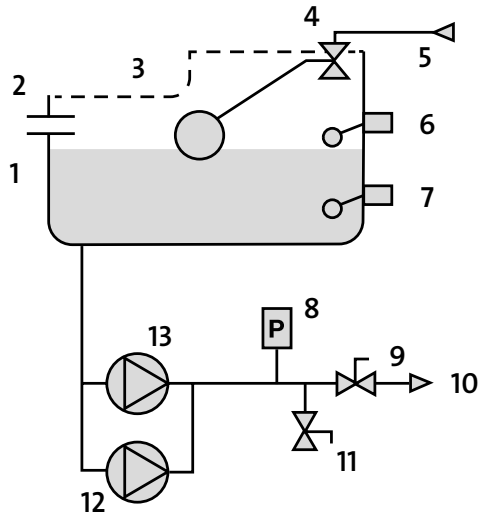
Connections



Break Tank Capacity	Glyco Tank Capacity	Dimensions (mm)			Connections		
		Width	Depth	Height	System	Mains Supply	Drain
3.6 Litre	17.5 Litre	670	333	852	1/2"	1/2"	3/4"

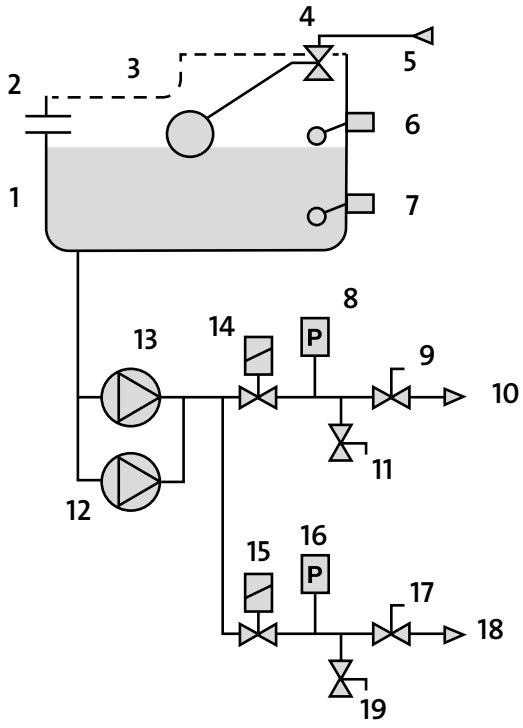
Standard Pressurisation Unit
(PHT A N/D/F models)

1. Break tank
2. Drain overflow
3. Weir overflow
4. Float valve
5. Water supply
6. High level float switch
7. Low level float switch
8. System pressure transmitter
9. System isolation valve
10. System connection
11. Drain valve
12. Pump 1
13. Pump 2



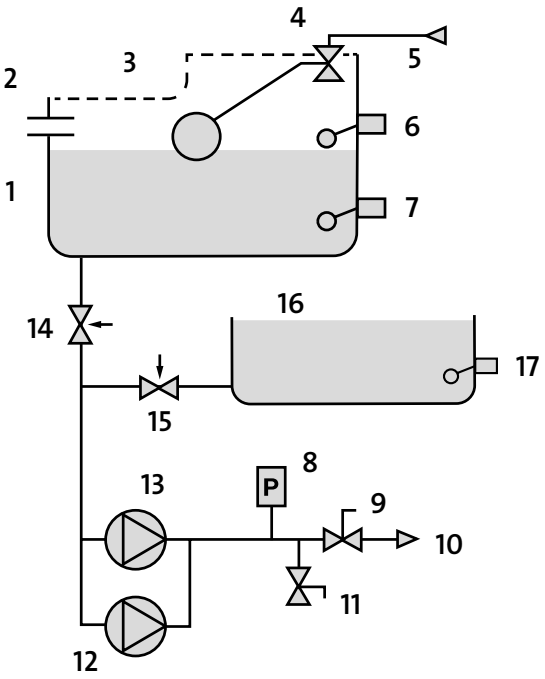
Twin System Pressurisation Unit
(PHT A T models)

