reflex
Thinking solutions.

Pressurisation Systems

Reflexomat, Variomat

Reflex —
a powerful brand for decades

Reflex Winkelmann GmbH — part of the Building+ Industry division — is a leading provider of highquality heating and hot water supply technology systems. Under its Reflex brand, the company, which has its headquarters in Ahlen in the German region of Westphalia, develops, produces and sells not only diaphragm expansion vessels, but also innovative components and holistic solutions for pressure maintenance, water make-up, degassing and water treatment, storage water tanks and plate heat exchangers, as well as hydraulic manifold and tank components. Reflex Winkelmann GmbH has about 2,000 employees worldwide, giving it an international presence in all major markets.

With its energy-efficient and sustainable products, the company is already doing its bit to help the environment, as evidenced by its commitment to sustainability and the climate policy goals agreed by the German Federal Government. This support is built on proven technologies and future-oriented innovations. What's more, Reflex Winkelmann GmbH works together with others as equals, always maintains its focus on the customer and offers additional services such as its own factory service centre fleet and a comprehensive range of training options.

Contents

New configuration software

Reflex Solutions **Pro**
rsp.reflex.de/en

→ Read more on page 50

Reflex City

Reliable pressure maintenance for any requirements
Living, shopping, working, manufacturing: cities are synonymous with diversity. The requirements for supply technology are as individual as the buildings themselves. Whether it's a 5 kW facility in a detached home or a safety-related cooling system in a computer centre — Reflex offers products and solutions for systems of all sizes and complexities. As shown in our Reflex City concept.

We offer a broad portfolio of pressurisation stations to enable automated and precise pressure maintenance in systems with the broadest spectrum of different requirements: Office buildings from 100 kW heating capacity or more to power plants up to 300 MW, water as hot as 250 °C or cooling water with -10 °C, flat buildings 10 m tall to high-rises up to 200 m tall, as well as customised solutions for complex hydraulic systems.

Dynamic pressure maintenance

Basic principles of pressure maintenance

Pressure maintenance systems play a key role in heating, cooling and solar systems, as well as in pressure boosting systems. Essentially, they have to perform three important tasks:

1. To keep the pressure within permissible limits at all points of the system. This means the permissible operating pressure must not be exceeded, but also that a minimum pressure has to be ensured to prevent vacuums, cavitation and vapourisation.
2. To compensate volume fluctuations in the system water due to temperature fluctuation.
3. Balance out system-related water losses, e.g. by providing a water seal.

The pressure changes in a closed heating, cooling or solar system when temperature or physical factors cause volume changes in the system water. The fluctuations in pressure must be controlled in these systems. This is achieved by maintaining pressure consistency with the use of expansion vessels that accommodate these changes in volume and keep the pressure within permissible limits. Depending on the relevant application, optimum pressure maintenance can be achieved with two different pressure maintenance systems:

- Static pressure maintenance system: Diaphragm expansion vessels
- Dynamic pressure maintenance system: Pressurisation stations

Advantages of dynamic pressure maintenance

Pressure maintenance stations are the next generation improvement on conventional diaphragm expansion vessels with static pressure pads. The difference in principle lies in the addition of a control unit that can be used to change the volume in a connected vessel and ensures highly efficient performance. This approach produces three key advantages:

1. **Automated and monitored operation**
   The control unit offers all the opportunities associated with automated and monitored operation, which is the decisive reason for a pressurisation station even for smaller capacities starting from around 300 kW.

2. **Smaller vessel volume saves space**
   Virtually the entire capacity of the expansion vessel can be used to accommodate expansion water. As a result, vessel volume can be reduced by up to approximately ⅓ compared to a diaphragm expansion vessel.

3. **Reliable pressure maintenance**
   The minimum operating pressure is programmed on the controller, which automatically monitors the pressure settings. Any deviations are immediately remedied to ensure reliable facility operation.

Pressurisation stations made by Reflex

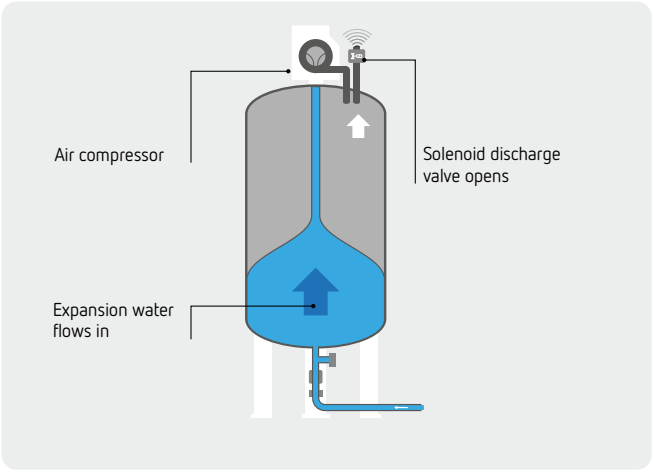
A distinction is made between two types of dynamic pressure maintenance system:

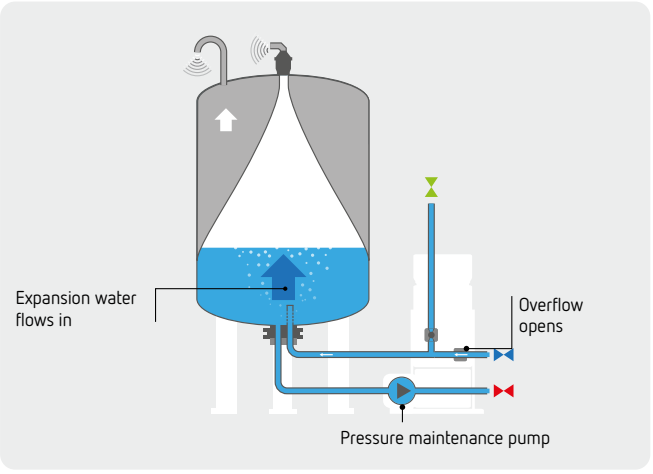
Compressor-controlled pressure maintenance: **Reflexomat**

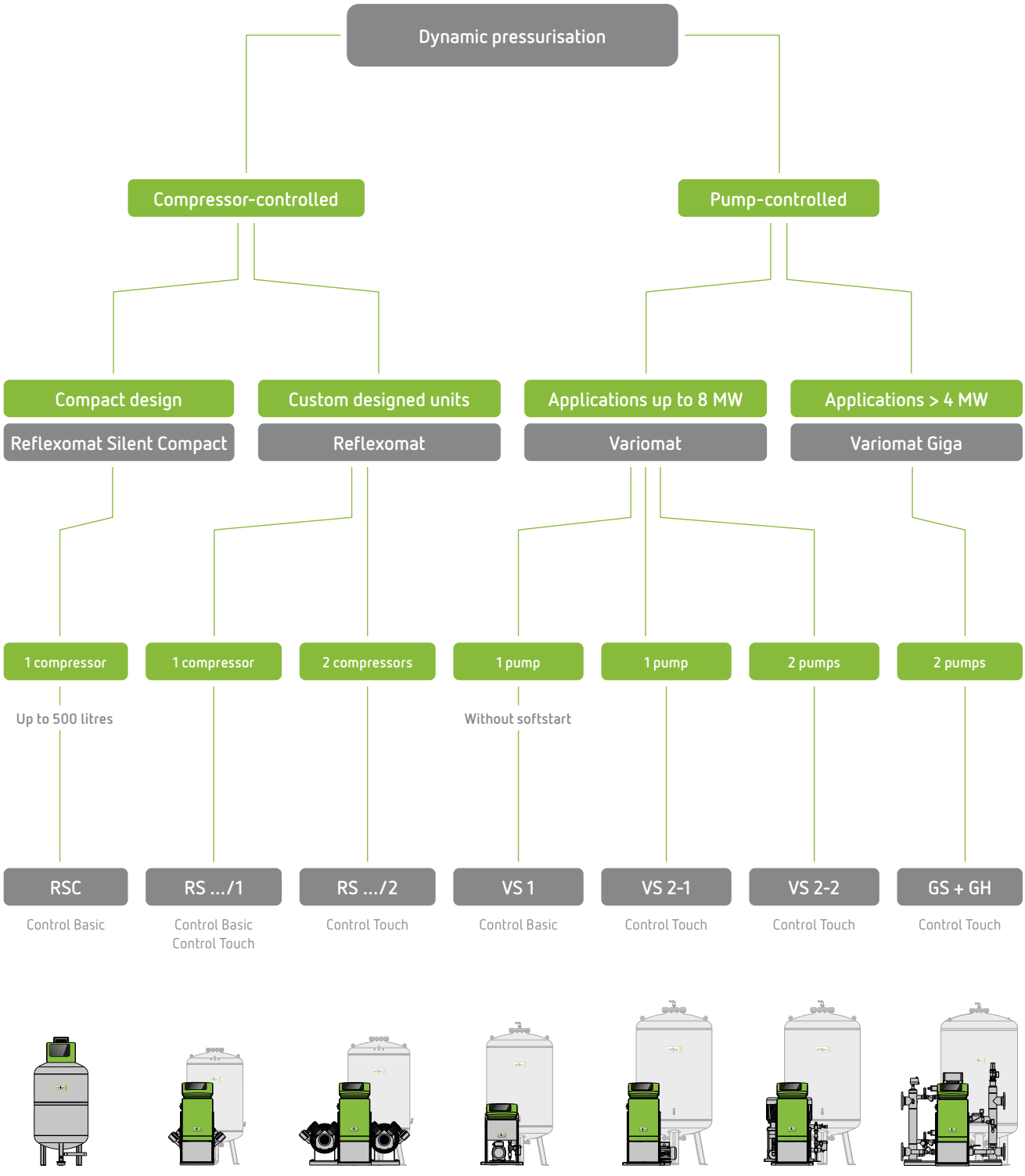
- A compressor controls the pressure on the gas side of the vessel.
- If the set pressure is exceeded, the overflow valve opens and releases air from the expansion vessel.
  With the pressure dropping, water flows out of the system into the expansion vessel. If the pressure falls below the programmed setting, the compressor cuts in and feeds air to the gas side of the expansion vessel. As a result, water is forced into the system.
- Reflexomat can be upgraded with additional make-up and degassing equipment. The option for intelligent make-up and degassing inclusion is already integrated in the control unit of Reflex Control.

Pump-controlled pressure maintenance: **Variomat**

- Pumps are used to control the pressure on the water side.
- If the set pressure is exceeded, the overflow valve opens and releases water from the system into the expansion vessel. If the pressure falls below the programmed setting, the pump activates and conveys water from the expansion vessel into the system.
- Degassing is included in the performance specification of the Variomat: A timer controls a partial flow from system to pressureless expansion vessel, where it depressurises. In slight overpressure, released gases escape through a special valve.
- Make-up is also part of the performance specification. If the water falls below the lower level, the leakage and tube fracture detection capability ensures automatic make-up.






Dynamic pressurisation
Compressor-controlled
Pump-controlled
Compact design
Reflexomat Silent Compact
Custom designed units
Reflexomat
Applications up to 8 MW
Variomat
Applications > 4 MW
Variomat Giga
1 compressor
Up to 500 litres
1 compressor
2 compressors
1 pump
Without softstart
1 pump
2 pumps
2 pumps
RSC
Control Basic
RS .../1
Control Basic
Control Touch
RS .../2
Control Touch
VS 1
Control Basic
VS 2-1
Control Touch
VS 2-2
Control Touch
GS + GH
Control Touch

Reflexomat

Key advantages

Precise and reliable pressure maintenance

- Flexible pressure maintenance within the tightest limits ±0.1 bar
- Standard systems with one or two compressor units
- High-quality butyl diaphragm protects expansion water from air ingress

Highly modern, user-friendly controller

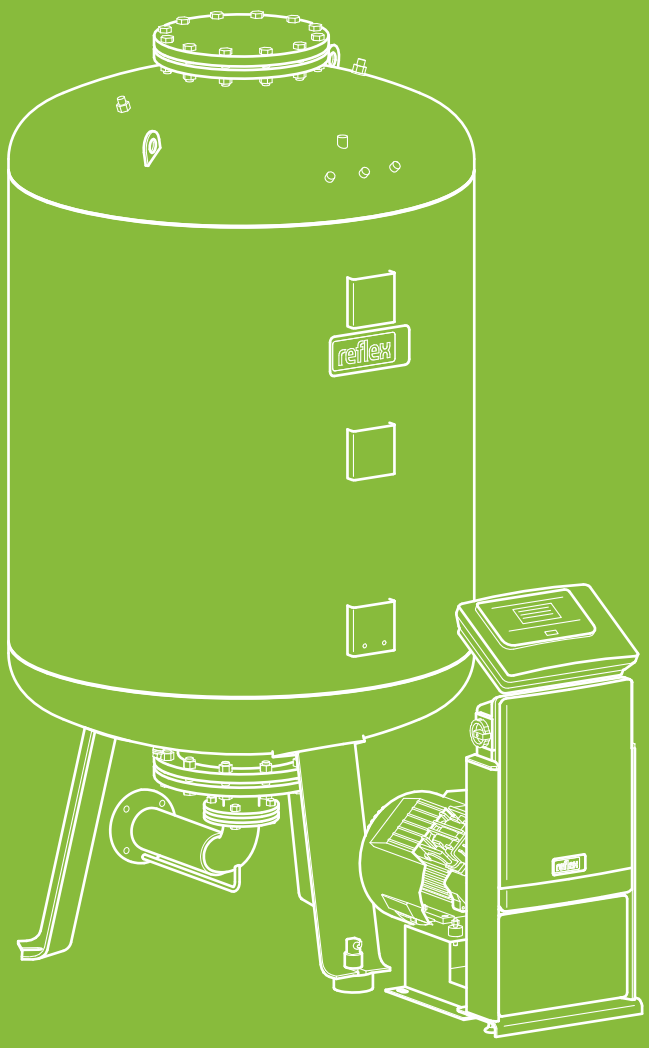
- With expandable microprocessor controller, the control concept Reflex Control
- Master-Slave operation enables parallel operation of up to 10 pressurisation stations (from RS 90/1)
- Fully automatic operation with data interface (from RS 90/1) for incorporation into modern building management systems

Easy installation and commissioning

- Supplied pre-assembled and ready for operation
- Easy to install and put into service
- Low-maintenance operation

Comprehensive system extension

- Automatic controlled make-up can be added in (controlled by the level sensor on the RG primary vessel)
- Combination with Reflex Servitec vacuum spray tube degassing (controlled via Reflexomat)



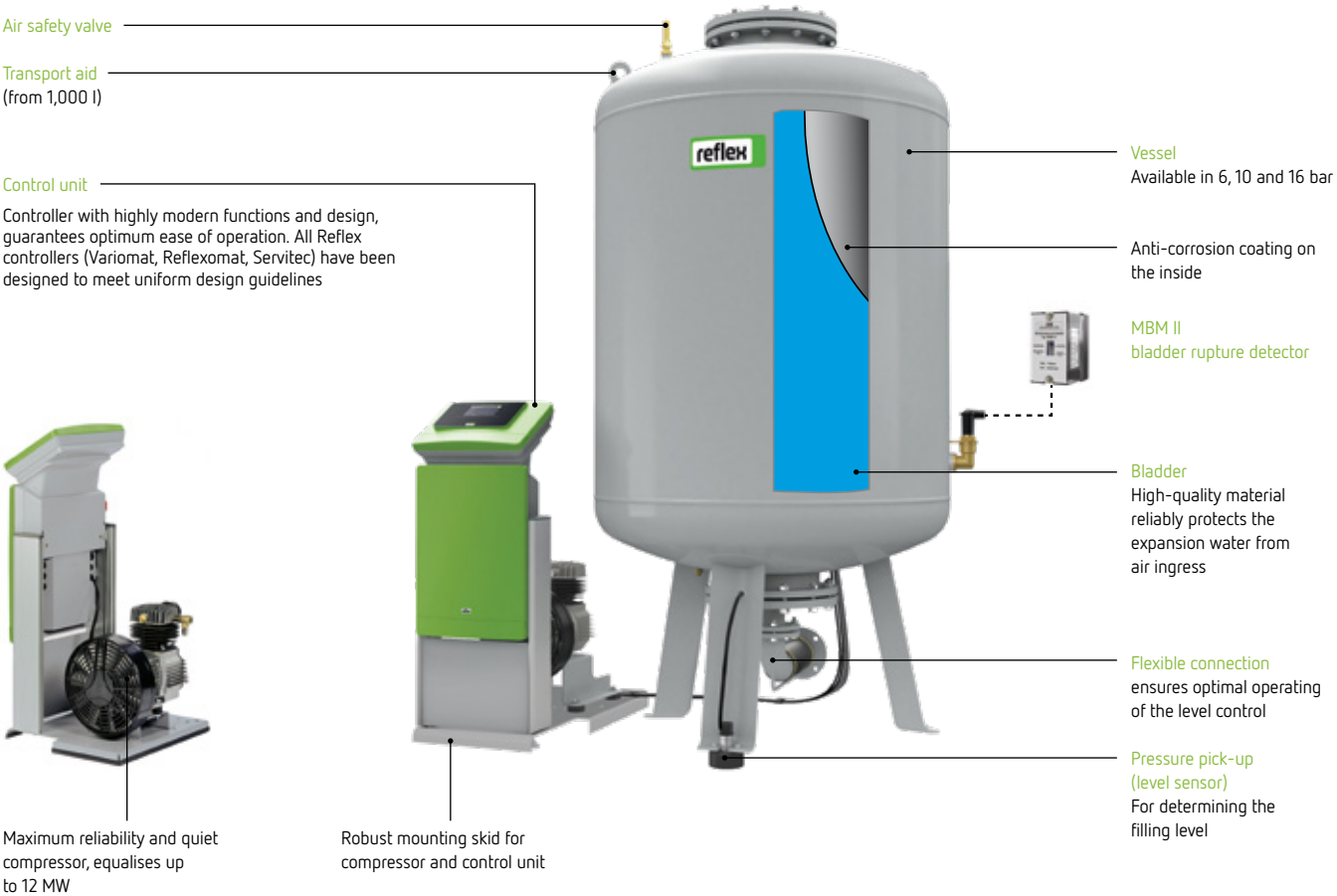
Design, function and application

Reflexomat design

Reflexomat

RS control unit	RG primary vessel
	

Accessories



Air safety valve

Transport aid
(from 1,000 l)

Control unit
Controller with highly modern functions and design, guarantees optimum ease of operation. All Reflex controllers (Variomat, Reflexomat, Servitec) have been designed to meet uniform design guidelines

Vessel
Available in 6, 10 and 16 bar

Anti-corrosion coating on the inside

MBM II
bladder rupture detector

Bladder
High-quality material reliably protects the expansion water from air ingress

Flexible connection
ensures optimal operating of the level control

Pressure pick-up
(level sensor)
For determining the filling level

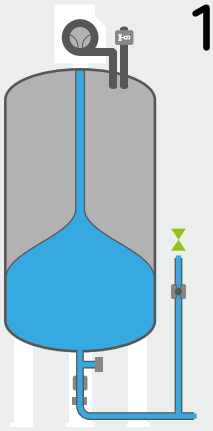
Maximum reliability and quiet compressor, equalises up to 12 MW

Robust mounting skid for compressor and control unit

Reflexomat – functional principle for heating

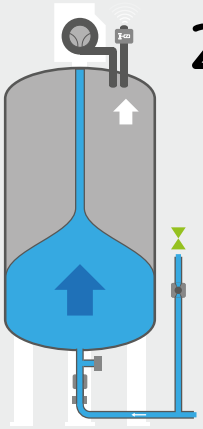
Low temperature

The Reflexomat is fed the minimum amount of water at the lowest system temperature.



