

# Reflexomat

Pressurisation unit compressor-controlled



## Pressurisation Systems

# Control Unit

### Control Basic



- 2-line LCD display
- 8 control keys
- 2 status displays
- 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 Basic S



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### 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, HMS networks and KNX module, as well as SD card

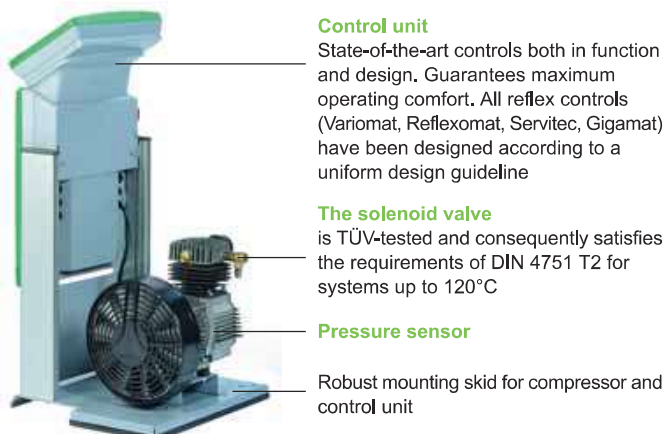
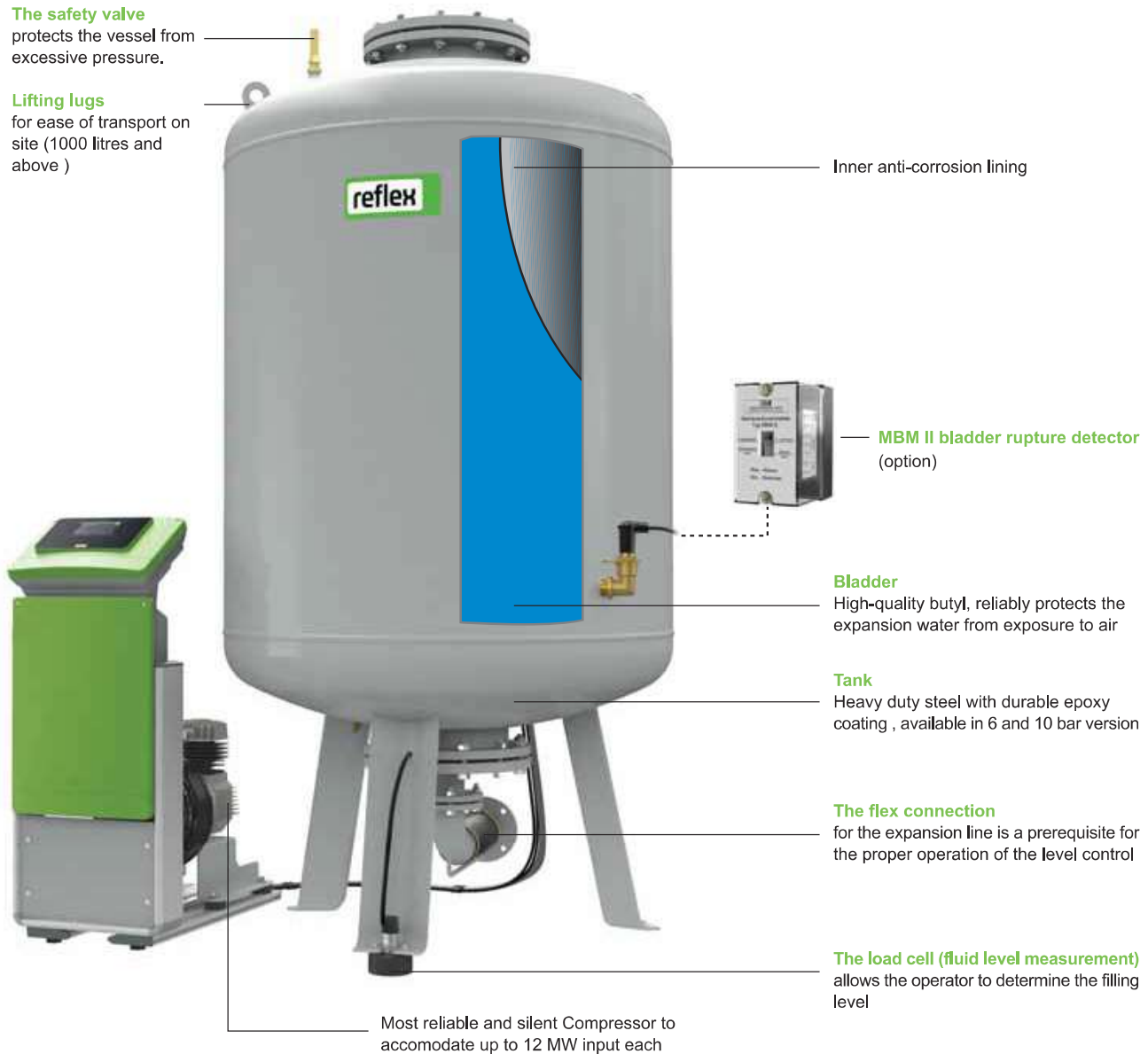