1. Break tank
2. Drain overflow
3. Weir overflow
4. Float valve
5. Water supply
6. High level float switch
7. Low level float switch
8. System 1 pressure transmitter
9. System 1 isolation valve
10. System 1 connection
11. Drain valve
12. Pump 1
13. Pump 2
14. System 1 solenoid valve
15. System 2 solenoid valve
16. System 2 pressure transmitter
17. System 2 isolation valve
18. System 2 connection
19. Drain valve



Glycol Pressurisation unit
(PHT A V models)

1. Break tank
2. Drain overflow
3. Weir overflow
4. Float valve
5. Water supply
6. High level float switch
7. Low level float switch
8. System pressure transmitter
9. System isolation valve
10. System connection
11. Drain valve
12. Pump 1
13. Pump 2
14. Water flow regulator
15. Glycol flow regulator
16. Glycol tank
17. Low glycol float switch



Model	Mini Monopress	Mini Doupress	PHT A				
			N-Series	D-Series	F-Series	T-Series	V-Series
Mechanical Features							
Cabinet	●	●	●	●	●	●	●
Wall mounted	●	●	●	●	●		
Floor mounted			●	●	●	●	●
Single pump	●		●	●	●		
Duty / standby pumps		M*	○	○	○	●	●
Glycol mix							●
De- gasser							
Twin system						●	
Pump non return valve	●	●	●	●	●	●	●
Common outlet isolation valve			●	●	●	●	●
Category 5 A/B air gap	●	●	●	●	●	●	●
Electrical Features							
Pressure transducer control	S*	S*	●	●	●	●	●
Password protection			●	●	●	●	●
LED display			●	●	●	●	●
Pump trip monitoring			●	●	●	●	●
System flood detection			●	●	●	●	●
Service due reminder			●	●	●	●	●
Adjustable pressure differential			●	●	●	●	●
Manual run			●	●	●	●	●
Low water alarm			●	●	●	●	●
High water alarm			○	○	○	○	○
Excessive starts alarm			●	●	●	●	●
Hours run			●	●	●	●	●
Pump activation counter			●	●	●	●	●
Alarm logging			●	●	●	●	●
Anti seize run (30/60/90 days)			●	●	●	●	●
Automatic duty rotation (twin pump units)			●	●	●	●	●
MODBUS (via CIM card)			○	○	○	○	○
BACnet (via CIM card)			○	○	○	○	○
USB software update port			●	●	●	●	●
Audible alarm			●	●	●	●	●
Status LED			●	●	●	●	●
Volt Free Contacts -8A/230v							
System interlock	○	●	●	●	●	1(x2)	●
General Fault			●	●	●	●	●
Programmable outputs			3	3	3	2	3

Key

● Standard ○ Option M - manual switch over S - pressure switch

PHT Range Table

Product Name	Pump Quantity	Maximum Fill Pressure (bar)	Power Consumption (KW)	Full Load Current (amps)	Product Code
PHT A N130	1	3	0.028	0.12	99264904
PHT A N230	2	3	0.028	0.12	99264947
PHT A D125	1	2.5	0.41	1.83	99264948
PHT A D150	1	5	0.9	3.94	99264949
PHT A D225	2	2.5	0.41	1.83	99264951
PHT A D250	2	5	0.9	3.94	99264952
PHT A F125	1	2.5	0.41	1.83	99264963
PHT A F150	1	5	0.9	3.94	99264964
PHT A F180	1	8	0.15	5.2	99264965
PHT A F225	2	2.5	0.41	1.83	99264966
PHT A F250	2	5	0.9	3.94	99264967
PHT A F280	2	8	1.15	5.2	99264968
PHT A T225	2	2.5	0.41	1.839	99264969
PHT A T250	2	5	0.9	3.94	99264970
PHT A V225	2	2.5	0.41	1.83	99264977
PHT A V250	2	5	0.9	3.94	99264979

