Variomat

Pump Controlled Pressurisation Systems

- Pressure maintenance
- Deaeration
- Water make-up

Reflex Control

Control Basic

- 2-line LCD display
- 8 control keys
- 2 status LED Integrated control of system pressure, deaeration and water make-up
- Manual and automatic operation
- Common fault output signal
- Input, for contact water meter
- RS-485 interface

Control Touch

- 4.3" touch screen colour display
- Graphic user interface
- Simply structured plain text menus including operating instructions and help texts
- Integrated control of system pressure, deaeration and water make-up
- Manual and automatic operation
- Permanent display of the most important operating parameters in the system diagram
- Intelligent Plug & Play operational management
- Evaluation and storage of the most important operational data
- Extensive interfaces:
  - → Input, for contact water meter
  - → 2 x dry contact outputs for error messages
  - → 2 x analogue outputs for pressure and vessel content
  - → 2 x RS-485 interfaces
  - → Plugs for Bluetooth module and HMS networks, as well as SD card

Control Remote

NEW!

- Remote control via secure server
- System monitoring via PC or mobile device at any time and everywhere
- (Professional) remote servicing by Reflex Customer Service
- Reflex Remote Portal with intuitive user interface
- Simple management of multiple installations
- Visualisation of all parameters
- Diagrams for run-time monitoring
- Alarm messages via e-mail or messaging
- User-provided Internet or GSM connection
- Factory-installed or retrofitting, independent of Touch or Basic

PLUS X AWARD®
achieved for:
Innovation
High Quality
Design
Ease of Use
Functionality

Variomat

Pump Controlled Pressurisation Systems

The expansion bend
guarantees the pressure compensation towards the atmosphere between the vessel wall and the diaphragm

Heavy duty steel tank

Control unit
guarantees maximum operating comfort. All Reflex controls (Variomat, Variomat Giga, Reflexomat, Servitec) have been designed according to a uniform design guideline

The sounding pipe
deaeration extracts the gasses from the tank and prevents de-aeration.

The high-quality butyl bladder
protects the expansion water from a direct air admission

Bladder Control
By Cumtomer

MBM II bladder rupture detector
(option)

The pressure expansion relief at atmospheric pressure results in the deaeration of the expansion water

The connection set
connects the control unit with the VG basic vessel. For 1-pump systems, the protected shut-off is integrated in the connection set. With respect to 2-pump systems, the protected shut-off is located on the control unit

The pressure cell
(level measurement) enables the determination of the vessel fill level

Pump
Most reliable and silient.
From VS 2 soft start pumps

Over-flow line
With patented motor ball-valve-Auto-function

Water make-up line
When the fill level in the VG basic vessel is too low, the solenoid valve opens. For a connection to the drinking water network, Fillset must be added

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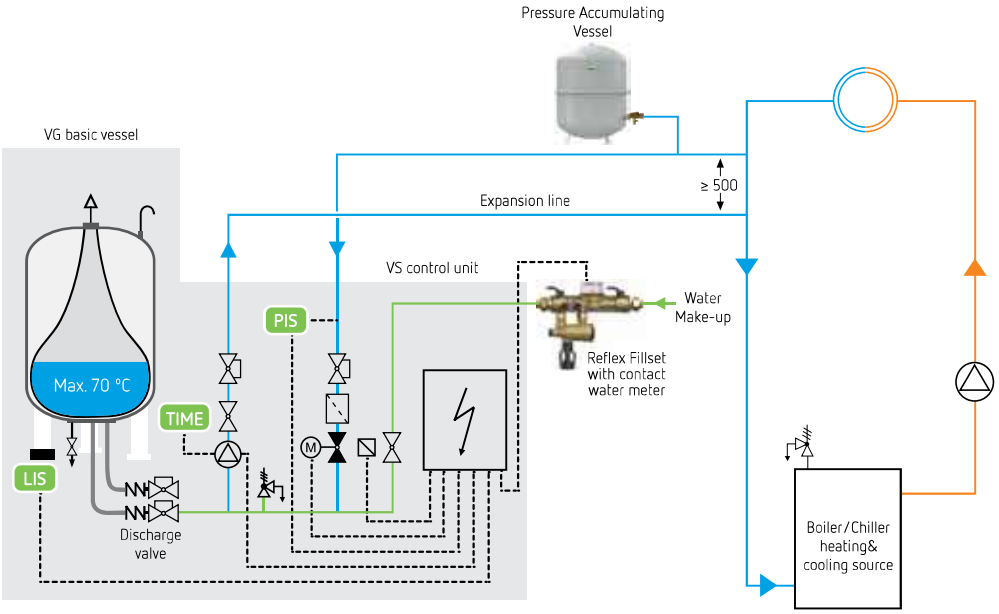
Variomat Pressurisation Systems

Variomat 1 up to 2 MW with 1 pump



PIS

Pressure maintenance, compensating for the expansion volume

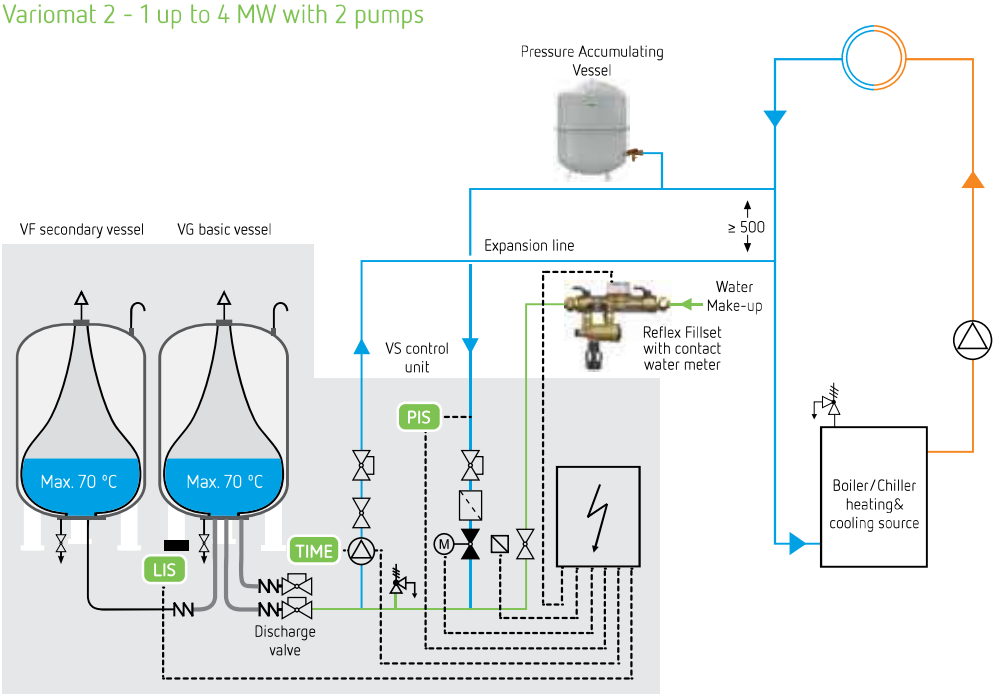
The pump and over flow valve are actuated in such a way that pressure remains constant within a range of around ± 0.2 bar. The expansion water is supplied to or discharged from the depressurised basic vessel in 2 separate expansion lines.

LIS

Water Make-up

The volume of discharged free gases and water losses are automatically replenished. The level measurement is carried out by evaluating the weight of the basic vessel. Water make-up based on the filling level in the basic vessel is monitored by a leakage monitor and interrupted in the event of any malfunctions. With the Variomat 2, the signals of a contact water meter can be evaluated (Reflex Fillset with contact water meter).

