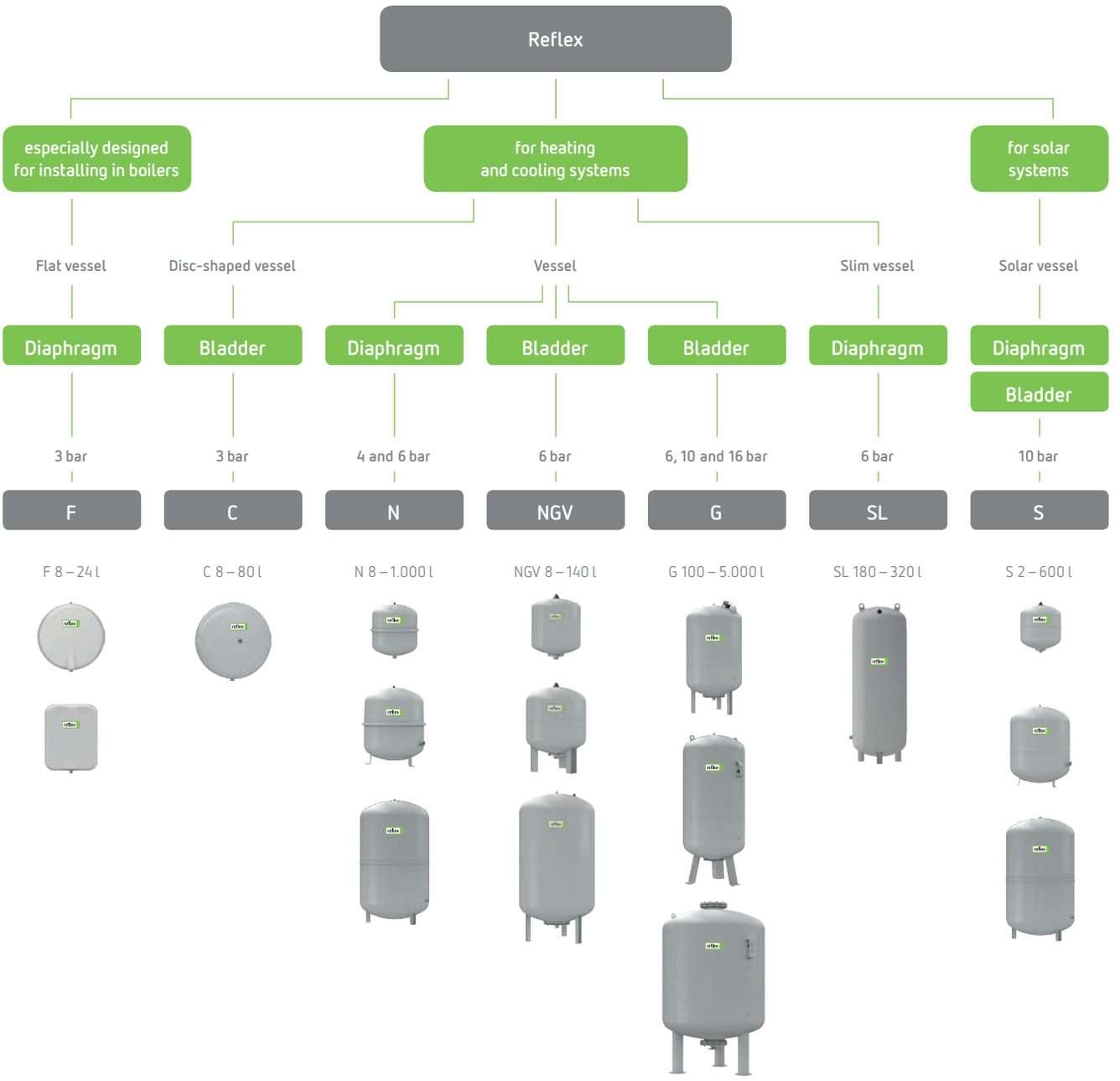
Expansion vessels

for heating, solar and cold water systems



V Auxiliary vessels

Without membrane

V 500 – 5.000 → 6 bar / 110 °C
V 6 – 5.000 → 10 bar / 110 °C



Other pressure ratings available on request

for potable and non-potable systems

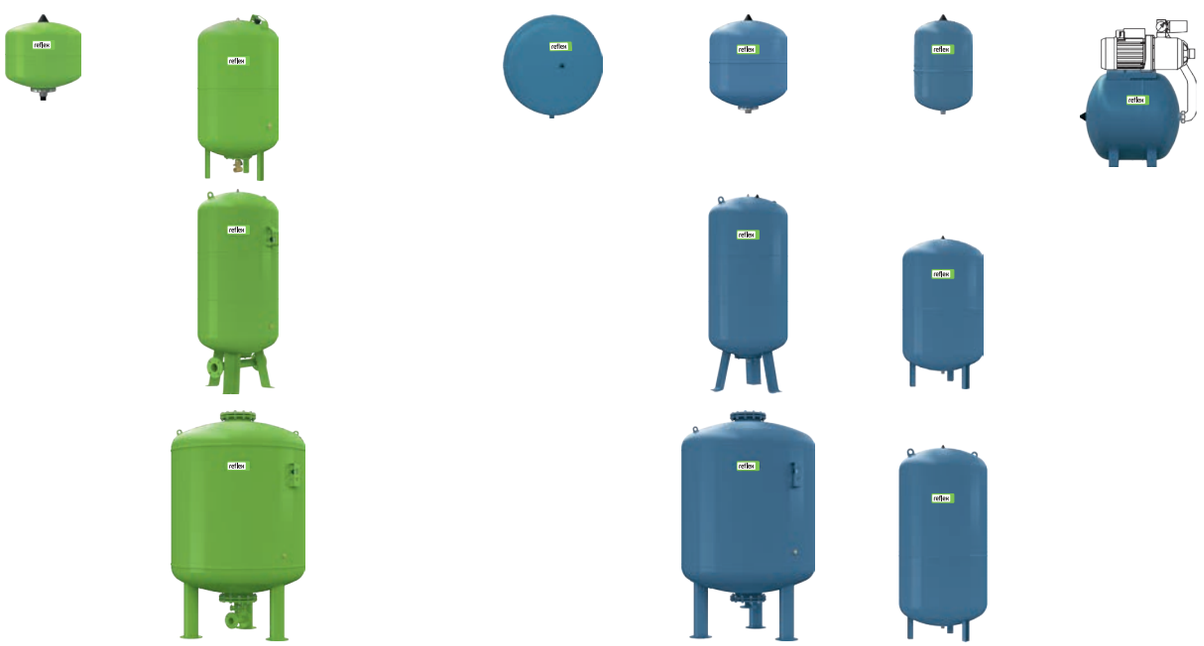
Refix

for potable water, pressure-boosting and water heating systems according to DIN 1988 norm

- Small vessel
  - **Bladder**
    - 10, 16 & 25 bar
      - **DD**
        - DD 2 – 33 l
- Large vessel
  - **Bladder**
    - 10 & 16 bar
      - **DT**
        - DT 60 – 3.000 l

only for systems not subject to the requirements of the DIN 1988 norm*

- Disc-shaped vessel
  - **Bladder**
    - 10 bar
      - **C-DE**
        - C-DE 8 – 80 l
- Vessel
  - **Bladder**
    - 10, 16 & 25 bar
      - **DE**
        - DE 2 – 5.000 l
  - **Diaphragm**
    - 10 bar
      - **DC**
        - DC 25 – 600 l
- Vessel for domestic water systems
  - **Bladder**
    - 10 bar
      - **HW**
        - HW 25 – 100 l



Water shock arrestor | Diaphragm | WD**



0.165 l / 10 bar**

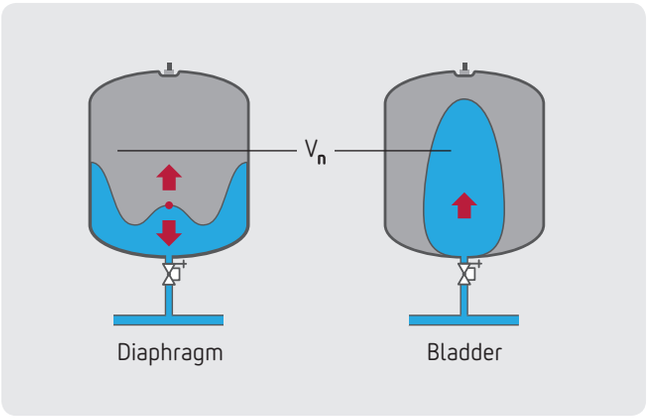
For example, installation directly at the draw-off point

* For example, fire extinguishing and non-potable water systems, underfloor heating, geothermal energy...

** Not approved for potable water.

Theoretical principles

Construction: Reflex & Refix



Membrane expansion vessels (MAG) with gas cushioning are functional without auxiliary energy and therefore also assigned to static pressurisation systems. The pressure is generated by a gas cushion in the vessel.

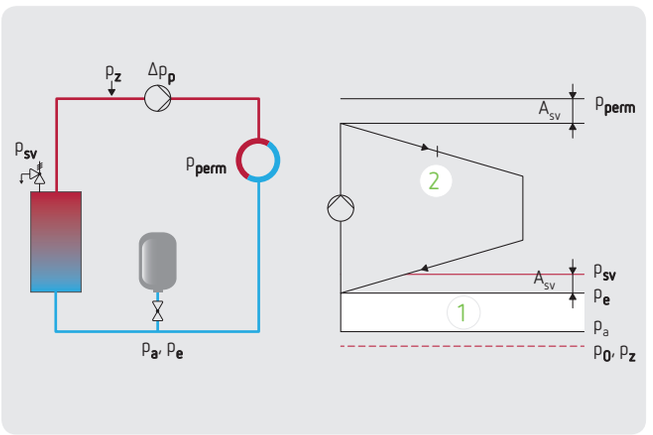
The water level and the pressure in the gas chamber are linked ($p \times V$ = constant). This means that it is not possible to use the 100 % of the nominal volume V_n for water intake.

The nominal volume is greater than the required water intake volume $V_e + V_v$ by the factor $\frac{p_e + 1}{p_e - p_0}$.

This is one reason why dynamic pressure maintenance systems are more favourable for larger systems and narrow pressure ratios ($p_e - p_0$).

Calculating the nominal volume: $V_n = (V_e + V_v) \frac{p_e + 1}{p_e - p_0}$

Supply pressure maintenance (suction pressure maintenance)

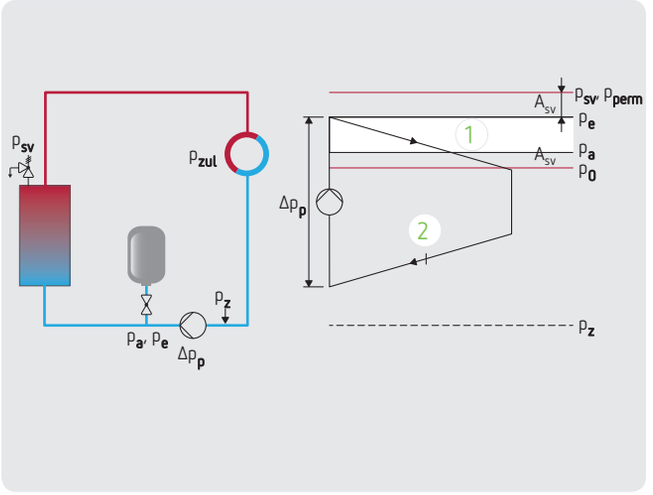


Pressure maintenance is integrated **upstream** of the circulating pump, i.e. on the suction side. This type is most commonly used, as it requires the least technical effort.

- Advantages:
  - \+ low idle pressure level
  - \+ operating pressure → idle pressure, meaning there is no risk of a vacuum forming
- Disadvantages:
  - – bat high flow-through pump pressure (large systems) high operating pressure, observe network load p_{perm}

1. Idle pressure target value
2. Operating pressure

Follow-up pressure maintenance

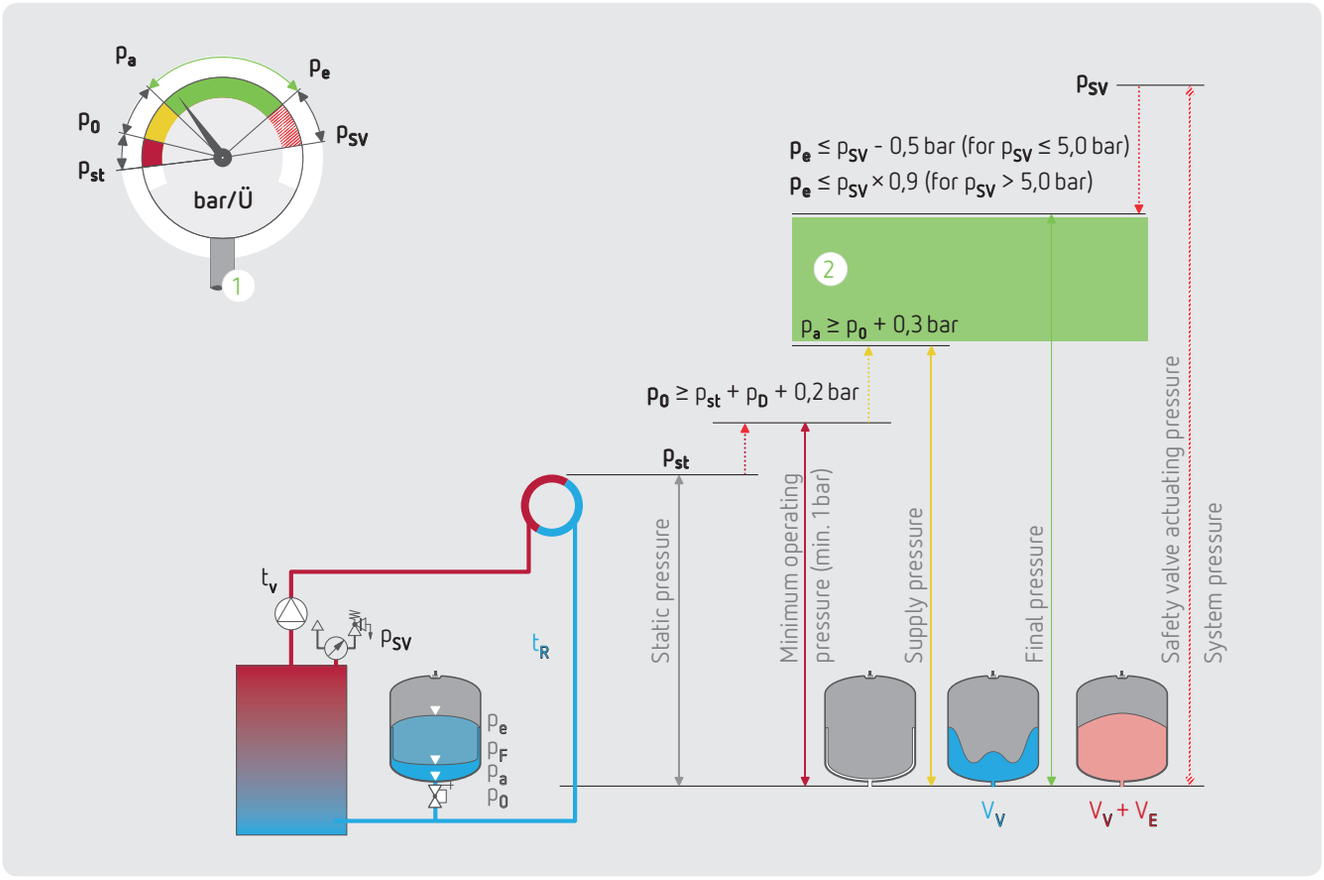


Pressure maintenance is integrated **downstream** of the circulating pump, i.e. on the pressure side. When determining the idle pressure, a system-specific differential pressure component of the circulating pump (50 ... 100 %) must be allowed for. The application is limited to a few individual cases → solar systems.

- Advantages:
  - \+ low idle pressure level if the entire pump pressure does not have to be loaded
- Disadvantages:
  - – high idle pressure level
  - – mainly for maintaining required inlet pressure p_z as per manufacturer's specifications

1. Idle pressure target value
2. Operating pressure

Calculation parameters



p_{st} Static pressure
p_0 Minimum operating pressure (min. 1 bar)
p_a Supply pressure
p_F Filling pressure
p_e Final pressure
p_{SV} Safety valve actuating pressure/system pressure

1. System pressure changes
2. Idle pressure range = pressure maintenance target value

Tasks of pressurisation systems

Pressurisation systems play a key role in heating and cooling circuits, where they essentially have to carry out three fundamental functions:

1. To keep pressure within permissible limits at every point of the system, i.e. so that the maximum gauge operating pressure is not exceeded but also that a minimum pressure is ensured so as to prevent vacuums, cavitation and evaporation.
2. To compensate volume fluctuations in the heating or cooling water due to temperature fluctuations.
3. To avert system-related water losses in the form of a hydraulic seal.

Careful calculation, commissioning and maintenance is a basic requirement for the proper functioning of the overall system.

New transport guidelines for expansion vessels

Product adjustments according to ADR* and IMDG**

Due to new legal requirements according to the ADR (*Accord européen relatif au transport international des marchandises dangereuses par route = Agreement concerning the International Carriage of Dangerous Goods by Road) and IMDG (**International Maritime Dangerous Goods Code), Reflex Winkelmann GmbH has taken appropriate measures to satisfy these regulations. This involves changing the packaging and the factory prepressure (p_0) of various vessels.

Allowed (✓) or not allowed (×) according to the new transport guidelines



Overview of measures for satisfying the legal requirements

Vessel (litres)	Measures for satisfying the legal requirements
Reflex (vessels for heating, solar and cold water systems)	
All types Reflex N, C, F, SL, V	No measures necessary, packaging and prepressure remain as before
Reflex G 100 – 600	Additional item numbers are available for sea transport for the following countries/regions for vessels with reduced prepressure (2 bar): Sweden, Norway, Finland, Region IMEA/Asia Pacific
Reflex G 300 – 600	New packaging
Reflex G from 800	Prepressure reduced to 2 bar
Reflex S to 33	No measures necessary, packaging and prepressure remain as before
Reflex S 50 – 600	Additional item numbers are available for sea transport for the following countries/regions for vessels with reduced prepressure (2 bar): Sweden, Norway, Finland, Region IMEA/Asia Pacific
Reflex S 300 – 600	New packaging

Vessel (litres)	Measures for satisfying the legal requirements
Refix (vessels for potable and non-potable systems)	
All types Refix HW	No measures necessary, packaging and prepressure remain as before
Refix DT 60 – 600 + DE 2 – 600	Additional item numbers are available for sea transport for the following countries/regions for vessels with reduced prepressure (2 bar): Sweden, Norway, Finland, Region IMEA/Asia Pacific
Refix DT + DE 300 – 600	New packaging
Refix DT + DE from 800	Prepressure reduced to 2 bar
All types Refix DD + C-DE	Additional item numbers are available for sea transport for the following countries/regions for vessels with reduced prepressure (2 bar): Sweden, Norway, Finland, Region IMEA/Asia Pacific
Refix DC 25	No measures necessary, packaging and prepressure remain as before
Refix DC 300 – 600	New packaging
Refix DC 50 – 600	Additional item numbers are available for sea transport for the following countries/regions for vessels with reduced prepressure (2 bar): Sweden, Norway, Finland, Region IMEA/Asia Pacific

Additional item numbers are added for the named countries that are automatically changed upon order confirmation.