BUS communication and High Level Alarm options:

High water level alarm can be provided as option, must be requested at time of order.
BACnet and Modbus communication modules are available as accessories

PHT Range Dimensions Table

Product Name	Dimensions (mm)			Connections			Dry Weight (Kg)
	Width	Depth	Height	System	Mains	Overflow	
PHT A N130	240	152	482	1/4"	1/2"	3/4"	12
PHT A N230	240	152	482	1/4"	1/2"	3/4"	13
PHT A D125	260	277	522	1/2"	1/2"	3/4"	20
PHT A D150	260	277	522	1/2"	1/2"	3/4"	21
PHT A D225	440	302	522	1/2"	1/2"	3/4"	29
PHT A D250	440	302	522	1/2"	1/2"	3/4"	30
PHT A F125	470	332	832	1/2"	1/2"	3/4"	31
PHT A F150	470	332	832	1/2"	1/2"	3/4"	32
PHT A F180	470	332	832	1/2"	1/2"	3/4"	37
PHT A T225	470	332	832	1/2"	1/2"	3/4"	38
PHT A T250	470	332	832	1/2"	1/2"	3/4"	39
PHT A F280	470	332	832	1/2"	1/2"	3/4"	46
PHT A T225	470	333	850	2X 1/2"	1/2"	3/4"	41
PHT A T250	470	333	850	2X 1/2"	1/2"	3/4"	42
PHT A V225	670	333	852	1/2"	1/2"	3/4"	56
PHT A V250	670	333	852	1/2"	1/2"	3/4"	58

Expansion Vessels

Expansion vessels are small tanks used to protect closed water heating and cooling systems from excessive pressure. The tank is partially filled with air or nitrogen, whose compressibility cushions shock caused by water hammer and absorbs excess water pressure caused by thermal expansion.

Traditional expansion tanks were larger and had no rubber diaphragm separating the water from the air pocket. This meant air gradually dissolved in to the water and transferred to the highest part of the system. As a result vessels regularly needed to be drained and systems bled of air to avoid corrosion and bacterial growth.

Sealed expansion vessels are divided in two by a rubber diaphragm. One side is connected to the pipe work of the heating system and therefore contains water. The other, the dry side, contains nitrogen gas under pressure, and a Schrader valve, similar to a car tyre valve, for checking pressures and adding nitrogen. When the heating system is empty, or at the low end of the normal range of working pressure, the diaphragm will be pushed against the water inlet. As the water pressure increases, the diaphragm moves, compressing the nitrogen on its other side.

The rubber diaphragm in expansion tanks prevents the undesirable transfer of air and helps maintain low levels of oxygen, reducing corrosion in the system and saving on maintenance costs.



GT-HR 6 Bar Rated Expansion Vessels

The GT-HR 6 bar vessel range is suitable for use in sealed heating and chilled systems.



Features

- low-carbon sheet steel shell
- non- replaceable SBR rubber diaphragm
- liquid compartment with a polypropylene liner (PP)
- threaded connection
- available in a variety of sizes

Installation

To ensure that the temperature at the diaphragm does not exceed 70°C (system flow <90°C), the vessel should be installed on the coldest part of the system, typically the return pipe to the heat exchanger. For systems running at elevated temperatures (system flow >90°C), an intermediate vessel may be required to provide additional heat dissipation.