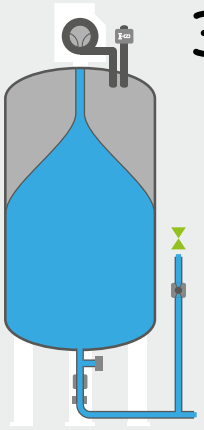
Temperature increase

If the system temperature — and with it, the pressure — increases, the controller responds immediately by opening the solenoid discharge valve. The expansion water can then be taken up by the vessel.



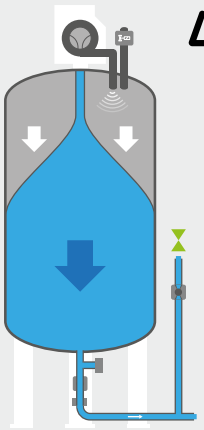
Full capacity

At maximum system temperature, the Reflexomat stores all the expansion water and reaches the maximum filling level in normal operation.



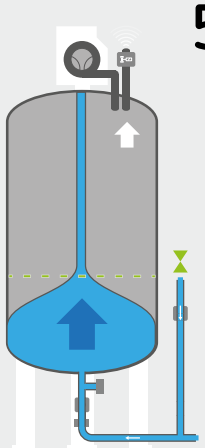
Cool down

If the system cools down, the system pressure drops and the Reflexomat feeds the expansion water back into the system with the aid of the compressor. The maximum pressure fluctuation is ±0.1 bar.



Make-up

If the water content in the vessel sinks below the defined target value, the Reflexomat automatically opens the make-up valve (optional accessory) to balance out the water loss on the system side.



Videos showing how our products work can be found at

www.reflex-winkelmann.com/int/services-downloads/video-area

Applications

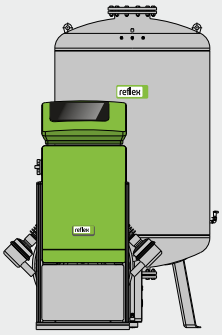
Reflex pressurisation stations always consist of a controller, hydraulic system and one or more vessels. A huge range of customised solutions can be developed with the broad selection of matching components and the extremely precise control design.

Reflexomat Silent Compact (RSC)

- Control unit on the expansion vessel
- Maximum performance on minimum footprint
- 200-500 litre expansion vessel
- Up to 2 MW system capacity

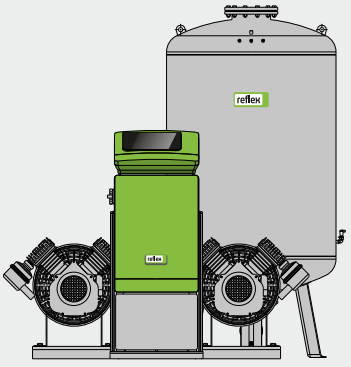
Reflexomat (RS .../1)

- One compressor
- Up to 12 MW
- With separate control unit
- 200-5,000 litre expansion vessel
- Any number of RF secondary vessels can be installed



Reflexomat (RS .../2)

- Two compressors
- Up to 24 MW
- With separate control unit
- 200-5,000 litre expansion vessel
- Additional compressors and any number of RF secondary vessels can be installed



Do your requirements extend beyond our standard products? Our Project Sales Team can customise a solution to suit your individual requirements:
angebote@reflex.de

Reflexomat product range

Reflexomat Silent Compact

Reflexomat Silent Compact

Technical features

- Compressor-controlled pressurisation system in a compact design for heating- and cooling-watersystems
- Approval according to Pressure Equipment Directive 2014/68/EU
- Diaphragm according to DIN EN 13831 norm
- Degree of protection IP 54
- Max. operating pressure 6 bar
- Power supply 230 V / 50 Hz
- Max. operating temperature 70 °C
- Permissible ambient temperature 0 – 45 °C
- With Control Basic controller, group fault signal and RS-485 interface for internal communication
- Automatic water make-up via Fillvalve possible
- Max. permissible system temperature 120 °C

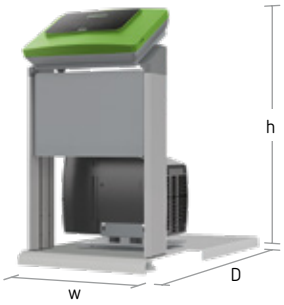
	Type	Art. No. Grey	Raccord c	Electric power [kW]	Ø d [mm]	Height h [mm]	Height h2 [mm]	Weight [kg]
6 bar 70 °C	RSC 200	8800200	G 1"	0.75	634	1,238	132	52.00
	RSC 300	8800300	G 1"	0.75	634	1,538	133	69.00
	RSC 400	8800400	G 1"	0.75	740	1,522	120	80.00
	RSC 500	8800500	G 1"	0.75	740	1,741	120	93.00

Reflexomat Silent Compact Accessories

Type	Art. No.	Weight [kg]
Bracket		
Bracket 90°	8894500	0.10
Commissioning		
Commissioning Cat. 3	7945725	0.00
Commissioning add. Cat. 3	7945726	0.00
Cap valve		
Cap valve SU R 1" x 1"	7613100	0.57
Solenoid valve		
Solenoid valve Fillvalve	7858300	0.95

See Reflex Product Guide for details of other accessories

Reflexomat control units



Reflexomat Control Basic

Reflexomat Control Touch

Technical features

- Compressor-controlled pressurisation system for heating- and cood water systems
- Supply temperature 120 °C
- Max. operating temperature 70 °C
- Permissible ambient temperature 0 – 45 °C
- Degree of protection IP 54
- Power supply 230 V / 400 V
- Group fault signal and RS 485 interface for internal communication
- Control Touch with graphical user interface, permanent display of operating parameters, wide array of interfaces, e.g. for control station connection, remote monitoring and system additions

Type	Art. No.			Electric connection	Electric power	Height h	Width w	Depth D	Weight
		6 bar	10 bar		[kW]	[mm]	[mm]	[mm]	[kg]
RS control unit with 1 compressor									
Control Basic									
RS 90/1 mounted*	–	8880111	–	230 V/50 Hz	0.75	395	340	523	21.00
RS 90/1 besides*	–	8880211	–	230 V/50 Hz	0.75	683	470	550	25.00
Control Touch									
RS 90/1 T	–	8880210	–	230 V/50 Hz	0.75	921	480	491	32.00
RS 150/1 T	–	8880311	8881311	400 V/50 Hz	1.10	921	480	491	45.00
RS 300/1 T	–	8880411	8881411	400 V/50 Hz	2.20	921	370	630	48.00
RS 400/1 T	–	8880511	8881511	400 V/50 Hz	2.40	921	565	670	62.00
RS 580/1 T	–	8880611	8881611	400 V/50 Hz	3.00	921	636	803	84.00
RS control unit with 2 compressors									
Control Touch									
RS 90/2 T	–	8882100	–	230 V/50 Hz	1.50	921	498	550	45.00
RS 150/2 T	–	8883100	8883150	400 V/50 Hz	2.20	921	580	510	60.00
RS 300/2 T	–	8884100	8884150	400 V/50 Hz	4.40	921	1,000	752	86.00
RS 400/2 T	–	8885100	8885150	400 V/50 Hz	4.80	921	1,230	792	118.00
RS 580/2 T	–	8886100	8886150	400 V/50 Hz	6.00	921	1,301	874	196.10
RS control unit without compressor for compressed air supplied on-site [1]									
Control Basic									
RS mounted*	8881100	–	–	230 V/50 Hz	–	415	395	520	15.00
RS besides*	8881105	–	–	230 V/50 Hz	–	690	395	345	15.00
Control Touch									
RS external air T*	8881400	–	–	230 V/50 Hz	–	683	470	600	18.00

[1] Includes solenoid valve for the supply of user-provided compressed air (article no.: 7913000)
User-supplied compressed air, filtered and oil-free
max. 10 bar

*mounted = attached controller up to RG 600
besides = adjoining controller from RG 800
external air = site provided compressed air

Reflexomat vessels

RG 500

RG 1000

Technical features

- Replaceable bladder according to DIN EN 13831
- Approval according to Pressure Equipment Directive 2014/68/EU
- Max. operating temperature 70 °C
- Max. permissible system temperature 120 °C

	Primary vessel			Secondary vessel						
	Type	Art. No.	Height h2 [mm]	Type	Art. No.	Height h2 [mm]	Connection c	Ø d [mm]	Height h [mm]	Weight [kg]
6 bar 70 °C	RG 200	8799100	155	RF 200	8789100	155	G 1"	634	989	37.00
	RG 300	8799200	155	RF 300	8789200	155	G 1"	634	1,289	60.70
	RG 400	8799300	177	RF 400	8789300	177	G 1"	740	1,277	69.40
	RG 500	8799400	177	RF 500	8789400	177	G 1"	740	1,497	78.70
	RG 600	8799500	177	RF 600	8789500	177	G 1"	740	1,807	90.10
	RG 800	8799600	177	RF 800	8789600	177	G 1"	740	2,272	110.30
	RG 1000	8650105	193	RF 1000	8652005	460	DN65/PN6	1,000	2,025	308.60
	RG 1500	8650305	186	RF 1500	8652205	460	DN65/PN6	1,200	2,020	328.00
	RG 2000	8650405	186	RF 2000	8652305	460	DN65/PN6	1,200	2,480	380.00
	RG 3000	8650605	220	RF 3000	8652505	490	DN65/PN6	1,500	2,480	795.00
	RG 4000	8650705	220	RF 4000	8652605	490	DN65/PN6	1,500	3,053	1,100.00
	RG 5000	8650805	220	RF 5000	8652705	490	DN65/PN6	1,500	3,588	1,115.00
10 bar 70 °C	RG 350	8654000	196	RF 350	8654300	196	DN40/PN16	750	1,340	230.00
	RG 500	8654100	196	RF 500	8654400	196	DN40/PN16	750	1,600	275.00
	RG 750	8654200	182	RF 750	8654500	182	DN50/PN16	750	2,179	345.00
	RG 1000	8651005	168	RF 1000	8653005	286	DN65/PN16	1,000	2,062	580.00
	RG 1500	8651205	166	RF 1500	8653205	305	DN65/PN16	1,200	2,054	546.00
	RG 2000	8651305	166	RF 2000	8653305	284	DN65/PN16	1,200	2,514	485.00
	RG 3000	8651505	195	RF 3000	8653505	490	DN65/PN16	1,500	2,532	954.00
	RG 4000	8651605	195	RF 4000	8653605	490	DN65/PN16	1,500	3,107	1,192.00
	RG 5000	8651705	195	RF 5000	8653705	490	DN65/PN16	1,500	3,642	1,286.00

Reflexomat Accessories

I/O module

- Two additional analogue outputs for pressure and level control
- Six freely programmable digital inlets
- Six freely programmable floating outputs

Busmodule

- For exchanging data between controller and central building management system

Commissioning

- **7945600**: Reflex commissioning Cat. 1 for Reflexomat, Variomat, Servitec with one compressor / one pump
- **7945704**: Reflex commissioning add. Cat. 1 for each additional system at the same location – one compressor / pump
- **7945630**: Reflex commissioning Cat. 2 for Reflexomat, Variomat, Servitec with two compressors / pumps
- **7945721**: Reflex commissioning add. Cat. 2 for each additional system at the same location – two compressors / pumps

Bladder rupture detector

- Indication of membrane rupture in vessels
- Consisting of an electrode relay and an electrode (factory fitted)
- Power supply 230 V / 50 Hz
- Floating output (changeover contact)
- Delivery only in combination with a vessel with MBM coupling

Solenoid valve

- Solenoid and ball valve
- For automatic water make-up with Reflexomat

More information about the Reflex Control concept is available from **page 44**

Master-Slave

- Software Tool
- For the operation of up to ten Reflexomat units in a hydraulic network over a distance up to 1,000 m

Type	Art. No.	Weight [kg]
AG connection set		
AG connection set 1"	9119204	0.85
Busmodule		
Busmodule BACnet MS/TP	8860600	0.40
Busmodule BACnet-IP Touch	8860500	0.40
Busmodule Ethernet	8860300	1.90
Busmodule Modbus RTU Touch	9125592	0.40
Busmodule Profibus DP	8860200	1.90
Busmodule Profibus DP Touch	9118042	0.40
Bracket		
Bracket 115°	8894510	0.10
Bracket 90°	8894500	0.10
I/O module		
I/O module RS	8858405	1.00

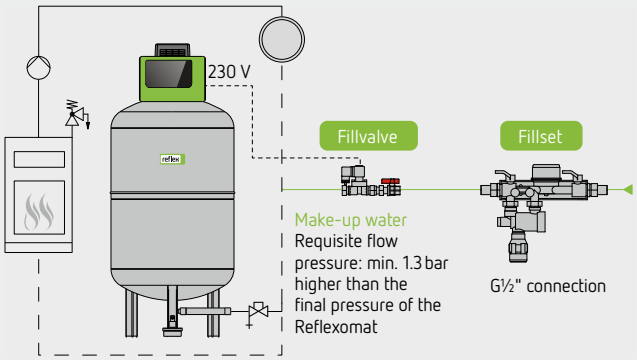
Type	Art. No.	Weight [kg]
Commissioning		
Commissioning Cat. 1	7945600	0.00
Commissioning Cat. 2	7945630	0.00
Commissioning add. Cat. 1	7945704	0.00
Commissioning add. Cat. 2	7945721	0.00
Mounting bracket		
Mounting bracket 90°	7881900	4.50
Solenoid valve		
Solenoid valve Fillvalve	7858300	0.95
Master-Slave		
Master-Slave	7859000	0.10
Bladder rupture detector		
Bladder rupture detector MBM II	7857700	0.62

Make-up options

To ensure lasting reliable and automatic operation of the system, we advise fitting the pressurisation equipment with make-up systems or adding Servitec degassing systems. This is particularly important for cooling water systems as any thermal venting effects have to be entirely eliminated. Automatic make-up is already incorporated into the Reflexomat controller and is automatically activated if the primary vessel reaches make-up level.

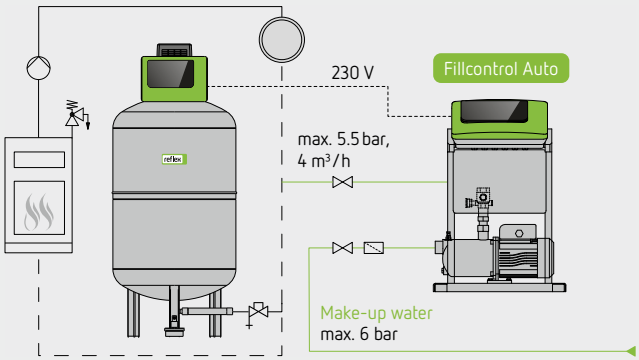
Automatic make-up with Reflex Fillvalve

Make-up is controlled by the Reflex Fillvalve solenoid valve using the inherent pressure of the make-up water. If making up from the drinking water system, the Reflex Fillset with integrated DVGW-tested system separator must be installed upstream.



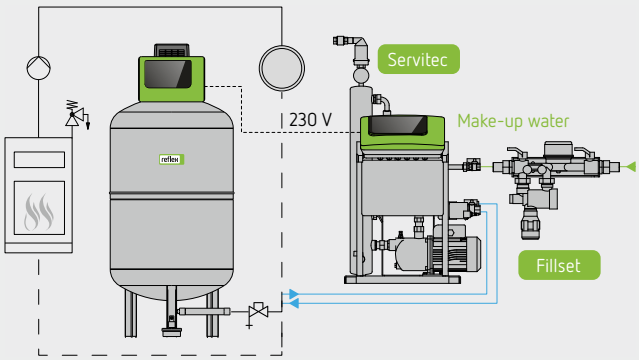
Automatic make-up with Reflex Fillcontrol

Reflex Fillcontrol Auto is a make-up station with integrated pump (system separator vessel to isolate the system from the drinking water system as stipulated in DIN 1988).
Reflex Fillcontrol Auto is generally used when the fresh water seal pressure is too low for direct make-up without pump support or when an intermediate vessel is needed to separate the system from the drinking water system.