Benefits of the measures

- ✓ **All transport capacities can still be flexibly and fully exhausted**
- ✓ **Simplification of transport processing thanks to secured standards**
- ✓ **Complex processes with respect to storing and handling dangerous goods are avoided**

Overview of affected items

Art. No.	Art. No. Description [colour, maximum pressure / prepressure, connection]	New Art. No.	New Art. No. Description [colour, maximum pressure / prepressure, connection]
8519000	G 100 grey 6/3,5 bar	8519001	G 100 grey 6/2 bar
8518000	G 100 grey 10/3,5 bar	8518001	G 100 grey 10/2 bar
8518400	G 100 grey 16/3,5 bar	8518401	G 100 grey 16/2 bar
8519100	G 200 grey 6/3,5 bar	8519101	G 200 grey 6/2 bar
8518100	G 200 grey 10/3,5 bar	8518101	G 200 grey 10/2 bar
8518500	G 200 grey 16/3,5 bar	8518502	G 200 grey 16/2 bar
8519200	G 300 grey 6/3,5 bar	8519201	G 300 grey 6/2 bar
8518200	G 300 grey 10/3,5 bar	8518201	G 300 grey 10/2 bar
8518600	G 300 grey 16/3,5 bar	8518602	G 300 grey 16/2 bar
8521605	G 400 grey 6/3,5 bar	8521606	G 400 grey 6/2 bar
8521005	G 400 grey 10/3,5 bar	8521001	G 400 grey 10/2 bar
8510206	G 400 grey 16/3,5 bar	8510203	G 400 grey 16/2 bar
8521705	G 500 grey 6/3,5 bar	8521700	G 500 grey 6/2 bar
8521006	G 500 grey 10/3,5 bar	8521004	G 500 grey 10/2 bar
8518700	G 500 grey 16/3,5 bar	8518702	G 500 grey 16/2 bar
8522605	G 600 grey 6/3,5 bar	8522606	G 600 grey 6/2 bar
8522006	G 600 grey 10/3,5 bar	8522001	G 600 grey 10/2 bar
8522007	G 600 grey 16/3,5 bar	8522002	G 600 grey 16/2 bar
8209500	S 50 grey 10/3 bar	8209503	S 50 grey 10/2 bar
8210300	S 80 grey 10/3 bar	8210301	S 80 grey 10/2 bar
8210500	S 100 grey 10/3 bar	8210501	S 100 grey 10/2 bar
8211500	S 140 grey 10/3 bar	8211501	S 140 grey 10/2 bar
8213400	S 200 grey 10/3 bar	8213401	S 200 grey 10/2 bar
8214400	S 250 grey 10/3 bar	8214401	S 250 grey 10/2 bar
8215400	S 300 grey 10/3 bar	8215401	S 300 grey 10/2 bar
8219000	S 400 grey 10/3 bar	8219001	S 400 grey 10/2 bar
8219200	S 600 grey 10/3 bar	8219202	S 600 grey 10/2 bar
7307700	DD 8 white 10/4 bar	7307701	DD 8 white 10/2 bar
7308000	DD 8 green 10/4 bar	7308001	DD 8 green 10/2 bar
7290200	DD 8 green 25/4 bar	7290202	DD 8 green 25/2 bar
7308200	DD 12 green 10/4 bar	7308201	DD 12 green 10/2 bar
7303805	DD 12 green 16/4 bar	7303806	DD 12 green 16/2 bar
7308300	DD 18 green 10/4 bar	7308301	DD 18 green 10/2 bar
7308400	DD 25 green 10/4 bar	7308401	DD 25 green 10/2 bar
7380700	DD 33 green 10/4 bar	7380701	DD 33 green 10/2 bar
7309000	DT 60 green 10/4 bar Rp 1¼"	7309003	DT 60 green 10/2 bar Rp1¼"
7365400	DT 100 green 10/4 bar DN 50/16	7365402	DT 100 green 10/2 bar DN 50/16
7365405	DT 100 green 10/4 bar DN 65/16	7365410	DT 100 green 10/2 bar DN 65/16
7309200	DT 100 green 10/4 bar Rp 1¼"	7309202	DT 100 green 10/2 bar Rp1¼"
7309300	DT 200 green 10/4 bar Rp 1¼"	7309301	DT 200 green 10/2 bar Rp 1¼"
7370200	DT 200 green 16/4 bar DN 50/16	7370201	DT 200 green 10/2 bar DN 50/16
7314206	DT 300 green 16/4 bar DN 80/16	7314208	DT 300 green 16/2 bar DN 80/16
7365500	DT 400 green 10/4 bar DN 50/16	7365501	DT 400 green 10/2 bar DN 50/16
7336505	DT 400 green 10/4 bar DN 65/16	7336506	DT 400 green 10/2 bar DN 65/16
7339005	DT 400 green 16/4 bar DN 80/16	7339007	DT 400 green 16/2 bar DN 80/16
7370500	DT 500 green 16/4 bar DN 50/16	7370501	DT 500 green 16/2 bar DN 50/16
7370507	DT 500 green 16/4 bar DN 65/16	7370502	DT 500 green 16/2 bar DN 65/16
7365600	DT 600 green 10/4 bar DN 50/16	7365602	DT 600 green 10/2 bar DN 50/16
7336806	DT 600 green 10/4 bar DN 80/16	7336808	DT 600 green 10/2 bar DN 80/16
7270900	C-DE 8 blue 10/4 bar	7270901	C-DE 8 blue 10/2 bar
7270910	C-DE 12 blue 10/4 bar	7270911	C-DE 12 blue 10/2 bar
7270920	C-DE 18 blue 10/4 bar	7270921	C-DE 18 blue 10/2 bar
7270930	C-DE 25 blue 10/4 bar	7270931	C-DE 25 blue 10/2 bar
7270940	C-DE 35 blue 10/4 bar	7270941	C-DE 35 blue 10/2 bar
7270950	C-DE 50 blue 10/4 bar	7270952	C-DE 50 blue 10/2 bar
7270960	C-DE 80 blue 10/4 bar	7270961	C-DE 80 blue 10/2 bar

Art. No.	Art. No. Description [colour, maximum pressure / prepressure, connection]	New Art. No.	New Art. No. Description [colour, maximum pressure / prepressure, connection]
7200300	DE 2 blue 10/4 bar	7200301	DE 2 blue 10/2 bar
7301000	DE 8 blue 10/4 bar	7301001	DE 8 blue 10/2 bar
7301008	DE 8 blue 10/4 bar sswc [2]	7300999	DE 8 blue 10/2 bar sswc [2]
7301006	DE 8 blue 16/4 bar	7301004	DE 8 blue 16/2 bar
7290100	DE 8 blue 25/4 bar	7290101	DE 8 blue 25/2 bar
7302000	DE 12 blue 10/4 bar	7302001	DE 12 blue 10/2 bar
7302008	DE 12 blue 10/4 bar sswc [2]	7302006	DE 12 blue 10/2 bar sswc [2]
7302105	DE 12 blue 16/4 bar sswc [2]	7302108	DE 12 blue 16/2 bar sswc [2]
7303000	DE 18 blue 10/4 bar	7303001	DE 18 blue 10/2 bar
7303008	DE 18 blue 10/4 bar sswc [2]	7303004	DE 18 blue 10/2 bar sswc [2]
7304000	DE 25 blue 10/4 bar	7303998	DE 25 blue 10/2 bar
7304009	DE 25 blue 10/4 bar sswc [2]	7303999	DE 25 blue 10/2 bar sswc [2]
7304015	DE 25 blue 16/4 bar	7304017	DE 25 blue 16/2 bar
7303900	DE 33 blue 10/4 bar	7303901	DE 33 blue 10/2 bar
7305508	DE 33 blue 10/4 bar sswc [1] [2]	7305509	DE 33 blue 10/2 bar sswc [1] [2]
7305500	DE 33 blue 10/4 bar [1]	7305501	DE 33 blue 10/2 bar [1]
7306005	DE 50 blue 10/4 bar	7306006	DE 50 blue 10/2 bar
7306400	DE 60 blue 10/4 bar	7306402	DE 60 blue 10/2 bar
7306500	DE 80 blue 10/4 bar	7306499	DE 80 blue 10/2 bar
7306505	DE 80 blue 10/4 bar sswc [2]	7306498	DE 80 blue 10/2 bar sswc [2]
7348600	DE 80 blue 16/4 bar	7348604	DE 80 blue 16/2 bar
7306600	DE 100 blue 10/4 bar	7306601	DE 100 blue 10/2 bar
7306605	DE 100 blue 10/4 bar sswc [2]	7306599	DE 100 blue 10/2 bar sswc [2]
7348610	DE 100 blue 16/4 bar	7348612	DE 100 blue 16/2 bar
7313700	DE 120 blue 25/4 bar	7313702	DE 120 blue 25/2 bar
7313500	DE 180 blue 25/4 bar	7313501	DE 180 blue 25/2 bar
7306700	DE 200 blue 10/4 bar	7306699	DE 200 blue 10/2 bar
7306705	DE 200 blue 10/4 bar sswc [2]	7306698	DE 200 blue 10/2 bar sswc [2]
7348620	DE 200 blue 16/4 bar	7348621	DE 200 blue 16/2 bar
7306800	DE 300 blue 10/4 bar	7306801	DE 300 blue 10/2 bar
7306805	DE 300 blue 10/4 bar sswc [2]	7306802	DE 300 blue 10/2 bar sswc [2]
7348630	DE 300 blue 16/4 bar	7348634	DE 300 blue 16/2 bar
7313800	DE 300 blue 25/4 bar	7313801	DE 300 blue 25/2 bar
7306850	DE 400 blue 10/4 bar	7306851	DE 400 blue 10/2 bar
7348640	DE 400 blue 16/4 bar	7348643	DE 400 blue 16/2 bar
7313300	DE 400 blue 25/4 bar	7313306	DE 400 blue 25/2 bar
7306900	DE 500 blue 10/4 bar	7306899	DE 500 blue 10/2 bar
7306905	DE 500 blue 10/4 bar sswc [2]	7306898	DE 500 blue 10/2 bar sswc [2]
7348650	DE 500 blue 16/4 bar	7348649	DE 500 blue 16/2 bar
7348660	DE 600 blue 16/4 bar	7348668	DE 600 blue 16/2 bar
7306950	DE 600 blue 10/4 bar	7306951	DE 600 blue 10/2 bar
7321500	DE 600 blue 25/4 bar	7321504	DE 600 blue 25/2 bar
7309600	DC 50 blue 10/4 bar	7309601	DC 50 blue 10/2 bar
7309700	DC 80 blue 10/4 bar	7309701	DC 80 blue 10/2 bar
7309800	DC 100 blue 10/4 bar	7309801	DC 100 blue 10/2 bar
7363500	DC 200 blue 10/4 bar	7363501	DC 200 blue 10/2 bar
7363600	DC 300 blue 10/4 bar	7363601	DC 300 blue 10/2 bar
7363800	DC 500 blue 10/4 bar	7363801	DC 500 blue 10/2 bar
7351000	WD white 10/3,5 bar	7351003	WD white 10/2 bar

[1] with feet
[2] version with stainless steel water connection

Reflex

Reflex — quick selection table

Heating Systems: 70/50 °C

	Safety Valve p_{SV} [bar]	2,5			3,0				4,0			
	Inlet Pressure p_0 [bar]	0,5	1,0	1,5	0,5	1,0	1,5	1,8	1,5	2,0	2,5	3,0
	V_n [litres]	Contents V_A [litres]										
Reflex	8	107	48	–	133	82	31	–	87	48	8	–
	12	161	71	–	199	122	46	–	131	71	12	–
	18	268	134	–	325	210	96	27	223	134	45	–
	25	424	238	52	504	344	185	89	362	238	114	–
	35	639	387	126	730	536	313	179	561	387	213	–
	50	912	608	238	1.043	782	504	313	811	608	362	114
	80	1.460	973	461	1.668	1.251	834	580	1.298	973	649	263
	100	1.825	1.217	608	2.086	1.564	1.043	730	1.622	1.217	811	362
	140	2.555	1.703	852	2.920	2.190	1.460	1.022	2.271	1.703	1.135	561
	200	3.650	2.433	1.217	4.171	3.128	2.086	1.460	3.244	2.433	1.622	811
	250	4.562	3.041	1.521	5.214	3.910	2.607	1.825	4.055	3.041	2.028	1.014
	300	5.474	3.650	1.825	6.257	4.692	3.128	2.190	4.866	3.650	2.433	1.217
	400	7.299	4.866	2.433	8.342	6.257	4.171	2.920	6.488	4.866	3.244	1.622
	500	9.124	6.083	3.041	10.428	7.821	5.214	3.650	8.110	6.083	4.055	2.028
	600	10.949	7.299	3.650	12.513	9.385	6.257	4.380	9.732	7.299	4.866	2.433
	800	14.599	9.732	4.866	16.684	12.513	8.342	5.839	12.976	9.732	6.488	3.244
	1.000	18.248	12.165	6.083	20.855	15.641	10.428	7.299	16.221	12.165	8.110	4.055

Key data

Safety valve	p_{SV} = 3 bar
Static height	H_{st} = 13 m
Heat generator capacity	$\dot{Q}$ = 40 kW
Panel radiators rated temperature	T = 70/50 °C
Volume buffer storage tank	V_{PH} = 1.000 l

Calculation

Water content (approximately)

Radiators:
$V_A = \dot{Q}\,[kW] \times 13{,}5\,l/kW$

Panel radiators:
$V_A = \dot{Q}\,[kW] \times 8{,}5\,l/kW$

$V_A = 40\,kW \times 8{,}5\,l/kW + 1.000\,l = 1.340\,l$

$$p_0 \geq \frac{H_{st}\,[m]}{10}\,bar + 0{,}2\,bar$$

$$p_0 \geq \frac{13}{10}\,bar + 0{,}2\,bar \qquad = 1{,}5\,bar$$

Result

From the table

with p_{SV} = 3 bar
and p_0 = 1,5 bar
V_A = 1.340 l

→ V_n = **140 l** (for V_A max. 1.460 l)

selected

1 × **Reflex N 140,** 6 bar, → page <?>

1 × **cap ball valve,** → page <?>

Example calculation
Reflex N

Reflex recommendations

- Set the safety valve operating pressure sufficiently high: **$p_{SV} \geq p_0 + 1{,}5$ bar**
- If possible, select an additional 0,2 bar when calculating the gas inlet pressure:

$$p_0 \geq \frac{H_{st}\,[m]}{10} + 0{,}2\,bar$$

- Due to the feed pressure required for the circulating pumps, at least 1 bar inlet pressure should be selected for roof-mounted systems, too: **$p_0 \geq 1$ bar**
- Set the water-side filling or supply pressure at least 0,3 bar above the inlet pressure when the system is vented in a cold condition: **$p_F \geq p_0 + 0{,}3$ bar**

Reflex — quick selection table

Heating Systems: 70/50 °C

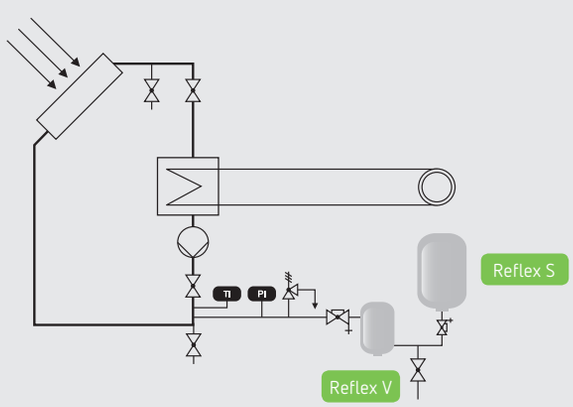
	Safety Valve p_{SV} [bar]	5,0					6,0					
	Inlet Pressure p_0 [bar]	2,0	2,5	3,0	3,5	4,0	2,0	2,5	3,0	3,5	4,0	5,0
	V_n [litres]	Contents V_A [litres]										
Reflex	8	91	58	26	–	–	118	90	63	35	7	–
	12	136	88	39	–	–	177	136	94	52	10	–
	18	231	158	85	12	–	293	230	167	105	42	–
	25	373	272	170	69	–	459	372	285	197	110	–
	35	576	434	292	150	8	679	574	452	330	208	–
	50	829	664	475	272	69	969	827	684	529	354	6
	80	1.327	1.062	796	515	191	1.551	1.323	1.095	867	639	89
	100	1.659	1.327	995	664	272	1.939	1.654	1.369	1.083	798	145
	140	2.322	1.858	1.393	929	434	2.714	2.315	1.916	1.517	1.118	257
	200	3.318	2.654	1.991	1.327	664	3.878	3.307	2.737	2.167	1.597	424
	250	4.147	3.318	2.488	1.659	829	4.847	4.134	3.422	2.709	1.996	564
	300	4.977	3.981	2.986	1.991	995	5.817	4.961	4.106	3.250	2.395	684
	400	6.636	5.309	3.981	2.654	1.327	7.755	6.615	5.474	4.334	3.193	912
	500	8.295	6.636	4.977	3.318	1.659	9.694	8.269	6.843	5.417	3.992	1.141
	600	9.954	7.963	5.972	3.981	1.991	11.633	9.922	8.212	6.501	4.790	1.369
	800	13.271	10.617	7.963	5.309	2.654	15.511	13.230	10.949	8.668	6.387	1.825
	1.000	16.589	13.271	9.954	6.636	3.318	19.389	16.537	13.686	10.835	7.984	2.281

Special configurations on request: Special tank > 5.000 litres; special tank > 10 bar

Customised planning with our configuration software

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

Reflex S in a solar heating system



Note for the installer

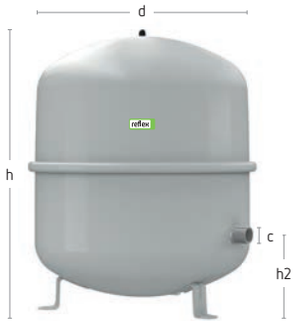
- The circulating pump and Reflex S are positioned in the collector return because of the low temperature load. This inevitably results in the installation of the expansion vessel on the discharge side of the circulating pump. Accordingly, the circulating pump pressure must be allowed for when calculating the inlet pressure p_0.
- The evaporation in the collector must be allowed for when calculating the nominal volume.
- The Reflex auxiliary vessel need not be installed if the temperature load at the expansion vessel cannot exceed 70 °C.

Reflex

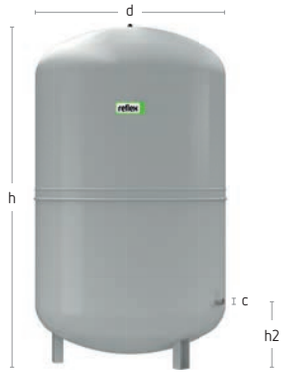
Reflex N



N 8 – 25 l



N 35 – 140 l



N 200 – 1.000 l

Technical Features

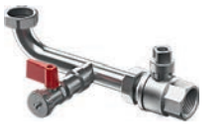
- for closed heating and cooling systems
- with threaded connections
- vertical from 35 litres, wall mounting up to size N 80
- non-replaceable diaphragm according to DIN EN 13831
- max. permissible operating temperature 70 °C
- for antifreeze additive of at least 25 – 50 %
- approval according to Pressure Equipment Directive 2014/68/EU
- durable epoxy resin coating
- with factory-pressurised gas chamber
- max. permissible system temperature 120 °C

	Type	Art. No.		DG	PQ	Inlet pressure	Connection c	Ø d	Height h	Height h2	Weight
		grey	white		[pce]	[bar]		[mm]	[mm]	[mm]	[kg]
4 bar 70 °C	N 8	8202501	7202801	0012	84	1,50	R ¾"	272	236	–	2,35
	N 12	8203301	7203501	0012	60	1,50	R ¾"	272	317	–	2,75
	N 18	8204301	7204401	0012	60	1,50	R ¾"	308	360	–	3,60
	N 25	8206301	7206401	0012	48	1,50	R ¾"	308	477	–	4,35
	N 35	8208401	7208501	0012	24	1,50	R ¾"	376	466	130	5,60
6 bar 70 °C	N 50	8209300	7209400	0013	24	1,50	R ¾"	441	487	175	9,60
	N 80	8210200	7210600	0013	12	1,50	R 1"	512	558	172	13,28
	N 100	8216300	–	0013	10	1,50	R 1"	512	669	172	15,84
	N 140	8211400	–	0013	6	1,50	R 1"	512	890	172	19,90
	N 200	8213300	–	0018	4	1,50	R 1"	634	767	205	23,80
	N 250	8214300	–	0018	4	1,50	R 1"	634	896	205	24,70
	N 300	8215300	–	0018	1	1,50	R 1"	634	1.101	238	30,00
	N 400	8218000	–	0018	1	1,50	R 1"	740	1.093	245	47,00
	N 500	8218300	–	0018	1	1,50	R 1"	740	1.313	245	52,00
	N 600	8218400	–	0018	1	1,50	R 1"	740	1.538	245	66,00
	N 800	8218500	–	0018	1	1,50	R 1"	740	2.003	245	96,00
	N 1000	8218600	–	0018	1	1,50	R 1"	740	2.413	245	118,00

Reflex N Accessories

CE

AG connection set



- for rapid assembly and maintenance of membrane expansion vessels
- incl. secured shut-off and connecting bend with screw connection
- with drainage cock (G ½") and hose nozzle
- according to DIN EN 12828
- 10 bar / 100 °C

Cap valve



- secured shut-off for maintenance and disassembly of expansion vessels
- with drainage
- according to DIN EN 12828
- 10 bar / 120 °C

Digital pressure gauge



- inlet pressure tester up to about 9 bar

Wall-hung console with multi-connections



- console with multi-connections for Reflex 8 – 25 litres
- With vessel connection

Wall mounting bracket with clamping strap



- console with clamping strap for Reflex 6 – 25 litres
- upright assembly

Type	Art. No.	DG	Weight [kg]
AG connection set AG 1"	9119204	0080	0,85
Cap valve SU R ¾" × ¾"	7613000	0084	0,26
Cap valve SU R 1" × 1"	7613100	0084	0,57
Digital pressure gauge	9119198	0086	0,06
Wall-hung console with multi-connections	7612000	0075	0,90
Wall mounting bracket with clamping strap	7611000	0075	0,22