Product Name	Maximum Working Pressure	Vessel Efficiency	Connection	Volume	Dimensions (mm)		Weight	Product Code
	(Bar)	%	BSP M	(L)	Diameter	Height	(Kg)	
GT-HR-8 PN6 G3/4 V	6	50	R ¾	8	206	305	1.9	96573376
GT-HR-12 PN6 G3/4 V	6	50	R ¾	12	280	275	2.6	96573377
GT-HR-18 PN6 G3/4 V	6	50	R ¾	18	280	380	3.5	96573378
GT-HR-25 PN6 G3/4 V	6	50	R ¾	25	280	490	4.6	96573390
GT-HR-35 PN6 G3/4 V	6	50	R ¾	35	354	460	5.4	96573393
GT-HR-50 PN6 R3/4 V	6	50	R ¾	50	409	493	12.5	96573395
GT-HR-80 PN6 R1 V	6	50	R1	80	480	565	17	96573396
GT-HR-100 PN6 R1 V	6	50	R1	100	480	670	20.5	96573397
GT-HR-140 PN6 R1 V	6	50	R1	140	480	912	28.6	96573398
GT-HR-200 PN6 R1 V	6	50	R1	200	634	758	36.7	96573399
GT-HR-250 PN6 R1 V	6	50	R1	250	634	888	45	96573400
GT-HR-300 PN6 R1 V	6	50	R1	300	634	1092	52	96573401
GT-HR-400 PN6 R1 V	6	50	R1	400	740	1102	65	96573403
GT-HR-500 PN6 R1 V	6	50	R1	500	740	1312	79	96573404
GT-HR-600 PN6 R1 V	6	50	R1	600	740	1531	85	96573405
GT-HR-800 PN6 R1 V	6	50	R1	800	740	1996	103	96573407
GT-HR-1000 PN6 R1 V	6	50	R1	1000	740	2406	120	96573408

GT-U+ 10 Bar Rated Expansion Vessels

Grundfos GT-U+ expansion vessels are suitable for use in sealed heating and chilled systems.



Features:

- low-carbon sheet steel shell
- replaceable butyl bladder
- built-in pressure gauge
- threaded connection
- WRAS approved
- available in a variety of sizes

Installation

To ensure that the temperature at the diaphragm does not exceed 70°C (system flow <90°C), the vessel should be installed on the coldest part of the system, typically the return pipe to the heat exchanger.
For systems running at elevated temperatures (system flow >90°C), an intermediate vessel may be required to provide additional heat dissipation.

Product Name	Vessel Maximum Working Pressure	Vessel Efficiency	Connections	Volume	Dimensions (mm)		Weight	Product Code
	(Bar)	%	BSP M	(L)	Diameter	Height	(Kg)	
GT-U+ 100 PN 10	10	50	1"	100	453	983	76.5	99082696
GT-U+ 150 PN10	10	50	1"	150	504	1056	91.5	99082697
GT-U+ 200 PN10	10	50	1¼"	200	604	1103	123.3	99082698
GT-U+ 300 PN10	10	50	1 ¼"	300	654	1286	148.3	99082699
GT-U+ 500 PN10	10	50	1 ¼"	500	754	1561	195.5	99082700
GT-U+ 750 PN10	10	50	2"	750	756	1834	231	99082701
GT-U+ 1000 PN10	10	50	2"	1000	806	2376	327.5	99082702
GT-U+ 1500 PN10	10	50	2"	1500	958	2435	391.5	99082703

GT-U+ 16 Bar Rated Expansion Vessels

Grundfos GT-U+ expansion vessels are suitable for use in sealed heating and chilled systems.



Features:

- low-carbon sheet steel shell
- replaceable butyl bladder
- built-in pressure gauge
- threaded connection
- WRAS approved
- available in a variety of sizes

Installation

To ensure that the temperature at the diaphragm does not exceed 70°C (system flow <90°C), the vessel should be installed on the coldest part of the system, typically the return pipe to the heat exchanger.

For systems running at elevated temperatures (system flow >90°C), an intermediate vessel may be required to provide additional heat dissipation.