Make-up and degassing with Reflex Servitec

The Servitec vacuum spray tube degassing function centrally degasses the system water and — in Levelcontrol mode — ensures automated controlled make-up when the make-up level is reached in the Reflexomat's expansion vessel. When making up from the drinking water system, the Reflex Fillset must be installed upstream.



For further details, please consult our brochure "Make-up systems and water treatment technology"

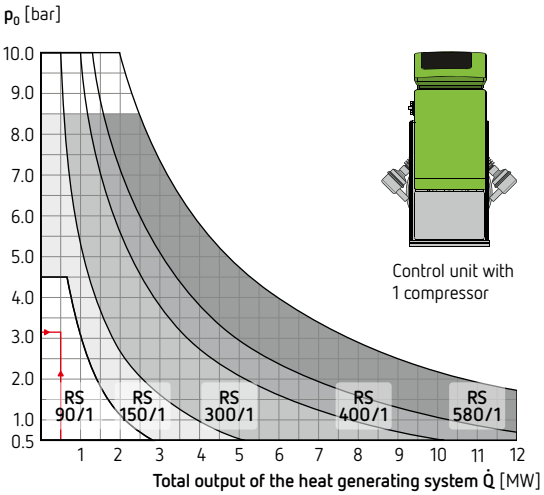
Ideal connection: Reflexomat and Servitec

- Vacuum spray tube degassing with automatic make-up
- Ensures that the system and make-up water are nearly free of gas
- Avoids air problems caused by free gas bubbles at system high points, or in circulating pumps or control valves

Selection and calculation

for heating systems up to 120 °C

Selection of Reflexomat control unit



Control unit with 1 compressor

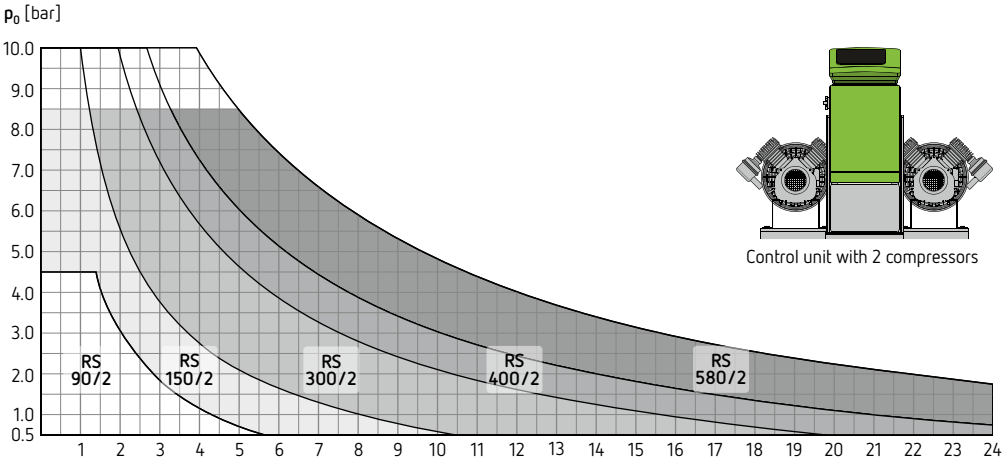
Reflexomat with one compressor

- In this respect, the Reflexomat Silent Compact (RSC) is equivalent to the RS 90/1

Alternative calculation method

$$p_0 \geq \frac{H[m]^*}{10} + \begin{cases} 0.2\ \text{bar}\ [\leq 100\,°C]^{**} \\ 0.5\ \text{bar}\ [105\,°C]^{**} \\ 0.7\ \text{bar}\ [110\,°C]^{**} \\ 1.2\ \text{bar}\ [120\,°C]^{**} \end{cases}$$

* H = static height
** Safety temperature



Control unit with 2 compressors

Reflexomat with two compressors

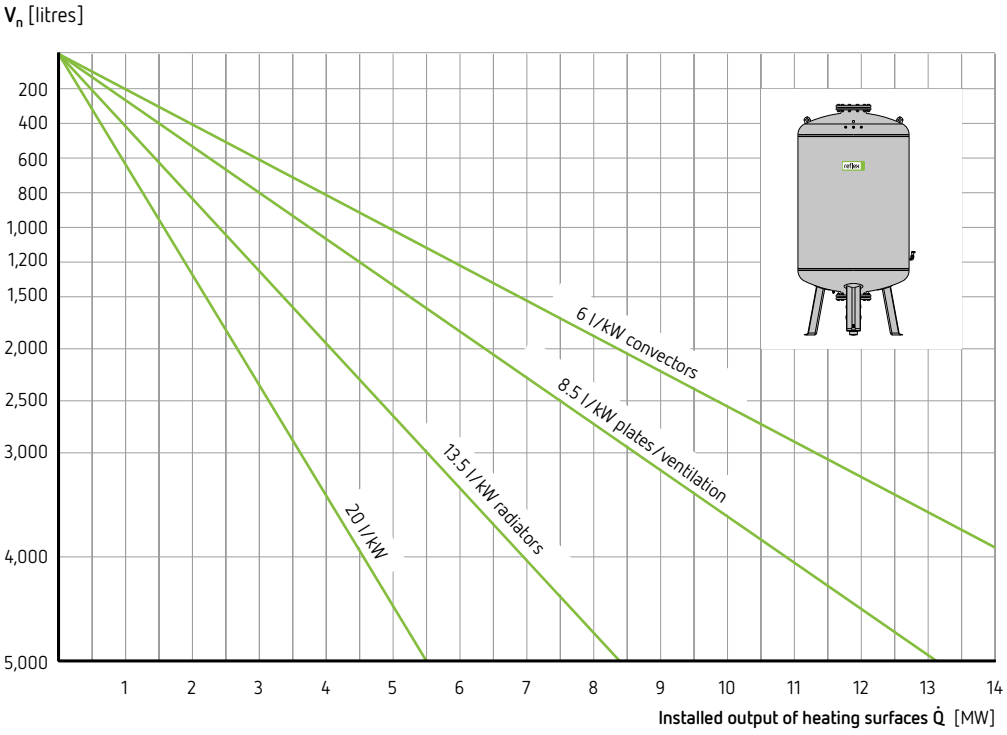
- When selecting the control unit for cooling water systems to 30 °C, only 50 % of the rated heat output may be included in the calculation.

Selection of the expansion lines

Expansion lines	DN 25 1"	DN 32 1¼"	DN 40 1½"	DN 50 2"	DN 65	DN 80	DN 100
Q̇ / kW Length ≤ 10 m	2,100	3,600	4,800	7,500	14,000	19,000	29,000
Q̇ / kW Length > 10 m ≤ 30 m	1,400	2,500	3,200	5,000	9,500	13,000	20,000

If the expansion line is longer than **10 m**, we recommend choosing a size larger.

Selection of Reflexomat vessels



Alternative calculation method

$V_n \geq V_a$ x
- 0.031 [70 °C]*
- 0.045 [90 °C]*
- 0.054 [100 °C]*
- 0.063 [110 °C]*

* Design flow temperature
V_n = Nominal volume
V_A = System water capacity

- The nominal volume can be split between multiple vessels (RG primary and RF secondary vessels).

Permissible operating pressure:
- Up to 800 litres: 6 bar
- 350, 500, 750 litres: 10 bar
- More than 1,000 litres: 6 and 10 bar

Basic technical data

Output

Heat generator	$\dot{Q}$ =	500 kW
Water capacity	V_A =	5,000 litres
Design temperature	=	70 °C
Safety temperature	=	100 °C
Static height	=	30 m

Calculation

$p_0 \geq \frac{H\,[m]}{10}$ bar + 0.2 bar [100 °C]

$p_0 \geq \frac{30}{10}$ bar + 0.2 bar = 3.2 bar

$V_n \geq V_A$ x 0.031

$V_n \geq 5{,}000$ x 0.031 = 155 litres

Result

Reflexomat with RS 90/1 control unit
Reflex primary vessel, 200 litres, RG 200
Reflex R 1x1 cap valve

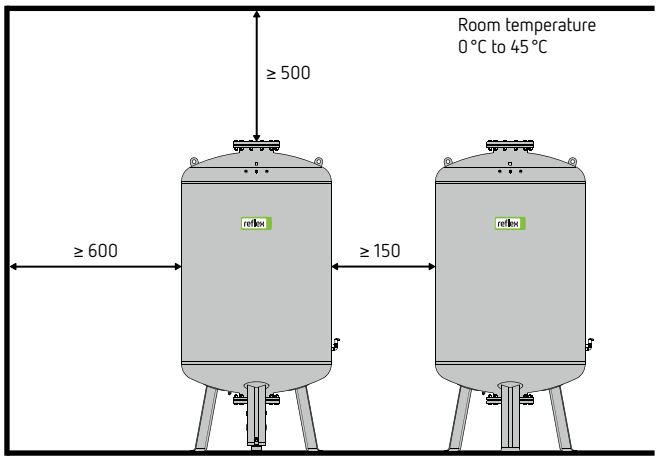
Selection example

Installation and commissioning

Installation notes

- When installing the oil meter, make sure it is always clean (no paint or coating, etc.).
- Primary vessel connections to dynamic pressure maintenance stations must always be flexible to ensure proper functional performance of the level sensor.
- The vessels must be placed on a firm and level base, make sure they are positioned at right angles and free standing. The control unit must be positioned at the same level as the vessels.
- When using secondary vessels, always use the same models and sizes.

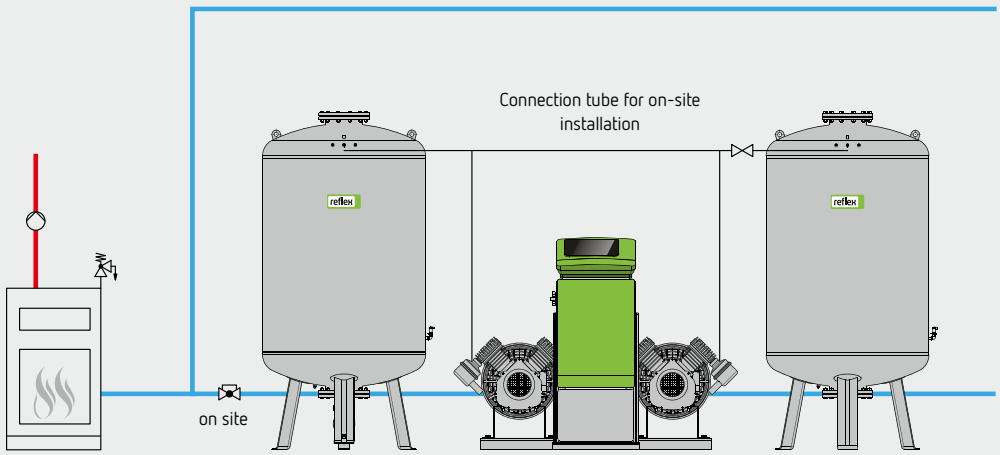
Note Please refer to our detailed operating instructions during installation and commissioning.



Installation clearances

Installation example

2-compressor system



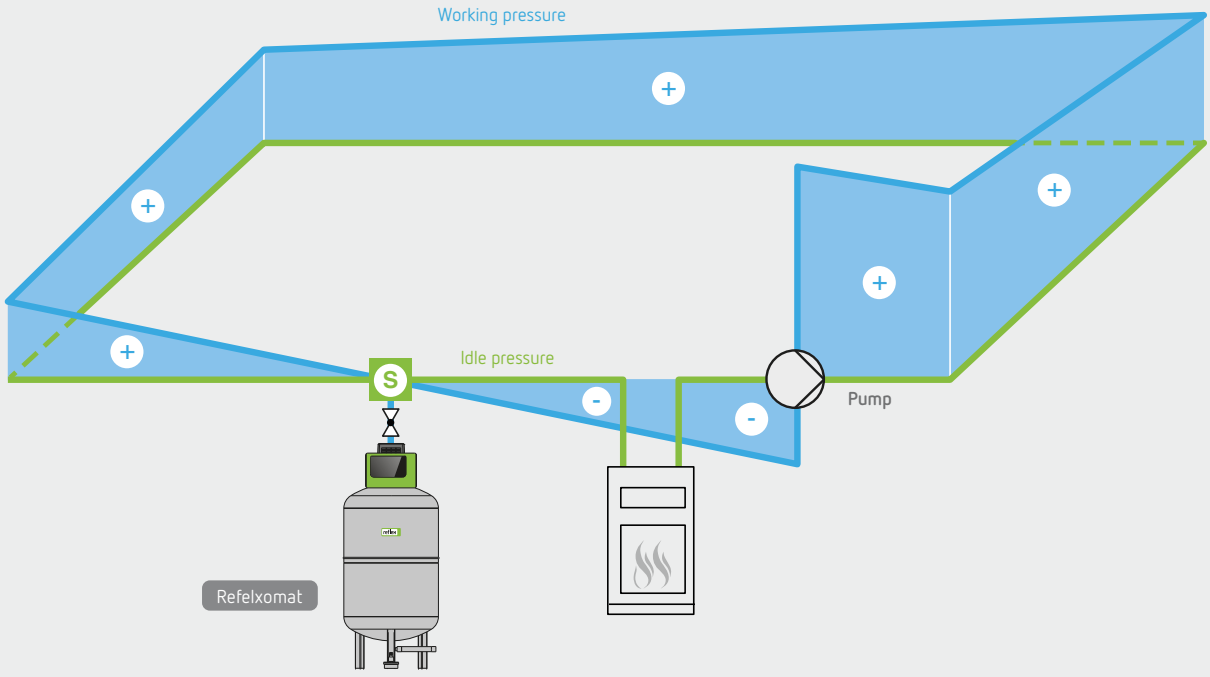
Hydraulic integration

The hydraulic integration of the pressure maintenance into the facility system has a fundamental influence on the operating pressure distribution. The latter is composed of the pressure level when pressure maintenance is not in operation and the differential pressure when the circulating pump is running. We recommend the use of upstream pressure maintenance:

Intake pressure maintenance (suction pressure maintenance)
The pressure maintenance function is tied in upstream of the circulating pump, i.e. on the suction side. This type is the most commonly used as it is the easiest to control.

- Direct connection of Reflexomat to heat generator
- Low temperature stress on the bladder
- If the bladder is at risk of permanent exposure to stress > 70 °C, Reflex V auxiliary vessels must be incorporated into the expansion line

- Use suction pressure maintenance!
- Only deviate in justified exceptions.
- Please don't hesitate to get in touch with us!



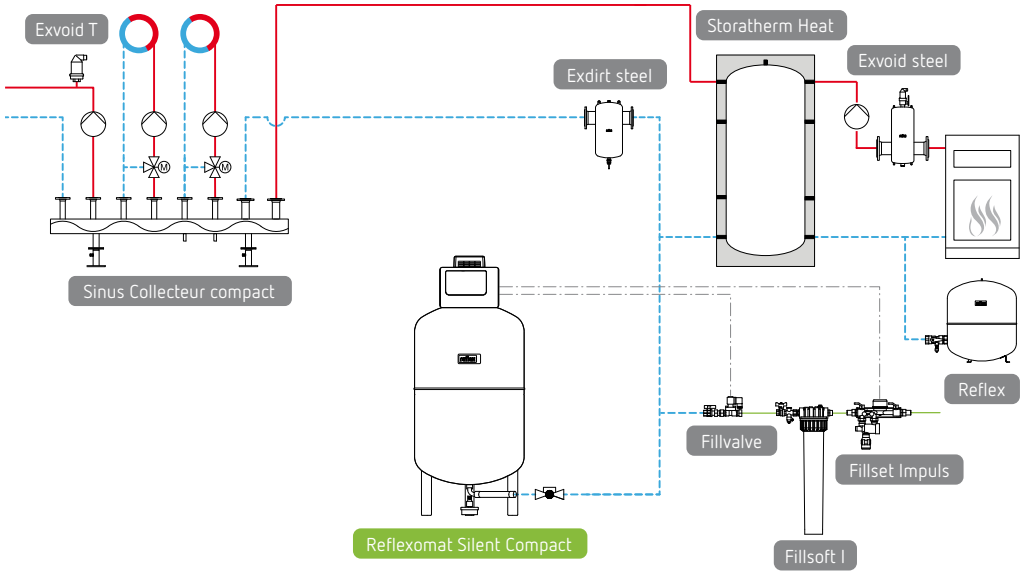
Pressure curve with upstream pressure maintenance (suction pressure maintenance)

Installation examples

Solution № 05 Reflexomat Silent Compact

When installing the oil meter, make sure it is mounted on a base and always clean (no paint or coating, etc.).