Reflex NGV



NGV 8 – 25 l



NGV 35 – 50 l



NGV 80 – 140 l

Technical Features

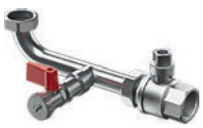
- For closed heating and cooling systems
- Non-replaceable full membrane according to DIN EN 13831
- Diffusion-tight butyl membrane
- Max. permissible operating temperature 70 °C
- Max. permissible system temperature 120 °C
- Approval according to Pressure Equipment Directive 2014/68/EU
- Durable epoxy resin coating
- With factory-pressurized gas chamber
- For antifreeze additive at least 25 to 50%
- With stainless steel threaded connection
- From 35 liters standing

	Typ	Art.-No grau	RG	VPE [St.]	Inlet pressure [bar]	Connection c	Ø d [mm]	Height h [mm]	Height h2 [mm]		Weight [kg]
6 bar 70 °C	NGV 8	8271008	0012	96	1,50	G ¾"	206	341	–		1,94
	NGV 12	8271012	0012	60	1,50	G ¾"	280	307	–		2,48
	NGV 18	8271018	0012	56	1,50	G ¾"	280	414	–		3,30
	NGV 25	8271025	0012	42	1,50	G ¾"	280	518	–		4,18
	NGV 35	8271035	0012	24	1,50	G ¾"	354	550	67		5,80
	NGV 50	8271050	0013	20	1,50	G 1"	409	613	97		8,55
	NGV 80	8271080	0013	10	1,50	G 1"	480	751	148		12,94
	NGV 100	8271100	0013	10	1,50	G 1"	480	858	148		14,60
	NGV 140	8271140	0013	10	1,50	G 1"	480	1.073	148		20,75

Accesorii Reflex NGV

CE

AG connection set



- for rapid assembly and maintenance of membrane expansion vessels
- incl. secured shut-off and connecting bend with screw connection
- with drainage cock (G ½") and hose nozzle
- according to DIN EN 12828
- 10 bar / 100 °C

Cap valve



- secured shut-off for maintenance and disassembly of expansion vessels
- with drainage
- according to DIN EN 12828
- 10 bar / 120 °C

Digital pressure gauge



- inlet pressure tester up to about 9 bar

Wall-hung console with multi-connections



- console with multi-connections for Reflex 8 – 25 litres
- With vessel connection

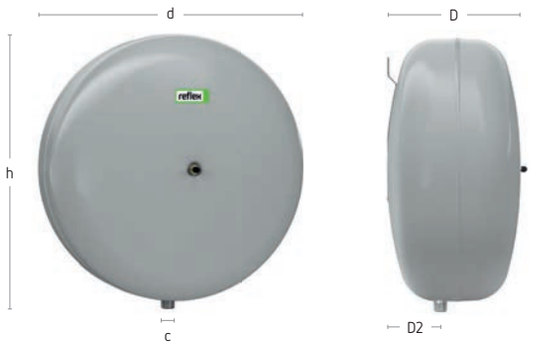
Wall mounting bracket with clamping strap



- console with clamping strap for Reflex 6 – 25 litres
- upright assembly

Type	Art. No.	DG	Weight [kg]
AG connection set AG 1"	9119204	0080	0,85
Cap valve SU R ¾" × ¾"	7613000	0084	0,26
Digital pressure gauge	9119198	0086	0,06
Wall-hung console with multi-connections	7612000	0075	0,90
Wall mounting bracket with clamping strap	7611000	0075	0,22

Reflex C



C 8 – 80 l

Technical Features

- for closed heating and cooling systems
- with threaded connections
- including brackets for easy installation
- non-replaceable bladder according to DIN EN 13831
- max. permissible operating temperature 70 °C
- for antifreeze additive of at least 25 – 50 %
- approval according to Pressure Equipment Directive 2014/68/EU
- durable epoxy resin coating
- with factory-pressurised gas chamber
- max. permissible system temperature 120 °C

	Type	Art. No. grey	DG	PQ [pce]	Inlet pressure [bar]	Connection c	Ø d [mm]	Height h [mm]	Depth D [mm]	Depth D2 [mm]	Weight [kg]
3 bar 70 °C	C 8	8280000	0017	96	1,00	G ½"	280	296	176	52	2,71
	C 12	8280100	0017	60	1,00	G ½"	354	370	182	64	3,65
	C 18	8280200	0017	42	1,00	G ¾"	356	370	236	76	4,38
	C 25	8280300	0017	42	1,00	G ¾"	409	427	253	93	5,10
	C 35	8280400	0017	24	1,00	G ¾"	480	465	256	97	6,55
	C 50	8280500	0017	20	1,50	G ¾"	480	465	332	125	8,00
	C 80	8280600	0017	8	1,50	G ¾"	634	621	338	135	15,70

Cap valve

- secured shut-off for maintenance and disassembly of expansion vessels
- with drainage
- according to DIN EN 12828
- 10 bar / 120 °C



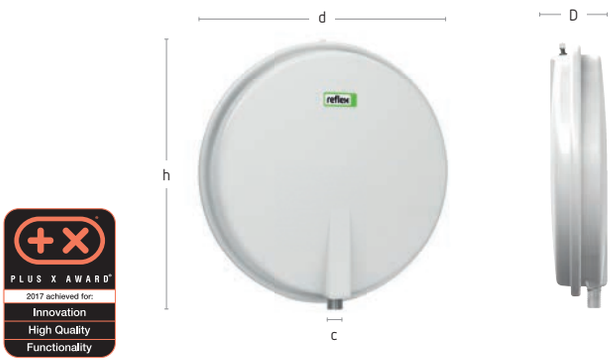
Digital pressure gauge

- inlet pressure tester up to about 9 bar



Type	Art. No.	DG	Weight [kg]
Cap valve SU R ¾" × ¾"	7613000	0084	0,26
Digital pressure gauge	9119198	0086	0,06

Reflex F



F 8 l



F 12 – 24 l

PLUS X AWARD®
2017 achieved for:
Innovation
High Quality
Functionality

Technical Features

- flat vessel for closed heating and cooling systems, especially for installation in boilers
- with threaded connections
- from 18 litres, with mounting lug
- non-replaceable diaphragm according to DIN EN 13831
- max. permissible operating temperature 70 °C
- for antifreeze additive of at least 25 – 50 %
- approval according to Pressure Equipment Directive 2014/68/EU
- durable epoxy resin coating
- with factory-pressurised gas chamber
- max. permissible system temperature 120 °C
- Reflex F 8 vessel recognised with the Plus X-Award

	Type	Art. No. white	DG	PQ [pce]	Inlet pressure [bar]	Connection c	Ø d [mm]	Height h [mm]	Width w [mm]	Depth D [mm]	Depth D2 [mm]	Weight [kg]
3 bar 70 °C	F 8	2407000	0015	54	0,75	G ⅜"	389	389	350	88	72	4,15
	F 12	2211900	0015	36	1,00	G ½"	–	444	350	108	81	6,60
	F 15	2215500	0015	36	1,00	G ¾"	–	444	350	134	97	7,12
	F 18	2218300	0015	28	1,00	G ¾"	–	444	350	158	109	7,70
	F 24	2219000	0015	25	1,00	G ¾"	–	444	350	180	120	9,10

Cap valve

- secured shut-off for maintenance and disassembly of expansion vessels
- with drainage
- according to DIN EN 12828
- 10 bar / 120 °C



Digital pressure gauge

- inlet pressure tester up to about 9 bar



Type	Art. No.	DG	Weight [kg]
Cap valve SU R ¾" × ¾"	7613000	0084	0,26
Digital pressure gauge	9119198	0086	0,06

This product follows **new transport guidelines for expansion vessels.**
→ For the according article number see page <?>

Reflex G

CE



G 100 – 500 l



G 600 – 1.000 l



G 1.000 (Ø1,000) – 2.000 l



G 3.000 – 5.000 l

Technical Features

- for closed heating and cooling systems
- upright configuration
- connections:
  → up to 1.000 l / Ø 740 mm with threaded connections
  → from 1.000 l / Ø 1.000 mm with flange connections DN 65 / PN 6 or DN 65 / PN 16
- replaceable bladder according to DIN EN 13831
- max. permissible operating temperature 70 °C
- for antifreeze additive of at least 25 – 50 %
- approval according to Pressure Equipment Directive 2014 / 68 / EU
- the following types are equipped with a diaphragm break detector coupling:
  → 6 bar
  → 10 bar
  → 16 bar
- with inspection opening (from 1.000 litres with Ø 1.000 mm)
- pressure gauge and supply pressure valve protected by clip
- durable epoxy resin coating
- with factory-pressurised gas chamber
- max. permissible system temperature 120 °C

This product follows **new transport guidelines for expansion vessels.**
→ For the according article number see page <?>

Reflex G

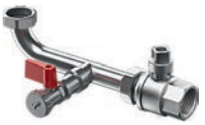
CE

	Type	Art. No. grey	DG	PQ [pce]	Inlet pressure [bar]	Connection c	Ø d [mm]	Height h [mm]	Height h2 [mm]	Weight [kg]
6 bar 70 °C	G 100	8519000	0021	4	3,50	G1"	480	850	145	14,80
	G 200	8519100	0021	4	3,50	G 1¼"	634	967	144	36,00
	G 300	8519200	0021	1	3,50	G 1¼"	634	1.267	144	45,00
	G 400	8521605	0021	1	3,50	G1"	740	1.276	146	53,00
	G 500	8521705	0021	1	3,50	G1"	740	1.494	146	56,00
	G 600	8522605	0021	1	3,50	G1"	740	1.739	146	74,00
	G 800	8523610	0021	1	2,00	G1"	740	2.186	149	98,00
	G 1000/740	8546605	0021	1	2,00	G1"	740	2.593	146	150,00
	G 1000/1000	8524605	0022	1	2,00	DN 65/PN 6	1.000	1.973	307	228,00
	G 1500	8526605	0022	1	2,00	DN 65/PN 6	1.200	1.971	305	280,00
	G 2000	8527605	0022	1	2,00	DN 65/PN 6	1.200	2.451	291	300,00
	G 3000	8544605	0022	1	2,00	DN 65/PN 6	1.500	2.490	334	620,00
	G 4000	8529605	0022	1	2,00	DN 65/PN 6	1.500	3.065	334	770,00
	G 5000	8530605	0022	1	2,00	DN 65/PN 6	1.500	3.598	334	849,00
10 bar 70 °C	G 100	8518000	0021	4	3,50	G1"	480	850	146	14,80
	G 200	8518100	0021	4	3,50	G 1¼"	634	966	144	36,00
	G 300	8518200	0021	1	3,50	G 1¼"	634	1.267	144	45,00
	G 400	8521005	0021	1	3,50	G 1¼"	740	1.275	133	59,00
	G 500	8521006	0021	1	3,50	G 1¼"	740	1.494	133	68,00
	G 600	8522006	0021	1	3,50	G 1½"	740	1.859	263	143,00
	G 800	8523005	0021	1	2,00	G 1½"	740	2.324	263	166,00
	G 1000/740	8546005	0021	1	2,00	G 1½"	740	2.804	263	190,00
	G 1000/1000	8524005	0022	1	2,00	DN 65/PN 16	1.000	2.001	286	335,00
	G 1500	8526005	0022	1	2,00	DN 65/PN 16	1.200	1.991	291	390,00
	G 2000	8527005	0022	1	2,00	DN 65/PN 16	1.200	2.451	291	528,50
	G 3000	8544005	0022	1	2,00	DN 65/PN 16	1.500	2.542	320	830,00
	G 4000	8529005	0022	1	2,00	DN 65/PN 16	1.500	3.117	320	1.120,00
	G 5000	8530005	0022	1	2,00	DN 65/PN 16	1.500	3.652	320	1.274,00
16 bar 70 °C	G 100	8518400	0021	1	3,50	DN 25/PN 16	480	992	231	31,00
	G 200	8518500	0021	1	3,50	DN 25/PN 16	634	1.088	221	57,00
	G 300	8518600	0021	1	3,50	DN 25/PN 16	634	1.392	221	67,00
	G 400	8510206	0021	1	3,50	DN 40/PN 16	740	1.373	198	110,00
	G 500	8518700	0021	1	3,50	DN 40/PN 16	740	1.618	197	130,00
	G 600	8522007	0021	1	3,50	DN 40/PN 16	740	1.871	198	158,00
	G 800	8523906	0021	1	2,00	DN 40/PN 16	740	2.336	198	221,00
	G 1000/740	8546906	0021	1	2,00	DN 40/PN 16	740	2.804	201	260,00
	G 1000/1000	8524205	0022	1	2,00	DN 65/PN 16	1.000	2.031	276	468,00
	G 1500	8526305	0022	1	2,00	DN 65/PN 16	1.200	2.021	281	650,00
	G 2000	8527100	0022	1	2,00	DN 65/PN 16	1.200	2.481	281	731,00
	G 3000	8544705	0022	1	2,00	DN 65/PN 16	1.500	2.550	310	960,00
	G 4000	8529405	0022	1	2,00	DN 65/PN 16	1.500	3.110	310	1.450,00
	G 5000	8529705	0022	1	2,00	DN 65/PN 16	1.500	3.645	310	1.636,00

Reflex G Accessories

CE

AG connection set



- for rapid assembly and maintenance of membrane expansion vessels
- incl. secured shut-off and connecting bend with screw connection
- with drainage cock (G ½") and hose nozzle
- according to DIN EN 12828
- 10 bar / 100 °C

Digital pressure gauge



- inlet pressure tester up to about 9 bar

Bladder rupture detector



- membrane rupture detector in vessels
- consisting of an electrode relay and an electrode (factory fitted)
- power supply 230 V / 50 Hz
- floating output (changeover contact)

Type	Art. No.	DG	Weight [kg]
AG connection set AG 1"	9119204	0080	0,85
AG connection set AG 1¼"	9119205	0080	1,00
AG connection set AG 1½"	9119206	0080	1,15
Bladder rupture detector MBM II	7857700	0086	0,62
Digital pressure gauge	9119198	0086	0,06

Reflex SL



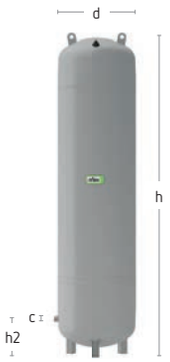
SL 180 l



SL 220 l



SL 280 l



SL 320 l

Technical Features

- the footprint of Reflex SL vessels corresponds to the footprint and usable capacity of the OTTO Expansomats, making a direct exchange possible
- for closed heating and cooling systems
- slim, space-saving vessel
- non-replaceable diaphragm according to DIN EN 13831
- with factory-pressurised gas chamber
- durable epoxy resin coating
- with threaded connections
- for antifreeze additive of at least 25 – 50 %
- max. permissible operating overpressure 6 bar
- max. permissible operating temperature 70 °C
- max. permissible system temperature 120 °C

	Type	Art. No. grey	DG	PQ [pce]	Inlet pressure [bar]	Connection c	Ø d [mm]	Height h [mm]	Height h2 [mm]	Weight [kg]
6 bar 70 °C	SL 180	8200200	0020	1	1,50	G1"	480	1.156	214	27,38
	SL 220	8200250	0020	1	1,50	G1"	480	1.386	214	33,34
	SL 280	8200300	0020	1	1,50	G1"	480	1.716	214	41,82
	SL 320	8200350	0020	1	1,50	G1"	480	1.946	214	47,78

Cap valve

- secured shut-off for maintenance and disassembly of expansion vessels
- with drainage
- according to DIN EN 12828
- 10 bar / 120 °C



Digital pressure gauge

- inlet pressure tester up to about 9 bar



Type	Art. No.	DG	Weight [kg]
Cap valve SU R 1" × 1"	7613100	0084	0,57
Digital pressure gauge	9119198	0086	0,06

This product follows **new transport guidelines for expansion vessels.**
→ For the according article number see page <?>

Reflex S



S 2 – 33 l



S 50 – 250 l



S 300 – 600 l

Technical Features

- for solar, heating and cooling systems
- with threaded connections
- 33 litres with brackets, from 50 litres with adjustable feets
- for antifreeze additive of at least 25 – 50 %
- up to 33 litres non-replaceable bladder, non-replaceable diaphragm for 50 – 600 litres
- max. permissible operating temperature 70 °C
- approval according to Pressure Equipment Directive 2014/68/EU
- durable epoxy resin coating
- with factory-pressurised gas chamber
- max. permissible system temperature 120 °C

	Type	Art. No.		DG	PQ	Inlet pressure	Connection c	Ø d	Height h	Height h2	Weight
		grey	white		[pce]	[bar]		[mm]	[mm]	[mm]	[kg]
10 bar 70 °C	S 2	8707700	–	0014	200	0,50	G ¾"	132	260	–	0,98
	S 8	8703900	9702600	0014	96	1,50	G ¾"	206	332	–	1,80
	S 12	8704000	9702700	0014	60	1,50	G ¾"	280	300	–	2,16
	S 18	8704100	9702800	0014	56	1,50	G ¾"	280	409	–	2,95
	S 25	8704200	9702900	0014	42	1,50	G ¾"	280	518	–	3,68
	S 33	8706200	9706300	0014	24	1,50	G ¾"	354	455	–	4,80
	S 50	8209500	–	0019	20	3,00	R ¾"	415	468	158	8,02
	S 80	8210300	–	0019	12	3,00	R 1"	486	565	170	11,30
	S 100	8210500	–	0019	10	3,00	R 1"	486	667	165	12,90
	S 140	8211500	–	0019	10	3,00	R 1"	486	886	172	19,20
	S 200	8213400	–	0019	4	3,00	R 1"	640	758	205	28,00
	S 250	8214400	–	0019	4	3,00	R 1"	640	888	205	32,00
	S 300	8215400	–	0019	1	3,00	R 1"	640	1.092	235	38,00
	S 400	8219000	–	0019	1	3,00	R 1"	746	1.102	245	55,00
	S 500	8219100	–	0019	1	3,00	R 1"	746	1.321	245	72,00
	S 600	8219200	–	0019	1	3,00	R 1"	746	1.559	245	80,00

Reflex S Accessories

CE

Cap valve

- secured shut-off for maintenance and disassembly of expansion vessels
- with drainage
- according to DIN EN 12828
- 10 bar / 120 °C



Digital pressure gauge

- inlet pressure tester up to about 9 bar



Wall-hung console with multi-connections

- console with multi-connections for Reflex 8 – 25 litres
- With vessel connection



Wall mounting bracket with clamping strap

- console with clamping strap for Reflex 6 – 25 litres
- upright assembly



Type	Art. No.	DG	Weight [kg]
Cap valve SU R ¾" × ¾"	7613000	0084	0,26
Cap valve SU R 1" × 1"	7613100	0084	0,57
Digital pressure gauge	9119198	0086	0,06
Wall-hung console with multi-connections	7612000	0075	0,90
Wall mounting bracket with clamping strap	7611000	0075	0,22

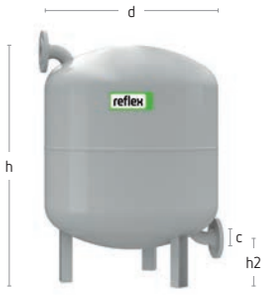
Reflex V



V 6 – 20



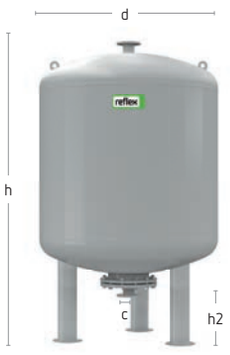
V 40 – 60



V 200 – 350



V 500 – 750



V 1.000 – 2.000



V 3.000 – 5.000

Technical Features

- auxiliary vessel without membrane
- approval according to Pressure Equipment Directive 2014/68/EU
- from V 40 with feet
- required for systems with return temperatures greater than the maximum permissible operating temperature of the diaphragm expansion vessel or in cooling systems with temperatures less than the maximum permissible operating temperature of the diaphragm expansion vessel
- can also be used as a buffer storage tank
- special vessel >10 bar / > 110 °C available upon request
- durable epoxy resin coating