Variomat 2 - 1 up to 4 MW with 2 pumps



TIME

Deaeration

A part flow of the heating water is released into the basic vessel and thus degassed. The deaeration mode can be selected from the following versions:

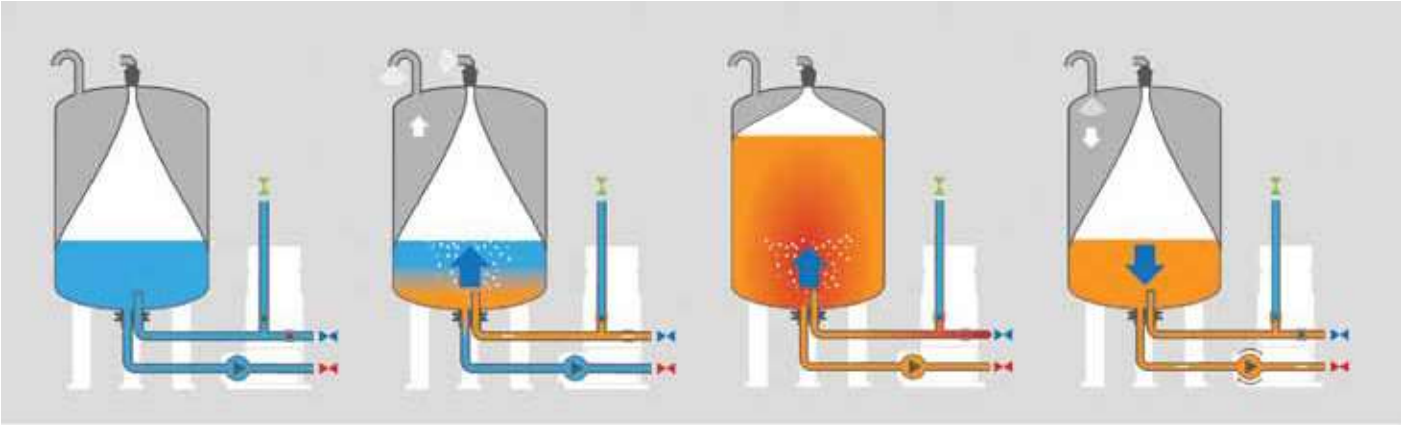
- Continuous deaeration: constant deaeration after startup and repairs in the supply system, to allow all residual air to be removed from the system.
- Follow-up deaeration: activated automatically after continuous deaeration and performed after every pump operation.
- Interval deaeration: performed after a specified schedule.

Note: The useful volume rate is 90 % for the pump controlled pressurisation units.

Therefore according to calculations the required expansion tank size is smaller than static tank size.

Variomat Working Principle for Heating & Cooling

HEATING

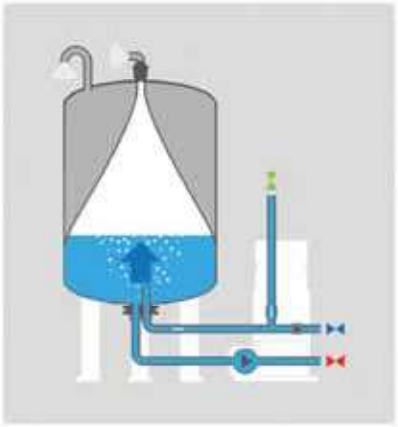


1. Low temperature
System pressure is constant, unit at rest with a small water reserve.

2. Temperature increase
System pressure increase is detected. Hence, water flows into the bladder through the open valve and is de-aerated due to pressure drop.

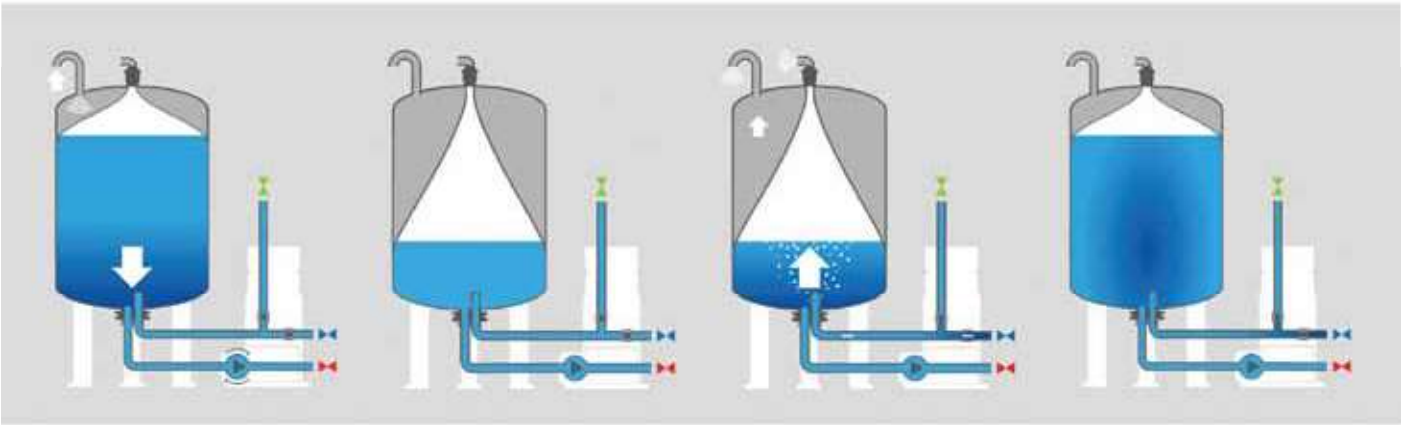
3. Full power
The unit reaches almost full capacity when the temperature increase is completed. Pressure is maintained.

4. Cooling down
System pressure decreases; the de-aerated water is pumped back to the system until pressure's setpoint is restored.



5. Replenish
if the vessel's water volume drops under critical level, the unit refills the bladder until minimum water reserve.

COOLING



1. Cooling down
Water volume and thus pressure drops, the de-aerated water is pumped back to the system until pressure reaches defined level.

2. Low temperature
The unit is at rest with a small amount of water.

3. Temperature increase
Water volume and system pressure increases subsequently, the overflow valve opens in order to allow water into the depressurised vessel until pressure stabilizes.

4. Full power
The unit reaches almost full capacity when the temperature surge is completed all while maintaining pressure constant.

Video clips demonstrating the function of this and other products are available under www.reflex.de/services/fachwissen-und-beitraege/videothek/

Variomat Control Units

- Variomat controller VS 1 with Control Basic
- From Variomat controller VS 2 with Control Touch and soft start
- Perm. advance temperature 120°C
- Perm. operating temperature 70°C
- Perm. ambient temperature 0 - 45°C
- Sound level approx. 55 dB(A)
- Degree of protection: IP 54
- Water make-up connection Rp 1/2"
- Pump/overflow valve connection Rp 1/Rp 1
- Common fault signal and RS 485 interface

VS Control unit - 1 pump

Type	Control Touch Article No	Material Group	PO bar	Height mm	Width mm	Depth mm	Connection	Power kW	Voltage V	Sound Level dB(A)	Weight kg
VS 1	8910100*	38	≤ 2.5	680	530	580	2 x G 1	0.75	230/50 Hz	55	25.0
VS 2-1/60	8910200	38	≤ 4.8	920	470	730	2 x G 1	1.10	230/50 Hz	55	33.0
VS 2-1/75	8910300	38	≤ 6.5	920	530	640	2 x G 1	1.10	230/50 Hz	55	35.0
VS 2-1/95	8910400	38	≤ 8.0	920	530	640	2 x G 1	1.10	230/50 Hz	55	37.0
VS 1-1/140	8910500	38	≤ 13.5	920	530	640	2 x G 1	2.20	400/50 Hz	60	50.0

* Control basic only
For 60 Hz operations, please consult us

VS Control unit - 2 pumps

Type	Control Touch Article No	Material Group	PO bar	Height mm	Width mm	Depth mm	Connection	Power kW	Voltage V	Sound Level dB(A)	Weight kg
VS 2-2/35	8911100	38	≤ 2.5	920	700	780	2 x G 1 1/4	1.20	230/50 Hz	55	54.0
VS 2-2/60	8911200	38	≤ 4.8	920	700	780	2 x G 1 1/4	2.20	230/50 Hz	55	58.0
VS 2-2/75	8911300	38	≤ 6.5	920	720	800	2 x G 1 1/4	2.20	230/50 Hz	55	72.0
VS 2-2/95	8911400	38	≤ 8.0	920	720	800	2 x G 1 1/4	2.20	230/50 Hz	55	76.0
VS 1-2/140	8911500	38	≤ 13.5	920	720	800	2 x G 1 1/4	4.40	400/50 Hz	60	80.0

For 60 Hz operations, please consult us

Variomat Pressurisation Systems

- Heavy duty steel tank
- Approval in acc. with the 2014/108/EC directives
- Replaceable butyl bladder in accordance with DIN EN 13831
- Max. system temperature 120°C
- Max. operation temperature 70°C
- Durable epoxy coating with attractive grey colour

Variomat = VS Control unit + VG Basic vessel + Connection Set

VG Basic Vessel

VF secondary vessel

	VG Basic vessel	VF Secondary vessel						
Type	Article No	Article No	Material Group	Ø D mm	H mm	h mm	Connection	Weight kg
200	8600011	8610000	36	634	1060	146	G 1	41.4
300	8600111	8610100	36	634	1360	146	G 1	52.2
400	8600211	8610200	36	740	1345	133	G 1	72.2
500	8600311	8610300	36	740	1560	133	G 1	81.8
600	8600411	8610400	36	740	1810	133	G 1	96.8
800	8600511	8610500	36	740	2275	133	G 1	109.9
1000 Ø 740	8600611	8610600	36	740	2685	133	G 1	156.0
1000 Ø 1000	8600705	8610705	37	1000	2130	350	G 1	292.8
1500	8600905	8610905	37	1200	2130	350	G 1	320.0
2000	8601005	8611005	37	1200	2590	350	G 1	565.0
3000	8601205	8611205	37	1500	2590	380	G 1	795.0
4000	8601305	8611305	37	1500	3160	380	G 1	1080.0
5000	8601405	8611405	37	1500	3695	380	G 1	1115.0