# Reflexomat

## Pressurisation unit compressor-controlled

**The safety valve**  
protects the vessel from  
excessive pressure.

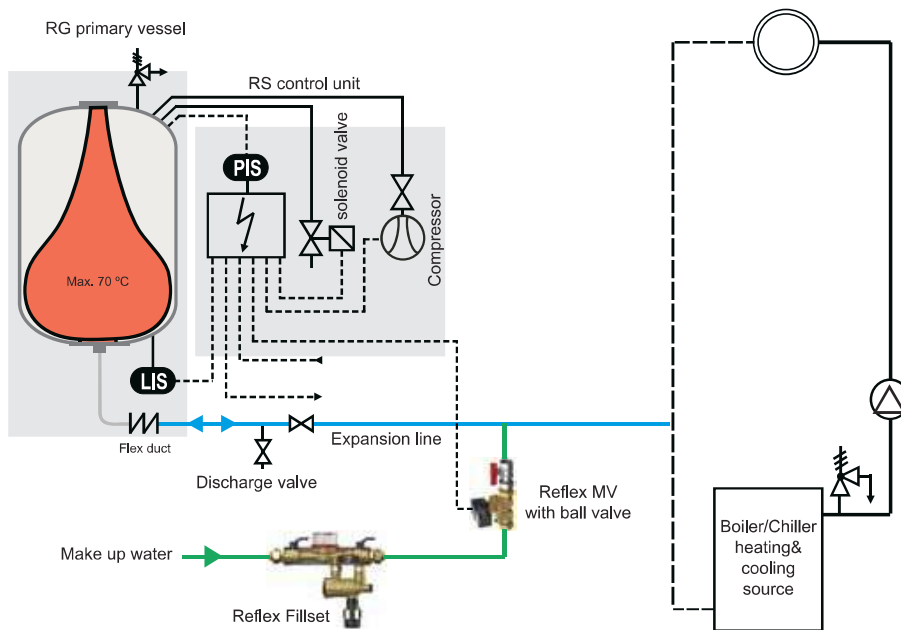
**Lifting lugs**  
for ease of transport on  
site (1000 litres and  
above )