Product Name	Vessel Maximum Working Pressure	Maximum Vessel Efficiency	Connections	Volume	Dimensions (mm)		Weight	Product Code
	(Bar)	%	BSP M	(L)	Diameter	Height	(Kg)	
GT-U+ 100 PN16	16	50	1 "	100	454	983	76.5	99082706
GT-U+ 150 PN16	16	50	1 "	150	506	1058	91.5	99082707
GT-U+ 200 PN16	16	50	1 ¼"	200	606	1105	123.3	99082708
GT-U+ 300 PN16	16	50	1 ¼"	300	656	1288	148.3	99082709
GT-U+ 500 PN16	16	50	1 ¼"	500	760	1565	254.5	99082710
GT-U+ 750 PN16	16	50	2"	750	760	1862	297.5	99082711
GT-U+ 1000 PN16	16	50	2"	1000	810	2367	409.5	99082712
GT-U+ 1500 PN16	16	50	2"	1500	962	2443	498	99082713
GT-U+ 2000 PN16	16	50	2"	2000	1116	2511	717	99082714
GT-U+ 3000 PN16	16	50	2 ½"	3000	1216	2938	1055	99082715

Vessel Selection Calculation

The following guidance is provided to assist with selection of the correct vessel for your application and uses calculations that conform to BS 7074. However, if you prefer, Grundfos are happy to assist you with your selection.

Vessel sizing centres around determining the minimum vessel sizing based upon the Expanded Volume of the system and the lower of either the Maximum Vessel Efficiency (see table on preceding pages) or the Acceptance Factor as below

$$\textbf{Minimum system vessel size} = \frac{\textbf{Expanded Volume}}{\textbf{Maximum Vessel Efficiency OR Acceptance Factor}} \textbf{ +10\%}$$

The Expanded Volume is the volume by which system water expands as it is heated and can be calculated from the water temperature with the assistance of standard reference tables. To provide a level of safety the maximum flow temperature should be used, not the average temperature. When the quantity of water in the system is unknown an approximation can be used: 12 litres of system water per 1kW of thermal input. For chilled systems Grundfos work with 18 litres per kW of thermal input when the actual volume is unknown.

Expanded Volume = Volume x Coefficient at Maximum Flow Temperature

EXAMPLE
For a system with a 100kW boiler we can estimate the water volume is 1200 litres.
If the max. flow temperature is 82°C, tables give an expansion coefficient of 3.02%

Expanded Volume = 1200 x 3.02% = 36.24 litres

The Maximum Vessel Efficiency is the design specification of the vessel, as shown on pages 16-18, whereas the Acceptance Factor takes into account the limitations that may be placed on the Maximum Vessel Efficiency by the design of a specific system. As the lower of the two values must be used in sizing it is important to confirm the Acceptance Factor for your specific system. This is done using the calculation below:

$$\textbf{Acceptance Factor} = \frac{\textbf{Maximum System Working Pressure (absolute) - Cold Fill Pressure (absolute)}}{\textbf{Maximum System Working Pressure (absolute)}}$$

Note the use of absolute pressures ie the requirement to add 1.0 bar atmospheric pressure to measured values.

Cold Fill Pressure is calculated from the static height, plus 0.3 bar to expel air.

Note: Cold Fill Pressure (including 0.3 bar to expel air) must not be less than 0.7 bar ie 1.7 bar(absolute).

EXAMPLE
For a system with Maximum Working Pressure 3.0 bar at the pressurisation set and a static height of 7.0 metres

$$\textbf{Cold Fill Pressure} = \left(\frac{\textbf{7.0 metres}}{\textbf{10}}\right) \textbf{ bar + 0.3 bar = 0.7 bar + 0.3 bar = 1.0 bar (or 2 bar absolute)}$$