Reflex V

CE

	Type	Art. No. grey	DG	PQ [pce]	Connection c	Ø d [mm]	Height h [mm]	Height h2 [mm]	Weight [kg]
6 bar 110 °C	V 500	8852803	0024	1	DN 40/PN 6	750	1.652	208	160,00
	V 750	8851801	0024	1	DN 40/PN 6	750	2.273	208	205,00
	V 1000	8851908	0024	1	DN 65/PN 6	1.000	2.020	305	310,00
	V 1500	8852306	0024	1	DN 65/PN 6	1.200	2.020	305	405,10
	V 2000	8852408	0024	1	DN 65/PN 6	1.200	2.478	305	545,00
	V 3000	8852506	0024	1	DN 65/PN 6	1.500	2.537	337	775,00
	V 4000	8853406	0024	1	DN 65/PN 6	1.500	3.112	337	1.060,00
	V 5000	8854806	0024	1	DN 65/PN 6	1.500	3.648	337	1.095,00
10 bar 110 °C	V 6	8303100	0024	96	R ¾"	206	244	–	1,60
	V 12	8303200	0024	56	R ¾"	280	244	–	2,56
	V 20	8303300	0024	56	R ¾"	280	360	–	3,28
	V 40	8303400	0024	20	R 1"	409	562	113	9,75
	V 60	8303500	0024	12	R 1"	409	732	172	12,40
	V 200	8303600	0024	4	DN 40/PN 16	634	901	142	35,25
	V 300	8303700	0024	1	DN 40/PN 16	634	1.201	142	48,00
	V 350	8303800	0024	1	DN 40/PN 16	634	1.341	142	46,00
	V 500	8854807	0024	1	DN 40/PN 16	750	1.652	208	290,00
	V 750	8854808	0024	1	DN 40/PN 16	750	2.283	197	420,00
	V 1000	8854809	0024	1	DN 65/PN 16	1.000	2.055	286	560,00
	V 1500	8854810	0024	1	DN 65/PN 16	1.200	2.045	284	636,10
	V 2000	8854811	0024	1	DN 65/PN 16	1.200	2.505	284	940,00
	V 3000	8854812	0024	1	DN 65/PN 16	1.500	2.563	313	1.405,00
	V 4000	8854813	0024	1	DN 65/PN 16	1.500	3.138	313	1.930,00
	V 5000	8854814	0024	1	DN 65/PN 16	1.500	3.674	313	2.015,00

Cap valve

- secured shut-off for maintenance and disassembly of expansion vessels
- with drainage
- according to DIN EN 12828
- 10 bar / 120 °C



Wall mounting bracket with clamping strap

- console with clamping strap for Reflex 6 – 25 litres
- upright assembly



Type	Art. No.	DG	Weight [kg]
Cap valve SU R ¾" × ¾"	7613000	0084	0,26
Cap valve SU R 1" × 1"	7613100	0084	0,57
Wall mounting bracket with clamping strap	7611000	0075	0,22

Refix

Quick selection table for Refix — according to the nominal volume V_n

Cold water inlet temperature: 10 °C / Storage temperature: 60 °C

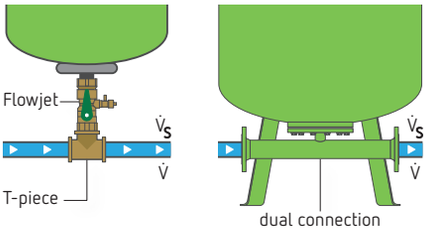
	Gas inlet pressure p_0 [bar]	3,0				4,0 = standard			
	Pressure reducer set-point pressure p_a [bar]	≥ 3,2				≥ 4,2			
	Safety Valve p_{SV} [bar]	6	7	8	10	6	7	8	10
	V_{sp} [litres]	V_n [litres]							
Refix	90	8	8	8	8	8	8	8	8
	100	8	8	8	8	12	8	8	8
	120	8	8	8	8	12	8	8	8
	130	8	8	8	8	12	8	8	8
	150	8	8	8	8	18	12	8	8
	180	12	8	8	8	18	12	8	8
	200	12	12	8	8	18	12	12	8
	250	12	12	12	8	25	18	12	12
	300	18	18	12	12	25	18	18	12
	400	25	18	18	18	33	33	15	25
	500	25	25	18	18	60	33	25	25
	600	33	25	25	18	60	60	33	25
	700	33	33	25	25	60	60	33	25
	800	60	33	33	25	80	80	60	25
	900	60	60	33	25	80	60	60	33
	1.000	60	60	33	33	100	60	60	60
	1.500	80	80	60	60	200	100	80	60
	2.000	100	100	80	80	200	200	100	80
	3.000	100	100	100	100	300	200	200	100

Quick selection table for Refix — according to peak volumetric flow $\dot{V}_S$

Cold water inlet temperature: 10 °C / Storage temperature: 60 °C

	available connections		recommended max. peak volume flow $\dot{V}_S$*	actual pressure loss at volume flow $\dot{V}$
Refix DD 8 – 33 l	with or without Flowjet	Rp ¾" = standard	≤ 2,5 m³/h	$\Delta p = 0{,}03\,\text{bar} \times \left(\frac{\dot{V}\,\text{m}^3/\text{h}}{2{,}5\,\text{m}^3/\text{h}}\right)^2$
	passing T-piece	Rp 1" (on-site)	≤ 4,2 m³/h	negligible
Refix DT 60 – 500 l	with Flowjet Rp 1 ¼"		≤ 7,2 m³/h	$\Delta p = 0{,}04\,\text{bar} \times \left(\frac{\dot{V}\,\text{m}^3/\text{h}}{2{,}5\,\text{m}^3/\text{h}}\right)^2$
Refix DT 80 – 3.000 l	dual connection DN 50		≤ 15 m³/h	$\Delta p = 0{,}14\,\text{bar} \times \left(\frac{\dot{V}\,\text{m}^3/\text{h}}{2{,}5\,\text{m}^3/\text{h}}\right)^2$
	dual connection DN 65		≤ 27 m³/h	$\Delta p = 0{,}11\,\text{bar} \times \left(\frac{\dot{V}\,\text{m}^3/\text{h}}{2{,}5\,\text{m}^3/\text{h}}\right)^2$
	dual connection DN 80		≤ 36 m³/h	negligible
	dual connection DN 100		≤ 56 m³/h	negligible
Refix DE, Refix DC	(no medium circulating)		unlimited	Δp = 0

* determined for a speed of 2 m/s



After the nominal volume of the Refix has been selected, a check as to whether the peak volumetric flow $\dot{V}_S$ (resulting from a tube network analysis according to DIN 1988 norm) can be realised at the Refix must be made with the medium circulating in the vessels.

If this is the case, then a 60 litre Refix DT must be used at the Refix DD instead of a 8–33 litre vessel to ensure a greater flow.

This product follows **new transport guidelines for expansion vessels.**
→ For the according article number see page <?>

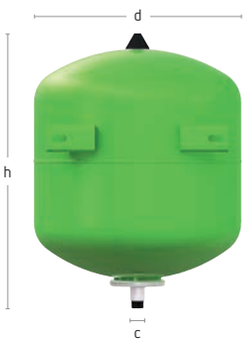
Refix DD



DD 2 – 25 l



Flowjet–flow through valve
Includes Rp ¾ T-piece (for DD 8–33 l)



DD 33 l with brackets (rear view)

Technical Features

- for potable water, pressure-rising and water-heating systems according to DIN 1988
- with stainless steel thread connection
- 33 litres with brackets
- circulation with high-flow circulation star
- non-replaceable bladder according to DIN EN 13831, DIN 4807 T5, KTW-C and W270
- built and tested to DIN 4807 T5, DIN DVGW Reg. No. NW-0411AT2534 (applicable for 8 – 33 litres and 10/16 bar in combination with Flowjet flow through valve)
- approval according to Pressure Equipment Directive 2014/68/EU
- interior and exterior coating in compliance with KTW-A
- may be combined with the Flowjet — flow through valve
- with factory-pressurised gas chamber
- vessels certified to WRAS and ACS upon request
- **only for use in cold water pipes** (consider installation and operating instructions)

	Type	Art. No.		DG	PQ	Inlet pressure	Connection c	Ø d	Height h	Weight
		green	white		[pce]	[bar]		[mm]	[mm]	[kg]
10 bar 70 °C	DD 2	7381500	–	0048	288	4,00	G ¾"	132	269	1,00
	DD 8	7308000	7307700	0048	96	4,00	G ¾"	206	352	2,00
	DD 12	7308200	7307800	0048	60	4,00	G ¾"	280	319	2,20
	DD 18	7308300	7307900	0048	56	4,00	G ¾"	280	426	3,04
	DD 25	7308400	7380400	0048	42	4,00	G ¾"	280	528	4,18
	DD 33	7380700	7380800	0048	24	4,00	G ¾"	354	468	5,10
16 bar 70 °C	DD 8	7301905	–	0048	96	4,00	G ¾"	206	345	2,40
	DD 12	7303805	–	0048	60	4,00	G ¾"	280	318	2,96
25 bar 70 °C	DD 8	7290200	7290300	0048	60	4,00	G ¾"	206	344	3,50

Refix DD Accessories

CE

Flowjet



- secured shut-off fitting with drain for Refix DD to DIN 4807 T5
- max. permissible operating overpressure 16 bar
- max. permissible operating temperature 70 °C
- connections both sides ¾", internal/ external threads
- may be combined with user-provided T-pieces
- nominal passage width: 1"

Wall mounting bracket with clamping strap



- console with clamping strap for Reflex 6 – 25 litres
- upright assembly

Digital pressure gauge



- inlet pressure tester up to about 9 bar

Type	Art. No.	DG	Weight [kg]
Flowjet G ¾"	9116799	0085	0,24
Digital pressure gauge	9119198	0086	0,06
Wall mounting bracket with clamping strap	7611000	0075	0,22

This product follows **new transport guidelines for expansion vessels.**
→ For the according article number see page <?>

Refix DT



DT 60 – 500 l (with Flowjet)



DT 600 – 1.000 l (Ø740)



DT 1.000 (Ø1000) – 2.000 l



DT 3.000 l

Technical Features

- for potable water, pressure-rising and water-heating systems according to DIN 1988
- Flowjet incl. shut-off and draining or dual connection
- replaceable bladder according to DIN EN 13831, DIN 4807 T5, KTW-C and W270, built and tested to DIN 4807 T5, DIN DVGW Reg. No. NW-0411BR0350
- approval according to Pressure Equipment Directive 2014/68/EU
- interior and exterior coating in compliance with KTW-A
- the following types are equipped with a diaphragm break detector coupling:
  → 10 bar
  → 16 bar
- pressure gauge and supply pressure valve protected by clip
- with factory-pressurised gas chamber
- vessels certified to WRAS and ACS upon request
- **only for use in cold water pipes** (consider installation and operating instructions)

This product follows **new transport guidelines for expansion vessels.**
→ For the according article number see page <?>

Refix DD Accessories

CE

	Type	Art. No. green	DG	PQ [pce]	Inlet pressure [bar]	Connection c	Ø d [mm]	Height h [mm]	Height h2 [mm]	Weight [kg]
10 bar 70 °C	DT 60	7309000	0047	12	4,00	Rp 1¼"	409	766	80	13,10
	DT 80	7309100	0047	8	4,00	Rp 1¼"	480	750	56	17,00
	DT 80	7365000	0047	8	4,00	DN 50/PN 16	480	750	97	22,20
	DT 80	7335705	0047	4	4,00	DN 65/PN 16	480	750	107	24,70
	DT 80	7335805	0047	4	4,00	DN 80/PN 16	480	750	115	26,80
	DT 100	7309200	0047	8	4,00	Rp 1¼"	480	834	56	17,00
	DT 100	7365400	0047	8	4,00	DN 50/PN 16	480	834	97	22,90
	DT 100	7365405	0047	4	4,00	DN 65/PN 16	480	834	107	23,90
	DT 100	7365406	0047	4	4,00	DN 80/PN 16	480	834	114	26,70
	DT 200	7309300	0047	4	4,00	Rp 1¼"	634	973	80	37,00
	DT 200	7365100	0047	4	4,00	DN 50/PN 16	634	973	105	53,00
	DT 200	7365105	0047	4	4,00	DN 65/PN 16	634	973	115	54,00
	DT 200	7365106	0047	4	4,00	DN 80/PN 16	634	973	120	57,00
	DT 300	7309400	0047	1	4,00	Rp 1¼"	634	1.273	80	51,00
	DT 300	7365200	0047	1	4,00	DN 50/PN 16	634	1.273	105	59,00
	DT 300	7336305	0047	1	4,00	DN 65/PN 16	634	1.273	115	60,00
	DT 300	7336405	0047	1	4,00	DN 80/PN 16	634	1.273	120	63,00
	DT 400	7319305	0047	1	4,00	Rp 1¼"	740	1.245	69	61,00
	DT 400	7365500	0047	1	4,00	DN 50/PN 16	740	1.245	95	68,00
	DT 400	7336505	0047	1	4,00	DN 65/PN 16	740	1.245	105	68,00
	DT 400	7336605	0047	1	4,00	DN 80/PN 16	740	1.245	110	83,00
	DT 500	7309500	0047	1	4,00	Rp 1¼"	740	1.475	69	69,00
	DT 500	7365300	0047	1	4,00	DN 50/PN 16	740	1.475	90	77,00
	DT 500	7365307	0047	1	4,00	DN 65/PN 16	740	1.475	100	89,00
	DT 500	7365305	0047	1	4,00	DN 80/PN 16	740	1.475	110	92,00
	DT 600	7365600	0047	1	4,00	DN 50/PN 16	740	1.859	233	150,00
	DT 600	7336705	0047	1	4,00	DN 65/PN 16	740	1.859	233	165,00
	DT 600	7336806	0047	1	4,00	DN 80/PN 16	740	1.859	235	153,00
	DT 800	7365700	0047	1	2,00	DN 50/PN 16	740	2.324	233	204,00
	DT 800	7336905	0047	1	2,00	DN 65/PN 16	740	2.324	233	205,00
	DT 800	7337006	0047	1	2,00	DN 80/PN 16	740	2.324	233	208,00
	DT 1000/740	7365800	0047	1	2,00	DN 50/PN 16	740	2.804	233	260,00
	DT 1000/740	7337105	0047	1	2,00	DN 65/PN 16	740	2.804	233	261,00
	DT 1000/740	7337205	0047	1	2,00	DN 80/PN 16	740	2.804	233	264,00
	DT 1000/1000	7320105	0046	1	2,00	DN 65/PN 16	1.000	2.001	160	386,20
	DT 1000/1000	7337305	0046	1	2,00	DN 80/PN 16	1.000	2.001	150	386,20
	DT 1000/1000	7337405	0046	1	2,00	DN 100/PN 16	1.000	2.001	140	386,20
	DT 1500	7320305	0046	1	2,00	DN 65/PN 16	1.200	2.001	158	502,40
	DT 1500	7337505	0046	1	2,00	DN 80/PN 16	1.200	2.001	150	444,30
	DT 1500	7337605	0046	1	2,00	DN 100/PN 16	1.200	2.001	140	502,40
	DT 2000	7320505	0046	1	2,00	DN 65/PN 16	1.200	2.461	158	686,50
	DT 2000	7337705	0046	1	2,00	DN 80/PN 16	1.200	2.461	150	686,50
	DT 2000	7337805	0046	1	2,00	DN 100/PN 16	1.200	2.461	140	686,50
	DT 3000	7320705	0046	1	2,00	DN 65/PN 16	1.500	2.580	187	1.054,00
	DT 3000	7337905	0046	1	2,00	DN 80/PN 16	1.500	2.530	180	1.057,00
	DT 3000	7338005	0046	1	2,00	DN 100/PN 16	1.500	2.530	170	1.057,00

This product follows **new transport guidelines for expansion vessels.**
→ For the according article number see page <?>

Refix DD Accessories

CE

	Type	Art. No. green	DG	PQ [pce]	Inlet pressure [bar]	Connection c	Ø d [mm]	Height h [mm]	Height h2 [mm]	Weight [kg]
16 bar 70 °C	DT 80	7316005	0047	8	4,00	Rp 1¼"	480	750	56	27,80
	DT 80	7370000	0047	8	4,00	DN 50/PN 16	480	750	97	33,00
	DT 80	7310306	0047	4	4,00	DN 65/PN 16	480	750	107	29,10
	DT 80	7310307	0047	4	4,00	DN 80/PN 16	480	750	114	36,00
	DT 100	7365408	0047	2	4,00	Rp 1¼"	480	834	56	29,90
	DT 100	7370100	0047	4	4,00	DN 50/PN 16	480	834	97	35,00
	DT 100	7370101	0047	4	4,00	DN 65/PN 16	480	834	107	36,00
	DT 100	7370102	0047	4	4,00	DN 80/PN 16	480	834	114	38,00
	DT 200	7365108	0047	1	4,00	Rp 1¼"	634	973	80	55,00
	DT 200	7370200	0047	1	4,00	DN 50/PN 16	634	973	105	55,00
	DT 200	7370205	0047	1	4,00	DN 65/PN 16	634	973	115	56,00
	DT 200	7370206	0047	1	4,00	DN 80/PN 16	634	973	120	59,00
	DT 300	7319205	0047	1	4,00	Rp 1¼"	634	1.273	115	64,00
	DT 300	7370300	0047	1	4,00	DN 50/PN 16	634	1.273	105	70,00
	DT 300	7314205	0047	1	4,00	DN 65/PN 16	634	1.273	80	71,00
	DT 300	7314206	0047	1	4,00	DN 80/PN 16	634	1.273	120	71,00
	DT 400	7370400	0047	1	4,00	DN 50/PN 16	740	1.394	235	115,00
	DT 400	7339006	0047	1	4,00	DN 65/PN 16	740	1.394	235	117,00
	DT 400	7339005	0047	1	4,00	DN 80/PN 16	740	1.394	235	124,00
	DT 500	7370500	0047	1	4,00	DN 50/PN 16	740	1.615	235	136,00
	DT 500	7370507	0047	1	4,00	DN 65/PN 16	740	1.615	235	137,00
	DT 500	7370505	0047	1	4,00	DN 80/PN 16	740	1.615	235	140,00
	DT 600	7370600	0047	1	4,00	DN 50/PN 16	740	1.859	235	174,00
	DT 600	7339105	0047	1	4,00	DN 65/PN 16	740	1.859	235	175,00
	DT 600	7339205	0047	1	4,00	DN 80/PN 16	740	1.859	235	178,00
	DT 800	7370700	0047	1	2,00	DN 50/PN 16	740	2.324	235	224,00
	DT 800	7339305	0047	1	2,00	DN 65/PN 16	740	2.324	235	208,00
	DT 800	7339406	0047	1	2,00	DN 80/PN 16	740	2.324	235	228,00
	DT 1000/740	7370800	0047	1	2,00	DN 50/PN 16	740	2.804	235	275,00
	DT 1000/740	7339505	0047	1	2,00	DN 65/PN 16	740	2.804	235	276,00
	DT 1000/740	7339605	0047	1	2,00	DN 80/PN 16	740	2.804	235	248,00
	DT 1000/1000	7320205	0046	1	2,00	DN 65/PN 16	1.000	2.001	160	488,00
	DT 1000/1000	7339705	0046	1	2,00	DN 80/PN 16	1.000	2.001	150	488,00
	DT 1000/1000	7339805	0046	1	2,00	DN 100/PN 16	1.000	2.001	140	488,00
	DT 1500	7320405	0046	1	2,00	DN 65/PN 16	1.200	2.220	158	630,00
	DT 1500	7339905	0046	1	2,00	DN 80/PN 16	1.200	2.220	150	630,00
	DT 1500	7340005	0046	1	2,00	DN 100/PN 16	1.200	2.220	140	630,00
	DT 2000	7320605	0046	1	2,00	DN 65/PN 16	1.200	2.480	158	850,50
	DT 2000	7340105	0046	1	2,00	DN 80/PN 16	1.200	2.480	150	850,50
	DT 2000	7340205	0046	1	2,00	DN 100/PN 16	1.200	2.480	140	850,50
	DT 3000	7320805	0046	1	2,00	DN 65/PN 16	1.500	2.580	187	1.240,00
	DT 3000	7340305	0046	1	2,00	DN 80/PN 16	1.500	2.580	180	1.240,00
	DT 3000	7340405	0046	1	2,00	DN 100/PN 16	1.500	2.580	170	1.200,00

Refix DT Accessories

CE

Bladder rupture detector

- membrane rupture detector in vessels
- consisting of an electrode relay and an electrode (factory fitted)
- power supply 230 V / 50 Hz
- floating output (changeover contact)



Digital pressure gauge

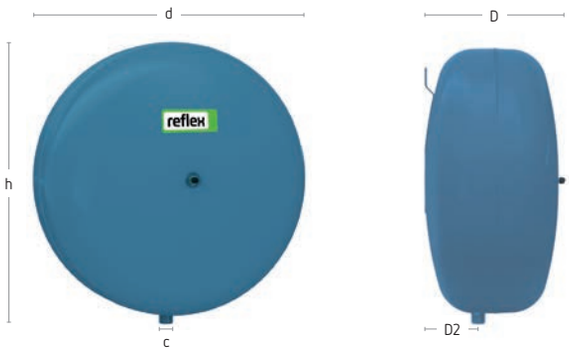
- inlet pressure tester up to about 9 bar