# Reflexomat

## Reflexomat System With 1 & 2 Compressors

Reflexomat up to 12 MW with 1 compressor

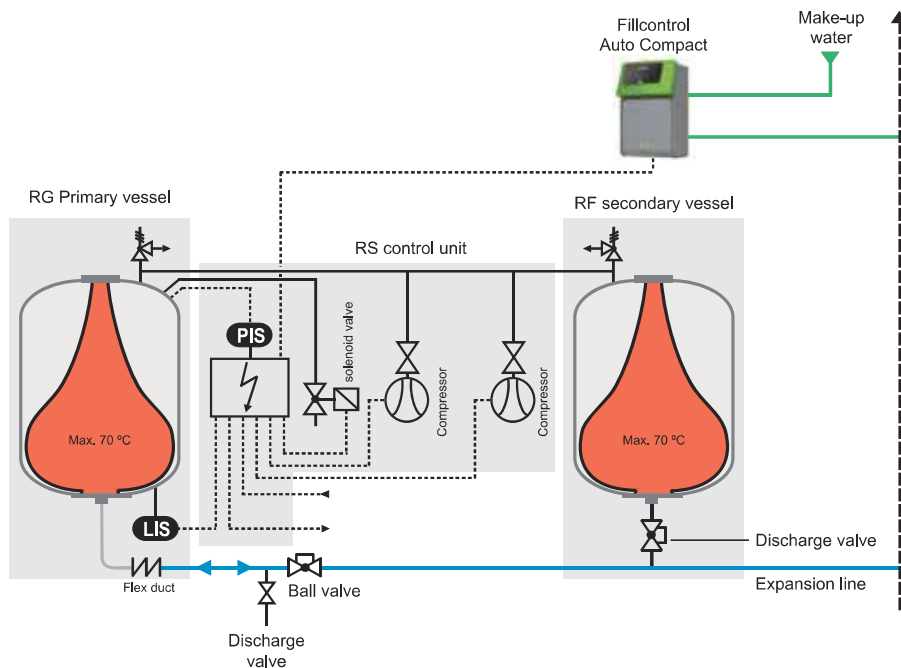


### PIS Pressure maintenance, compensating for the expansion volume

The compressor and solenoid valve are actuated in such a way that if pressure is maintained at approximately  $\pm 0.1$  bar, the expansion water flowing in or out via expansion line P is compensated for in the basic vessel. Because pressure is "stored" in the form of an air buffer in the expansion vessel (basic vessel), the method of operation is very gentle. Reflexomats with 2 compressors work with load-based, automatically alternating operation and automatic malfunction switchover.

Note: The useful volume rate is 90 % for the compressor controlled pressurisation units. Therefore according to calculations the required expansion tank size is smaller than static tank size.

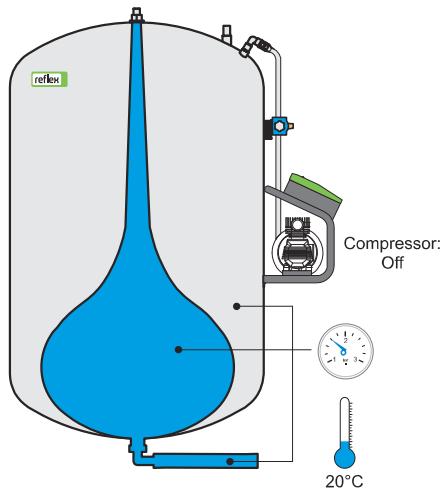
Reflexomat up to 24 MW with 2 compressors



### LIS Water make-up

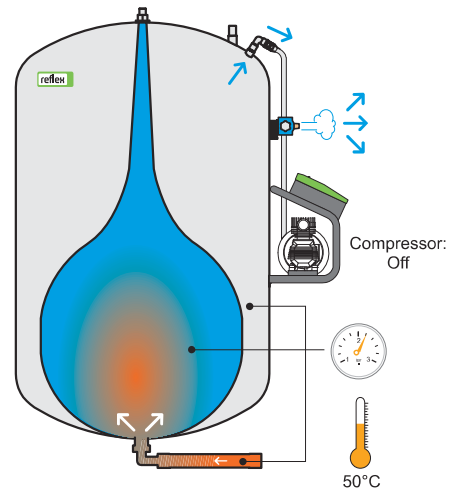
Water make-up in the event of system-based water losses is integrated into the Reflexomat controls. It is performed based on the filling level in the basic vessel. The level measurement is carried out by evaluating the weight of the basic vessel. The solenoid valve for water make-up and the Reflex Fillset with water meter and system separator can be ordered optionally. Water make-up is monitored by a leakage monitor and interrupted in the event of any malfunctions. The signals of a contact water meter can be evaluated (Reflex Fillset with contact water meter). The Reflex Fillcontrol Auto make-up station with integrated pump is available for very high system pressures.

## Reflexomat Working Principle



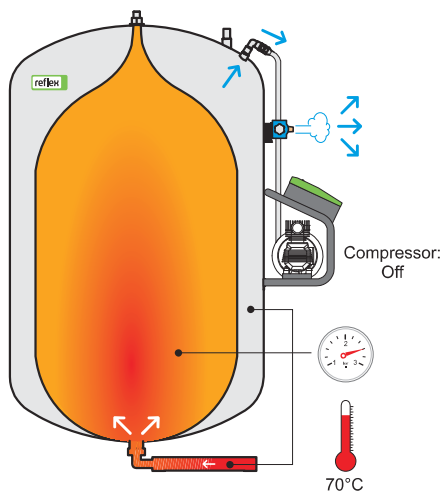
### 1. Low Temperature

The unit contains a small amount of water. The unit is in rest.



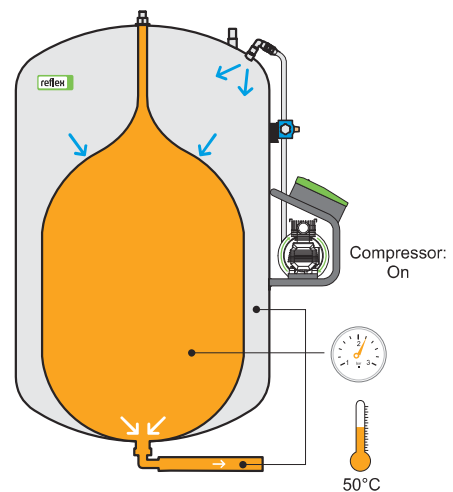
### 2. Temperature increase

The volume of water, and thus the system pressure, increases. The controller responds to this by discharging air from the vessel and, as a result, the expansion water flows into the bladder.