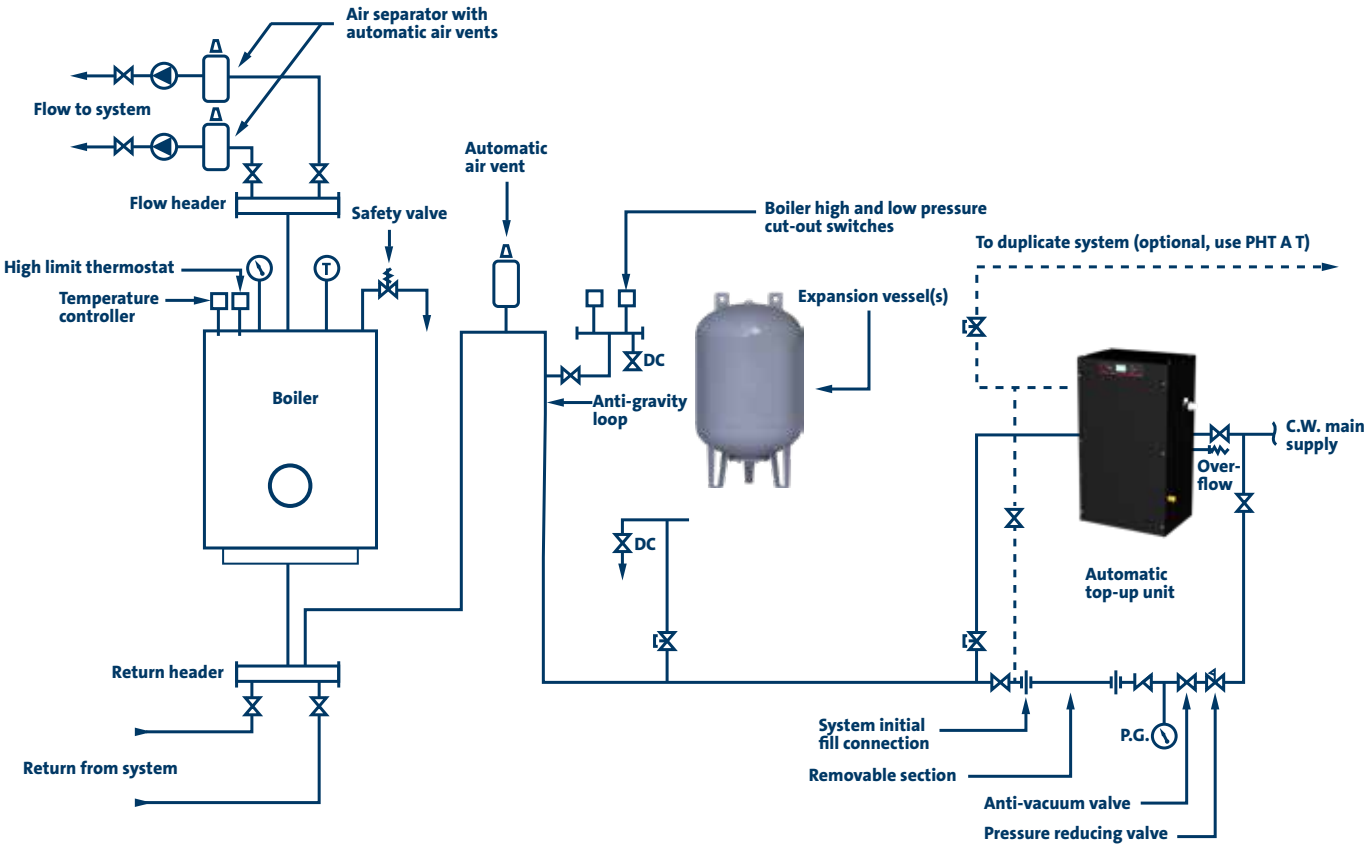
$$\textbf{Acceptance Factor} = \frac{\textbf{(3.0 + 1.0) – (1.0 + 1.0)}}{\textbf{(3.0 + 1.0)}} = \frac{\textbf{2}}{\textbf{4}} \textbf{ = 0.5}$$

$$\textbf{Minimum Vessel Size} = \frac{\textbf{36.24 litres}}{\textbf{0.5}} \textbf{ + 10\% = 79.73 litres}$$

Looking at the 6 bar pressure vessel range on page 16, the smallest vessel size is 80 litres. A check shows this vessel has a Maximum Vessel Efficiency of 50%, which is not smaller than the Acceptance Factor for the example system. This means an 80 litre vessel is the correct size to select.