Type	Art. No.	DG	Weight [kg]
Bladder rupture detector MBM II	7857700	0086	0,62
Digital pressure gauge	9119198	0086	0,06

This product follows **new transport guidelines for expansion vessels.**
→ For the according article number see page <?>

Refix C-DE



C-DE 8 – 80 l

Technical Features

- vertical flat disc-shaped shallow vessels for heating, heat pump, cooling and solar applications as well as service water applications **not** required to meet the DIN 1988 requirements
- with stainless steel thread connection
- non-replaceable bladder according to DIN EN 13831
- no medium circulating, without shut-off
- parts in contact with water are corrosion-protected
- approval according to Pressure Equipment Directive 2014/68/EU
- for antifreeze additive of at least 25 – 50 %
- durable epoxy resin coating
- with factory-pressurised gas chamber

	Type	Art. No. blue	DG	PQ [pce]	Inlet pressure [bar]	Connection c	Ø d [mm]	Height h [mm]	Depth D [mm]	Depth D2 [mm]	Weight [kg]
10 bar 70 °C	C-DE 8	7270900	0017	96	4,00	G ½"	280	296	176	52	3,84
	C-DE 12	7270910	0017	60	4,00	G ½"	354	370	182	64	4,92
	C-DE 18	7270920	0017	42	4,00	G ¾"	356	370	236	76	5,82
	C-DE 25	7270930	0017	42	4,00	G ¾"	409	427	253	93	8,78
	C-DE 35	7270940	0017	24	4,00	G ¾"	480	465	256	97	12,90
	C-DE 50	7270950	0017	20	4,00	G ¾"	480	465	332	125	16,24
	C-DE 80	7270960	0017	8	4,00	G ¾"	634	621	338	135	23,36

Cap valve

- secured shut-off for maintenance and disassembly of expansion vessels
- with drainage
- according to DIN EN 12828
- 10 bar / 120 °C



Digital pressure gauge

- inlet pressure tester up to about 9 bar



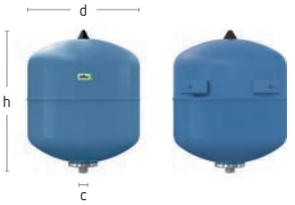
Type	Art. No.	DG	Weight [kg]
Cap valve SU R ¾" × ¾"	7613000	0084	0,26
Digital pressure gauge	9119198	0086	0,06

This product follows **new transport guidelines for expansion vessels.**
→ For the according article number see page <?>

Refix DE



DE 2 – 25 l



DE 33 l



DE 33 – 500 l



DE 600 – 1.000 l (Ø740)



DE 1.000 – 2.000 l (Ø1000)



DE 3.000 – 5.000 l

Technical Features

- only for systems **not** required to meet DIN 1988, such as fire-fighting and service water systems, underfloor heating and geothermal installations
- parts in contact with water are corrosion-protected
- bladder according to DIN EN 13831/ replaceable from 50 litres
- for antifreeze additive of at least 25 – 50 %
- no medium circulating, without shut-off and without draining
- the following types incl. pressure gauge:
  → 10/16 bar: from Ø 1.000 mm
  → 25 bar: from Ø 450 mm
- pressure gauge and supply pressure valve protected by clip
- approval according to Pressure Equipment Directive 2014/68/EU
- durable epoxy resin coating
- with factory-pressurised gas chamber
- vessels certified to WRAS and ACS upon request
- the following types are equipped with a diaphragm break detector coupling:
  → 10/16 bar: ≥ 1.000 l/Ø 1.000 mm
  → 25 bar: ≥ 80 l

This product follows **new transport guidelines for expansion vessels.**
→ For the according article number see page <?>

Refix DE

CE

	Type	Art. No. blue	DG	PQ [pce]	Inlet pressure [bar]	Connection c	Ø d [mm]	Height h [mm]	Height h2 [mm]	Weight [kg]
10 bar 70 °C	DE 2	7200300	0040	200	4,00	G ¾"	132	260	–	1,02
	DE 8	7301000	0040	96	4,00	G ¾"	206	332	–	1,96
	DE 12	7302000	0040	60	4,00	G ¾"	280	310	–	2,42
	DE 18	7303000	0040	56	4,00	G ¾"	280	407	–	3,30
	DE 25	7304000	0040	42	4,00	G ¾"	280	518	–	4,12
	DE 33	7303900	0040	24	4,00	G ¾"	354	457	–	4,92
	DE 33 st*	7305500	0040	24	4,00	G ¾"	354	520	66	5,76
	DE 50	7306005	0042	20	4,00	G1"	409	604	102	8,92
	DE 60	7306400	0042	12	4,00	G1"	409	734	161	10,48
	DE 80	7306500	0042	10	4,00	G1"	480	737	143	12,96
	DE 100	7306600	0042	10	4,00	G1"	480	852	143	14,70
	DE 200	7306700	0042	4	4,00	G 1¼"	634	967	150	35,00
	DE 300	7306800	0042	1	4,00	G 1¼"	634	1.267	150	44,00
	DE 400	7306850	0042	1	4,00	G 1¼"	740	1.245	139	58,00
	DE 500	7306900	0042	1	4,00	G 1¼"	740	1.475	133	68,00
	DE 600	7306950	0042	1	4,00	G 1½"	740	1.859	263	139,00
	DE 800	7306960	0042	1	2,00	G 1½"	750	2.324	263	171,00
	DE 1000	7306970	0042	1	2,00	G 1½"	740	2.804	261	210,00
	DE 1000	7311405	0044	1	2,00	DN 65/PN 16	1.000	2.001	286	308,00
	DE 1500	7311605	0044	1	2,00	DN 65/PN 16	1.200	1.991	291	426,00
	DE 2000	7311705	0044	1	2,00	DN 65/PN 16	1.200	2.451	291	693,50
	DE 3000	7311805	0044	1	2,00	DN 65/PN 16	1.500	2.531	320	962,00
	DE 4000	7354000	0044	1	2,00	DN 65/PN 16	1.500	3.080	320	1.132,00
	DE 5000	7354200	0044	1	2,00	DN 65/PN 16	1.500	3.645	320	1.292,00
16 bar 70 °C	DE 8	7301006	0040	96	4,00	G ¾"	206	337	–	2,44
	DE 12	7302105	0040	60	4,00	G ¾"	280	310	–	2,90
	DE 25	7304015	0040	42	4,00	G ¾"	280	518	–	5,00
	DE 80	7348600	0042	4	4,00	G1"	480	744	138	20,50
	DE 100	7348610	0042	4	4,00	G1"	480	849	132	23,50
	DE 200	7348620	0042	1	4,00	G 1¼"	634	967	150	48,00
	DE 300	7348630	0042	1	4,00	G 1¼"	634	1.267	150	60,00
	DE 400	7348640	0042	1	4,00	G 1½"	740	1.394	263	118,00
	DE 500	7348650	0042	1	4,00	G 1½"	740	1.614	263	127,00
	DE 600	7348660	0042	1	4,00	G 1½"	740	1.859	263	151,00
	DE 800	7348670	0042	1	2,00	G 1½"	740	2.324	263	195,00
	DE 1000	7348680	0042	1	2,00	G 1½"	740	2.804	263	240,00
	DE 1000	7312805	0044	1	2,00	DN 65/PN 16	1.000	2.001	286	530,00
	DE 1500	7312905	0044	1	2,00	DN 65/PN 16	1.200	1.991	291	685,00
	DE 2000	7313005	0044	1	2,00	DN 65/PN 16	1.200	2.451	291	895,00
	DE 3000	7313105	0044	1	2,00	DN 65/PN 16	1.500	2.531	320	1.240,00
	DE 4000	7354100	0044	1	2,00	DN 65/PN 16	1.500	3.120	320	1.442,00
	DE 5000	7354300	0044	1	2,00	DN 65/PN 16	1.500	3.655	320	1.844,00

* oB = without feet
st = vertical design with feet

This product follows **new transport guidelines for expansion vessels.**
→ For the according article number see page <?>

Refix DE

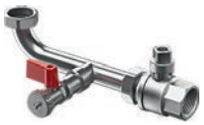
CE

	Type	Art. No. blue	DG	PQ [pce]	Inlet pressure [bar]	Connection c	Ø d [mm]	Height h [mm]	Height h2 [mm]	Weight [kg]
25 bar 70 °C	DE 8	7290100	0040	60	4,00	G ¾"	206	338	–	3,52
	DE 80	7317600	0044	1	4,00	DN 50/PN 40	450	942	159	70,00
	DE 120	7313700	0044	1	4,00	DN 50/PN 40	450	1.253	159	108,00
	DE 180	7313500	0044	1	4,00	DN 50/PN 40	450	1.528	159	124,00
	DE 300	7313800	0044	1	4,00	DN 50/PN 40	750	1.318	160	243,00
	DE 400	7313300	0044	1	4,00	DN 50/PN 40	750	1.423	160	258,00
	DE 600	7321500	0044	1	4,00	DN 50/PN 40	750	1.868	159	290,00
	DE 800	7321200	0044	1	2,00	DN 50/PN 40	750	2.268	159	355,00
	DE 1000	7321000	0044	1	2,00	DN 50/PN 40	750	2.768	159	245,00
	DE 1000	7322200	0044	1	2,00	DN 65/PN 40	1.000	2.051	242	800,00
	DE 1500	7322100	0044	1	2,00	DN 65/PN 40	1.200	2.071	291	850,00
	DE 2000	7313400	0044	1	2,00	DN 65/PN 40	1.200	2.531	240	960,00
	DE 3000	7345700	0044	1	2,00	DN 65/PN 40	1.500	2.619	269	1.550,00

Refix DE Accessories

CE

AG connection set



- for rapid assembly and maintenance of membrane expansion vessels
- incl. secured shut-off and connecting bend with screw connection
- with drainage cock (G ½") and hose nozzle
- according to DIN EN 12828
- 10 bar / 100 °C

Cap valve



- secured shut-off for maintenance and disassembly of expansion vessels
- with drainage
- according to DIN EN 12828
- 10 bar / 120 °C

Bladder rupture detector



- membrane rupture detector in vessels
- consisting of an electrode relay and an electrode (factory fitted)
- power supply 230 V / 50 Hz
- floating output (changeover contact)

Digital pressure gauge



- inlet pressure tester up to about 9 bar

Wall mounting bracket with clamping strap



- console with clamping strap for Reflex 6 – 25 litres
- upright assembly

Type	Art. No.	DG	Weight [kg]
AG connection set AG 1"	9119204	0080	0,85
AG connection set AG 1 ¼"	9119205	0080	1,00
AG connection set AG 1 ½"	9119206	0080	1,15
Cap valve SU R ¾" × ¾"	7613000	0084	0,26
Cap valve SU R 1" × 1"	7613100	0084	0,57
Bladder rupture detector MBM II	7857700	0086	0,62
Digital pressure gauge	9119198	0086	0,06
Wall mounting bracket with clamping strap	7611000	0075	0,22

This product follows **new transport guidelines for expansion vessels.**
→ For the according article number see page <?>

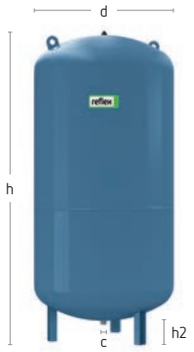
Refix DC



DC 25 l



DC 50 – 400 l



DC 500 – 600 l

Technical Features

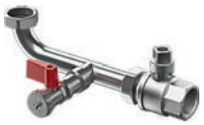
- only for systems **not** required to meet DIN 1988, such as fire-fighting and service water systems, underfloor heating and geothermal installations
- parts in contact with water are corrosion-protected
- for antifreeze additive of at least 25 – 50 %
- non-replaceable diaphragm according to DIN EN 13831
- no medium circulating, without shut-off & without draining
- approval according to Pressure Equipment Directive 2014/68/EU
- durable epoxy resin coating
- with factory-pressurised gas chamber
- vessels certified to WRAS and ACS upon request

	Type	Art. No. blue	DG	PQ [pce]	Inlet pressure [bar]	Connection c	Ø d [mm]	Height h [mm]	Height h2 [mm]	Weight [kg]
10 bar 70 °C	DC 25	7200400	0054	42	2,00	G1"	289	510	–	3,34
	DC 50	7309600	0054	20	4,00	R 1"	418	588	115	9,20
	DC 80	7309700	0054	12	4,00	R 1"	489	676	103	12,82
	DC 100	7309800	0054	10	4,00	R 1"	489	782	103	14,28
	DC 140	7309900	0054	8	4,00	R 1"	489	997	104	20,30
	DC 200	7363500	0054	4	4,00	R 1"	643	883	91	29,30
	DC 300	7363600	0054	1	4,00	R 1"	643	1.184	93	38,00
	DC 400	7363700	0054	1	4,00	R 1"	749	1.173	81	54,00
	DC 500	7363800	0054	1	4,00	R 1"	749	1.392	82	63,00
	DC 600	7363900	0054	1	4,00	R 1"	749	1.629	75	80,00

Refix DC Accessories

CE

AG connection set



- for rapid assembly and maintenance of membrane expansion vessels
- incl. secured shut-off and connecting bend with screw connection
- with drainage cock (G ½") and hose nozzle
- according to DIN EN 12828
- 10 bar / 120 °C

Cap valve



- secured shut-off for maintenance and disassembly of expansion vessels
- with drainage
- according to DIN EN 12828
- 10 bar / 120 °C

Digital pressure gauge



- inlet pressure tester up to about 9 bar

Wall mounting bracket with clamping strap

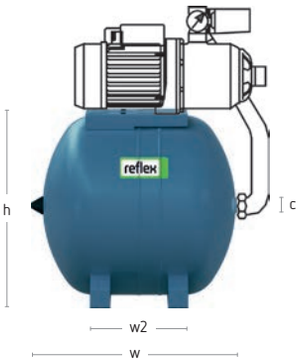


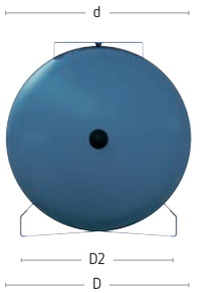
- console with clamping strap for Reflex 6 – 25 litres
- upright assembly

Type	Art. No.	DG	Weight [kg]
AG connection set AG 1"	9119204	0080	0,85
Cap valve SU R 1" × 1"	7613100	0084	0,57
Digital pressure gauge	9119198	0086	0,06
Wall mounting bracket with clamping strap	7611000	0075	0,22

Refix HW







HW 25 – 100 l

Technical Features

- as a buffer vessel for domestic water systems not subject to the DIN 1988 requirements
- parts in contact with water are corrosion-protected
- bladder according to DIN EN 13831/replaceable from 50 litres
- max. permissible operating temperature 70 °C
- approval according to Pressure Equipment Directive 2014/68/EU
- durable epoxy resin coating
- with factory-pressurised gas chamber
- vessels certified to WRAS and ACS upon request

	Type	Art. No. blue	DG	PQ [pce]	Inlet pressure [bar]	Connection c	Ø d [mm]	Height h [mm]	Width w [mm]	Wide w2 [mm]	Depth D [mm]	Depth D2 [mm]	Weight [kg]
10 bar 70 °C	HW 25	7200310	0049	36	1,50	G ¾"	280	301	518	227	270	214	5,05
	HW 50	7200320	0049	16	2,00	G1"	409	432	503	175	350	285	9,00
	HW 60	7200330	0049	16	2,00	G1"	409	432	577	175	350	285	10,00
	HW 80	7200340	0049	16	2,00	G1"	480	504	593	185	350	285	12,50
	HW 100	7200350	0049	16	2,00	G1"	480	504	706	305	350	285	14,06

Digital pressure gauge

- inlet pressure tester up to about 9 bar

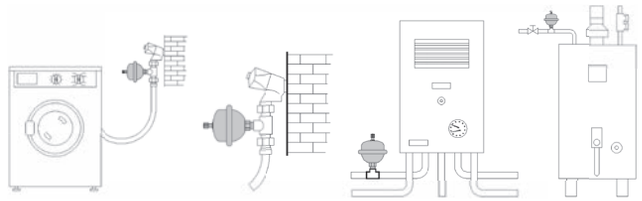


Type	Art. No.	DG	Weight [kg]
Digital pressure gauge	9119198	0086	0,06

This product follows **new transport guidelines for expansion vessels.**
→ For the according article number see page <?>

Refix WD





WD 0,165 l

Technical Features

- for appliances with quick-closing fittings such as washers and dishwashers
- parts in contact with water are corrosion-protected
- approval according to Pressure Equipment Directive 2014/68/EU
- total volume 165 cm^3
- non-replaceable diaphragm according to DIN EN 13831
- max. permissible operating temperature 70 °C
- vessels certified to WRAS and ACS upon request

	Type	Art. No. white	DG	PQ [pce]	Inlet pressure [bar]	Connection c	Ø d [mm]	Height h [mm]	Weight [kg]
10 bar 70 °C	WD	7351000	0074	576	3,50	G ½"	83	111	0,28

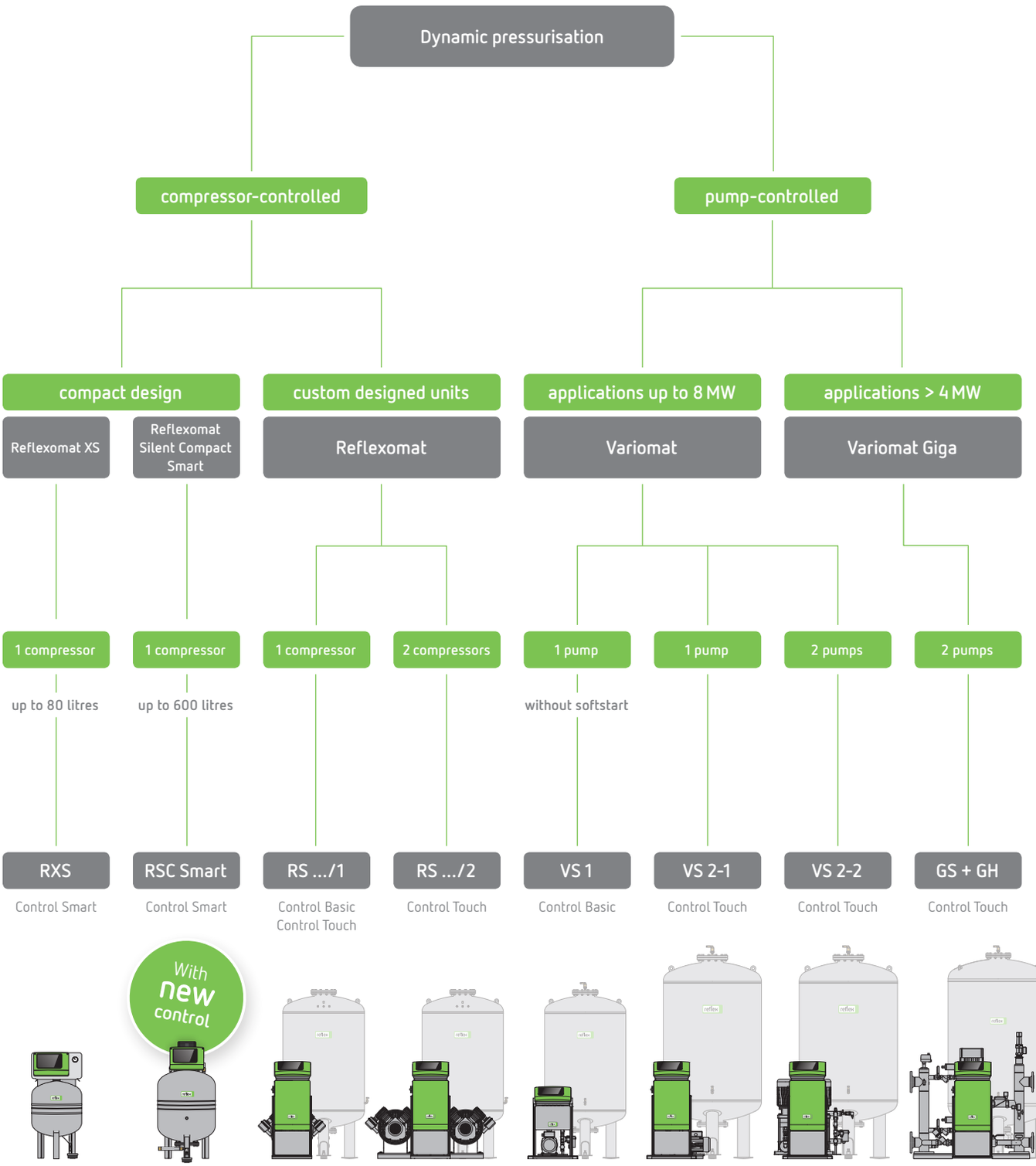
Digital pressure gauge

- inlet pressure tester up to about 9 bar



Type	Art. No.	DG	Weight [kg]
Digital pressure gauge	9119198	0086	0,06

Pressurisation systems



Reflex Control systems

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

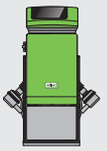
- access via Bluetooth interface
- quick and easy commissioning
- parameterisation of the degassing mode (continuous or intermittent operation, number of cycles) including days of the week and time
- fault message display
- system pressure checking
- software updates for the system control
- maintenance and troubleshooting wizard
- currently available for **Reflexomat XS, Reflexomat Silent Compact Smart, Fillcontrol Smart, Servitec Mini, Servitec S** and **Reflex Greenbox**