### 3. Full power

By storing increasing amounts of water in the vessel the controller keeps the system pressure at a constant level. When the system has warmed up completely, the vessel will be almost full to capacity.



### 4. Cooling down

When the volume of water and thus the system pressure decreases, the controller will respond by increasing the airpressure in the vessel with displacement of water back into the system as a result. This restores equilibrium in the system pressure.

## Pressurisation Systems

## Reflexomat Compact

- Compact Compressor-controlled pressurisation unit for heating and chilled water systems
- Air cushion compartment has anti-corrosion lining
- Compact design
- Meets or exceeds EC norms for pressure vessels 97/23/EC
- **Butyl** diaphragm according to DIN EN 13831 norm part 3, max. operating temperature 70°C
- Maintains the pressure level within +/- 0.1 bar boundary
- Design pressure 6 bar
- Max. system flow temperature 120°C\*
- Degree of protection: IP 54
- With Control Basic
- Power supply 230 V
- 1 dry contact (BMS common fault signal)
- Featuring RS 485 interface
- **Minimat, now with it's new name Reflexomat Compact**

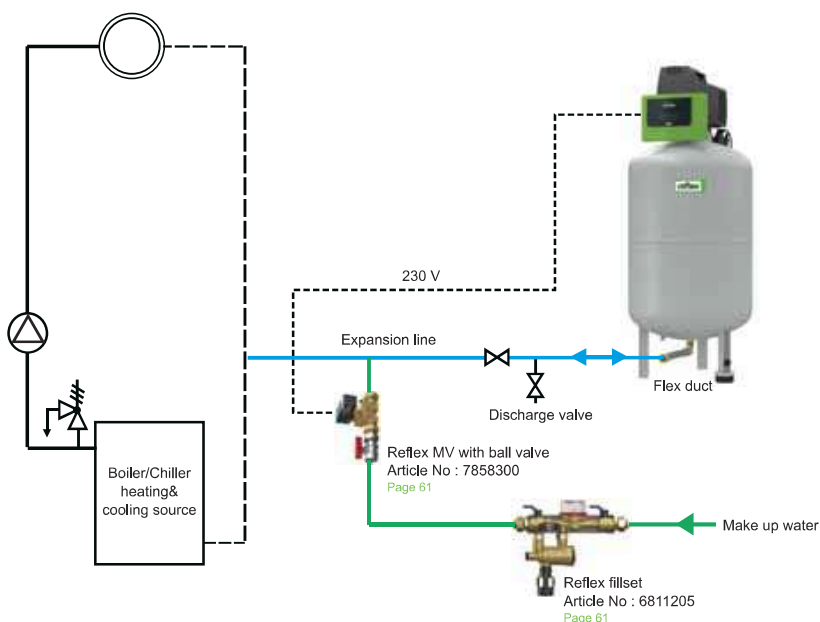


CE

Formerly, Minimat	Type	Article No	Material Group	Ø D mm	H mm	h mm	System Connection	Weight
	RC 200	8806405	31	634	1320	135	R 1	52.0
	RC 300	8801705	31	634	1620	135	R 1	69.0
	RC 400	8802805	31	740	1620	135	R 1	80.0
	RC 500	8803705	31	740	1745	135	R 1	93.0

↑  
Vn Nominal Volume [Litres]

## Reflexomat Compact With Make-up System



## Reflexomat Compact with replenish

Reflexomat Compact in combination with MV (solenoid valve) 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. MV solenoid valve to be connected to the control unit to have signal for replenish.

The Fillset RPZ valve protects against backflow, providing protection against the contamination of mains cold water supply according to EN1717.

## Reflexomat - Compressor - Controlled Dynamic Pressure Maintenance

- Compressor-controlled pressurisation system for heating and chilled water systems up to 120°C max. flow temperature
- Maintains the pressure level within  $\pm 0.1$  bar boundary
- Meets or exceeds EC norms for pressure vessels 97/23/EC
- Superior quality **butyl** bladder according to German DIN EN 13831 norm part 3, max. operating temperature 70°C
- Microprocessor control with display in 8 languages
- Permanent display of system pressure and tank volume level
- 230 V output for fully automated water make-up
- 2 dry contacts (common fault, min. water level)
- Data output through RS-485 (from VS 90/2 and VS 150)
- Durable epoxy coating with attractive new colour