Commissioning by Reflex - After Sales Service (Option)

Single pump system **Article No** : 7945600
Double pump system **Article No** : 7945630

Variomat Connection Set

- For connecting Variomat pump systems to VG basic vessels with protected shut-offs and screw connections

Variomat Connection set - 1 pump

VG vessel (Ø/mm)	Article No	Material Group	Weight kg
480 - 740	6940100	39	2.0
1000 - 1500	6940200	39	3.0

Variomat Connection set - 2 pumps

VG vessel (Ø/mm)	Article No	Material Group	Weight kg
480 - 740	6940300	39	2.0
1000 - 1500	6940400	39	3.0

Thermal Insulation For Variomat Vessels

- 50 mm flexible foam thermal insulation with laminated grey PE cladding with zip fastener
- For heating applications only. For cooling water systems appropriate diffusion-resistant insulation must be provided on-site
- Removable, for assembly on site
- Fire classification of jacket-B2

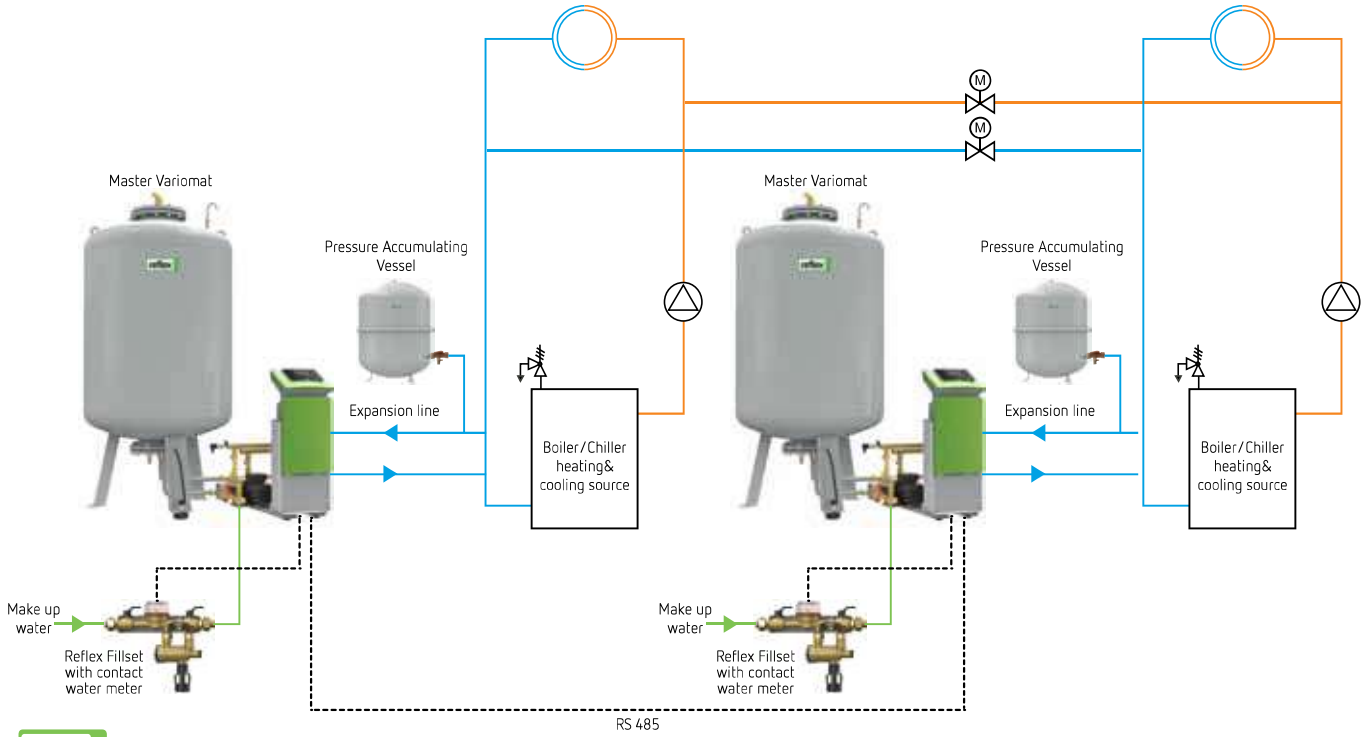
VG Thermal Insulation

	VW thermal insulation for VG basic vessels					
Type	Article No	Material Group	Ø D mm	H mm	h mm	Weight kg
VW 200	7985700	39	634	1060	146	3.0
VW 300	7986000	39	634	1360	146	3.5
VW 400	7995600	39	740	1345	133	4.5
VW 500	7983900	39	740	1560	133	5.5
VW 600	7995700	39	740	1810	133	6.0
VW 800	7993800	39	740	2275	133	8.0
VW 1000 Ø 740	7993900	39	740	2685	133	8.0
VW 1000 Ø 1000	7986800	39	1000	2130	350	9.0
VW 1500	7987000	39	1200	2130	350	10.6
VW 2000	7987100	39	1200	2590	350	13.0
VW 3000	7993200	39	1500	2590	380	15.0
VW 4000	7993300	39	1500	3160	380	17.0
VW 5000	7993400	39	1500	3695	380	21.8

Master - Slave Connection

- Software tool for operating up to 10 Variomat in a hydraulic group to a distance of 1000 m

Article No : 7859000 **Material Group** : 35



MBM II Bladder Rupture Detector

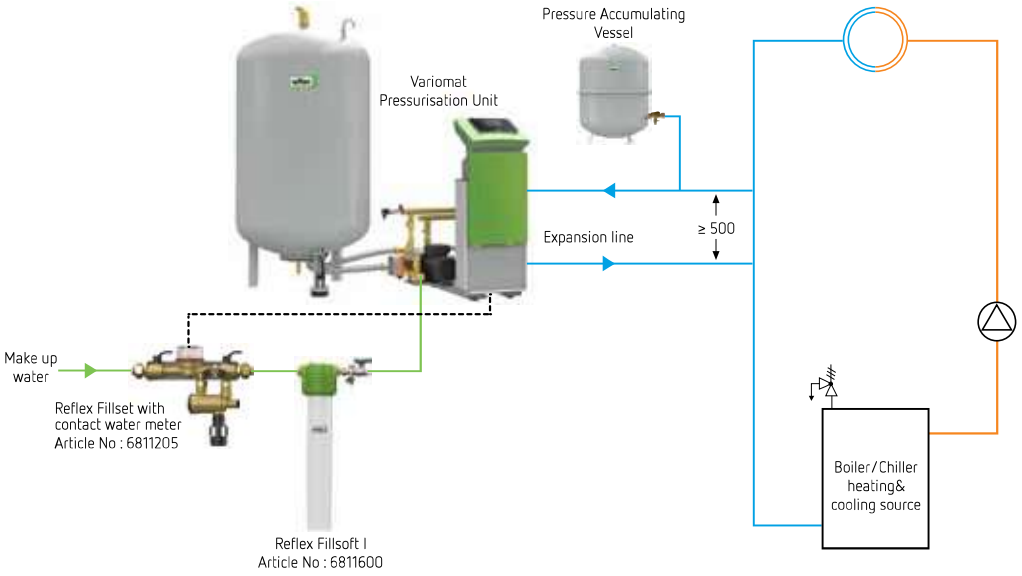
- For the signalling of bladder rupture in Variomat expansion
- Consists of a factory-mounted electrode and a relay
- Power supply 230 V / 50 Hz supply
- Three terminal dry contact
- Recommended: 1 device for each vessel
- MBM Electronics in two variants :

→ For wall-mounting **Article No** : 7857700 **Material Group** : 86
→ Factory-installed in the Touch Control cabinet **Article No** : 9122294 **Material Group** : 86