We realise using the above calculations can be time consuming and Grundfos is available to assist you with vessel selection if required.

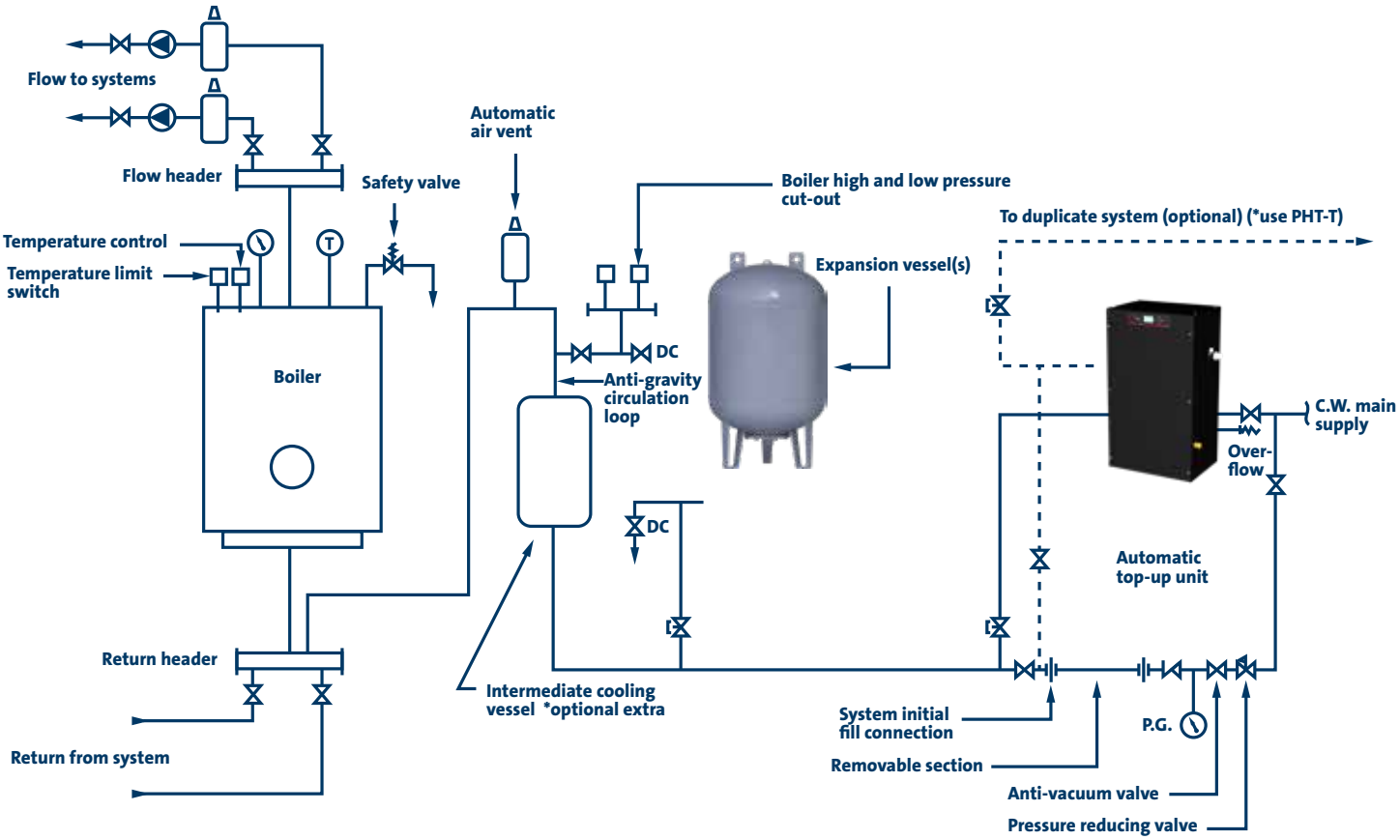
Low temperature heating water system (Typical Installation)