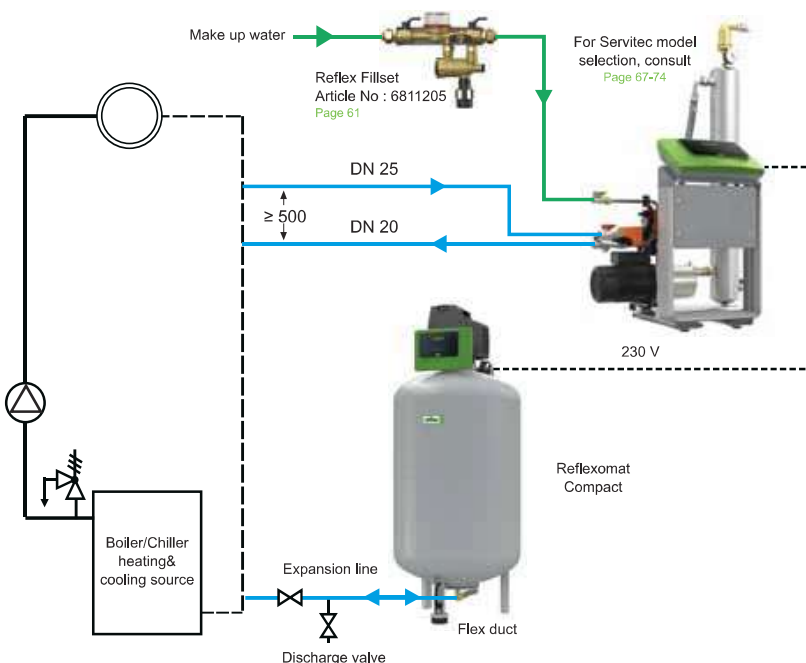
Reflexomat 200-600



Reflexomat  
RS 300/1

RG 1000

## Reflexomat, Degassing and Water Make-up With Servitec



### Reflexomat with Servitec

Reflexomat 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 Reflexomat 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. This combination can also be used for applications where the water supply comes from an adjacent container, as the Servitec device is self priming.



## Pressurisation Systems

### Reflexomat Control Unit

- Compressor-controlled pressurisation unit for heating and chilled water systems
- Degree of protection: IP 54
- Power supply 230/400 V
- Common fault signal and RS 485 interface
- Control Touch from RS 150 as standard, control basic S as alternative
- Control Touch: graphic menu display, permanent display of the operating parameters, extensive interfaces, e.g. for BMS connection, remote monitoring
- VS Control Unit, now with it's new name RS Control Unit



RS control unit with 1 compressor

Type	Control Touch Article No	Control Basic S Article No	Material Group	Height (H) mm	Width (W) mm	Depth (D) mm	Weight kg	Compressor
RS 90/1	8880111*	-	33	415	395	520	21.0	≤ 600 l, RS 90/1 on vessel
RS 90/1	8880211*	-	33	690	395	345	25.0	≥ 800 l, RS 90/1 adjacent
RS 150/1	8880311	8880010	33	920	395	600	28.0	adjacent
RS 300/1	8880411	8880020	33	920	395	700	34.0	
RS 400/1	8880511	8880030	33	920	395	700	51.0	
RS 580/1	8880611	8880040	33	920	395	700	102.0	

\* Control basic only

RS control unit with 2 compressors

Type	Control Touch Article No	Control Basic S Article No	Material Group	Height (H) mm	Width (W) mm	Depth (D) mm	Weight kg	Compressor
RS 90/2	8882100	8882000	33	920	1225	800	33.0	adjacent
RS 150/2	8883100	8882010	33	920	1225	800	45.0	
RS 300/2	8884100	8882020	33	920	1225	800	61.0	
RS 400/2	8885100	8882030	33	920	1225	800	95.0	
RS 580/2	8886100	8882040	33	920	1225	800	197.0	

Voltage operation: RS 90 → 230 V/50 Hz, from RS 150 → 400 V/50 Hz

### Reflexomat Control Unit Without Compressor (For On Site Compressed Air)

Type	Article No	Material Group	H/W/D (mm)*	Weight kg*
≤ 600 litre, RS 90/1	8881100	33	415/395/520	9.0
> 800 litre, RS 90/1	8881105	33	690/395/345	9.0