Relay
For on site mounting

Electrode
Factory mounted

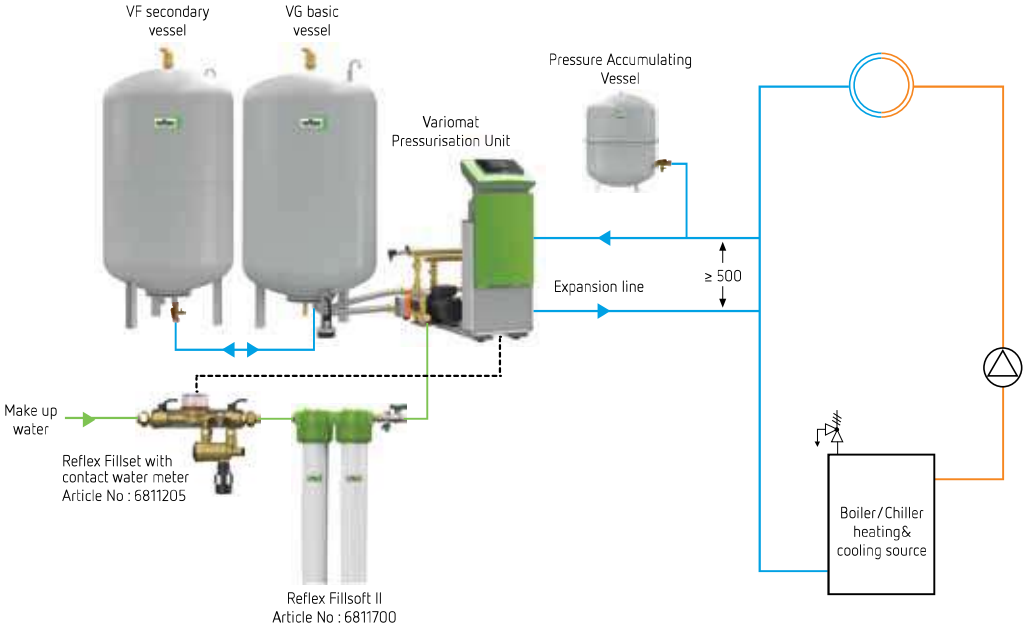
Variomat 1 water make-up with drinking water



Fillsoft I

Variomat unit in combination with Fillsoft I water softening device and Fillset RPZ valve. If the water level in the vessel drops to a critical level, an appropriate amount of water will be filled into the unit from the water mains. By the Fillsoft device the system water can be totally softened or adjusted to the required level. The Fillset RPZ valve protects against backflow, providing protection against the contamination of mains cold water supply according to EN1717. By connecting the contact water meter to the Variomat control unit the Fillmeter function is available.

Variomat 2-1 water make-up via softening equipment



Fillsoft II

Variomat unit in combination with Fillsoft II water softening device for higher capacity and Fillset RPZ valve. If the water level in the vessel drops to a critical level, an appropriate amount of water will be filled into the unit from the water mains. By the Fillsoft device the system water can be totally softened or adjusted to the required level.

The Fillset RPZ valve protects against backflow, providing protection against the contamination of mains cold water supply according to EN1717. By connecting the contact water meter to the Variomat control unit the Fillmeter function is available.

Variomat Quick Selection

Selection Example

Output heat generator	Q	= 500 kW
Water capacity	Vs	= 5000 litres
Design temperature	T	= 70/50 °C
Static height	Hst	= 30 m
Expansion coefficient	n	= 0.0228

$$P_0 \geq \frac{Hst\ [m]}{10}\ bar + 0.2\ bar$$

$$P_0 \geq \frac{30}{10}\ bar + 0.2\ bar = 3.2\ bar$$

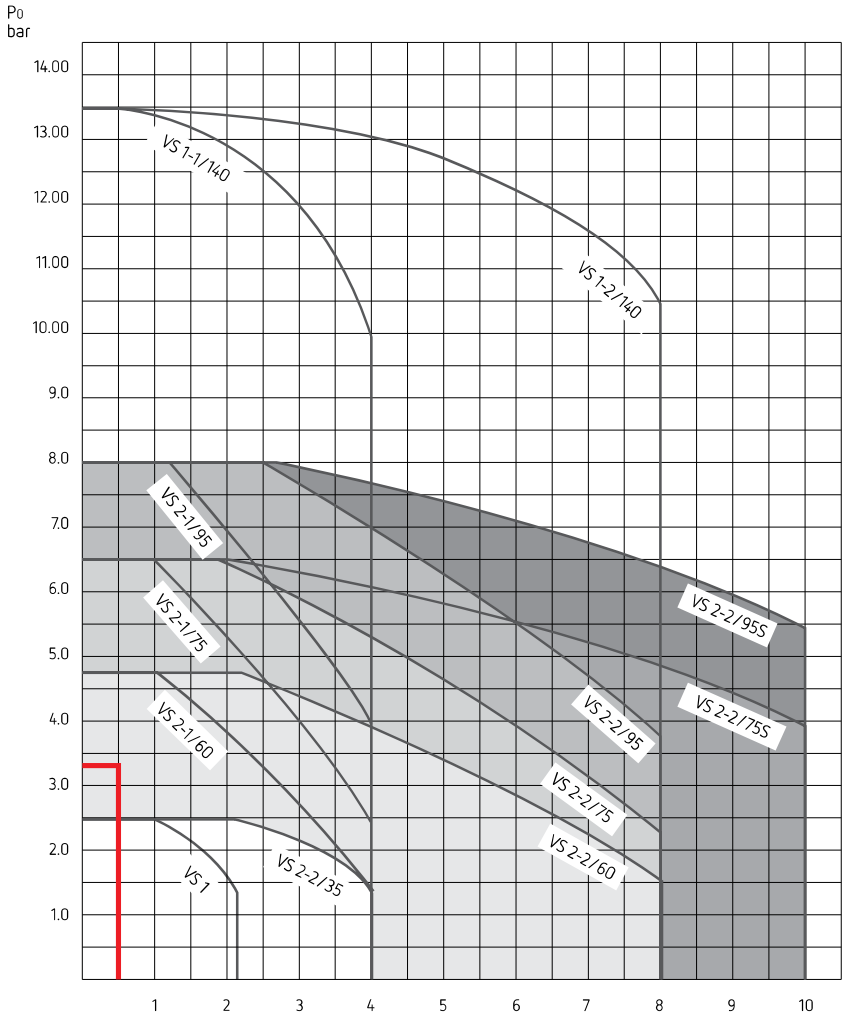
$$V_n \geq \frac{Ve + Vws}{DF}$$

$$V_n \geq \frac{5000 \times (0.0228 + 0.005)}{0.9} = 155\ liter$$

Selected:

Control unit	VS 2-1/60
Expansion vessel	VG 200
Pressure Accumulating Vessel	NG 80
Connection set	G 1"
Make-up	Reflex Fillset

- For cooling water systems up to 30°C only 50% of the nominal heating power should be considered when selecting the control unit
- In performance ranges > 2 MW we recommend using double pump systems



Total thermal output of the heat generation system - MW

Variomat VG - VF Vessel Sizing

- Nominal volume Vn

Approximate value from the diagram →

or

Calculation acc. to formula ↓

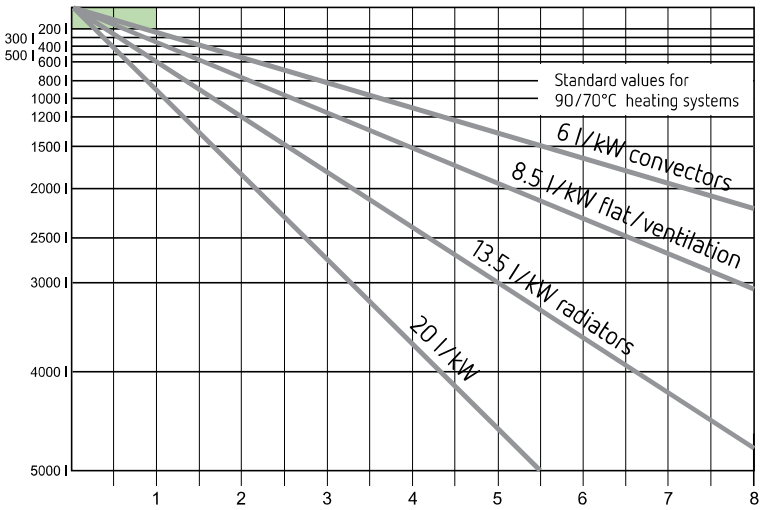
$$V_n \geq V_A \times \begin{matrix} 0.031\ [70°C] \\ 0.045\ [90°C] \\ 0.054\ [100°C] \\ 0.063\ [110°C] \end{matrix}$$

Setting flow temperature ↑

V_n = Nominal volume, liter

V_A = System water content , liter

- The nominal volumes can be distributed to several vessels (VG basic vessel and VF secondary vessel).