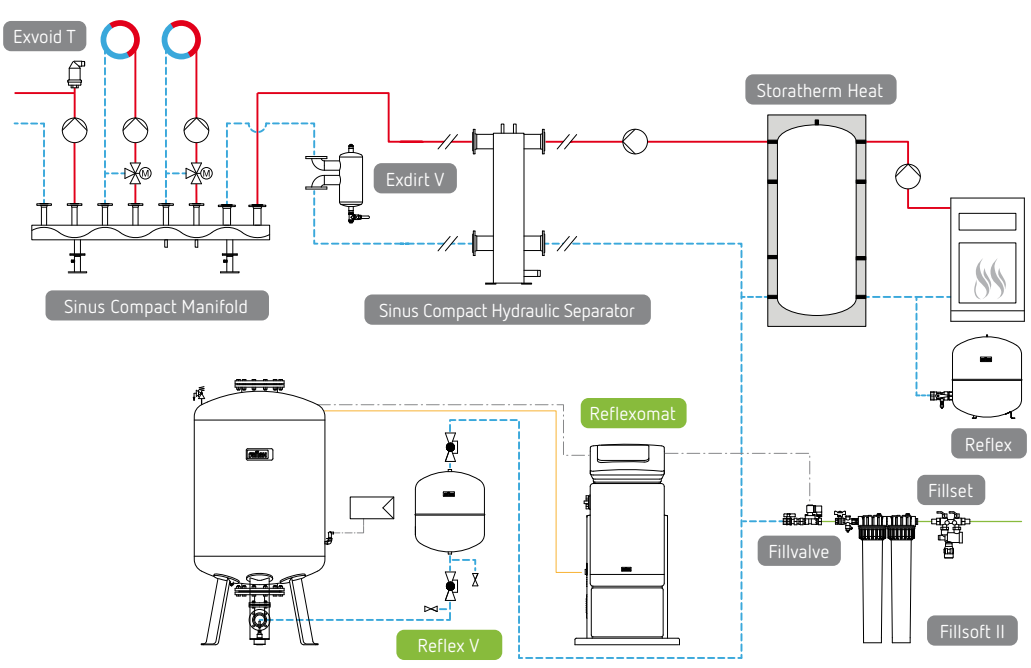
Primary vessel connections to dynamic pressurisation stations must always be flexible to ensure proper functional performance of the level sensor.



Solution № 07 Reflexomat with 1 compressor and auxiliary vessel

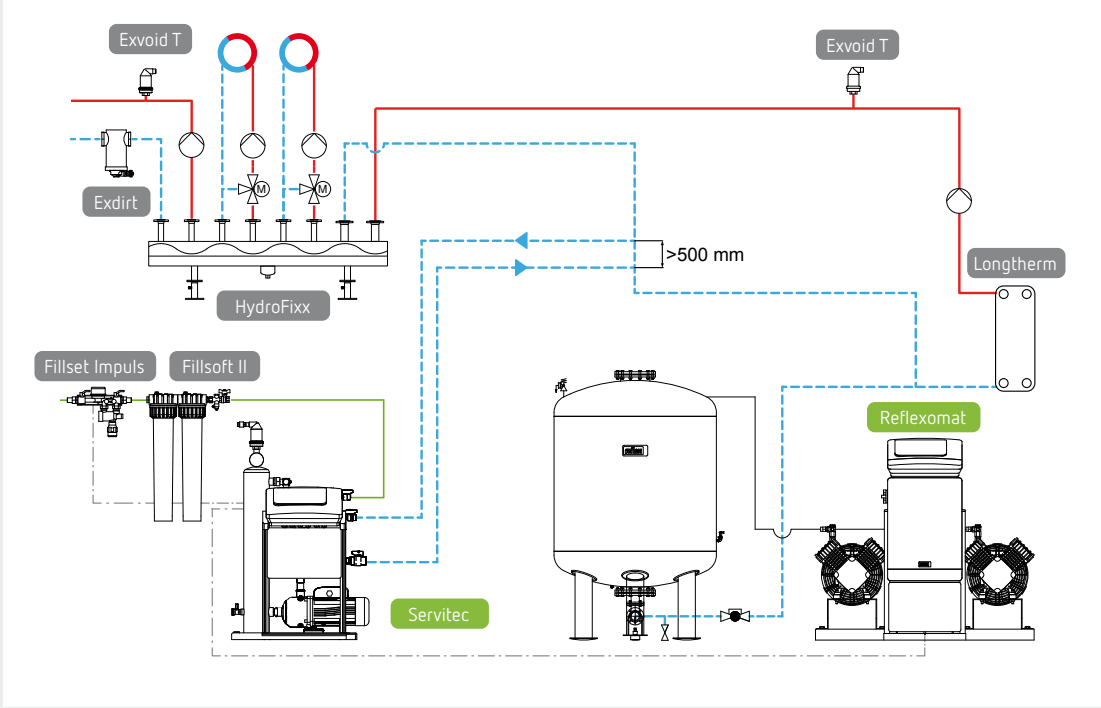
If the temperature of the media is less than 0 °C or more than 70 °C at the pressure maintenance integration point into the system, an auxiliary vessel must be installed to protect the bladder in the expansion vessel.

Incorporate an auxiliary vessel if the return flow temperature is > 70 °C!



Reflexomat with 2 compressors and Servitec degassing

Solution № 08



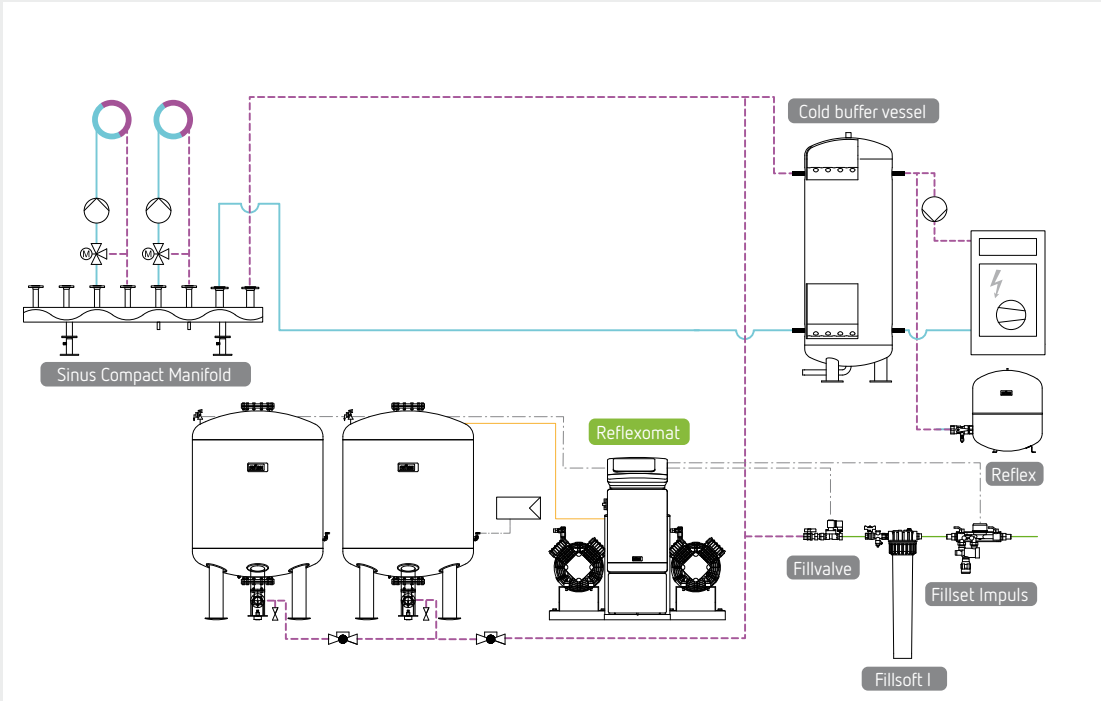
Servitec and Reflexomat must communicate with each other (both are fitted with a pressure sensor).

An electrical connection on site must be put in place between the appliances.

Servitec must be set to Levelcontrol mode.

Reflexomat with secondary vessel in a cooling water system

Solution № 17



Secondary vessels must be the same and size as the primary vessel.

In cooling applications, the pressure maintenance must be tied into the warmer medium to avoid condensate on the expansion lines. Dew point violation is usually prevented by the load case at higher temperatures.

These diagrams are only meant to visualise the interconnections.
Installation must be adapted to local conditions accordingly and must be specified in more detail.

Variomat

Key advantages

Pressure maintenance, degassing and make-up in a single system

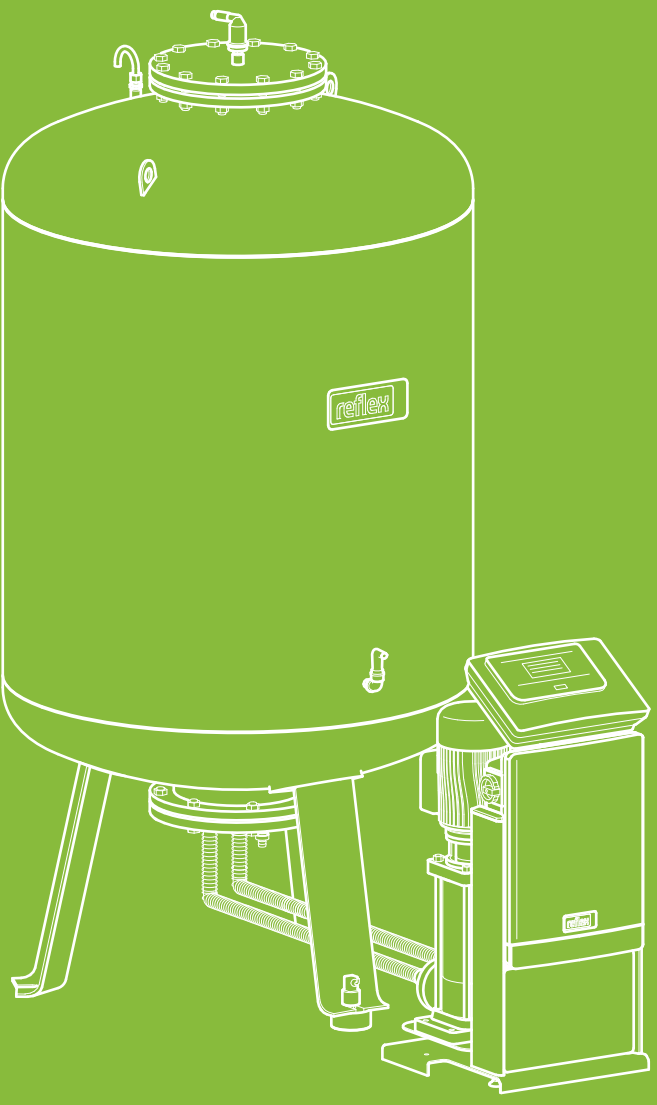
- Reliable pressure maintenance within very tight limits
- Efficient, atmospheric degassing of the system water for long-term operational safety
- Automatic make-up depending on the filling level

Easy installation and commissioning

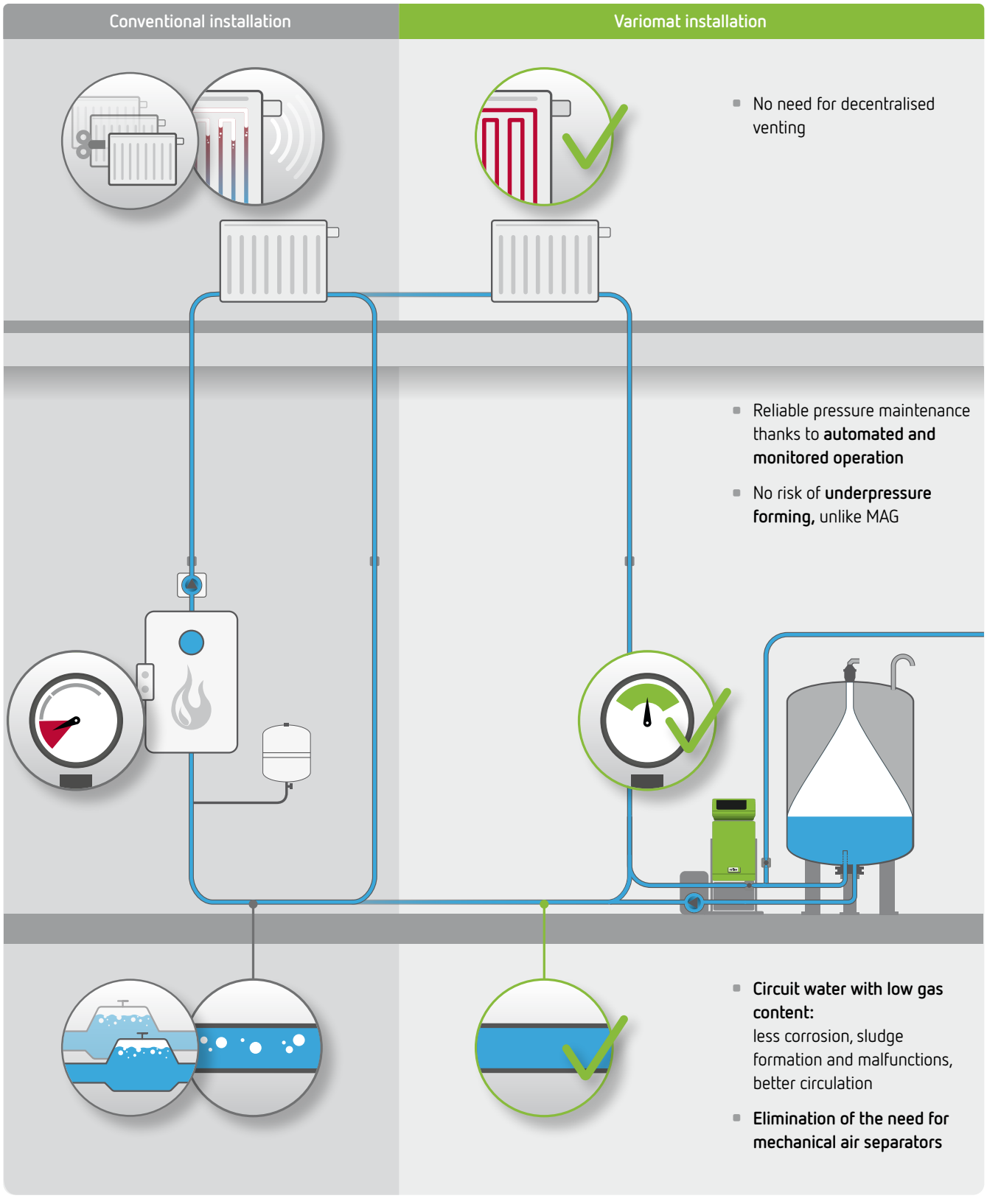
- Supplied pre-assembled and ready for operation
- Easy to install; no need for mechanical adjustments
- Low-maintenance operation

Highly modern, user-friendly controller

- Easy function and modern design ensure optimum-operating convenience
- With extendable microprocessor controller Reflex Control
- Master-Slave operation enables parallel operation of up to 10 pressure maintenance stations
- Fully automatic operation with data interface for incorporation into modern building management



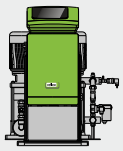
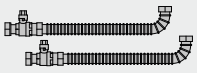
Comparison using a heating system as an example



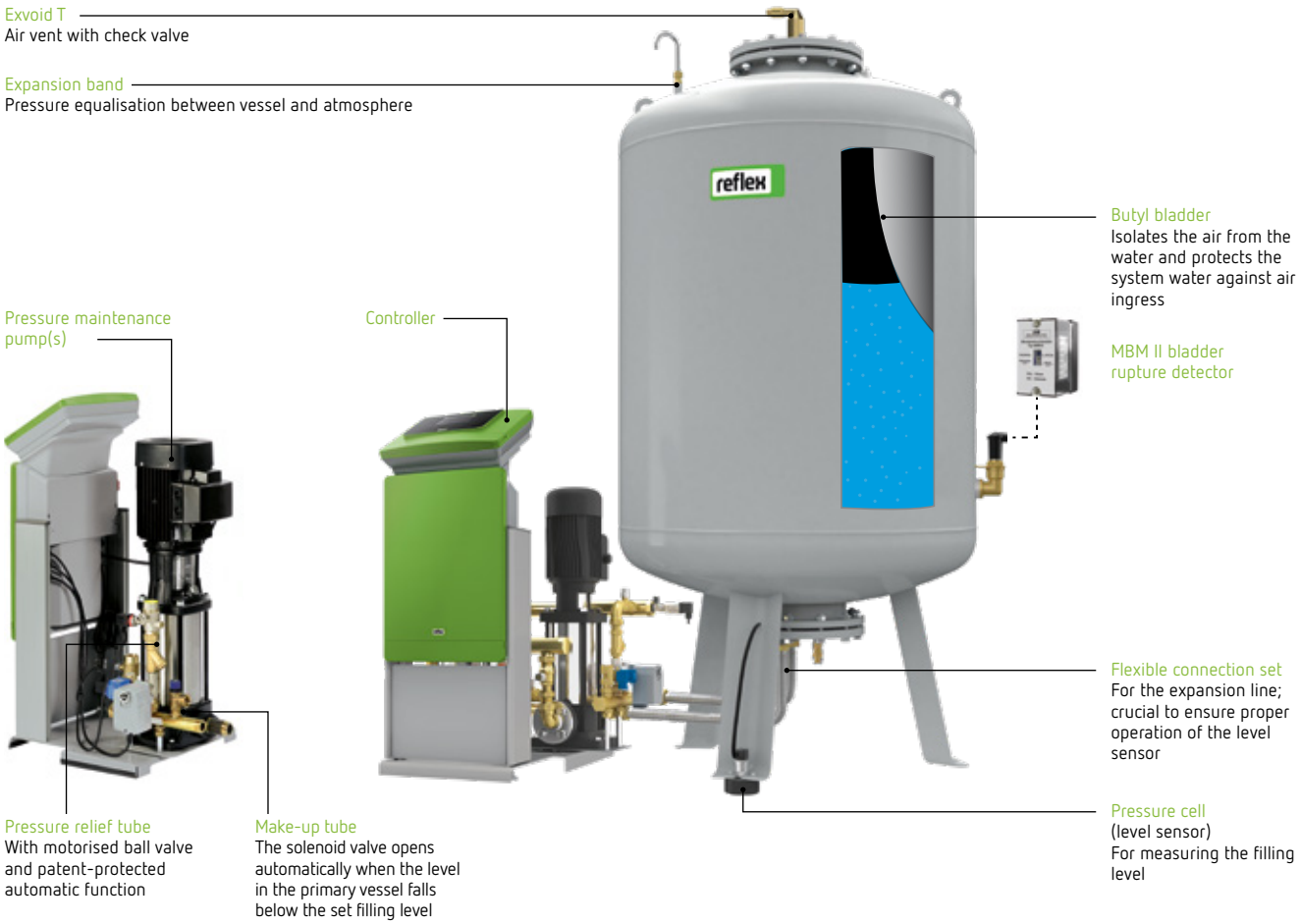
Design, function and application

Variomat design

Variomat

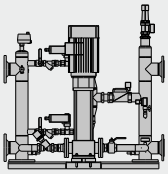
VS control unit	Connection set	VG primary vessel
		