\* Without compressor

### Solenoid Valve For On-site Compressed Air

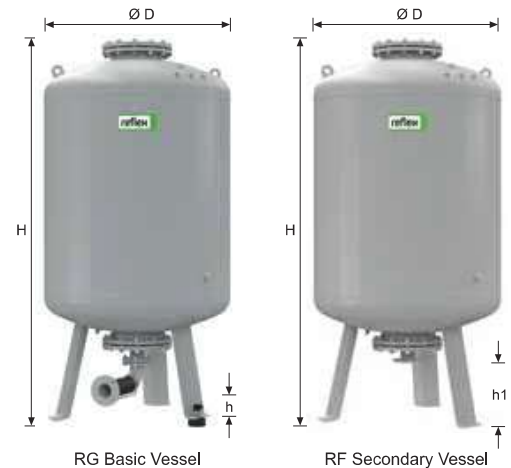
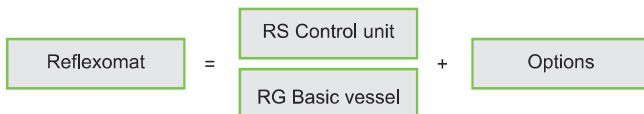
Fitted ready-to-connect in the RS 90/1 control unit without compressor

**MV 1/4    Article No: 7913000    Material Group: 35**



## Reflexomat Vessels

- Heavy duty steel tank
- Replaceable **butyl** bladder in accordance with DIN EN 13831
- Approval in accordance with the Pressure Equipment Directive 97/23/EC
- Max. operating temperature bladder: 70°C
- Max. system flow temperature: 120°C
- Durable epoxy coating with attractive new colour



RG Basic Vessel

RF Secondary Vessel

	RG basic vessel			RF secondary vessel (optional)		Article Group	Ø D mm	H mm	Connection	HG mm	Weight kg
	Type 6 Bar	h mm	Article No	h1 mm	Article No						
6 bar	200	115	8799100	155	8789100	30	634	970*	R 1	1350	42.8
	300	115	8799200	155	8789200	30	634	1270*	R 1	1650	60.7
	400	100	8799300	140	8789300	30	740	1255*	R 1	1640	69.4
	500	100	8799400	140	8789400	30	740	1475*	R 1	1860	78.7
	600	100	8799500	140	8789500	30	740	1720*	R 1	2110	90.1
	800	100	8799600	140	8789600	30	740	2185	R 1	-	110.3
	1000	195	8650105	305	8652005	32	1000	2025	DN 65	-	308.6
	1500	185	8650305	305	8652205	32	1200	2025	DN 65	-	328.0
	2000	185	8650405	305	8652305	32	1200	2480	DN 65	-	380.0
	3000	220	8650605	334	8652505	32	1500	2480	DN 65	-	795.0
10 bar	4000	220	8650705	334	8652605	32	1500	3065	DN 65	-	1.188.0
	5000	220	8650805	334	8652705	32	1500	3590	DN 65	-	1.115.0
	350	190	8654000	190	8654300	30	750	1340	DN 40	-	230.0
	500	190	8654100	190	8654400	30	750	1600	DN 40	-	275.0
	750	180	8654200	180	8654500	30	750	2185	DN 50	-	345.0
	1000	165	8651005	285	8653005	32	1000	2065	DN 65	-	580.0
	1500	165	8651205	285	8653205	32	1200	2055	DN 65	-	800.0
	2000	165	8651305	285	8653305	32	1200	2515	DN 65	-	960.0
	3000	195	8651505	310	8653505	32	1500	2520	DN 65	-	1.425.0
	4000	195	8651605	310	8653605	32	1500	3100	DN 65	-	1.950.0
	5000	195	8651705	310	8653705	32	1500	3630	DN 65	-	2.035.0

\* Height, with RS 90/1 control unit included

## Commissioning by Reflex - After Sales Service (Option)

Single compressor system **Article No:** 7945600

Double compressor system **Article No:** 7945630

## Wall Bracket (Option)

- Wall mount facility for the RS 90/1 control unit in conjunction with RG 200, RG 300, RG 400, RG 500 and RG 600 expansion vessels (observe installation height H/HG)
- Incl. 3 m long connection hoses

**Article No :** 7881900

**Material Group :** 35



## Pressurisation Systems

### I / O Modules

- 2 x additional analogue outputs for system pressure and expansion vessel content monitoring
- 6 x freely programmable digital inputs
- 6 x freely programmable volt free outputs

**Article No :** 8858405

**Material Group :** 35



### MBM II Bladder Rupture Detector

- For the signalling of bladder rupture in Reflexomat 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