Now available
for Android and iOS

Theoretical principles

Reflexomat — combination matrix

Reflexomat

RS control unit	RG primary vessel
	

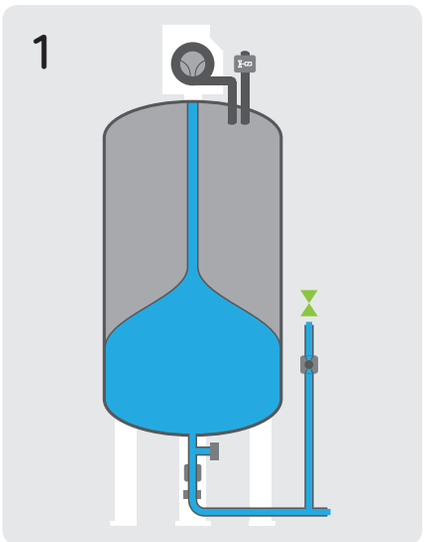
+ Accessories

Reflexomat design

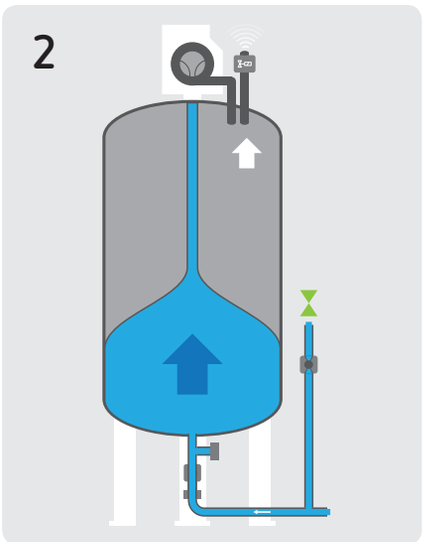


1. Control unit
   The state-of-the-art functioning and design of the controller ensure optimal operating convenience. All Reflex controllers (Variomat, Reflexomat, Servitec) are designed to meet uniform design guidelines.
2. Vessel
   Available in 6 and 10 bar versions. Higher pressure ratings available upon request.
3. Membrane
   Replaceable bladder from high-quality material reliably protects the expansion water against air ingress.
4. Air safety valve
   Protects the vessel against impermissible over pressure and prevents exceeding of the highest permissible operating pressure.
5. Lifting eyes
   Transport aid (from 1.000 l)
6. Corrosion protection
   Inner coating as long-term corrosion protection.
7. MBM II membrane rupture detector
   Reliable monitoring of the membrane state.
8. Flexible connection set
   Ensures optimal working of the pressure load cell (level measurement).
9. Pressure load cell (level measurement)
   for determining the filling level

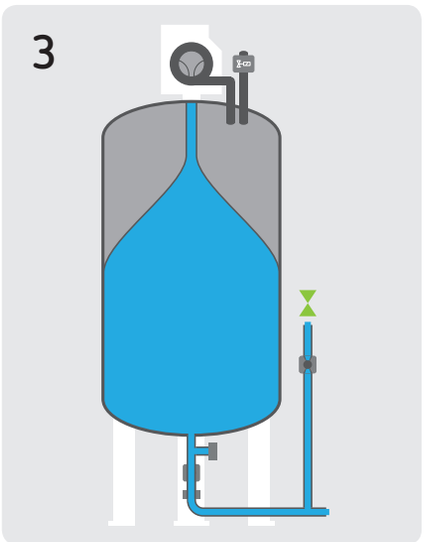
Reflexomat — operating principle in heating



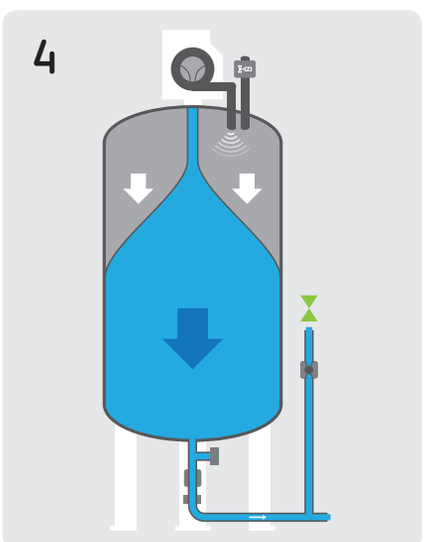
1. Low temperature
   The Reflexomat is fed the minimum amount of water at the lowest system temperature.



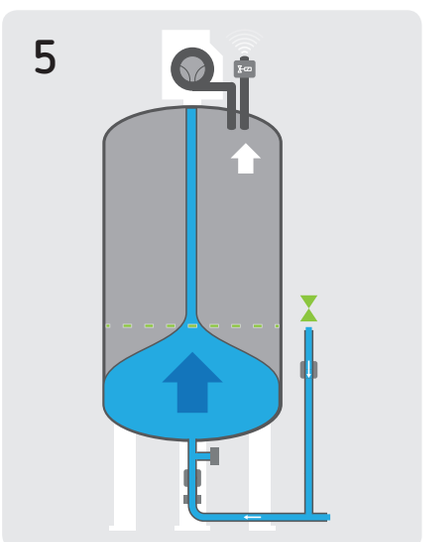
2. Temperature increase
   If the system temperature and thus also the pressure rises, then the controller responds immediately and opens the discharge solenoid valve. The expansion water can then be taken up by the vessel.



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



4. Cool down
   If the system cools down, then the system pressure drops and the Reflexomat uses the compressor to feed the expansion water back into the system. Maximum pressure fluctuation is ±0,1 bar.



5. Water make-up
   If the water content in the vessel falls below the defined target value, then the Reflexomat opens the water make-up valve (optional accessory) automatically to compensate for the loss of water in the system.

Video clips demonstrating the function of this and other products are available under

www.youtube.com/@ReflexWinkelmann UnitedKingdom

Reflexomat

Reflexomat XS



Reflexomat XS



Reflexomat XS – with a wide range of pre-installed digital functions

Technical Features

- compressor-controlled pressurisation system with a compact design for heating- and cold water systems according to EN 12828
- approval according to Pressure Equipment Directive 2014/68/EU
- diaphragm according to DIN EN 13831 norm
- ingress protection rating IP 54
- max. permissible operating overpressure
- power supply 230 V/50 Hz
- max. permissible operating temperature (at the membrane) 70 °C
- permissible ambient temperature 0 – 45 °C
- sound pressure level ~ 57 dB(A)
- automatic water make-up via Fillvalve possible
- max. perm. safety temperature in the system 110 °C
- **Control Smart controller** via Bluetooth with numerous digital functions:
  → Integrated p_0 wizard for ideal commissioning
  → RS-485 interface and factory-fitted Modbus RTU
  → Operating assistant for fault diagnosis, commissioning, service and maintenance

	Type	Art. No. grey	DG	Connection c	Electric power [kW]	Ø d [mm]	Height h [mm]	Height h2 [mm]	Weight [kg]
6 bar 70 °C	XS	8800100	0031	G1"	0,25	480	1.016	153	28,00

Reflexomat XS accessories

CE

Commissioning



- **7945725**: Reflex commissioning Cat. 3 for Reflexomat Silent Compact/Reflexomat XS/Servitec Mini/Servitec S with one compressor/ one pump or Reflex Hydroflow freshwater station and Reflex Greenbox
- **7945726**: Reflex commissioning add. Cat. 3 for each additional system at the same location and on the same day – one compressor/one pump

Cap valve



- secured shut-off for maintenance and disassembly of expansion vessels
- with drainage
- according to DIN EN 12828
- 10 bar/120 °C

Solenoid valve



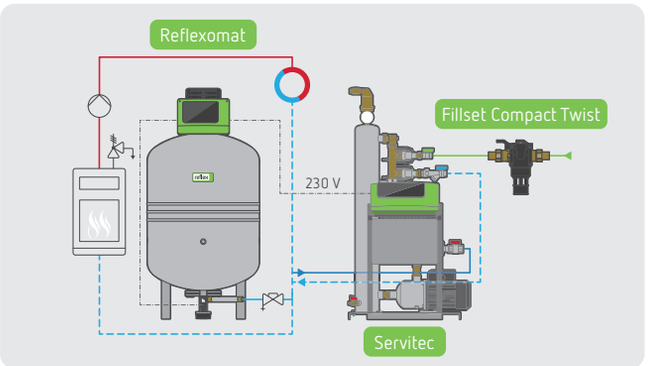
- solenoid and ball valve
- for automatic water make-up with Reflexomat

Type	Art. No.	DG	Weight [kg]
Commissioning Cat. 3	7945725	0095	–
Commissioning add. Cat. 3	7945726	0095	–
Cap valve SU R 1" × 1"	7613100	0084	0,57
Solenoid valve Fillvalve	7858300	0035	0,95

Reflexomat Silent Compact Smart



Reflexomat Silent Compact Smart



Reflexomat in combination with Servitec degassing and Fillset make-up

Technical Features

- compressor-controlled pressurisation system with a compact design for heating- and cold water systems according to EN 12828
- approval according to Pressure Equipment Directive 2014/68/EU
- bladder (Butyl) according to requirement VDI/BTGA 6044
- sleeve for optional membrane rupture detector
- ingress protection rating IP 54
- max. permissible operating overpressure 6 bar
- power supply 230 V/50 Hz
- max. permissible operating temperature (at the membrane) 70 °C
- permissible ambient temperature 0 – 40 °C
- sound pressure level ~ 59 dB(A)
- **Control Smart controller** via Bluetooth with numerous digital functions:
  → Integrated p_0 wizard for ideal commissioning
  → RS-485 interface and factory-fitted Modbus RTU
  → Operating assistant for fault diagnosis, commissioning, service and maintenance
- automatic water make-up via Fillvalve possible
- max. perm. safety temperature in the system 110 °C

	Type	Art. No. grey	DG	Connection c	Electric power [kW]	Ø d [mm]	Height h [mm]	Height h2 [mm]	Weight [kg]
6 bar 70 °C	RSC Smart 200	8810200	0031	G1"	0,80	634	1.223	118	52,40
	RSC Smart 300	8810300	0031	G1"	0,80	634	1.523	118	60,40
	RSC Smart 400	8810400	0031	G1"	0,80	740	1.509	103	74,00
	RSC Smart 500	8810500	0031	G1"	0,80	740	1.729	103	84,40
	RSC Smart 600	8810600	0031	G1"	0,80	740	2.130	103	96,00

Smart Controller with many digital wizards



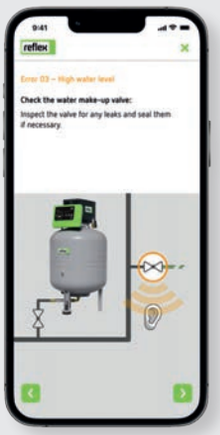
Digital Display
Displays the volume level, the operating pressure and possible error codes, thus ensuring a rapid overview of the most important system parameters.



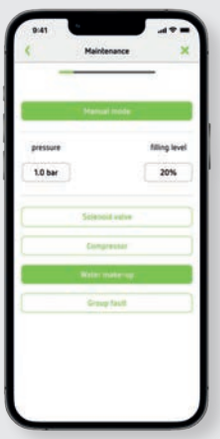
Commissioning Wizard
Guides you through commissioning step-by-step, including initial filling instructions and parameter checks.



Troubleshooting Wizard
Shows possible sources of errors in detail with images and guides you through troubleshooting with explanations.



Maintenance Wizard
Makes maintenance easier because the technician is guided step-by-step through the maintenance measures.



Reflex Control Smart App
Now available
for Android and iOS

Reflexomat Silent Compact Smart accessories

Commissioning

- **7945725**: Reflex commissioning Cat. 3 for Reflexomat Silent Compact / Reflexomat XS / Servitec Mini / Servitec S with one compressor / one pump or Reflex Hydroflow freshwater station and Reflex Greenbox
- **7945726**: Reflex commissioning add. Cat. 3 for each additional system at the same location and on the same day – one compressor / one pump

Cap valve



- secured shut-off for maintenance and disassembly of expansion vessels
- with drainage
- according to DIN EN 12828
- 10 bar / 120 °C

Solenoid valve



- solenoid and ball valve
- for automatic water make-up with Reflexomat

Bladder rupture detector



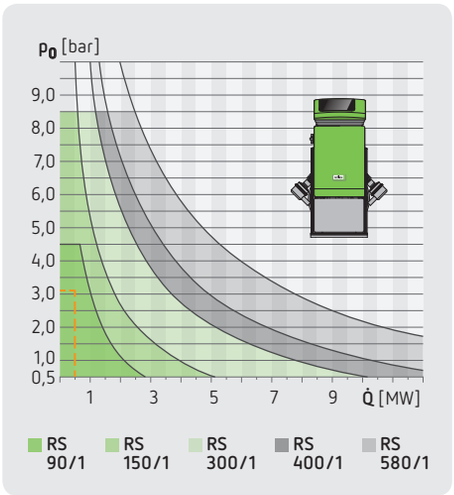
- membrane rupture detector in vessels
- consisting of an electrode relay and an electrode (factory fitted)
- power supply 230 V / 50 Hz
- floating output (changeover contact)

Type	Art. No.	DG	Weight [kg]
Commissioning Cat. 3	7945725	0095	–
Commissioning add. Cat. 3	7945726	0095	–
Cap valve SU R 1" × 1"	7613100	0084	0,57
Solenoid valve Fillvalve	7858300	0035	0,95
Bladder rupture detector MBM II	7857700	0086	0,62

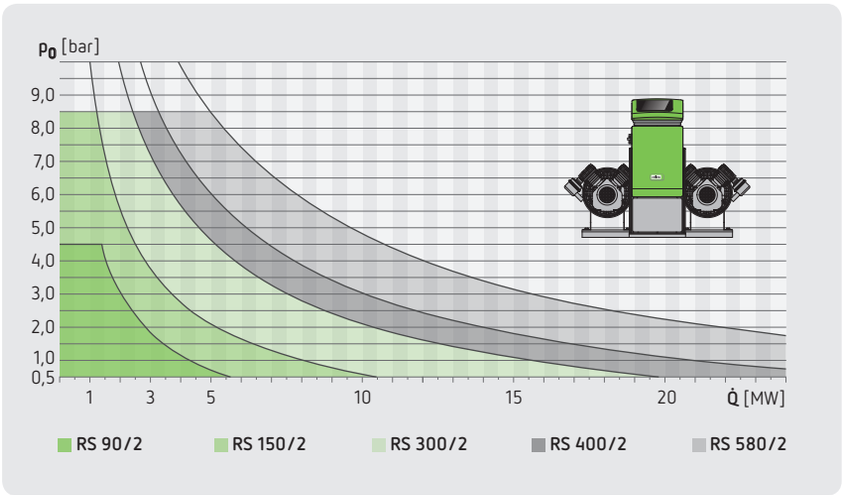
Reflexomat

Reflexomat control unit — quick selection

Minimum operating pressure p_0 dependent on the total heat output of the heat generator $\dot{Q}$ [MW]



Reflexomat with one compressor



Reflexomat with two compressors

Key data

Heat generator capacity	$\dot{Q}$	=	500 kW
Water content	V_A	=	5.000 l
Rated temperature	T	=	70/50 °C
Static height	H_{st}	=	30 m
Expansion coefficient	n	=	0.0228

Calculation

$$p_0 \geq \frac{H_{st}\,[m]}{10}\ \text{bar} + 0{,}2\ \text{bar}$$

$$p_0 \geq \frac{30}{10}\ \text{bar} + 0{,}2\ \text{bar} = 3{,}2\ \text{bar}$$

$$V_n \geq V_A \times 0.031\ (70\,°C)$$

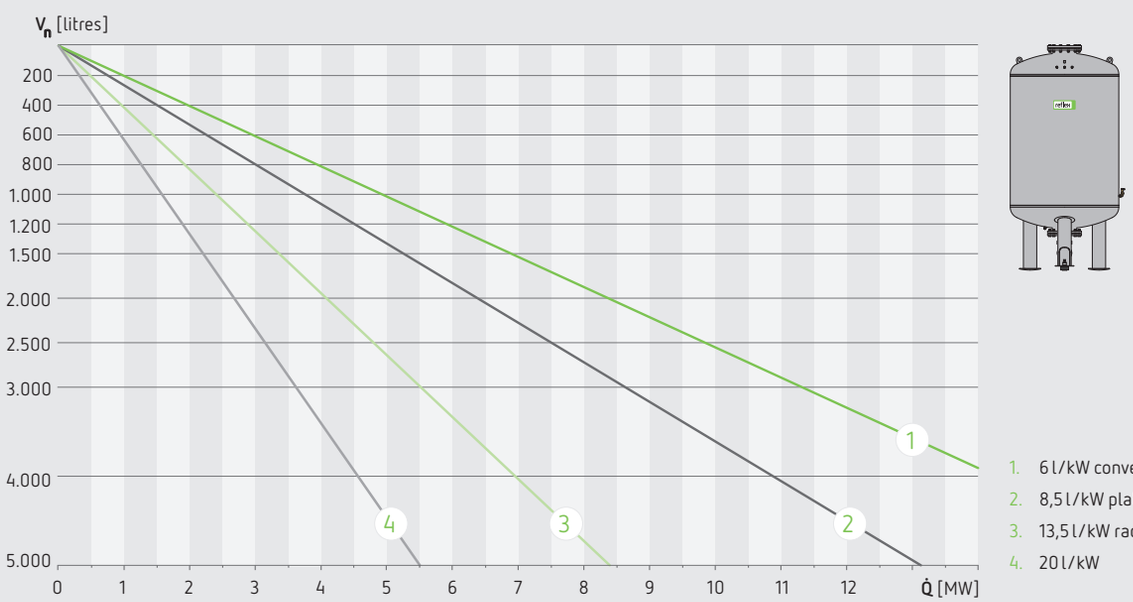
$$V_n \geq 5.000 \times 0.031\ (70\,°C) = 155\ \text{l}$$

Result

Control unit	**RS 90/1**
Expansion vessel 200 l	**RG 200**
SU operating valve	**R 1 × 1**

Example calculation

Reflexomat vessels — quick selection



1. 6 l/kW convectors
2. 8,5 l/kW plates/ventilation
3. 13,5 l/kW radiators
4. 20 l/kW

Reflexomat control units



Reflexomat Control Basic



Reflexomat Control Touch

Technical Features

- compressor-controlled pressurisation system for heating and cold water systems in accordance with EN 12828
- max. perm. safety temperature in the system 110 °C
- max. permissible operating temperature 90 °C
- permissible ambient temperature 0 – 45 °C
- ingress protection rating IP 54
- power supply 230 V / 400 V
- sound pressure level ~ 72 dB(A)
- 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.			DG	Electric connection	Electric power [kW]	Height h [mm]	Width w [mm]	Depth D [mm]	Weight [kg]
		6 bar	10 bar							
RS control unit with 1 compressor										
Control Basic										
RS 90/1 besides*	–	8882800	–	0033	230V/50Hz	0,75	683	470	550	25,00
Control Touch										
RS 90/1 T	–	8882900	–	0033	230V/50Hz	0,75	921	480	491	32,00
RS 150/1 T	–	8880311	8881311	0033	400V/50Hz	1,10	921	480	491	45,00
RS 300/1 T	–	8880411	8881411	0033	400V/50Hz	2,20	921	370	630	48,00
RS 400/1 T	–	8880511	8881511	0033	400V/50Hz	2,40	921	565	670	62,00
RS 580/1 T	–	8880611	8881611	0033	400V/50Hz	3,00	921	636	803	84,00
RS control unit with 2 compressors										
Control Touch										
RS 90/2 T	–	8883000	–	0033	230V/50Hz	1,50	921	498	550	45,00
RS 150/2 T	–	8883100	8883150	0033	400V/50Hz	2,20	921	580	510	60,00
RS 300/2 T	–	8884100	8884150	0033	400V/50Hz	4,40	921	1.000	752	90,00
RS 400/2 T	–	8885100	8885150	0033	400V/50Hz	4,80	921	1.230	792	131,00
RS 580/2 T	–	8886100	8886150	0033	400V/50Hz	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	–	–	0033	230V/50Hz	–	415	395	520	15,00
RS besides*	8881105	–	–	0033	230V/50Hz	–	690	395	345	15,00
Control Touch										
RS external air T*	8881400	–	–	0033	230V/50Hz	–	683	470	600	23,00