+ Accessories



Variomat Giga design

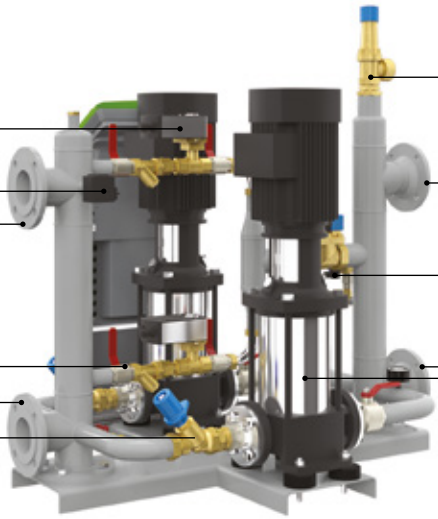
Variomat Giga

GS control unit	GH hydraulic module	GG primary vessel
		

Accessories

Flexible connection
For the expansion line; crucial to ensure proper performance of the level sensor

Pressure cell
(level sensor)
For measuring the filling level



Safety valve
Safeguard for the GG and GF vessels

Pressure relief tube

Min.-pressure limiter

Connection
DN 80/PN 16 expansion line

Connection
GG primary vessel
DN 80/PN 6

Make-up solenoid valve

Shut-off
Safeguarded against accidental closure Pump

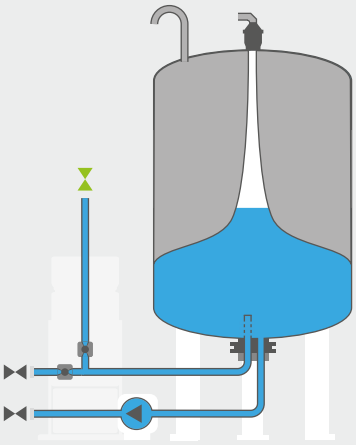
Pump

Throttle valve

Variomat – function principle

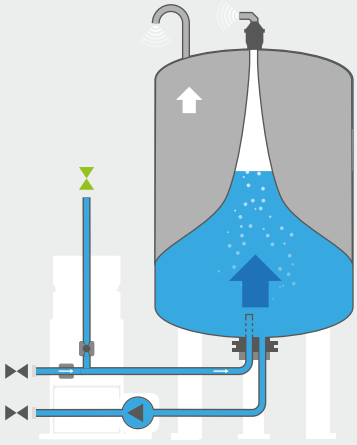
Low temperature 1

The Variomat is fed the minimum amount of water at the lowest system temperature.



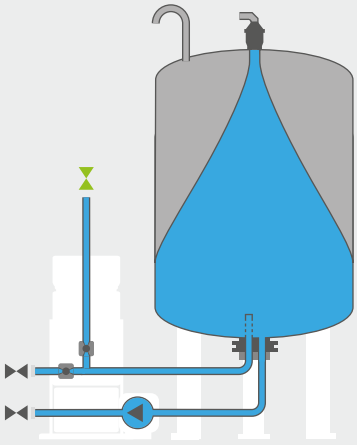
Temperature increase 2

If the system temperature – and with it, the pressure – increases, the controller responds immediately by opening the pressure relief tube. Expansion water flows into the pressureless vessel and is degassed by means of pressure relief.



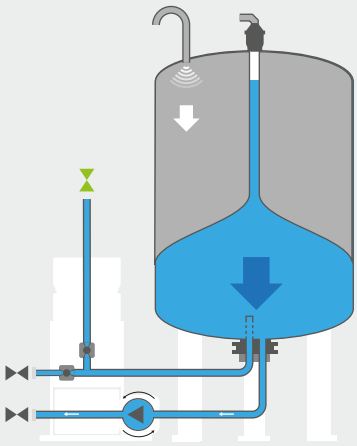
Full capacity 3

At maximum system temperature, the Variomat stores all the expansion water and reaches the highest filling level in normal operation.



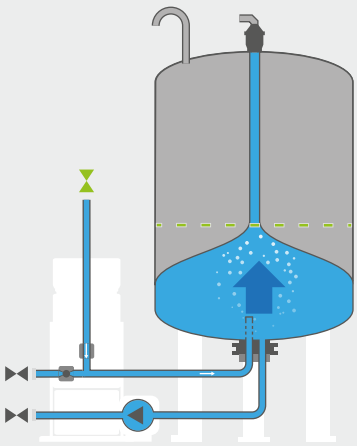
Cool down 4

If the system cools down, the system pressure drops and the Variomat feeds the expansion water back into the system with the aid of the pump. The maximum pressure fluctuation is ±0.2 bar.



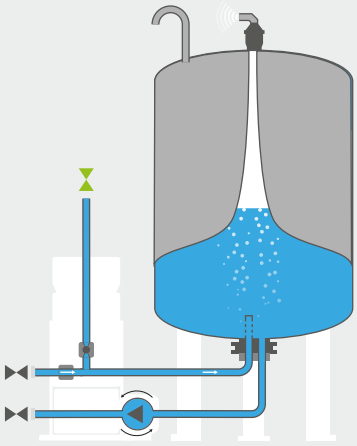
Make-up 5

If the water content in the vessel sinks below the defined target value, the Variomat automatically opens the make-up valve to balance out the water loss on the system side.



Continuous / interval degassing 6

Pump and overflow ball valve are both in operation. System pressure remains stable within the target value range. System water is specifically channelled through the primary vessel and degassed by means of pressure relief.



Do your requirements exceed our standard products? Our Project Sales Team can customise a solution to suit your individual requirements:
project-sales@reflex.de

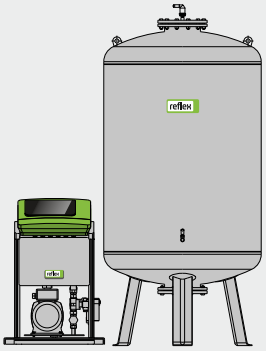
Applications

By combining the various control and hydraulic designs, and different vessels, Variomat systems can meet requirements in a whole host of different areas.

Variomat Giga can even satisfy the extreme requirements of industrial heal supply and district heating supply.

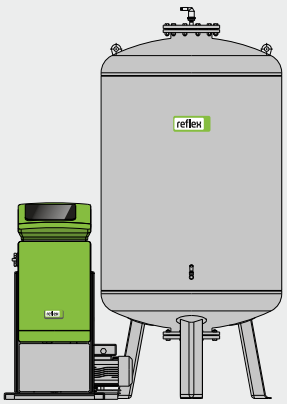
Variomat (VS 1)

- One pump
- Up to 8 MW
- Without soft start
- Control Basic
- 200–500 litre expansion vessel



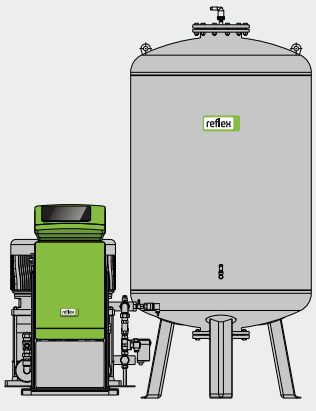
Variomat (VS 2-1)

- One pump
- Up to 8 MW
- With soft start
- Control Touch
- 200–5,000 litre expansion vessel



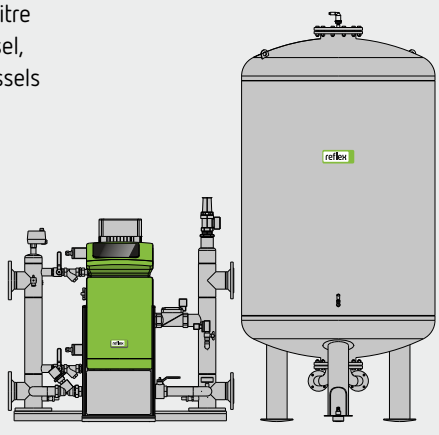
Variomat (VS 2-2)

- Two pumps
- Up to 8 MW
- With soft start
- Control Touch
- 200–5,000 litre expansion vessel



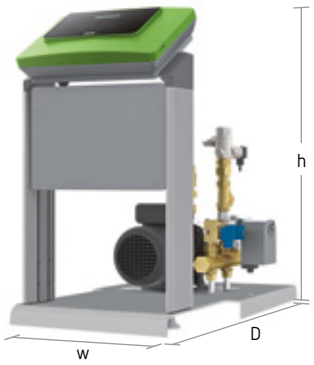
Variomat Giga

- Two pumps
- > 4 MW
- Control Touch
- 1,000–5,000 litre expansion vessel, customised vessels on request
- Additional pumps and any number of VF secondary vessels can be installed



Variomat product range

Variomat control units



Variomat VS 1

Variomat VS 2-2 95

Technical features

- Approval according to Pressure Equipment Directive 2014/68/EU
- Variomat controller VS 1 with Control Basic control unit
- From Variomat controller VS 2 with Control Touch controller and softstart
- Supply temperature 120 °C
- Max. operating temperature 70 °C
- Permissible ambient temperature 0 – 45 °C
- Sound pressure level ~ 55 dB (A)
- Degree of protection IP 54
- Connection water make-up Rp ½"
- Group fault signal and RS 485 interface for internal communication

	Type	Art. No.	Max. p_0 setting [bar]	Electric connection	Connection c	Electric power [kW]	Height h [mm]	Width w [mm]	Depth D [mm]	Weight [kg]
Control unit VS with 1 pump										
Control Basic control unit										
6 bar 70 °C	VS 1	8910100	2.5	230 V/50 Hz	Rp 1"	0.70	681	470	570	25.00
Control Touch control unit										
10 bar 70 °C	VS 2-1/35	8910110	2.5	230 V/50 Hz	Rp 1"	0.80	921	470	572	30.00
	VS 2-1/60	8910200	4.8	230 V/50 Hz	Rp 1"	1.10	921	470	572	36.90
	VS 2-1/75	8910300	6.5	230 V/50 Hz	Rp 1"	1.10	921	470	588	49.90
	VS 2-1/95	8910400	8.0	230 V/50 Hz	Rp 1"	1.10	921	470	588	51.40
16 bar 70 °C	VS 1-1/140	8910500	13.0	400 V/50 Hz	Rp 1"	2.20	964	470	557	47.00
Control unit VS with 2 pumps										
Control Touch control unit										
10 bar 70 °C	VS 2-2/35	8911100	2.5	230 V/50 Hz	G 1 ¼"	1.50	921	750	799	57.50
	VS 2-2/60	8911200	4.8	230 V/50 Hz	G 1 ¼"	2.20	921	750	799	61.10
	VS 2-2/75	8911300	6.5	230 V/50 Hz	G 1 ¼"	2.20	921	750	706	89.00
	VS 2-2/95	8911400	8.0	230 V/50 Hz	G 1 ¼"	2.20	921	750	706	92.00
16 bar 70 °C	VS 1-2/140	8911500	13.0	400 V/50 Hz	Rp 1 ¼"	2.20	964	750	698	85.00

Variomat vessels & heat insulation

Variomat VG 500

Variomat VG 1000

Variomat VW

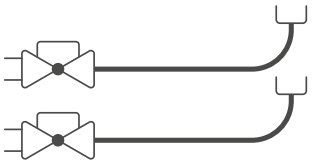
Technical features

- Replaceable bladder according to DIN EN 13831
- Approval according to Pressure Equipment Directive 2014/68/EU
- Max. operating temperature 70 °C
- Max. permissible system temperature 120 °C
- Optional heat insulation, 50 mm thick

	Primary vessel			Secondary vessel							Heat insulation		
	Type	Art. No.	Height h2 [mm]	Type	Art. No.	Height h2 [mm]	Connection c	Ø d [mm]	Height h [mm]	Weight [kg]	Type	Art. No.	Weight [kg]
6 bar 70 °C	VG 200	8600011	146	VF 200	8610000	146	G 1"	634	1,057	33.70	VW 200	5990100	3.00
	VG 300	8600111	146	VF 300	8610100	146	G 1"	634	1,357	55.20	VW 300	5990200	3.50
	VG 400	8600211	133	VF 400	8610200	133	G 1"	740	1,344	72.20	VW 400	5991300	4.50
	VG 500	8600311	133	VF 500	8610300	133	G 1"	740	1,564	81.10	VW 500	5990000	5.50
	VG 600	8600411	133	VF 600	8610400	133	G 1"	740	1,807	96.80	VW 600	5990500	6.00
	VG 800	8600511	133	VF 800	8610500	133	G 1"	740	2,272	109.90	VW 800	5990300	8.00
	VG 1000/740	8600611	133	VF 1000/740	8610600	133	G 1"	740	2,737	156.00	VW 1000/740	5990400	8.00
	VG 1000/1000	8600705	348	VF 1000/1000	8610705	348	G 1"	1,000	2,127	270.00	VW 1000/1000	5991400	9.00
	VG 1500	8600905	346	VF 1500	8610905	346	G 1"	1,200	2,127	300.00	VW 1500	5991000	10.60
	VG 2000	8601005	346	VF 2000	8611005	346	G 1"	1,200	2,587	400.00	VW 2000	5989700	13.00
	VG 3000	8601205	375	VF 3000	8611205	375	G 1"	1,500	2,588	740.00	VW 3000	5108700	15.00
	VG 4000	8601305	375	VF 4000	8611305	375	G 1"	1,500	3,160	820.00	VW 4000	5989800	17.00
	VG 5000	8601405	375	VF 5000	8611405	375	G 1"	1,500	3,695	980.00	VW 5000	5991100	21.80

Variomat connection set

Variomat connection set



2 connecting hoses
G 1" x G 1" with safe shut-off

Variomat connections for systems with one pump

2 connecting hoses
G 1 ¼" x G 1"

Variomat connections for systems with two pumps

Type	Art. No.	Weight [kg]
Variomat connection set for systems with one pump		
Connection set VS 1/VS 2-1 Ø 1,000–1,500 mm	6940200	1.90
Connection set VS 1/VS 2-1 Ø 480–740 mm	6940100	1.55
Variomat connection set for systems with two pumps		
Connection set VS 2-2 Ø 1,000–1,500 mm	6940400	2.15
Connection set VS 2-2 Ø 480–740 mm	6940300	1.85

The secured shut-off for systems with 1 pump is included in the connection set.
The secured shut-off for systems with 2 pumps is included on the control unit.

More information about the Reflex Control concept is available from **page 44**

Variomat Accessoires

I/O modules

- Two additional analogue outputs for pressure and level control
- Six free-programmable digital inputs
- Six free-programmable floating outputs

Busmodule

- For exchanging data between controller and central building management system

Master-Slave

- Software Tool
- For the operation of up to ten Variomat/-Giga units in a hydraulic network over a distance up to 1,000 m

Valve

- Reliable make-up for special applications
- Part number available with pre-assembled Safecontrol on request
- Rp ½"

Commissioning

- **7945600**: Reflex commissioning Cat. 1 for Reflexomat, Variomat, Servitec with one compressor/one pump
- **7945704**: Reflex commissioning add. Cat. 1 for each additional system at the same location – one compressor/pump
- **7945630**: Reflex commissioning Cat. 2 for Reflexomat, Variomat, Servitec with two compressors/pumps
- **7945721**: Reflex commissioning add. Cat. 2 for each additional system at the same location – two compressors/pumps

Bladder rupture detector MBM II

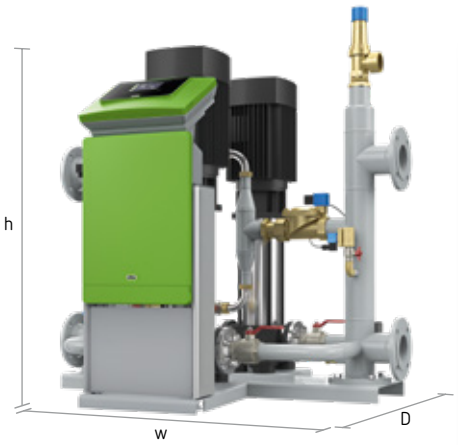
- Indication of membrane rupture in vessels
- Consisting of an electrode relay and an electrode (factory fitted)
- Power supply 230 V/50 Hz
- Floating output (changeover contact)
- Delivery only in combination with a vessel with MBM coupling

Type	Art. No.	Weight [kg]
Busmodule		
Busmodule BACnet MS/TP	8860600	0.40
Busmodule BACnet-IP Touch	8860500	0.40
Busmodule Ethernet	8860300	1.90
Busmodule Modbus RTU Touch	9125592	0.40
Busmodule Profibus DP	8860200	1.90
Busmodule Profibus DP Touch	9118042	0.40
I/O module		
I/O module VS	8997705	1.00

Type	Art. No.	Weight [kg]
Commissioning		
Commissioning Cat. 1	7945600	0.00
Commissioning Cat. 2	7945630	0.00
Commissioning add. Cat. 1	7945704	0.00
Commissioning add. Cat. 2	7945721	0.00
Master-Slave		
Master-Slave	7859100	0.10
Bladder rupture detector		
Bladder rupture detector MBM II	7857700	0.62
Valve		
Valve Safecontrol	9119352	0.97

Variomat Giga product range

Variomat Giga control & hydraulic module



Variomat Giga

Technical features

- Pump-controlled pressurisation station with integrated water make-up and degassing (Return ≤ 70 °C) for hot and cold water systems
- With two pumps and two overflow valves
- Max. operating pressure 16 bar
- Supply temperature 120 °C
- Max. operating temperature 70 °C
- Sound pressure level ~ 55 dB (A)
- Connection Pump DN 80 / PN 16
- Connection Primary vessel DN 80 / PN 6
- Connection water make-up Rp ½"
- Control Touch control unit

	Type	Art. No.	For hydraulic module	Max. p_0 setting [bar]	Electric connection	Connection c	Electric power [kW]	Height h [mm]	Width w [mm]	Depth D [mm]	Weight [kg]
Control Units											
	GS 1.1	8912500	GH 50/ GH 70	–	230 V/50 Hz	–	2.20	921	380	477	8.00
	GS 3	8912600	GH 90/ GH 100	–	400 V/50 Hz	–	6.00	921	380	477	8.00
Hydraulic modules											
16 bar 70 °C	GH 50	8931000	–	4.0	230 V/50 Hz	DN80/PN16	2.20	1,194	1,168	830	203.00
	GH 70	8932000	–	6.0	230 V/50 Hz	DN80/PN16	2.20	1,194	1,168	830	206.00
	GH 90	8931400	–	8.0	400 V/50 Hz	DN80/PN16	6.00	1,194	1,168	830	270.00
	GH 100	8931200	–	9.5	400 V/50 Hz	DN80/PN16	6.00	1,194	1,168	830	275.00

Two control units can also be connected in parallel operation.
For example, two standard Variomat Gigas with 30 MW each can be combined to form a single 60 MW system.