**Article No :** 7857700

**Material Group :** 86



**Relay**  
For on site mounting



**Electrode**  
Factory mounted

### Bus Modules

- For data exchange between the Reflexomat unit (via RS 485) and BMS

LonWorks Digital

**Article No :** 8860000

**Material Group :** 86

LonWorks

**Article No :** 8860100

**Material Group :** 86

Profi bus-DP

**Article No :** 8860200

**Material Group :** 86

Ethernet

**Article No :** 8860300

**Material Group :** 86

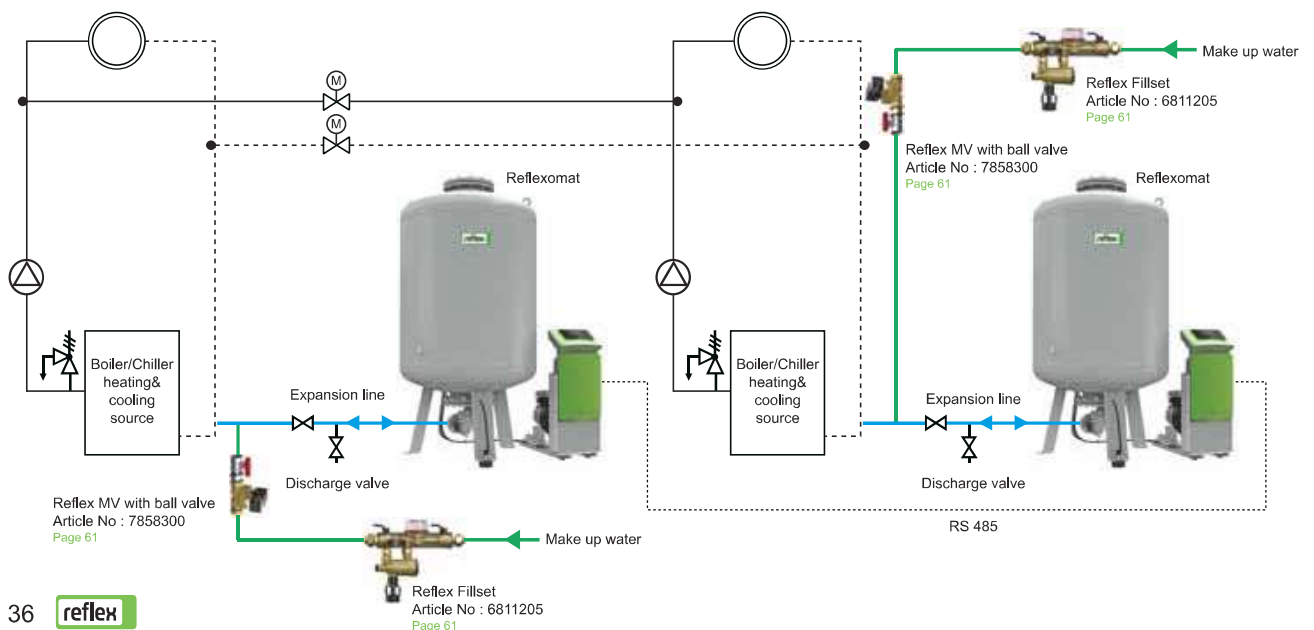


### Master - Slave Connection

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

**Article No :** 7859000

**Material Group :** 35



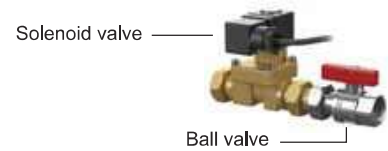
## Options

### Reflex MV Solenoid Valve With Ball Valve

- For water make-up within systems which are equipped with pressurisation units
- Operates on 230 V output from pressurisation unit