[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 l



RG 1.000 l

Technical Features

- replaceable bladder according to DIN EN 13831
- approval according to Pressure Equipment Directive 2014/68/EU
- max. permissible operating temperature (at the membrane) 70 °C
- max. perm. safety temperature in the system 110 °C

	Primary vessel				Secondary vessel							
	Type	Art. No.	DG	Height h2 [mm]	Type	Art. No.	DG	Height h2 [mm]	Connection c	Ø d [mm]	Height h [mm]	Weight [kg]
6 bar 70 °C	RG 200	8799100	0030	191	RF 200	8789100	0030	191	G1"	634	989	40,00
	RG 300	8799200	0030	191	RF 300	8789200	0030	191	G1"	634	1.289	60,70
	RG 400	8799300	0030	177	RF 400	8789300	0030	177	G1"	740	1.277	69,40
	RG 500	8799400	0030	177	RF 500	8789400	0030	177	G1"	740	1.497	78,70
	RG 600	8799500	0030	177	RF 600	8789500	0030	177	G1"	740	1.807	90,10
	RG 800	8799600	0030	177	RF 800	8789600	0030	177	G1"	740	2.272	110,30
	RG 1000	8650105	0032	190	RF 1000	8652005	0032	460	DN 65/PN 6	1.000	2.025	308,60
	RG 1500	8650305	0032	190	RF 1500	8652205	0032	460	DN 65/PN 6	1.200	2.020	328,00
	RG 2000	8650405	0032	190	RF 2000	8652305	0032	460	DN 65/PN 6	1.200	2.480	380,00
	RG 3000	8650605	0032	220	RF 3000	8652505	0032	490	DN 65/PN 6	1.500	2.480	795,00
	RG 4000	8650705	0032	220	RF 4000	8652605	0032	490	DN 65/PN 6	1.500	3.053	1.100,00
	RG 5000	8650805	0032	220	RF 5000	8652705	0032	490	DN 65/PN 6	1.500	3.588	1.115,00
10 bar 70 °C	RG 350	8654000	0030	196	RF 350	8654300	0030	196	DN 40/PN 16	750	1.340	230,00
	RG 500	8654100	0030	196	RF 500	8654400	0030	196	DN 40/PN 16	750	1.600	275,00
	RG 750	8654200	0030	182	RF 750	8654500	0030	182	DN 50/PN 16	750	2.179	345,00
	RG 1000	8651005	0032	168	RF 1000	8653005	0032	460	DN 65/PN 16	1.000	2.062	580,00
	RG 1500	8651205	0032	166	RF 1500	8653205	0032	460	DN 65/PN 16	1.200	2.054	492,10
	RG 2000	8651305	0032	166	RF 2000	8653305	0032	460	DN 65/PN 16	1.200	2.514	583,50
	RG 3000	8651505	0032	195	RF 3000	8653505	0032	490	DN 65/PN 16	1.500	2.532	987,00
	RG 4000	8651605	0032	195	RF 4000	8653605	0032	490	DN 65/PN 16	1.500	3.107	1.192,00
	RG 5000	8651705	0032	195	RF 5000	8653705	0032	490	DN 65/PN 16	1.500	3.642	1.286,00

Reflexomat accessories

Busmodule



- for exchanging data between controller and central building management system
- only bus modules type Ethernet and Profibus DP are suitable for a Control Basic controller

I/O module



- two additional analogue outputs for pressure and level control
- six freely programmable digital inlets
- six freely programmable floating outputs

Cap valve



- secured shut-off for maintenance and disassembly of expansion vessels
- with drainage
- according to DIN EN 12828
- 10 bar / 120 °C

Mounting bracket

- wall console for compressor and Basic controller

Solenoid valve



- solenoid and ball valve
- for automatic water make-up with Reflexomat

Bracket

- Reflex wall bracket for Control Basic controller and modules
- design in 90 ° and 115 ° inclination for optimum readability

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 and on the same day – one compressor / pump
- **7945630**: Reflex commissioning Cat. 2 for Reflexomat and Variomat with two compressors / pumps
- **7945721**: Reflex commissioning add. Cat. 2 for each additional system at the same location and on the same day – two compressors / pumps

Master-Slave

- software tool
- for the operation of up to 10 Reflexomat units in a hydraulic network at up to 1.000 m distance

Bladder rupture detector



- membrane rupture detector in vessels
- consisting of an electrode relay and an electrode (factory fitted)
- power supply 230 V / 50 Hz
- floating output (changeover contact)

Reflexomat accessories

CE

Type	Art. No.	DG	Weight [kg]
Busmodule			
Busmodule BACnet MS/TP Touch	8860600	0086	0,10
Busmodule BACnet-IP Touch	8860500	0086	0,40
Busmodule Ethernet	8860300	0086	1,90
Busmodule Modbus RTU Touch	9125592	0086	0,20
Busmodule Profibus DP	8860200	0086	3,00
Busmodule Profibus DP Touch	9118042	0086	0,10
Bracket			
Bracket 115°	8894510	0086	0,10
Bracket 90°	8894500	0086	0,10
I/O module			
I/O module RS	8858405	0035	1,00
Commissioning			
Commissioning Cat. 1	7945600	0095	–
Commissioning Cat. 2	7945630	0095	–
Commissioning add. Cat. 1	7945704	0095	–
Commissioning add. Cat. 2	7945721	0095	–
Cap valve			
Cap valve SU R 1" × 1"	7613100	0084	0,57
Mounting bracket			
Mounting bracket 90°	7881900	0035	4,50
Solenoid valve			
Solenoid valve Fillvalve	7858300	0035	0,95
Master-Slave			
Master-Slave	7859000	0035	0,10
Bladder rupture detector			
Bladder rupture detector MBM II	7857700	0086	0,62

Theoretical principles

Variomat — combination matrix

Variomat

VS control unit	Connection set	VG primary vessel
		

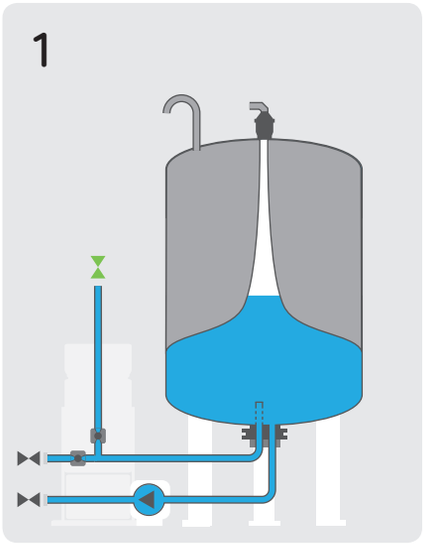
+ Accessories

Variomat design

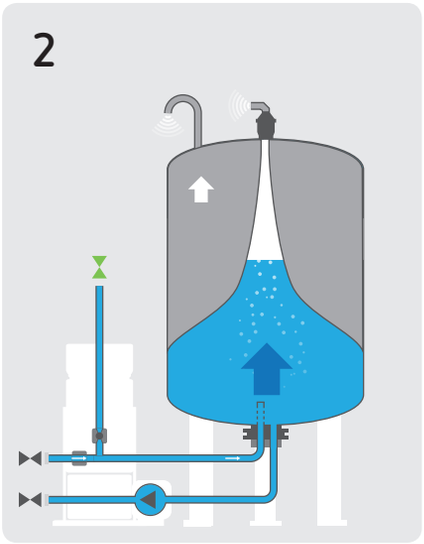


1. Control unit
   The state-of-the-art functioning and design of the controller ensure optimal operating convenience. All Reflex controllers (Variomat, Reflexomat, Servitec) are designed to meet uniform design guidelines.
2. Vessel
   Depressurised vessel
3. Membrane
   Replaceable bladder from high-quality material reliably protects the expansion water against air ingress.
4. Equalising bend
   Pressure equalisation between vessel and atmosphere.
5. Atmospheric degassing unit
   Expansion to atmospheric pressure causes the expansion water to be degassed.
6. Exvoid T
   Air separator with check valve
7. MBM II membrane rupture detector
   Reliable monitoring of the membrane state.
8. Flexible connection set
   Ensures optimal working of the pressure load cell (level measurement).
9. Pressure load cell (level measurement)
   for determining the filling level

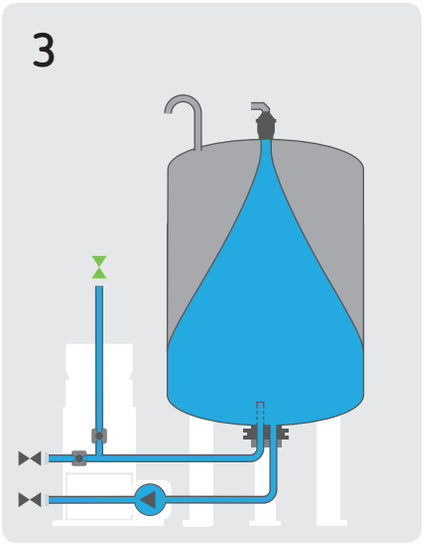
Variomat — operating principle in heating



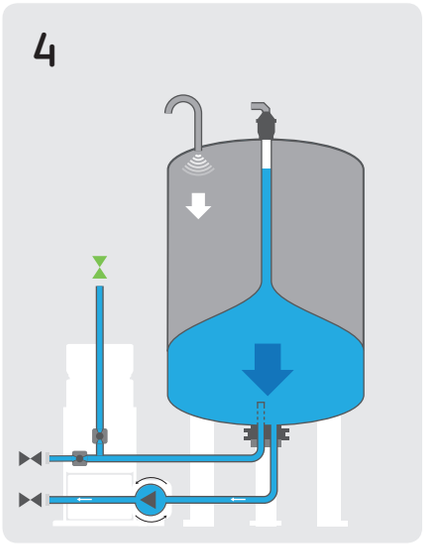
1. Low temperature
   The Variomat is fed the minimum amount of water at the lowest system temperature.



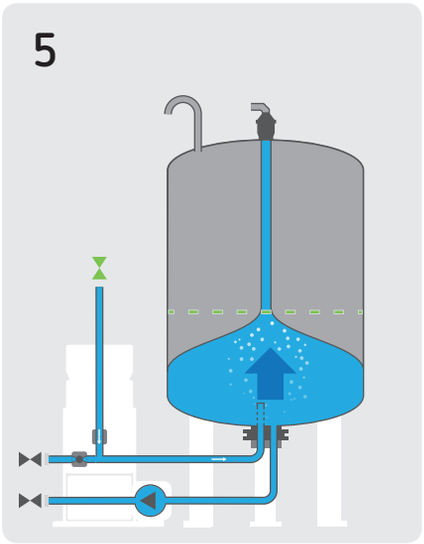
2. Temperature increase
   If the system temperature and thus also the pressure rises, then the controller responds immediately and opens the overflow. Expansion water flows into the de-pressurised vessel and is degassed due to the drop in pressure.



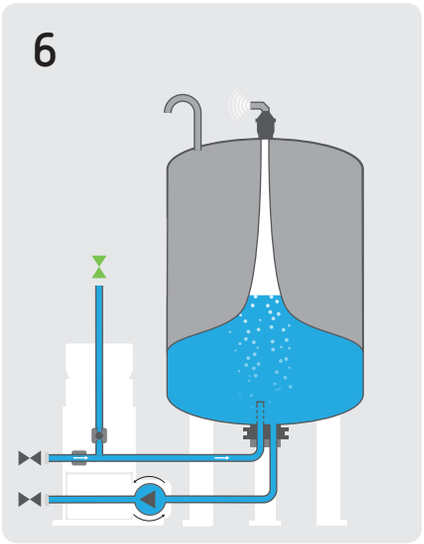
3. Full capacity
   At maximum system temperature the Variomat stores all the expansion water and reaches the maximum filling level in normal operation.



4. Cool down
   If the system cools down, then the system pressure drops and the Variomat uses the pump to feed the expansion water back into the system. Maximum pressure fluctuation is ±0,2 bar.



5. Water make-up
   If the water content in the vessel falls below the defined target value, then the Variomat opens the water make-up valve automatically to compensate for the loss of water in the system.

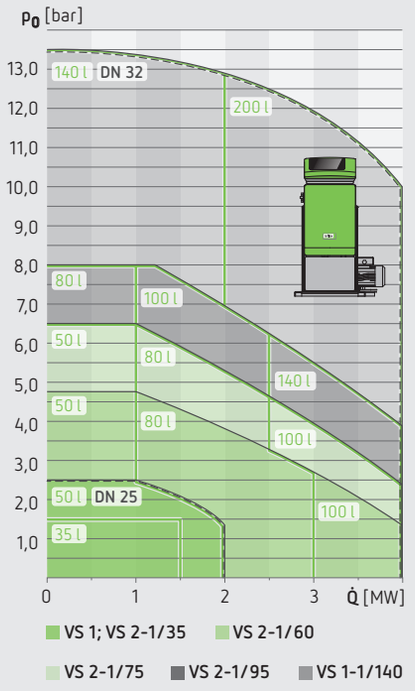


6. Continuous/interval degassing
   Pump and overflow ball valve are in operation simultaneously. System pressure remains stable within the range of target value. System water is directed via the primary vessel and degassed due to the drop in pressure.

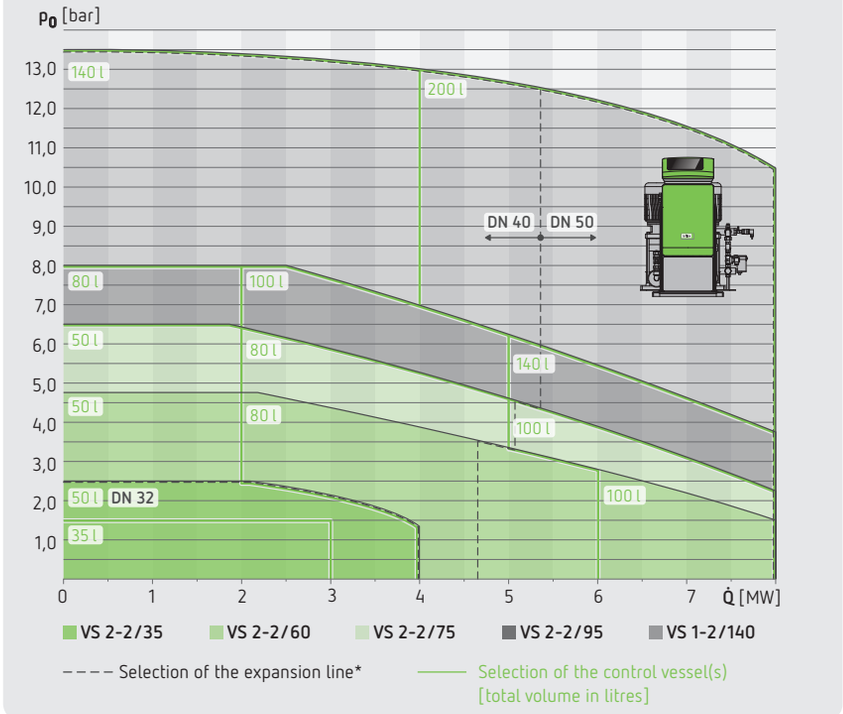
Variomat

Variomat control unit — quick selection

Minimum operating pressure p_0 dependent on the total heat output of the heat generator $\dot{Q}$ [MW]



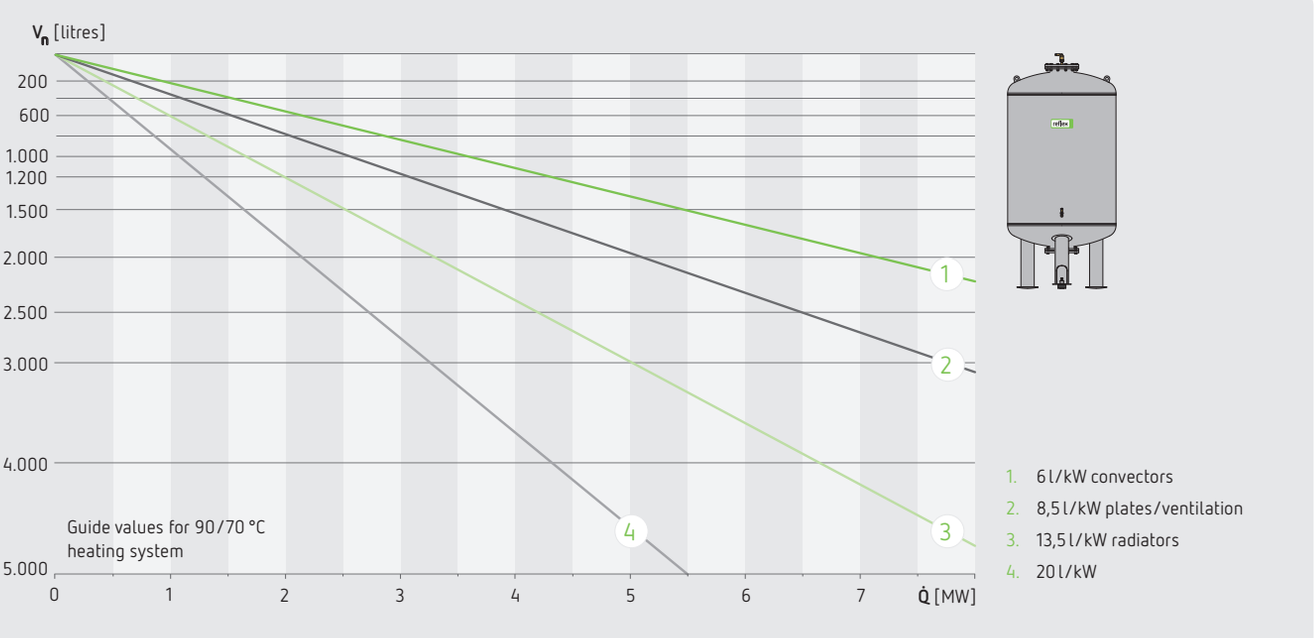
Variomat with one pump



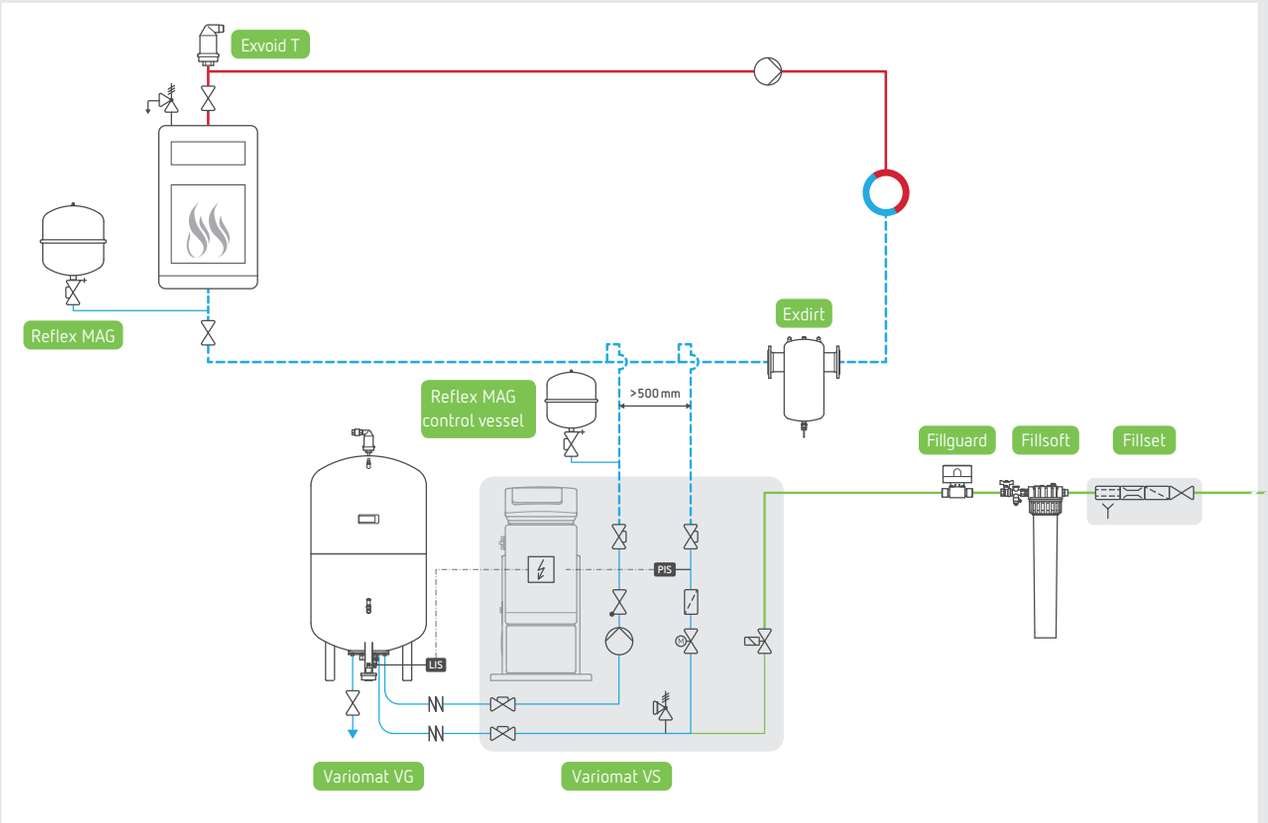
Variomat with two pumps

* It is advisable to choose a size larger if the **expansion line is longer than > 10 m**