Variomat Giga vessels

Vase de base GG

Vase complémentaire GF

Technical features

- Replaceable bladder to DIN EN 13831
- Approval according to Pressure Equipment Directive 2014/68/EU
- Max. operating temperature 70 °C
- Max. permissible system temperature 120 °C

	Primary vessel			Secondary vessel						
	Type	Art. No.	Height h2 [mm]	Type	Art. No.	Height h2 [mm]	Connection c	Ø d [mm]	Height h [mm]	Weight [kg]
6 bar 70 °C	GG 1000	8920105	285	GF 1000	8930105	285	DN65/PN6	1,000	2,127	270.00
	GG 1500	8920305	285	GF 1500	8930305	285	DN65/PN6	1,200	2,127	340.00
	GG 2000	8920405	285	GF 2000	8930405	285	DN65/PN6	1,200	2,587	430.00
	GG 3000	8920605	314	GF 3000	8930605	314	DN65/PN6	1,500	2,588	651.00
	GG 4000	8920705	314	GF 4000	8930705	314	DN65/PN6	1,500	3,163	890.00
	GG 5000	8920805	314	GF 5000	8930805	314	DN65/PN6	1,500	3,698	980.00

Variomat Giga Accessories

SV1 safety valve

- For additionally safeguarding GG and GF vessels at rated heat outputs > 10.5 MW

Type	Art. No.	Weight [kg]
Commissioning		
Commissioning Variomat Giga	7945724	0.00
Miscellaneous accessories		
SV1 safety valve	9119352	0.97

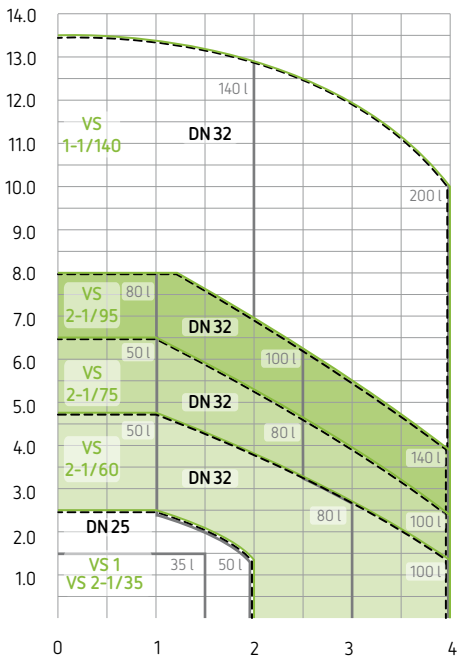
Further accessories can be found on **page 33**

Selection and calculation

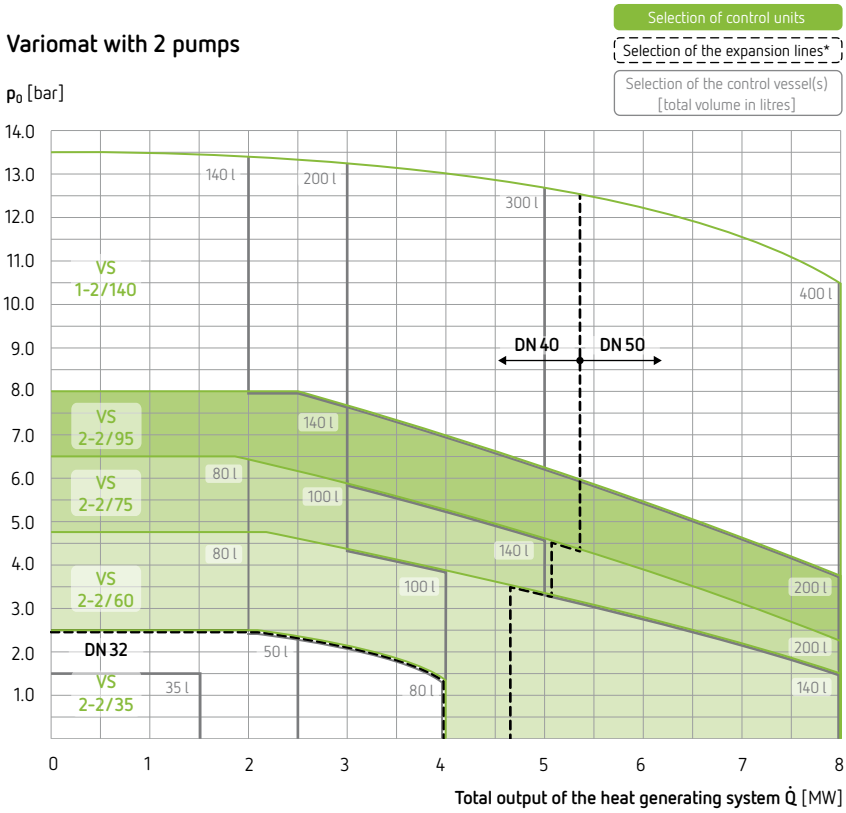
for heating systems up to 120 °C

Selection of Variomat control unit & Reflex control vessel

Variomat with 1 pump



Variomat with 2 pumps



Selection of control units

Alternative calculation method

$$p_0 \geq \frac{H[m]^*}{10} + \begin{cases} 0.2\ \text{bar} & [\leq 100\,°C]^{**} \\ 0.5\ \text{bar} & [105\,°C]^{**} \\ 0.7\ \text{bar} & [110\,°C]^{**} \\ 1.2\ \text{bar} & [120\,°C]^{**} \end{cases}$$

* H = Static height
** Safety temperature

Selection of control vessels

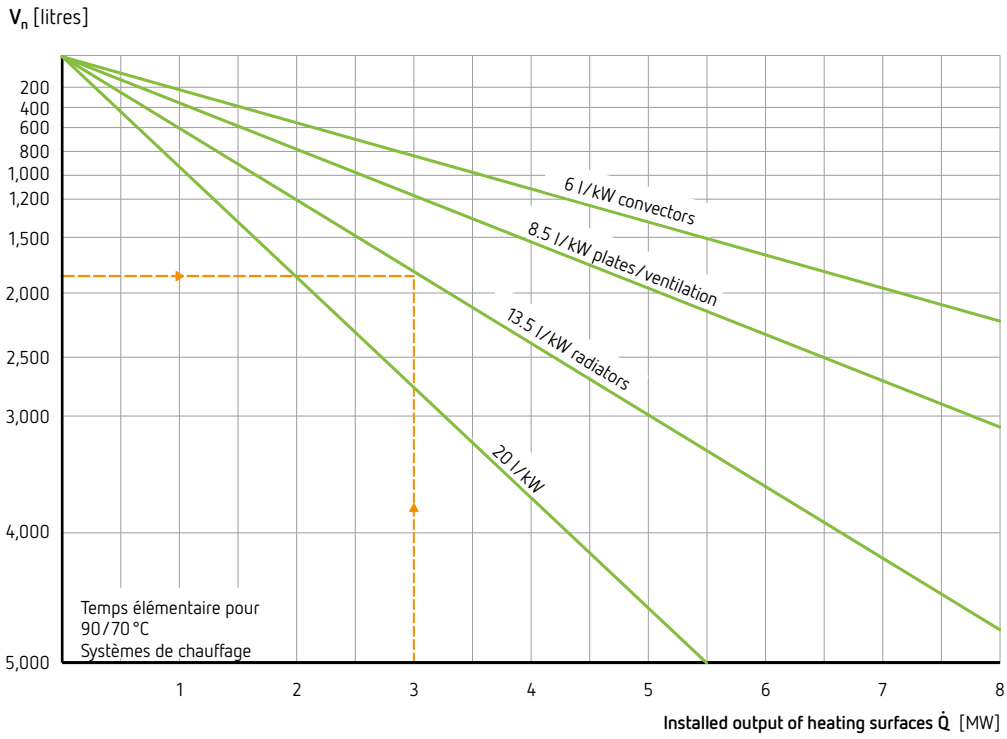
Unlike pressure expansion vessels or compressor-controlled pressure maintenance, gas cushions do not act as shock absorbers in pump-controlled pressure maintenance. A control vessel must therefore be incorporated to absorb the shocks occurring when the pump runs up and down.

If installed correctly, it does not share in the main task of maintaining pressure. The dimensioning of a control vessel is dictated by the characteristic values p0 and the expansion flow rate of the system, rather than by the type of pressure maintenance station.

In the absence of individual protection and pump redundancy, we recommend the rapid selection process described above when dimensioning the control vessels.

* If the expansion line is longer than **10 m**, we recommend choosing a size larger.

Selection of Variomat vessels



Alternative calculation method

$V_n \geq V_a \times \begin{matrix} 0.031 & [70\,°C]^* \\ 0.045 & [90\,°C]^* \\ 0.054 & [100\,°C]^* \end{matrix}$

* Design flow temperature
V_n = Nominal volume
V_A = System's water capacity

- Nominal volume V_n approximation from sketch or calculated using a formula
- The nominal volume can be split between multiple vessels (VG primary and VF secondary vessels).

Customised solutions and higher outputs or temperatures > 120 °C are available on request.

Basic technical data

Output

Heat generator	$\dot{Q}$ =	3,000 kW
Water capacity	V_A =	non précisé

(approximation from installed heat output $\dot{Q}$= 3,000 kW, radiators, 90/70 °C, no additional district heating tubes)

Design temperature	=	90 °C
Safety temperature	=	110 °C
Static height	=	25 m

Calculation

$p_0 \geq \frac{H\,[m]}{10}$ bar + 0.7 bar [110 °C]

$p_0 \geq \frac{25}{10}$ bar + 0.7 bar = 3.2 bar

Nominal volume V_A = 1,800 litres
from the sketch

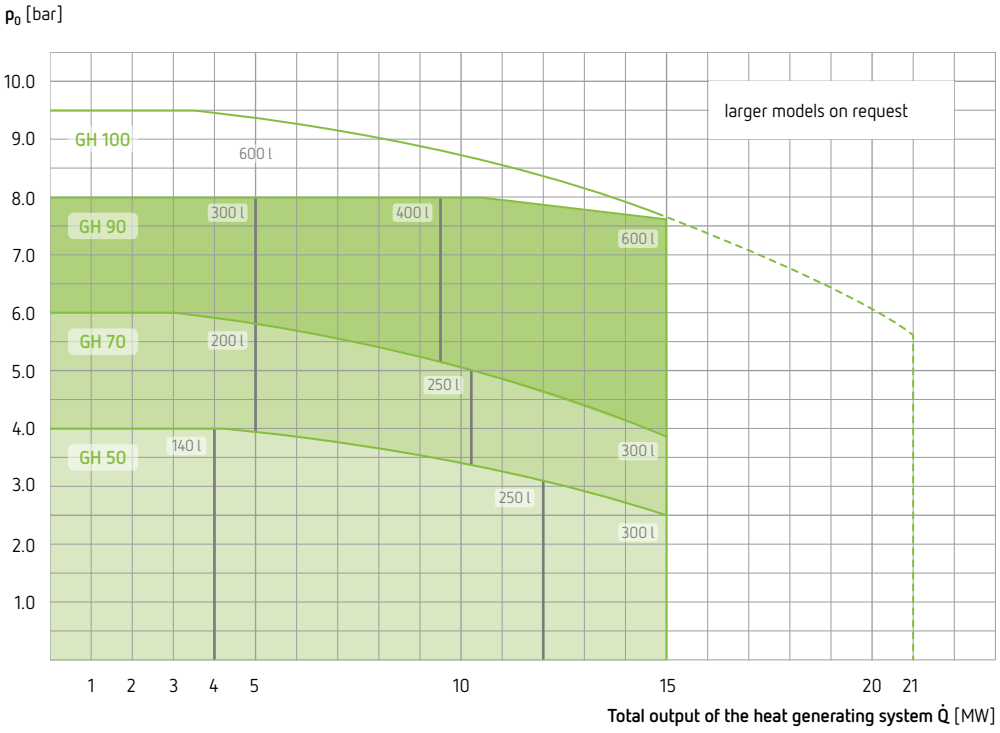
Result

selected

Variomat 2-2/60 control unit	
+ VG primary vessel (e.g. Ø 1,000)	1,000 litres
+ VF secondary vessel (e.g. Ø 1,000)	1,000 litres
	= 2,000 litres
+ VW heat insulation	1,000 litres
+ G 1¼" connection set, Ø 1,000	
+ Reflex R 1x1 cap valve	
+ Expansion line	= DN 50

Selection example

Selection of Variomat Giga hydraulic module



Selection of the hydraulic module GH

Selection of the control vessel(s) [total volume in litres]

Alternative calculation method

$$p_0 \geq \frac{H[m]^*}{10} +$$

0.2 bar	[≤100 °C]**
0.5 bar	[≤105 °C]**
0.7 bar	[≤110 °C]**
1.2 bar	[120 °C]**
1.9 bar	[130 °C]**
2.8 bars	[140 °C]**

* H = Static height
** Safety temperature

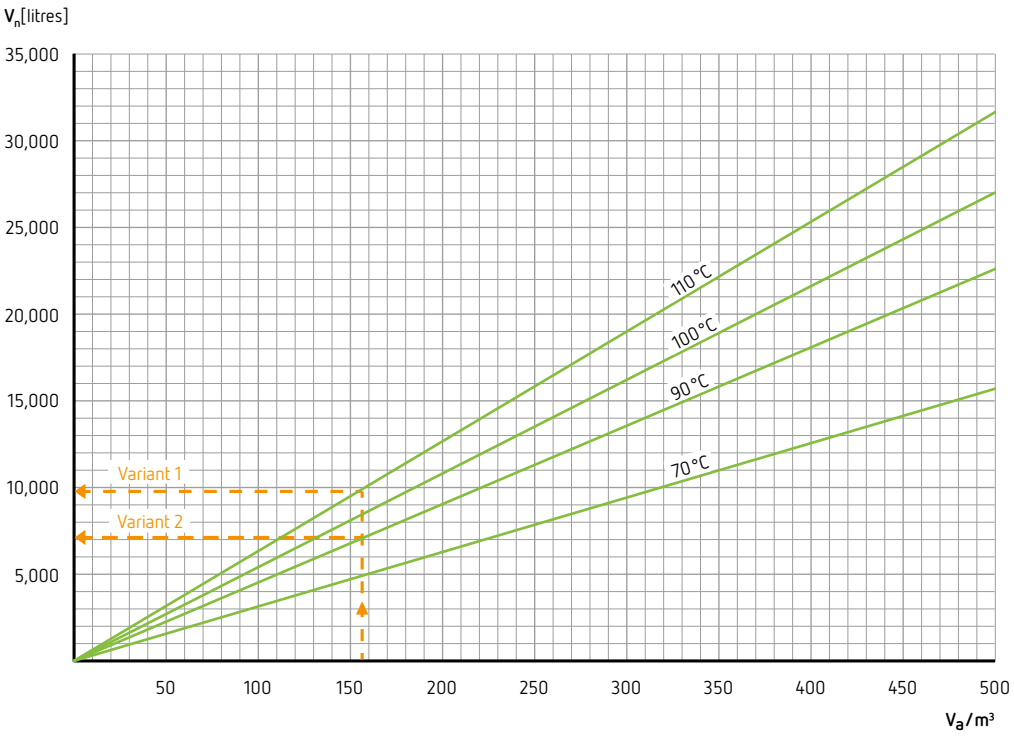
- When selecting the control unit for cooling water systems to 30 °C, only 50 % of the rated heat output may be included in the calculation.

Selection of the expansion lines

Expansion lines	DN 25 1"	DN 32 1¼"	DN 40 1½"	DN 50 2"	DN 65	DN 80	DN 100
$\dot{Q}$ / kW Length ≤ 10 m	2,100	3,600	4,800	7,500	14,000	19,000	29,000
$\dot{Q}$ / kW Length > 10 m ≤ 30 m	1,400	2,500	3,200	5,000	9,500	13,000	20,000

If the expansion line is longer than **10 m**, we recommend choosing a size

Selection of Variomat Giga vessels



Alternative calculation method

$V_n \geq V_a$ x

0.031	[70 °C]*
0.045	[90 °C]*
0.054	[100 °C]*
0.063	[110 °C]*

* Design flow temperature
V_n = Nominal volume
V_A = System's water capacity

- Nominal volume V_n approximation from sketch or calculated using a formula
- The nominal volume can be split between multiple vessels (GG primary and GF secondary vessels).

Customised solutions and higher outputs or temperatures > 120 °C are available on request.