Total thermal output of the heat generation system - MW

Variomat Giga

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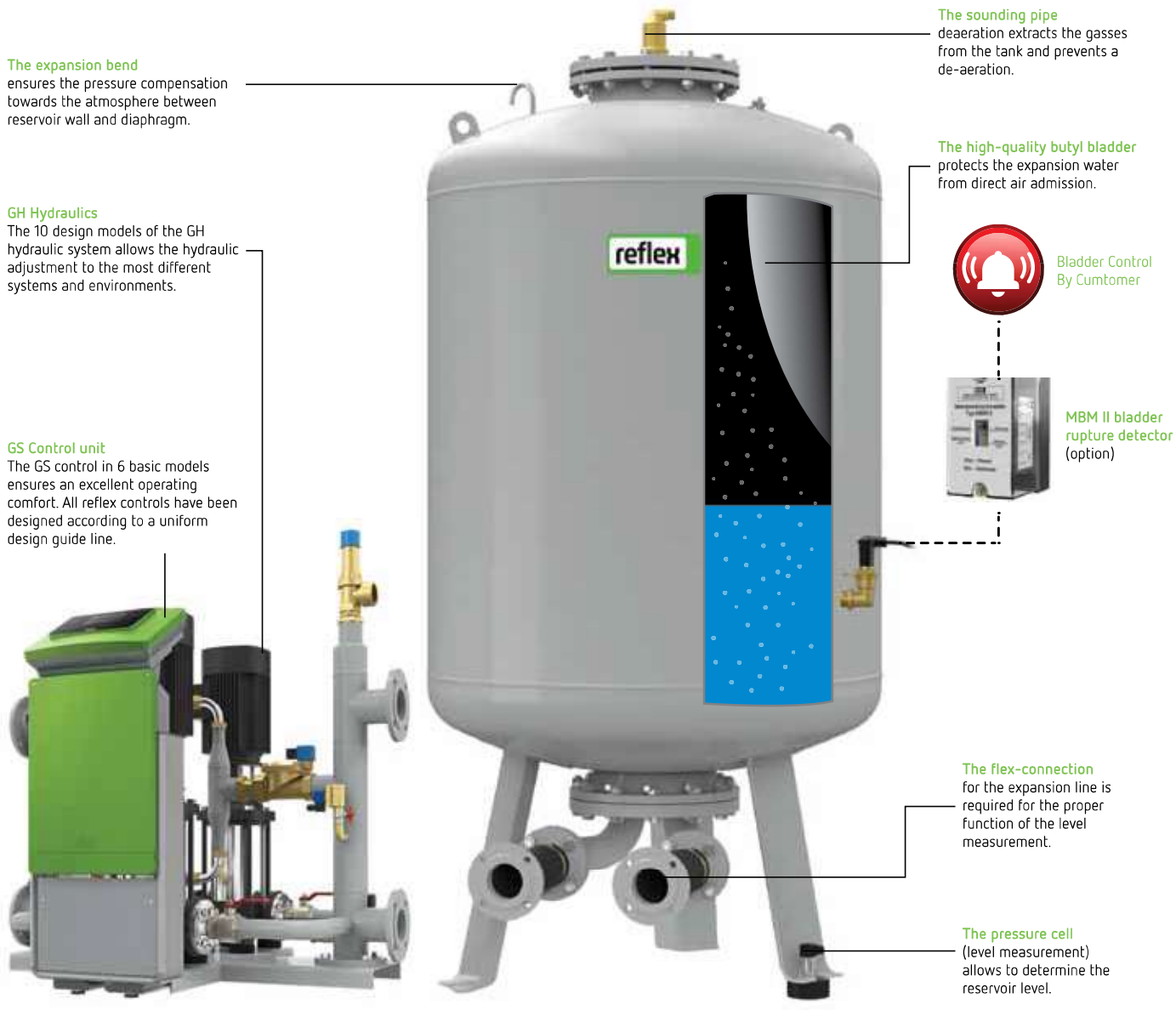
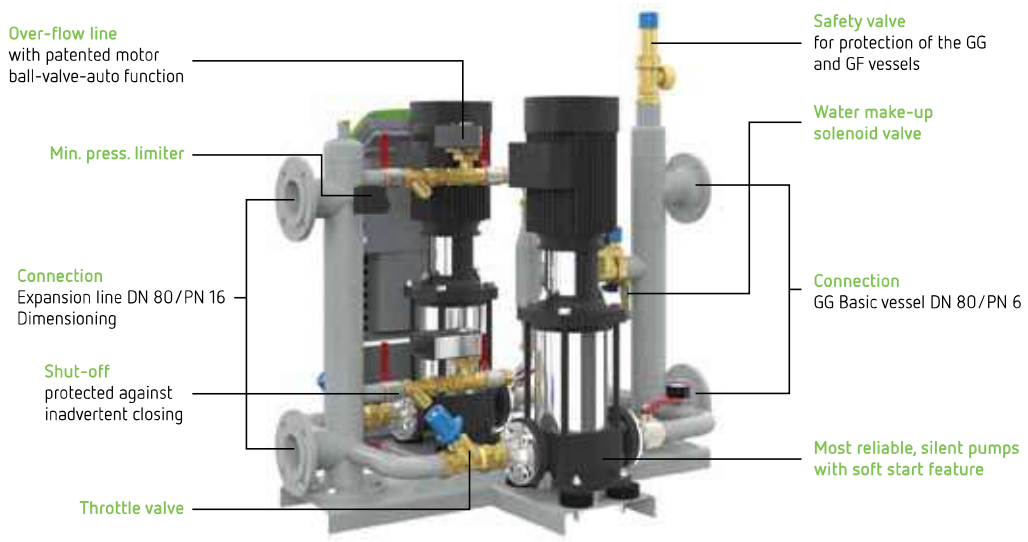
Variomat Giga

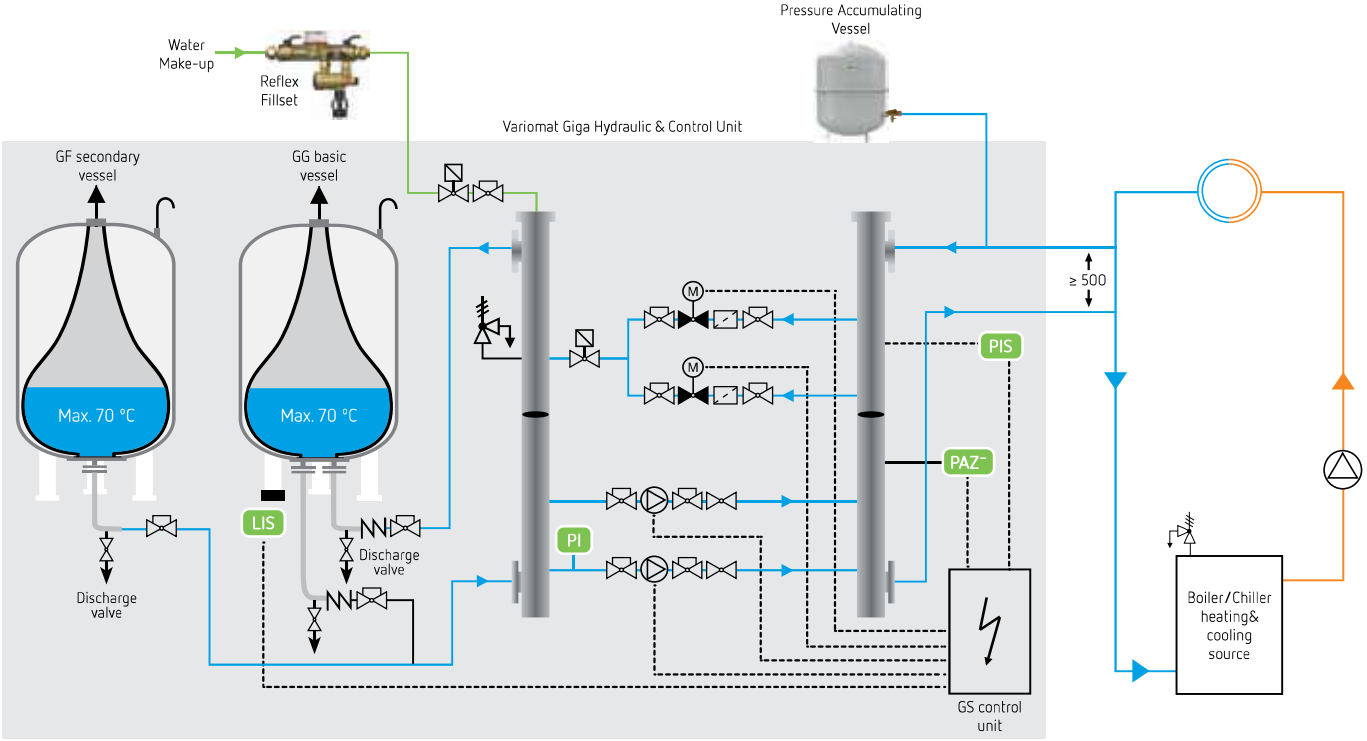
Pump Control Pressurisation Systems





Variomat Giga

Variomat Giga Pressurisation Systems



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Pressure maintenance, compensating for the expansion volume

The two pumps and two motorised ball valves are actuated in such a way that pressure remains constant within a range of around ± 0.2 bar. The expansion water is supplied to or discharged from the depressurised basic vessel in 2 separate expansion lines.