Key

- Lockshield valve
- Non-return valve
- Pressure reducing valve
- Gate valve
- Temperature gauge
- Pressure gauge
- Pump
- DC Draincock
- Safety valve

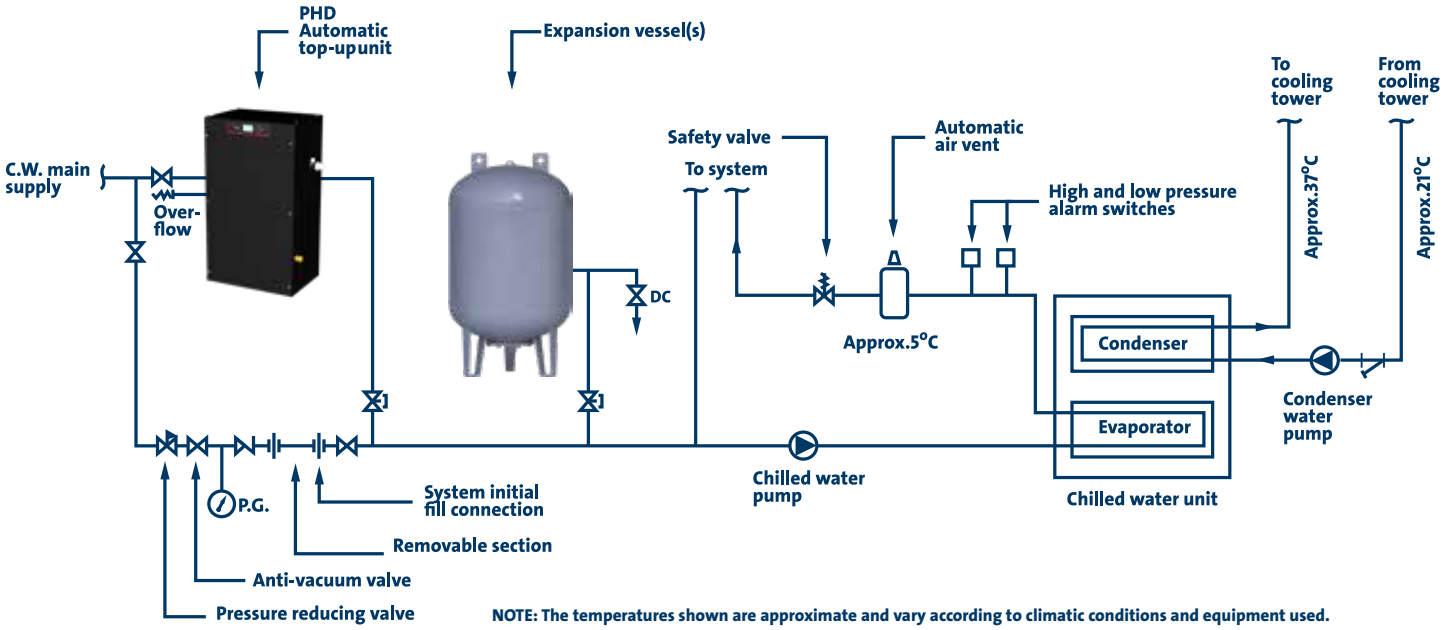
Medium temperature heating water system (Typical Installation)



Key

Lockshield valve	Non-return valve	Pressure reducing valve	Gate valve	Temperature gauge
Pressure gauge	Pump	DC Draincock	Safety valve	

Chilled water system (Typical Installation)



NOTE: The temperatures shown are approximate and vary according to climatic conditions and equipment used.

Key

Lockshield valve	Non-return valve	Pressure reducing valve	Gate valve	Temperature gauge
Pressure gauge	Pump	DC Draincock	Safety valve	

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