Basic technical data

Heat generator	$\dot{Q}$	=	2x 6,500 kW
		=	13,000 kW
Water capacity	V_A	=	156 m³
Design flow temperature		=	110 °C
Design return temperature		=	70 °C
Safety temperature		=	120 °C
Static height		=	25 m

Calculation

$p_0 \geq \frac{H\,[m]}{10}$ bar + 1.2 bar [120 °C]

$p_0 \geq \frac{25}{10}$ bar + 1.2 bar = 3.7 bar

Result

Variant 1 :

V_n for design flow temperature	=	**110 °C**
V_n = 0,063 x V_A		
= 0,063 x 156 m³	=	9.82 m³

Variant 2 :

V_n for average system temperature $\frac{110 + 70\,°C}{2}$	=	**90 °C**
V_n = 0,045 x V_A	=	7.02 m³*

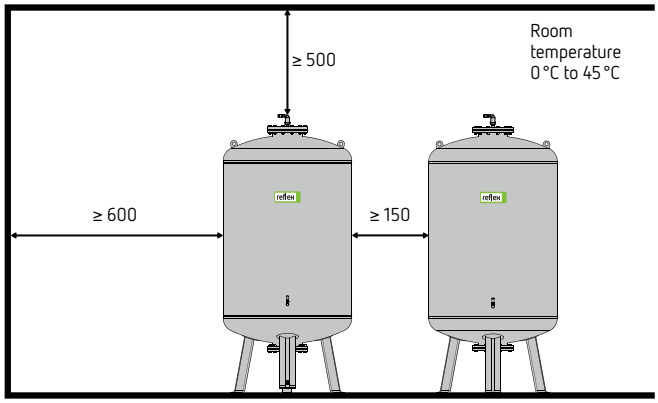
* The decision must be made after consultation with the operator and — if the systems are subject to mandatory testing — the Notified Body, as to whether the max. flow temperature or e.g. the average system temperature is to be used.

Selection example

Installation and commissioning

Installation notes

- Primary vessel connections must always be flexible to ensure proper functional performance of the level sensor.
- The connection set from the Reflex range of accessories must be used to connect the vessels. The secondary vessel is connected on site.
- Primary and secondary vessels must be installed on the same level (height) and close to each other.
- The control vessel is either tied into the expansion line or used as individual protection for the generator. The upstream pressure of control vessel p_0 must be set to the minimum operating pressure p_0 of the pressure maintenance station. Differences in static height must be taken into consideration.

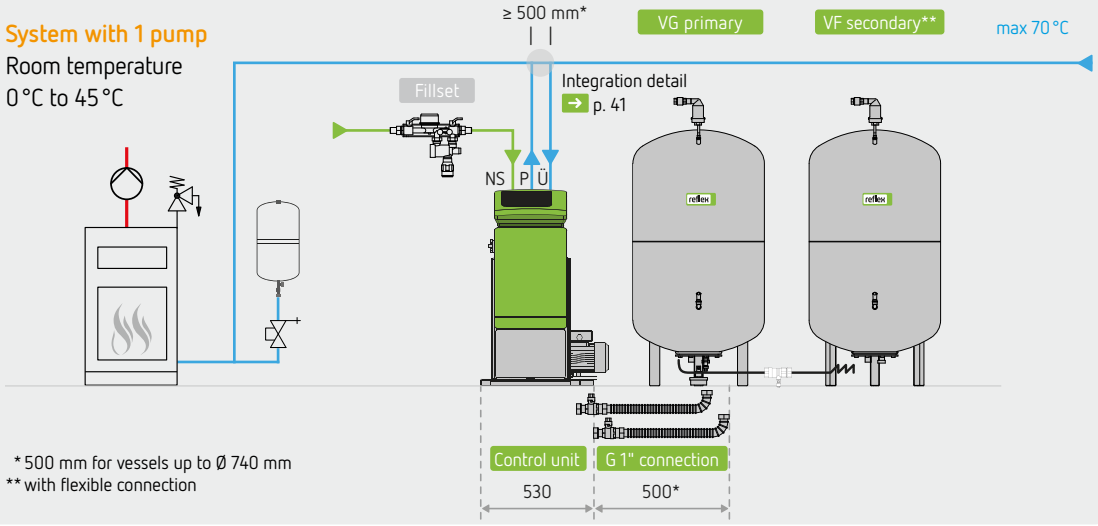


Side and ceiling clearances to be observed during installation

Installation examples

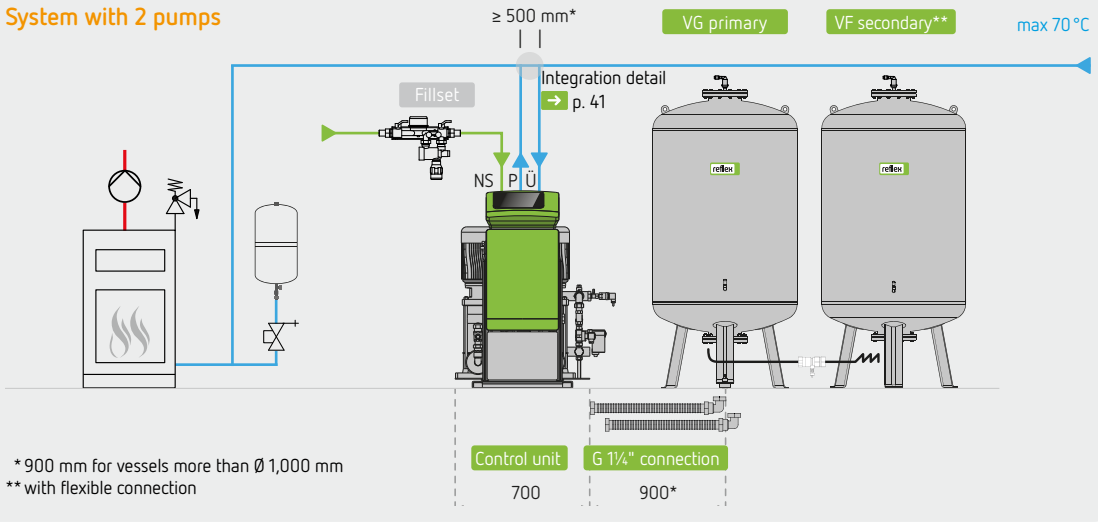
System with 1 pump

Room temperature 0 °C to 45 °C



* 500 mm for vessels up to Ø 740 mm
** with flexible connection

System with 2 pumps



* 900 mm for vessels more than Ø 1,000 mm
** with flexible connection

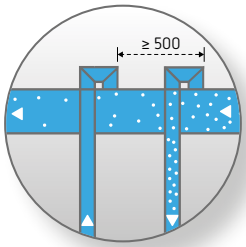
Flow rates

The Variomat degassing function will only work reliably if the Variomat is tied into a representative main flow of the facility system. The following minimum flow rates $\dot{V}$ must be adhered to in operation. Given a spread of dT = 20 K, this corresponds to a minimum design output of the customer's facility of $\dot{Q}$.

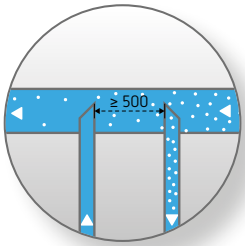
	Variomat			
	1	2-1	2-2/35	2-2/60-95
$\dot{V}$	2 m³/h	4 m³/h	2 m³/h	4 m³/h
$\dot{Q}$	47 kW	94 kW	47 kW	94 kW

Hydraulic integration

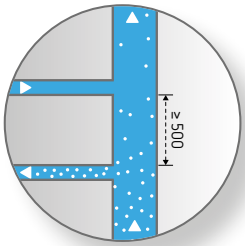
To avoid any coarse dirt getting directly into the Variomat, the connection tubes must be tied in from above, from the side, or from below as immersion tubes into the main line. A minimum distance of 500 mm between the integration points must be observed.



from above



from below
immersion tube



from the side
(optionally horizontal or vertical)

Caution: dirt!

- Tying the pump and pressure relief tubes into the system in such a way as to avoid the ingress of coarse dirt (see above). Dimensioning the expansion lines, see pages 36 and 38.
- When connecting the make-up tube directly to a drinking water system, a Reflex Fillset (shut-off, system separator, water meter, dirt trap) must be installed upstream.
- If the Fillset is not installed, at the very least a dirt trap (mesh-size < 0.25 mm) must be incorporated to protect the make-up solenoid valve.
- The tube between the dirt trap and the solenoid valve must be kept as short as possible and must be flushed.

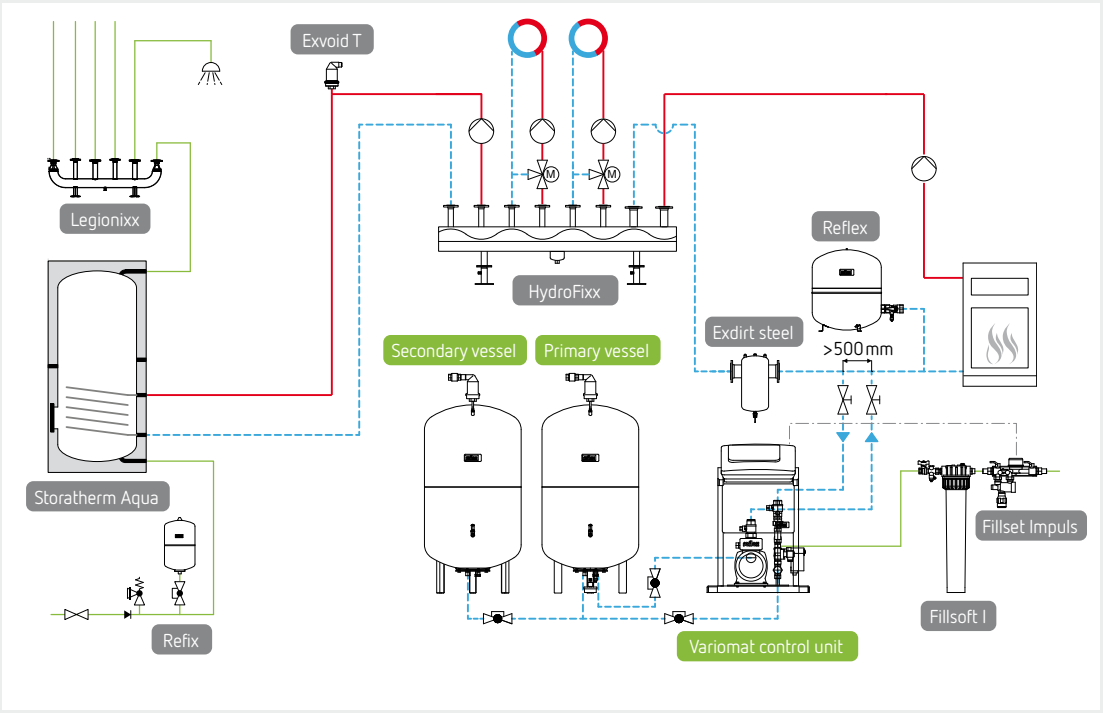
Please refer to our detailed operating instructions during installation and commissioning.

Installation examples

Solution № 09 Pressure maintenance and degassing by Variomat

Pump-controlled pressure maintenance with simultaneous degassing in a Reflex Variomat.

Reflex diaphragm expansion vessel as individual protection of the heat generator in the return flow.



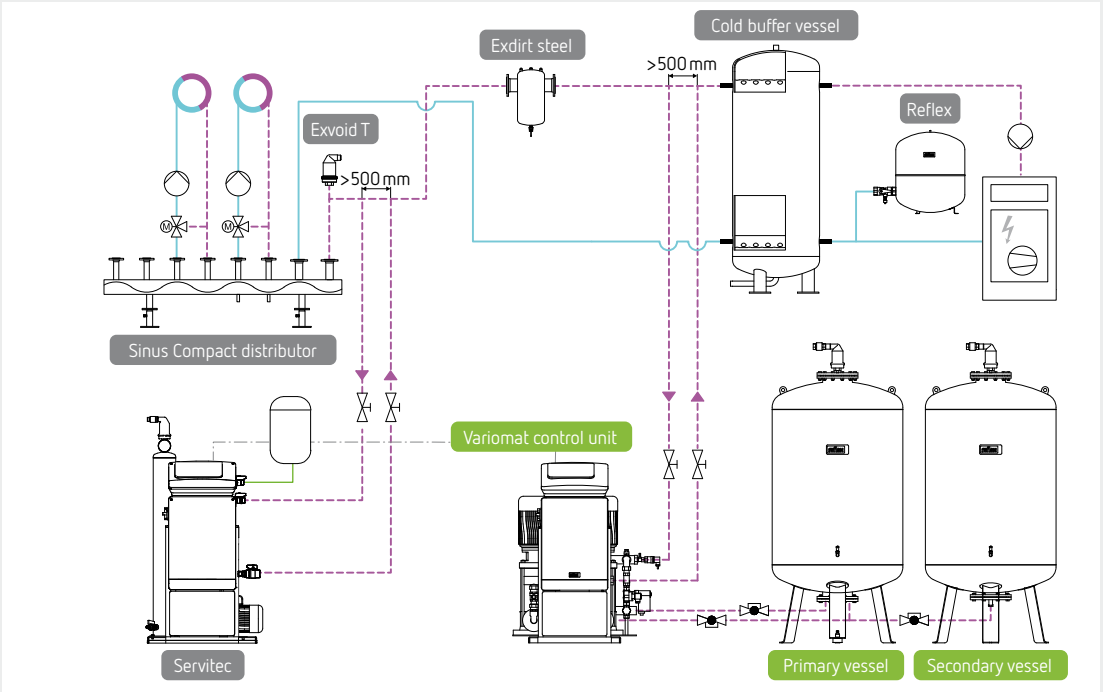
Solution № 20 Variomat in cooling applications

Use of Servitec vacuum spray tube degassing to achieve maximum degassing performance.

When combining Servitec and Variomat, the degassing function on the Variomat must be deactivated.

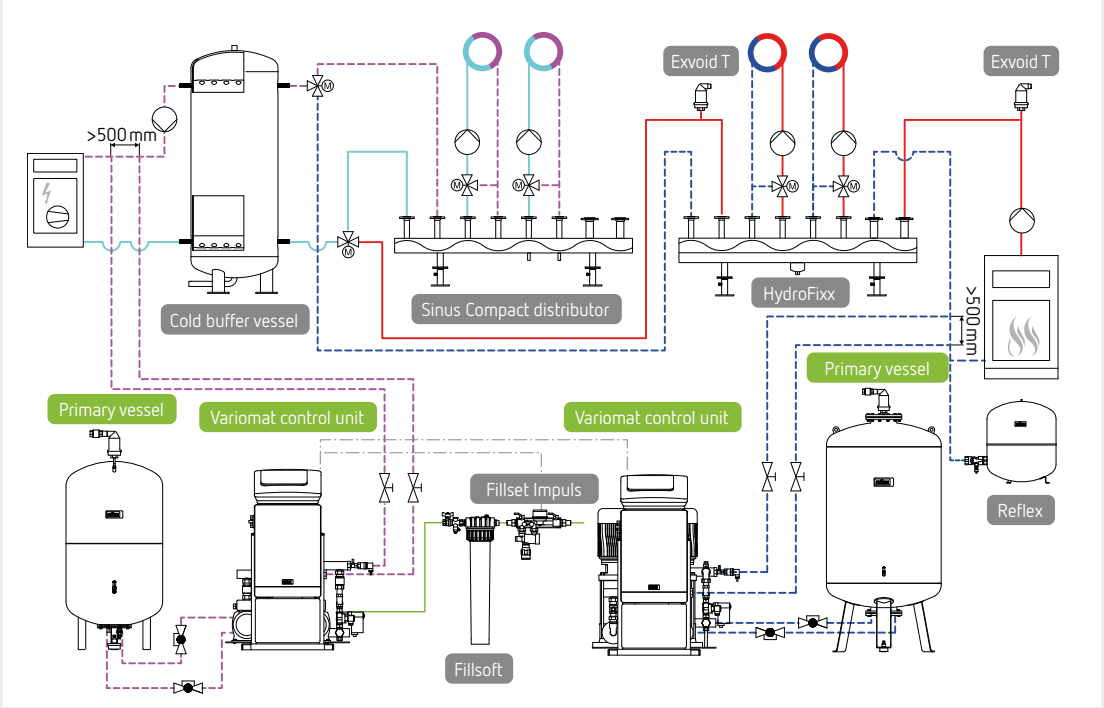
Automatic make-up of pre-mixed heat transfer medium, vessel supplied by installer.

When selecting the control unit for cooling water systems to 30 °C, only 50 % of the rated heat output may be included in the calculation.