LIS

Water make-up

The volume of discharged free gases and water losses are automatically replenished. The level measurement is carried out by evaluating the weight of the basic vessel. Water make-up based on the filling level in the basic vessel is monitored by a leakage monitor and interrupted in the event of any malfunctions. With the Variomat 2, the signals of a contact water meter can be evaluated (Reflex Fillset with contact water meter).

PAZ⁻

Pressure Limiter

If the min. operating pressure is fallen short at the component-instpected min. pressure controller PAZ , the electrical acutator in the overflow line is closed, and the heat generator is switched off. The min. pressure controller is to be installed on the expansion line, for medium pressure maintaining units on such unit.

TIME

Deaeration

A part flow of the heating water is released into the basic vessel and thus degassed. The deaeration mode can be selected from the following versions:

- Continuous deaeration: constant deaeration after startup and repairs in the supply system, to allow all residual air to be removed from the system.
- Follow-up deaeration: activated automatically after continuous deaeration and performed after every pump operation.
- Interval deaeration: performed after a specified schedule.

Note: The useful volume rate is 90 % for the pump controlled pressurisation units.
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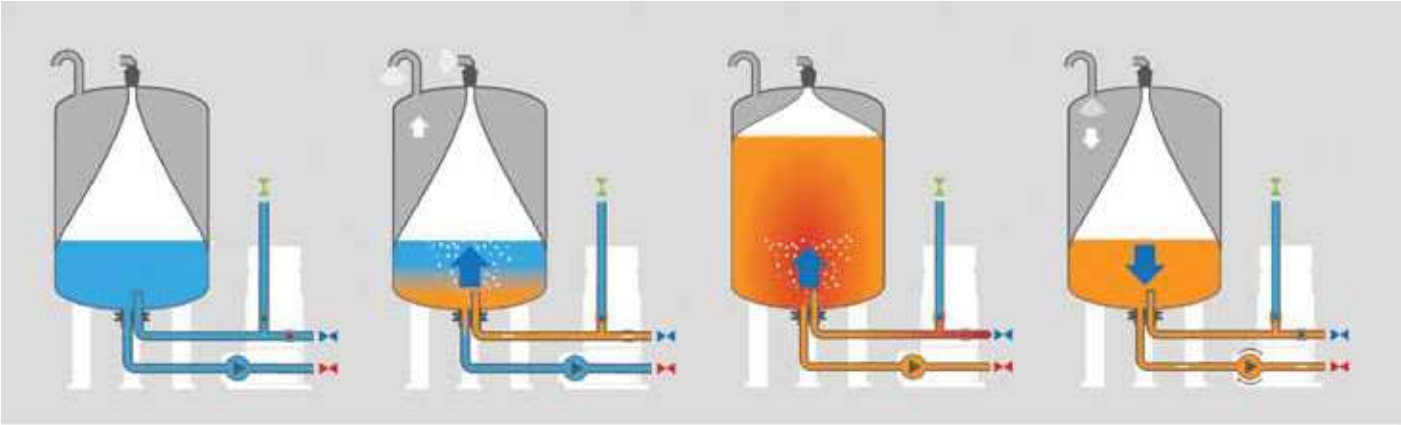
Variomat Giga Working Principle for Heating & Cooling

HEATING

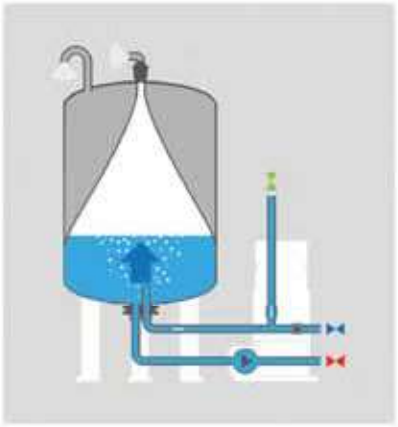


1. Low temperature
System pressure is constant, unit at rest with a small water reserve.

2. Temperature increase
System pressure increase is detected. Hence, water flows into the bladder through the open valve and is de-aerated due to pressure drop.

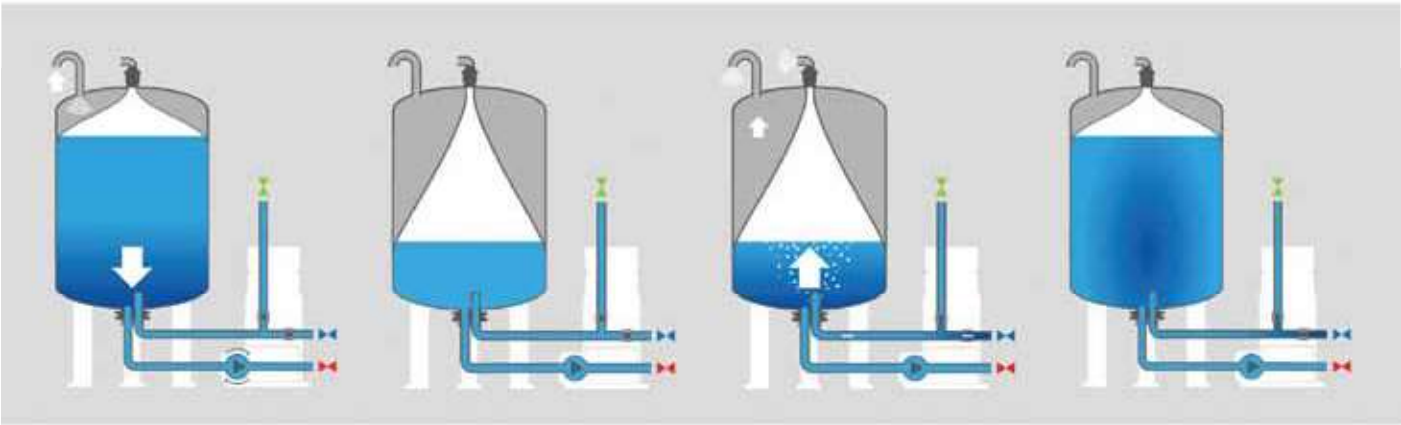
3. Full power
The unit reaches almost full capacity when the temperature increase is completed. Pressure is maintained.

4. Cooling down
System pressure decreases; the de-aerated water is pumped back to the system until pressure's setpoint is restored.



5. Replenish
if the vessel's water volume drops under critical level, the unit refills the bladder until minimum water reserve.

COOLING



1. Cooling down
Water volume and thus pressure drops, the de-aerated water is pumped back to the system until pressure reaches defined level.

2. Low temperature
The unit is at rest with a small amount of water.

3. Temperature increase
Water volume and system pressure increases subsequently, the overflow valve opens in order to allow water into the depressurised vessel until pressure stabilizes.

4. Full power
The unit reaches almost full capacity when the temperature surge is completed all while maintaining pressure constant.

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Variomat Giga Control Systems

- Pump-controlled pressurisation system with integral water-make-up and deaeration (RL ≤ 70°C) for heating and cooling water systems
- With 2 pumps and 2 overflow valves
- Max. operating pressure 16 bar
- Max. system temperature 120°C*
- Max. operating temperature 0–70°C**
- Sound level approx. 55 dB(A)
- Pump connection DN 80/PN 16
- Basic vessel connection DN 80/PN 6
- Water make-up connection Rp 1/2

Variomat Giga Control Unit

Control Module

Type	Control Touch Article No	Material Group	Electrical Power kW	Voltage	Hydraulic Module	Height mm	Width mm	Depth mm	Weight kg
GS 1.1	8912500	38	2.20	230 V/50 Hz	GH 50/GH 70	1200	1170	1020	15
GS 3	8912600	38	6.60	400 V/50 Hz	GH 90/GH100	1200	1170	830	15
GS 4	8913000	38	8.0	400 V/50 Hz	GH 110/ GH130/GH140	600	210	830	15
GS 7.5	8919000	38	15.0	400 V/50 Hz	GH 150	600	210	830	15