Article No : 7858300

Material Group : 35

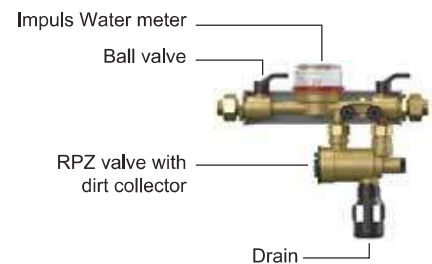


### Reflex Fillset With Impuls Water Meter

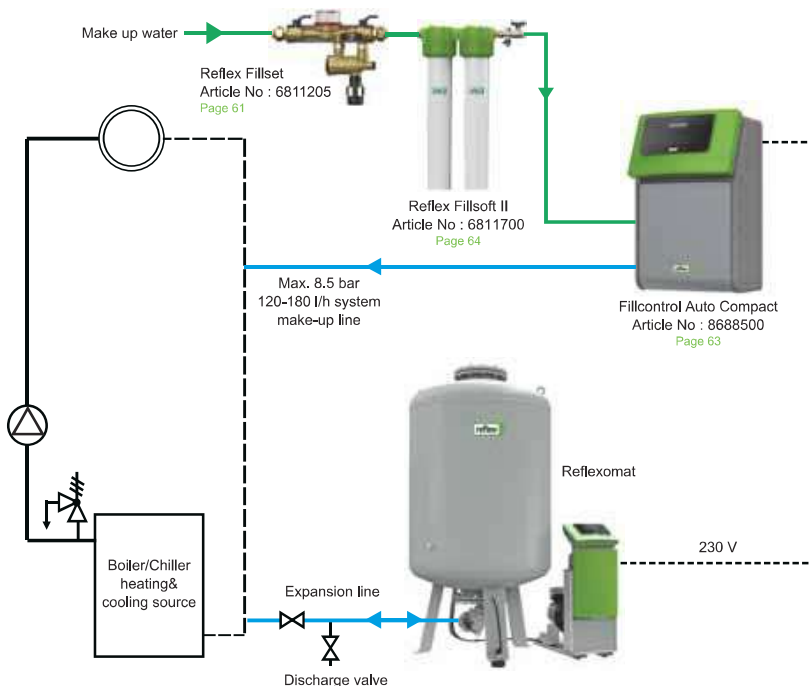
- Pre-fabricated assembly for direct connection of HVAC systems to water mains
- Total quantity of make-up water is measured by a water meter
- Prevents backflow of HVAC water into the water mains
- With German DVGW-approved BA-type backflow preventer
- Including wall bracket and isolation valves

Article No : 6811205

Material Group : 70



## Reflexomat With Fillcontrol Auto Compact and Fillsoft II



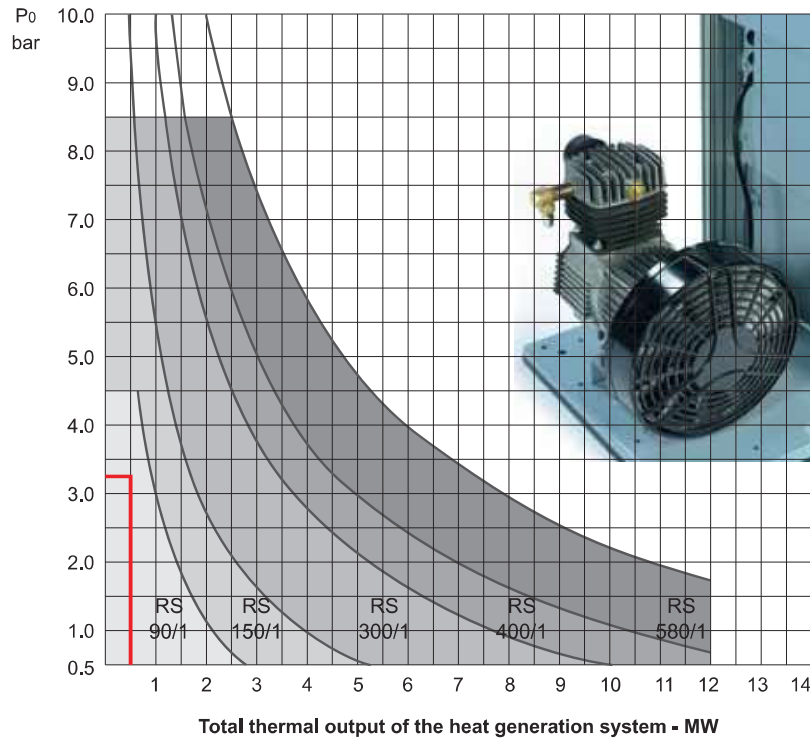
### Reflexomat with Fillcontrol Auto Compact

Reflexomat unit in combination with Fillcontrol Auto Compact, Fillsoft II 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 Fillcontrol Auto Compact. By connecting the Fillcontrol Auto Compact make-up unit to the Reflexomat control unit, make-up water is pumped into the system, if the pressure from the water mains is below system pressure. The make-up unit also include a break tank, which providing protection against contamination. 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 impuls water meter to the Variomat control unit the Fillmeter function is available.

## Pressurisation Systems

## Reflexomat Quick Selection

## 1 Compressor



## Selection Example

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

$$P_0 \geq \frac{H_{st} [m]}{10} \text{ bar} + 0.2 \text{ bar}$$

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

$$V_n \geq \frac{V_{ex} + V_{WR}}{F_{acc}}$$

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

**Selected:**  
 Control unit RS 90/1  
 Expansion vessel RG 200  
 SU Lock shield R 1x1

## 2 Compressors