Variomat in Master-Slave operation

Solution № 14

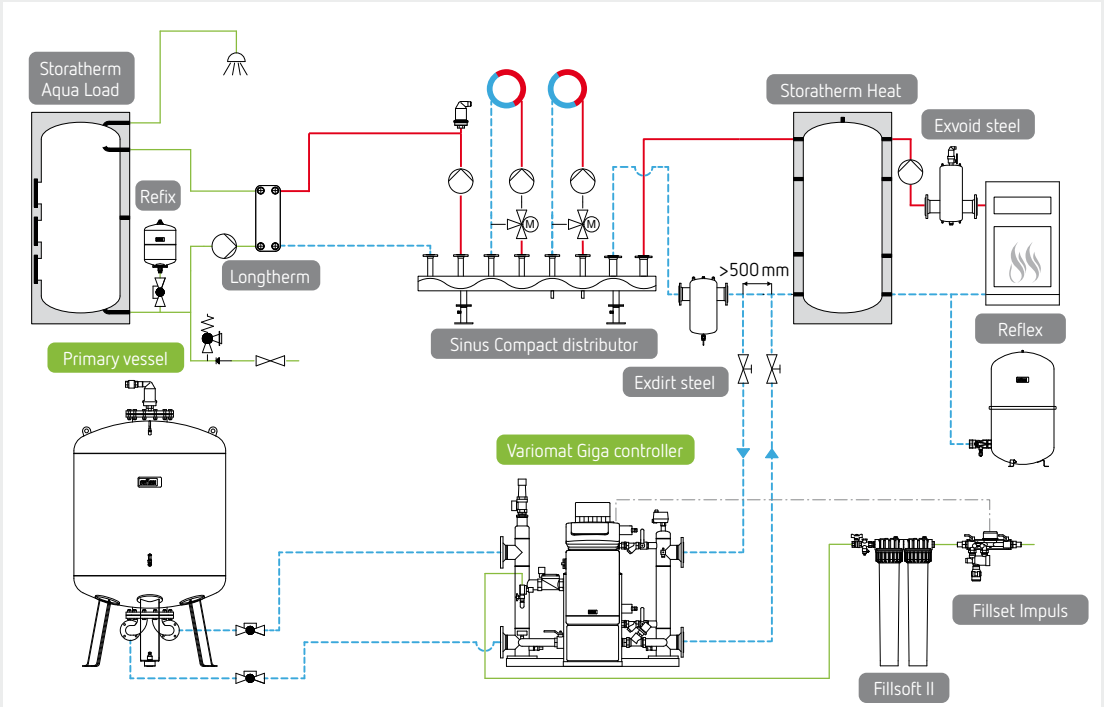


Hydraulically connected heating and cooling.

A Master-Slave configuration is only recommended if the systems are hydraulically connected or the stations at different levels; examples include summer and winter operation of cooling and heating systems, or a group of several heat generating systems.

Variomat Giga

Solution № 12



Pressure maintenance in major facilities requiring large quantities of heat and hot water.

Connection of the vessels must be flexible. Factory connections are provided for this purpose. The tube connection between the hydraulic units and the vessels must be provided on site.

These diagrams are only meant to visualise the interconnections.
Installation must be adapted to local conditions accordingly and must be specified in more detail.

Reflex Control

Key advantages

Extremely modern, user-friendly control concept, easy to operate and clearly structured

- Extendable microprocessor controller
- Reflex Control flexible control concept for fully automatic operation with data interface for incorporation into modern building management
- Enables communication between Servitec facilities, Reflex pressure maintenance stations, the Fillcontrol range, and a control centre

Reflex Control overview

Controllers

Control Basic

- 2-line LCD display
- 8 operating keys
- 2 status displays
- Integrated control of system pressure, degassing and water make-up
- Manual and automatic operation
- Floating-contact external group fault signal
- Counting pulse inlet for contact water meter
- RS-485 interface for BMS connection via Busmodules

Control Touch

- 4.3" touch screen colour display
- Graphical user interface
- Simply structured plain text menus, incl. operating instructions and help documentation
- Integrated control of system pressure, degassing and water make-up
- Manual and automatic operation
- Permanent display of key operating parameters on system diagram
- Intelligent plug-and-play function management
- Key operating data can be analysed and stored
- Wide array of interfaces:
  - → 1 × meter pulse inlet for contact water meter
  - → 2 × floating outputs for fault messages
  - → 2 × analogue parametrisable outputs for pressure & level
  - → 2 × RS-485 interfaces for connection to building management system and other networks
  - → Slots for HMS Networks and SD memory card

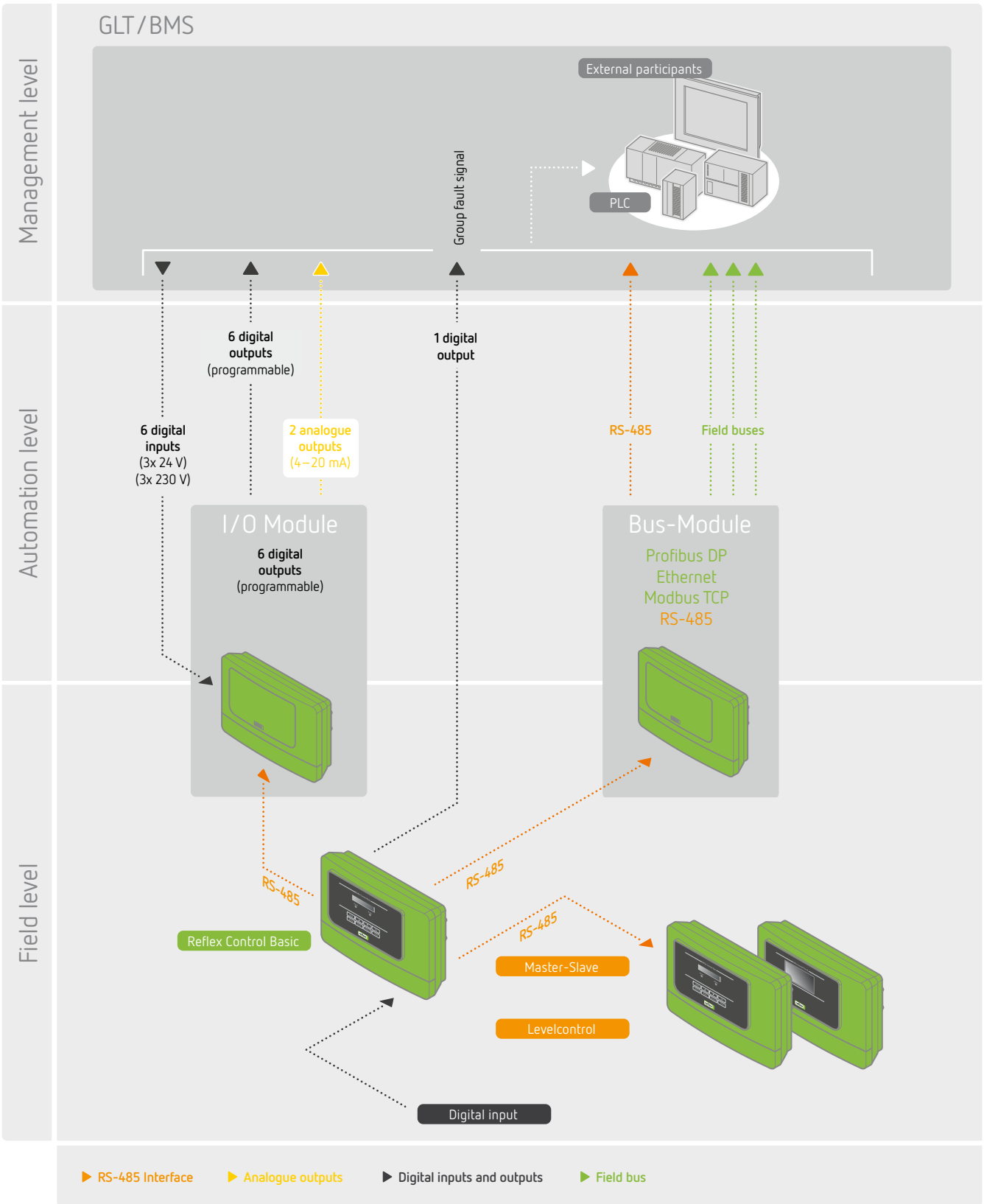
Control Smart

- Access via Bluetooth interface
- Parameterisation of the degassing mode (continuous or intermittent operation, number of cycles) including days of the week and time
- Fault message display
- System pressure checking
- Software updates
- currently available for Servitec Mini and Servitec S

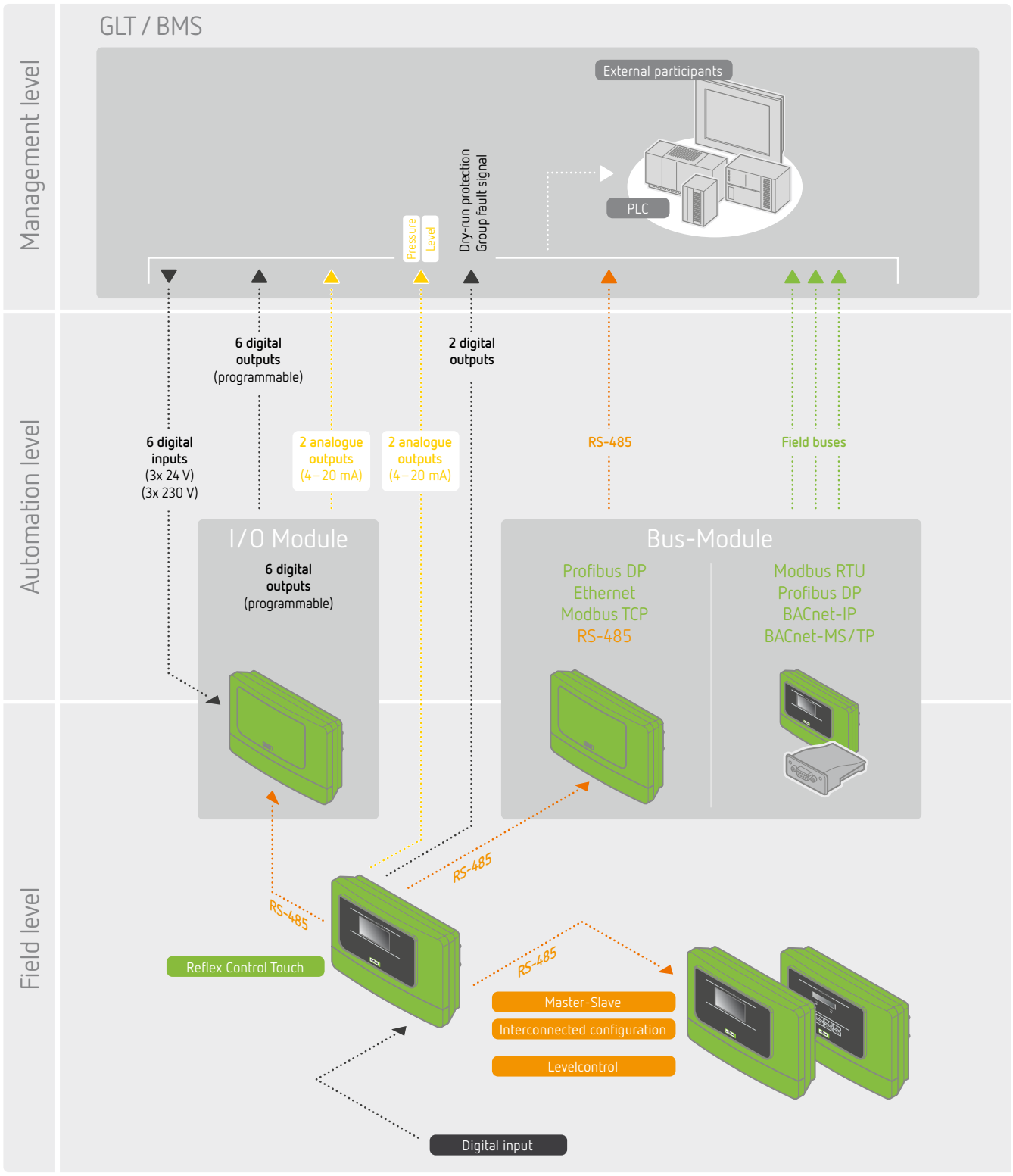
  For further details, please consult our brochure “Vacuum spray-tube degassing”

Communication overview

Reflex Control Basic



Reflex Control Touch



Network solutions using Reflex Control

The Reflex Control control concept ensures the flexible and easy networking of pressure maintenance, make-up and degassing. Reflex Control Touch and Control Basic are standard equipped with RS-485 data interface.

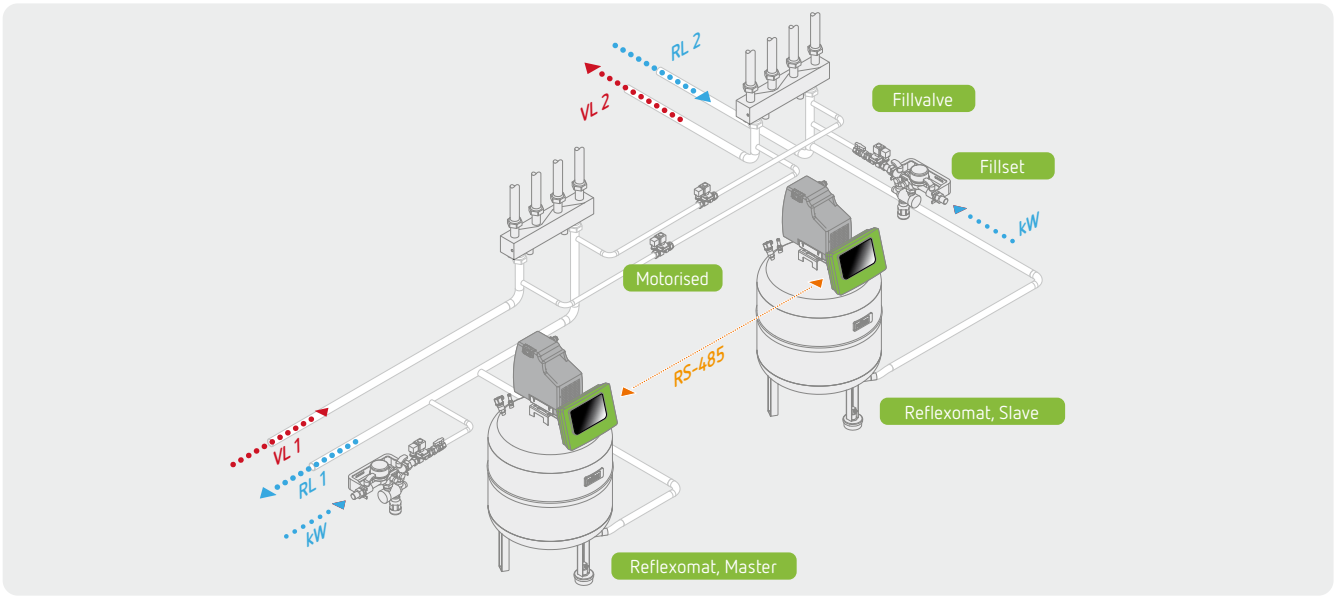
Additional I/O and bus modules with the required interfaces are available for sophisticated requirements, e.g. complex hydraulic systems with heating or cooling, or integrations to building management systems.

	Type of bus module/Interface	
Bus protocol	 Bus module for Basic and Touch	 Compact module for Touch
RS-485	●	–
Profibus DP	●	●
Ethernet	●	–
Modbus TCP	●	–
Modbus RTU	–	●
BACnet-IP	–	●
BACnet-MS/TP	–	●

Master-Slave operation

Reflex Control really shows what it is capable of when connecting multiple facility parts together. A Master/Slave configuration can switch up to ten pressure maintenance stations in hydraulically coupled systems (e.g. combined heating/cooling network). In this mode of operation, pressure maintenance is performed by one facility (Master), while the other facilities (Slaves) are only used for volume compensation. The relevant current level of the Master facility is transferred cyclically to the Slaves.

If the level of a Slave facility deviates by more than ±5% from the Master, level equalisation is initiated. The hardware in the controllers (Control Touch/ Basic) is ready for Master/Slave configuration. In addition to the relevant wiring of the controllers, facility-specific programming is required, which is performed by the Reflex customer service team and which must be ordered as an option for the relevant pressure maintenance station.



Two pressure maintenance stations as a Master/Slave configuration – using Reflexomats as an example

Your notes

Reflex added value

Our digital services

Reflex Solutions Pro —
Complete product solutions quickly and easily
The next generation of the proven configuration tool allows products from the entire Reflex portfolio to be individually compiled and configured to suit a specific system, irrespective of size — from a single-family home to residential buildings and industrial premises. Whether a single product or a complete system, just choose the application, then enter the relevant system parameters, Reflex Solutions Pro works out the appropriate configuration quickly and precisely. With one click, you can download the complete documentation such as product data, tender texts and BIM data.

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Reflex Training — expertise gives us the edge

Close to our headquarters in Ahlen, professional craftsmen, planners and operators gear up to meet the challenges posed by heating and hot water supply in modern building technology. From installation and planning to consulting and technical operation, the Reflex Training Centre and its team aligns its programme to those partners who want to learn more about technology, standards and service from the horse's mouth. Newly acquired expertise is put into practice, refined and experienced straight away on Reflex systems in a former manor house that has been refurbished to modern-day standards in the German region of Westphalia. Realistic simulations and a comprehensive portfolio of systems help to put the content learned to practical use, skilfully combining theory with practical aspects. The Reflex4Experts training courses are now also available online, for example, as webinars for PC, tablet or smartphone, and include short, interesting learning units on current and exciting topics that can be easily followed in the office, at home or on the road.

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Supply technology systems are becoming increasingly complex. This is true for the technology as well for documentation and testing requirements. With Reflex After-Sales & Service, you remain in good hands after your purchase. Our years of expertise specialising in the Reflex product world ensure the full safety and functionality of your system.

- Expertise and many years of experience with all Reflex products
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- Compliance with statutory regulations and therefore also with liability and warranty provisions
- Systems optimally adapted for maximum efficiency and functionality

You can find more information about all our services at **www.reflex-winkelmann.com/int/services-downloads/after-sales-service**

Warranty extension to five years
From now on, you can register your system after it has been commissioned by us or by a service partner certified by us. If you enter into a maintenance contract at the same time, you are entitled to a warranty extension to five years. Take advantage of this opportunity easily at www.reflex-winkelmann.com/int/services-downloads/after-sales-service/warranty on our home page or simply use the sticker on your product to access registration.

Registration is not only possible at the time of commissioning but is also valid for all systems with a manufacturing date of up to six months from the year of manufacture 2020.

With the new online service order, we are optimising the service for our customers even further. It takes just a few clicks to create the order form, and it can be processed directly in our system. This makes our service even faster and more customer friendly.

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Reflex Winkelmann GmbH
Gersteinstrasse 19
DE-59227 Ahlen
+49 2382 7069-0
info@reflex.de
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