Hydraulic Module

Type	Article No	Material Group	P0 bar	Height mm	Width mm	Depth mm	Weight kg
GH 50	8931000	38	≤ 4.0	1200	1170	830	195
GH 70	8932000	38	≤ 6.0	1200	1170	830	195
GH 90	8931400	38	≤ 8.0	1200	1170	830	265
GH 100	8931200	38	≤ 9.5	1200	1170	830	230
GH 110	8931700	38	≤ 10.0	1200	1170	830	270
GH 130	8931800	38	≤ 12.0	1200	1170	830	280
GH 140	8931300	38	≤ 13.0	1200	1170	830	273
GH 150	8931900	38	≤ 14.5	1200	1170	830	340

P0 = Setting value on the control
= static height + evaporation pressure + 0.2 bar (recommended)

* According to maximum possible setting value - Temperature control 105°C, in accordance with DIN EN 12828
** Installation in the system return, diaphragm load of expansion vessels max. 70°C. Please consult us for permanent temperatures of ≤ 0°C

Safe Control

- Reliable water make-up for special applications
- Rp 1/2"
- Factory-assembly **Article No** : 9119552 **Material Group** : 86
- As retrofit kit **Article No** : 9119352 **Material Group** : 86

Variomat Giga Tanks

- Heavy duty steel tank
- Approval in acc. with the 2014/108/EC directives
- Replaceable butyl diaphragm in accordance with DIN EN 13831
- Max. system temperature 120°C
- Max. operation temperature 70°C
- Durable epoxy coating with attractive new colour

Variomat Giga = GS Control unit / GG Basic vessel + GH hydraulic module

GG Basic vessel | GF Secondary vessel

	GG Basic Vessel	GF Seconday vessel							
Type	Article No Grey	Article No Grey	Material Group	Ø D mm	H mm	h mm	h1 mm	A	Weight kg
1000	8920105	8930105	37	1000	2130	285	305	DN 65/PN 6	330.0
1500	8920305	8930305	37	1200	2130	285	305	DN 65/PN 6	465.0
2000	8920405	8930405	37	1200	2590	285	305	DN 65/PN 6	565.0
3000	8920605	8930605	37	1500	2590	314	335	DN 65/PN 6	795.0
4000	8920705	8930705	37	1500	3160	314	335	DN 65/PN 6	1.080.0
5000	8920805	8930805	37	1500	3695	314	335	DN 65/PN 6	1.115.0

MBM II Bladder Rupture Detector

- For the signalling of bladder rupture in Variomat expansion
- Consists of a factory-mounted electrode and a relay
- Power supply 230 V / 50 Hz supply
- Three terminal dry contact
- Recommended: 1 device for each vessel
- MBM Electronics in two variants :

→ For wall-mounting **Article No** : 7857700 **Material Group** : 86
→ Factory-installed in the Touch Control cabinet **Article No** : 9122294 **Material Group** : 86

Relay
For on site mounting

Electrode
Factory mounted

SV1 Safety Valve

- For additional protection of GG and GF vessels at nominal heating outputs > 10.5 MW

Article No : 6942100 **Material Group** : 81

Commissioning by Reflex - After Sales Service (Option)

Double pump system **Article No** : 7945630

BMS Modules

Type	Article No	Material Group	Weight kg
LonWorks Digital	8860000	86	1.5
LonWorks	8860100	86	1.9
Profi bus-DP	8860200	86	1.9
Ethernet	8860300	86	1.9
BACnet-IP for Control Touch	8860500	86	0.4
BACnet MS/TP for Control Touch	8860600	86	0.4
Modbus RTU for Control Touch	9125592	86	0.4
Profibus RTU for Control Touch	9118042	86	0.4
I/O Modules	8997705	71	1.0

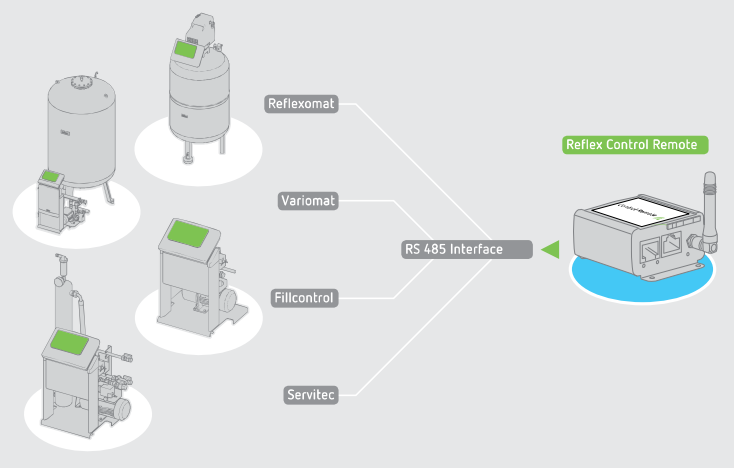
BACnet MS/TP

BACnet-IP

Control Remote

Remote monitoring, diagnostics and at last remote-control maintenance are becoming increasingly important for the supervision of supply grid systems. For the responsible on-site operator, it is more and more difficult to find qualified support staff. Long distances to sites frequently prevent quick and continuous control.

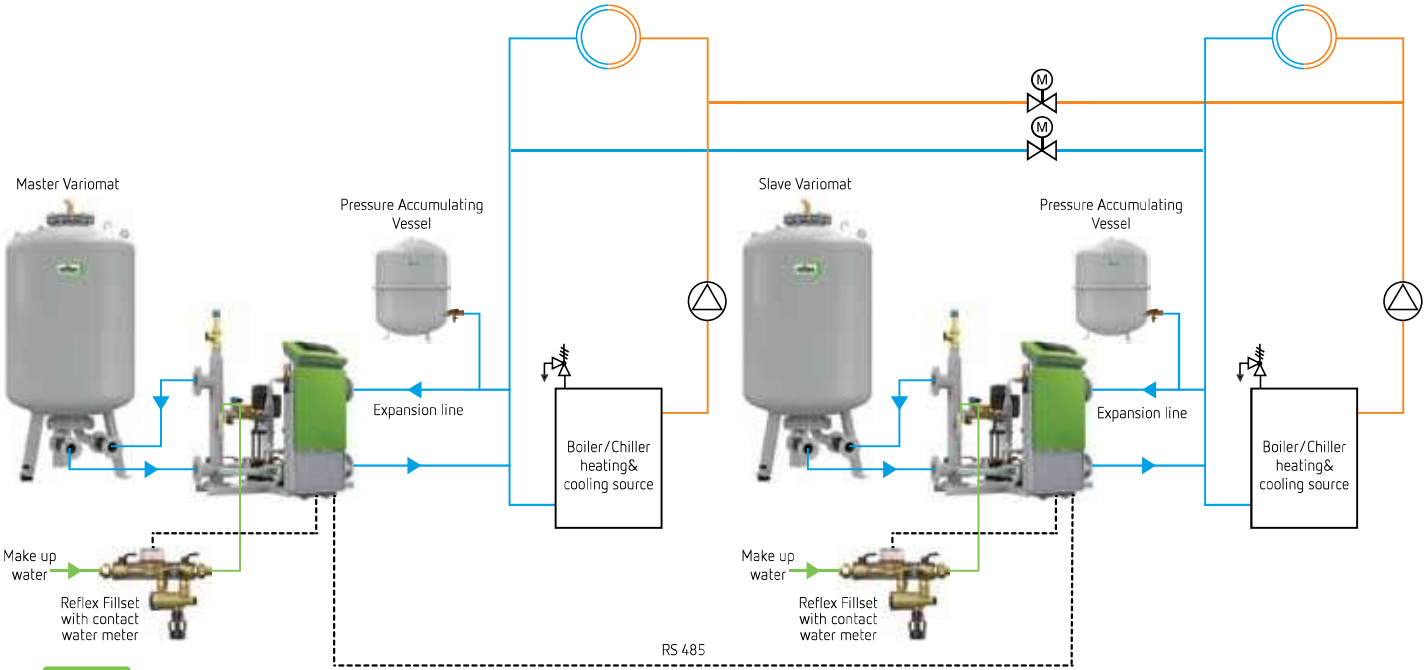
Type	Article No	Material Group	Length mm	Width mm	Height	Weight kg
Control Remote	8910800	86	83	60	34	0.3



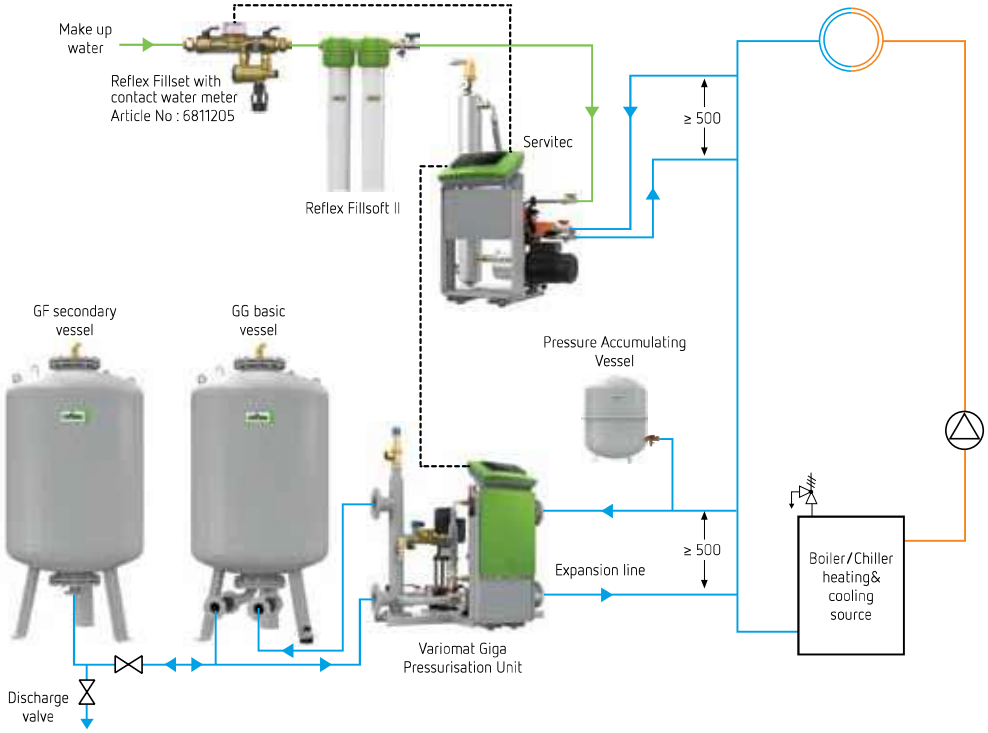
Master - Slave Connection

- Software tool for operating up to 10 Variomat Giga in a hydraulic group to a distance of 1000 m

Article No : 7859100 **Material Group** : 35



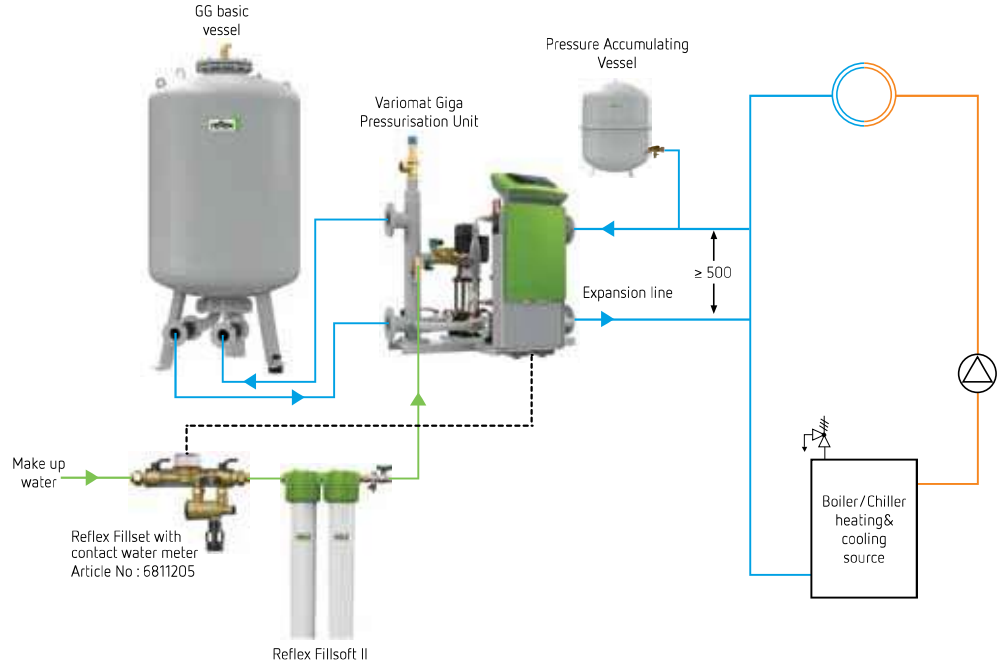
Variomat Giga With Servitec



Variomat Giga unit in combination with Servitec and Fillset RPZ valve. If the water level in the vessel drops to a critical level, an appropriate amount of water will be filled into the unit from the water mains via the Servitec device. By connecting the Servitec device in Levelcontrol mode to the Variomat Giga control unit, make-up water is de-aerated before going into the system.

The Fillset RPZ valve protects against backflow, providing protection against the contamination of mains cold water supply according to EN1717. By the Fillsoft device the system water can be totally softened or adjusted to the required level. By connecting the contact water meter to the Variomat Giga control unit the Fillmeter function is available. This combination can also be used for applications where the water supply comes from an adjacent container, as the Servitec device is self priming.

Variomat Giga With Softening Equipment



Variomat Giga unit in combination with Fillsoft II water softening device and Fillset RPZ valve. If the water level in the vessel drops to a critical level, an appropriate amount of water will be filled into the unit from the water mains. By the Fillsoft device the system water can be totally softened or adjusted to the required level.

The Fillset RPZ valve protects against backflow, providing protection against the contamination of mains cold water supply according to EN1717. By connecting the contact water meter to the Variomat control unit the Fillmeter function is available.

Variomat Giga Quick Selection

Selection Example

Output heat generator	Q	= 13 MW
Water capacity	Vs	= 50.000 litres
Design temperature	T	= 70/50 °C
Static height	Hst	= 30 m
Expansion coefficient	n	= 0.0228

$$P_0 \geq \frac{Hst\ [m]}{10}\ bar + 0.2\ bar$$

$$P_0 \geq \frac{30}{10}\ bar + 0.2\ bar = 3.2\ bar$$

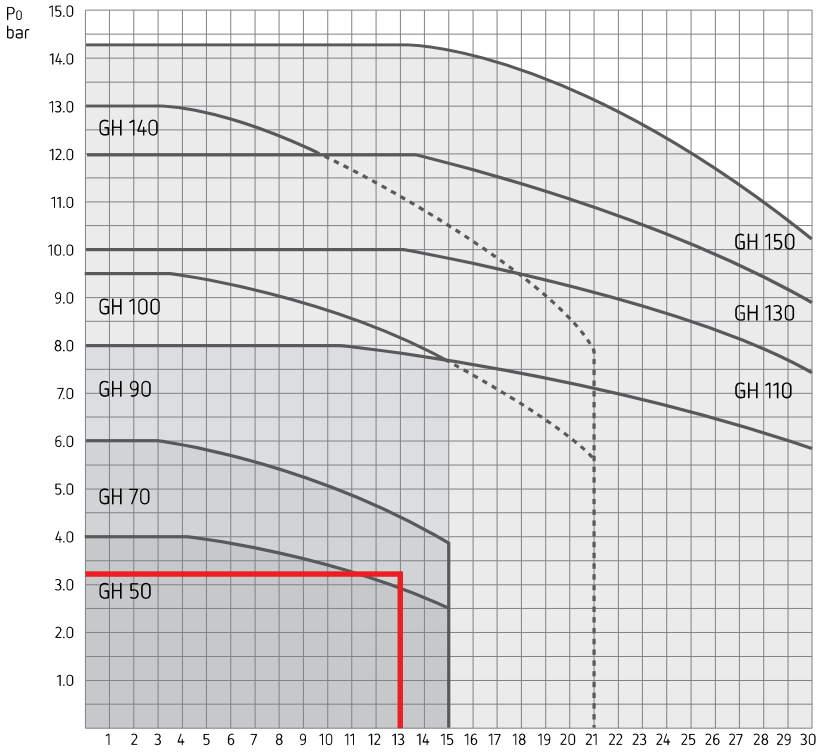
$$V_n \geq \frac{Ve + Vws}{DF}$$

$$V_n \geq \frac{50.000 \times (0.0228 + 0.005)}{0.9} = 155\ liter$$

Selected:

Control unit	GS 1.1
Hydraulic module	GH 70
Expansion vessel	GG 2000
Make-up	Reflex Fillset

- For cooling water systems up to 30°C only 50% of the nominal heating power should be considered when selecting the control unit
- In performance ranges > 2 MW we recommend using double pump systems



Total thermal output of the heat generation system - MW

Variomat Giga GG - GF Vessel Sizing

- Nominal volume Vn

Approximate value from the diagram →

or

Calculation acc. to formula ↓

$V_n \geq V_A \times$

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

↑ Setting flow temperature

V_n = Nominal volume, liter

V_A = System water content , liter

- The nominal volumes can be distributed to several vessels (GG basic vessel and GF secondary vessel).