Variomat vessels — quick selection



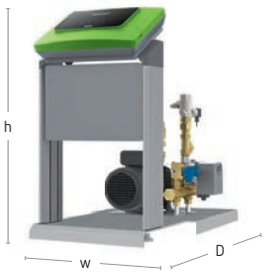
Installation example Variomat



Note: An expansion vessel must be integrated as a control vessel
(e.g. similar to here as individual boiler protection)

Variomat

Variomat control units



Variomat VS 1



Variomat VS 2-1/60



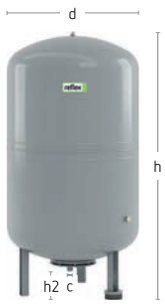
Variomat VS 2-2/95

Technical Features

- pump-controlled pressurisation system with integral water make-up and degassing for heating and cold water systems in accordance with EN 12828
- Variomat controller VS 1 with Control Basic control unit
- from Variomat controller VS 2 with Control Touch controller and softstart
- max. perm. safety temperature in the system 110 °C
- permissible ambient temperature 0 – 45 °C
- sound pressure level ~ 55 dB(A)
- ingress protection rating IP 54
- connection water make-up Rp ½"
- group fault signal and RS 485 interface for internal communication

	Type	Art. No.	DG	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 controller											
6 bar 90 °C	VS 1	8910100	0038	2,5	230V/50Hz	Rp 1"	0,70	681	495	535	25,00
Control Touch control unit											
10 bar 90 °C	VS 2-1/35	8910110	0038	2,5	230V/50Hz	Rp 1"	0,80	921	495	536	30,00
	VS 2-1/60	8910200	0038	4,8	230V/50Hz	Rp 1"	1,10	921	561	536	36,90
	VS 2-1/75	8910300	0038	6,5	230V/50Hz	Rp 1"	1,10	921	480	561	49,90
	VS 2-1/95	8910400	0038	8,0	230V/50Hz	Rp 1"	1,10	921	480	561	51,40
16 bar 90 °C	VS 1-1/140	8910500	0038	13,0	400V/50Hz	Rp 1"	1,10	964	470	557	47,00
Control unit VS with 2 pumps											
Control Touch control unit											
10 bar 90 °C	VS 2-2/35	8911100	0038	2,5	230V/50Hz	G 1¼"	1,50	921	630	735	63,00
	VS 2-2/60	8911200	0038	4,8	230V/50Hz	G 1¼"	2,20	921	704	825	61,10
	VS 2-2/75	8911300	0038	6,5	230V/50Hz	G 1¼"	2,20	921	704	706	89,00
	VS 2-2/95	8911400	0038	8,0	230V/50Hz	G 1¼"	2,20	921	704	706	92,00
16 bar 90 °C	VS 1-2/140	8911500	0038	13,0	400V/50Hz	Rp 1¼"	2,20	964	750	698	138,00

Variomat vessels



VG 500 l



VG 1.000 l

Technical Features

- replaceable bladder according to DIN EN 13831
- approval according to Pressure Equipment Directive 2014/68/EU
- max. permissible operating temperature (at the membrane) 70 °C
- max. perm. safety temperature in the system 110 °C

	Primary vessel				Secondary vessel							
	Type	Art. No.	DG	Height h2 [mm]	Type	Art. No.	DG	Height h2 [mm]	Connection c	Ø d [mm]	Height h [mm]	Weight [kg]
6 bar 70 °C	VG 200	8600011	0036	191	VF 200	8610000	0036	191	G1"	634	1.057	33,50
	VG 300	8600111	0036	191	VF 300	8610100	0036	191	G1"	634	1.357	55,20
	VG 400	8600211	0036	178	VF 400	8610200	0036	178	G1"	740	1.344	72,20
	VG 500	8600311	0036	178	VF 500	8610300	0036	178	G1"	740	1.564	81,10
	VG 600	8600411	0036	177	VF 600	8610400	0036	177	G1"	740	1.807	96,80
	VG 800	8600511	0036	177	VF 800	8610500	0036	177	G1"	740	2.272	109,90
	VG 1000/740	8600611	0036	178	VF 1000/740	8610600	0036	178	G1"	740	2.737	127,00
	VG 1000/1000	8600705	0037	460	VF 1000/1000	8610705	0037	460	G1"	1.000	2.127	270,00
	VG 1500	8600905	0037	460	VF 1500	8610905	0037	460	G1"	1.200	2.127	300,00
	VG 2000	8601005	0037	460	VF 2000	8611005	0037	460	G1"	1.200	2.587	400,00
	VG 3000	8601205	0037	490	VF 3000	8611205	0037	490	G1"	1.500	2.588	740,00
	VG 4000	8601305	0037	490	VF 4000	8611305	0037	490	G1"	1.500	3.160	820,00
	VG 5000	8601405	0037	490	VF 5000	8611405	0037	490	G1"	1.500	3.695	980,00

Variomat vessels accessories

Variomat VW

- thermal insulation for Variomat vessels
- consisting of thick flexible foam
- insulation thickness for all use cases: 50 mm



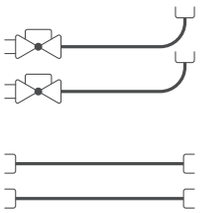
Type	Art. No.	DG	Weight [kg]
VW 200	5990100	0039	3,00
VW 300	5990200	0039	3,50
VW 400	5991300	0039	4,50
VW 500	5990000	0039	5,50
VW 600	5990500	0039	6,00
VW 800	5990300	0039	8,00
VW 1000/740	5990400	0039	8,00
VW 1000/1000	5991400	0039	9,00
VW 1500	5991000	0039	10,60
VW 2000	5989700	0039	13,00
VW 3000	5108700	0039	15,00
VW 4000	5989800	0039	17,00
VW 5000	5991100	0039	21,80

Variomat accessories

CE

Connection set

- Variomat connection set for single-pump systems: 2 connection hoses 1" × 1" male thread with secured shut-off
- Variomat connection set for two-pump systems: 2 connection hoses 1¼" × 1" male thread



Busmodule

- for exchanging data between controller and central building management system
- only bus modules type Ethernet and Profibus DP are suitable for a Control Basic controller



I/O module

- two additional analogue outputs for pressure and level control
- six freely programmable digital inlets
- six freely programmable floating outputs



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 and on the same day – one compressor / pump
- **7945630**: Reflex commissioning Cat. 2 for Reflexomat and Variomat with two compressors / pumps
- **7945721**: Reflex commissioning add. Cat. 2 for each additional system at the same location and on the same day – two compressors / pumps

Master-Slave

- software tool
- for the operation of up to 10 Reflexomat / - Giga in one hydraulic network at up to 1000 m distance

Bladder rupture detector

- membrane rupture detector in vessels
- consisting of an electrode relay and an electrode (factory fitted)
- power supply 230 V / 50 Hz
- floating output (changeover contact)



Valve

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



Variomat accessories

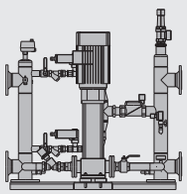
CE

Type	Art. No.	DG	Weight [kg]
Connection set			
Connection set VS 1/VS 2-1 Ø 480 – 740 mm	6940100	0039	1,55
Connection set VS 1/VS 2-1 Ø 1.000 – 1.500 mm	6940200	0039	1,90
Connection set VS 2-2 Ø 480 – 740 mm	6940300	0039	1,85
Connection set VS 2-2 Ø 1.000 – 1.500 mm	6940400	0039	2,10
Busmodule			
Busmodule BACnet MS/TP Touch	8860600	0086	0,10
Busmodule BACnet-IP Touch	8860500	0086	0,40
Busmodule Ethernet	8860300	0086	1,90
Busmodule Modbus RTU Touch	9125592	0086	0,20
Busmodule Profibus DP	8860200	0086	3,00
Busmodule Profibus DP Touch	9118042	0086	0,10
I/O module			
I/O module VS	8997705	0039	1,00
Commissioning			
Commissioning Cat. 1	7945600	0095	–
Commissioning Cat. 2	7945630	0095	–
Commissioning add. Cat. 1	7945704	0095	–
Commissioning add. Cat. 2	7945721	0095	–
Master-Slave			
Master-Slave	7859100	0039	0,10
Bladder rupture detector			
Bladder rupture detector MBM II	7857700	0086	0,62
Valve			
Valve Safecontrol	9119352	0086	0,97

Variomat Giga

Variomat Giga — combination matrix

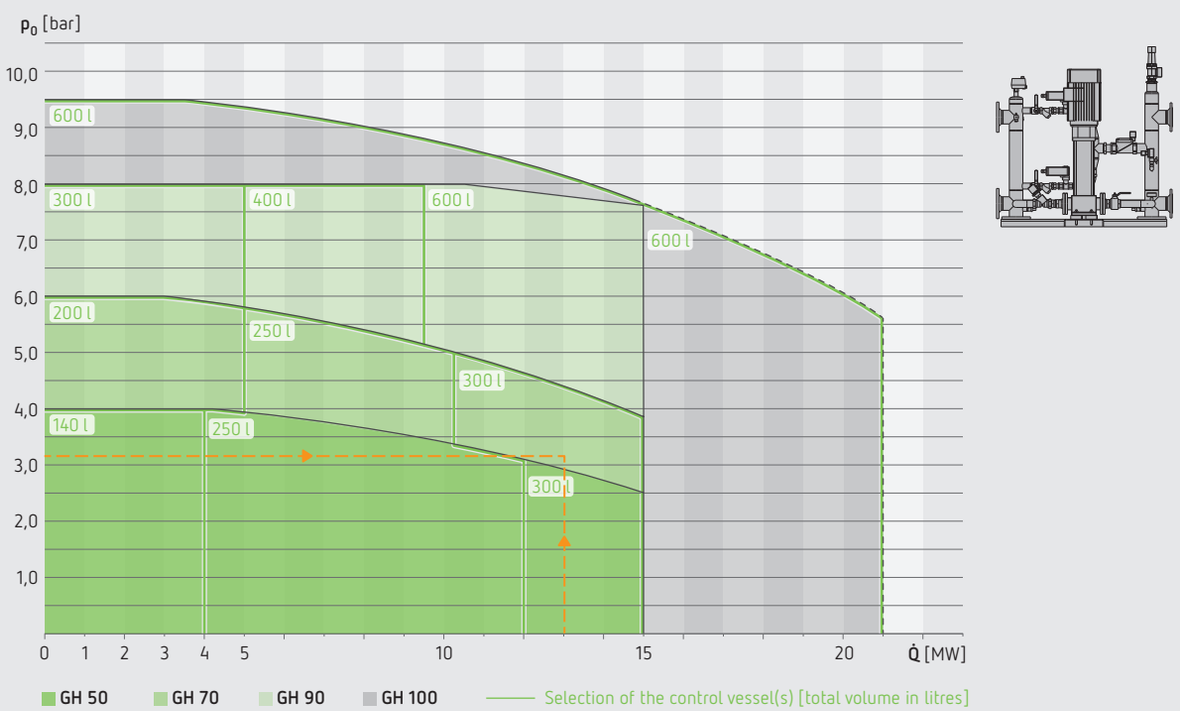
Variomat Giga

GS control unit	GH hydraulic module	GG primary vessel
		

+ Accessories

Variomat Giga hydraulic unit — quick selection

Minimum operating pressure p_0 dependent on the total heat output of the heat generator $\dot{Q}$ [MW]



Key data

Heat generator capacity	$\dot{Q}$	=	13 MW
Water content	V_A	=	50,000 l
Rated temperature	T	=	70/50 °C
Static height	H_{st}	=	30 m
Expansion coefficient	n	=	0.0228

Calculation

$$p_0 \geq \frac{H_{st}\,[m]}{10}\ \text{bar} + 0{,}2\ \text{bar}$$

$$p_0 \geq \frac{30}{10}\ \text{bar} + 0{,}2\ \text{bar} = 3{,}2\ \text{bar}$$

Result

Control unit **GS 1.1**
Hydraulic module **GH 70**

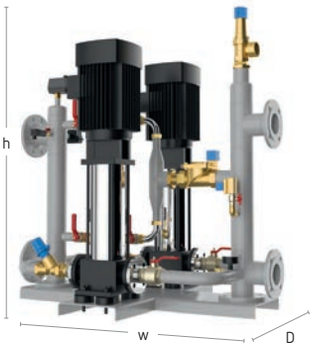
Only 50 % of the nominal thermal output should be taken into account when selecting the control unit for cold water systems up to 30 °C.

Example calculation

Variomat Giga control units



Variomat Giga Control Unit GS



Variomat Giga Hydraulic GH

Technical Features

- pump-controlled pressurisation system with integral water make-up and degassing for heating and cold water systems in accordance with EN 12828
- control module for hydraulic module:
  → GS 1.1 for GH 50/GH 70
  → GS 3 for GH 90/GH 100
- maximum operating safety due to 100 % redundant operation with two pumps and two overflow valves
- max. permissible operating overpressure 16 bar
- max. perm. safety temperature in the system 110 °C
- max. permissible operating temperature 90 °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.	DG	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	0038	–	230V/50Hz	–	2,20	921	380	477	7,60
	GS 3	8912600	0038	–	400V/50Hz	–	6,00	921	380	477	7,10
Hydraulic modules											
16 bar 90 °C	GH 50	8931000	0038	4,0	230V/50Hz	DN80/PN16	2,20	1.194	1.168	830	195,00
	GH 70	8932000	0038	6,0	230V/50Hz	DN80/PN16	2,20	1.194	1.168	830	161,00
	GH 90	8931400	0038	8,0	400V/50Hz	DN80/PN16	6,00	1.194	1.168	830	220,00
	GH 100	8931200	0038	9,5	400V/50Hz	DN80/PN16	6,00	1.194	1.168	830	214,50
Control & hydraulic module											
16 bar 90 °C	GS 1.1 + GH 50	8931025	0038	4,0	230V/50Hz	DN80/PN16	2,20	1.194	1.548	1.307	211,00
	GS 1.1 + GH 70	8931026	0038	6,0	230V/50Hz	DN80/PN16	2,20	1.194	1.548	1.307	214,00
	GS 3 + GH 90	8931027	0038	8,0	400V/50Hz	DN80/PN16	6,00	1.194	1.548	1.307	240,00
	GS 3 + GH 100	8931028	0038	9,5	400V/50Hz	DN80/PN16	6,00	1.194	1.548	1.307	283,00

Variomat Giga vessels



GG 1.000 l



GF 1.000 l

Technical Features

- replaceable bladder according to DIN EN 13831
- approval according to Pressure Equipment Directive 2014/68/EU
- max. permissible operating temperature (at the membrane) 70 °C
- max. perm. safety temperature in the system 110 °C

	Primary vessel				Secondary vessel							
	Type	Art. No.	DG	Height h2 [mm]	Type	Art. No.	DG	Height h2 [mm]	Connection c	Ø d [mm]	Height h [mm]	Weight [kg]
6 bar 70 °C	GG 1000	8920105	0037	252	GF 1000	8930105	0037	195	DN 65/PN 6	1.000	2.158	270,00
	GG 1500	8920305	0037	245	GF 1500	8930305	0037	195	DN 65/PN 6	1.200	2.158	340,00
	GG 2000	8920405	0037	245	GF 2000	8930405	0037	195	DN 65/PN 6	1.200	2.618	430,00
	GG 3000	8920605	0037	275	GF 3000	8930605	0037	225	DN 65/PN 6	1.500	2.606	651,00
	GG 4000	8920705	0037	275	GF 4000	8930705	0037	225	DN 65/PN 6	1.500	3.181	890,00
	GG 5000	8920805	0037	275	GF 5000	8930805	0037	225	DN 65/PN 6	1.500	3.716	980,00

Variomat Giga accessories

Busmodule



- for exchanging data between controller and central building management system
- only bus modules type Ethernet and Profibus DP are suitable for a Control Basic controller

I/O module



- two additional analogue outputs for pressure and level control
- six freely programmable digital inlets
- six freely programmable floating outputs

Commissioning



- **7945724**: Reflex commissioning for Variomat Giga with two pumps

Master-Slave

- software tool
- for the operation of up to 10 Reflexomat / - Giga in one hydraulic network at up to 1000 m distance

Bladder rupture detector



- membrane rupture detector in vessels
- consisting of an electrode relay and an electrode (factory fitted)
- power supply 230 V / 50 Hz
- floating output (changeover contact)

Safety valve



- safety valve SV1 for additional protection of GG and GF vessels at nominal heat capacities > 10,5 MV

Valve



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

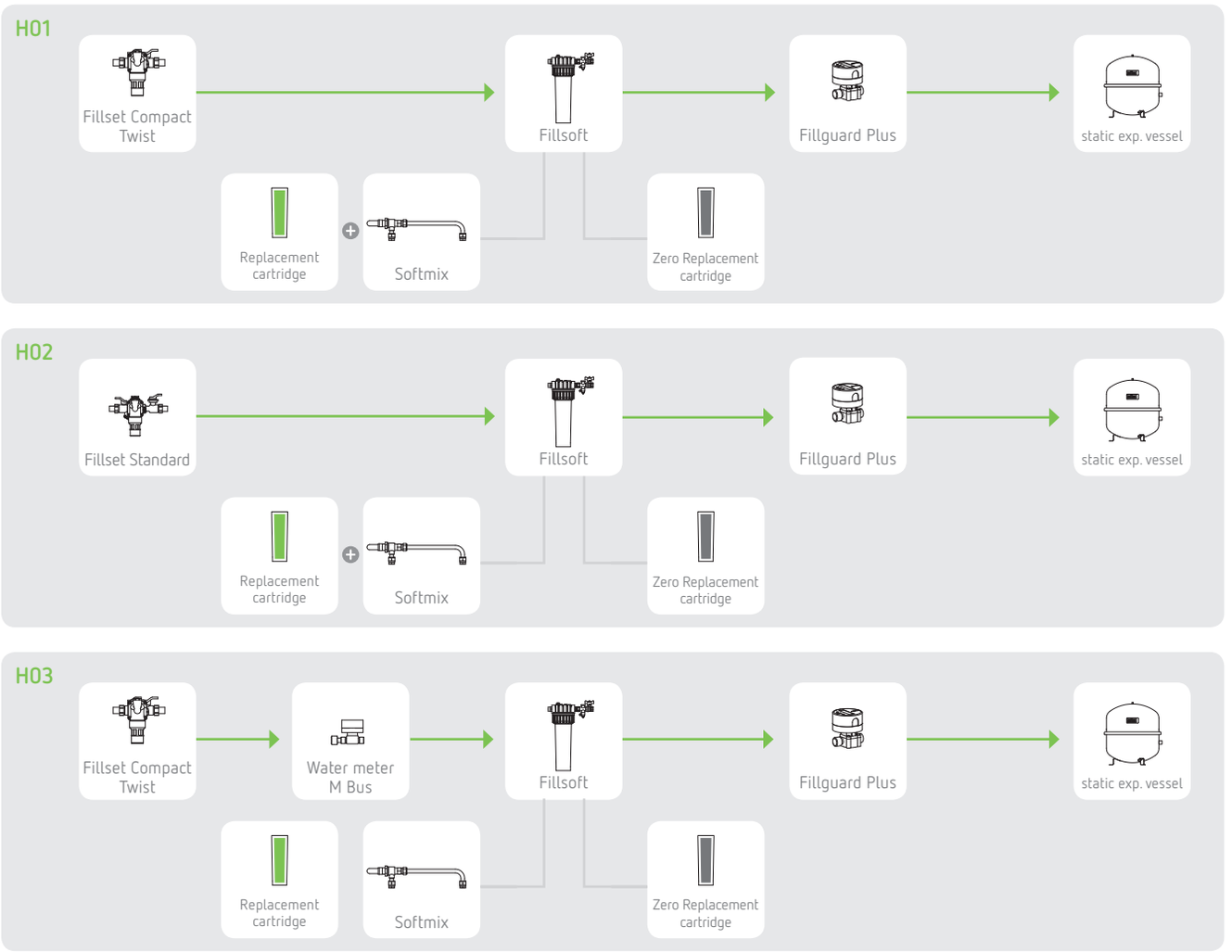
Variomat Giga accessories

CE

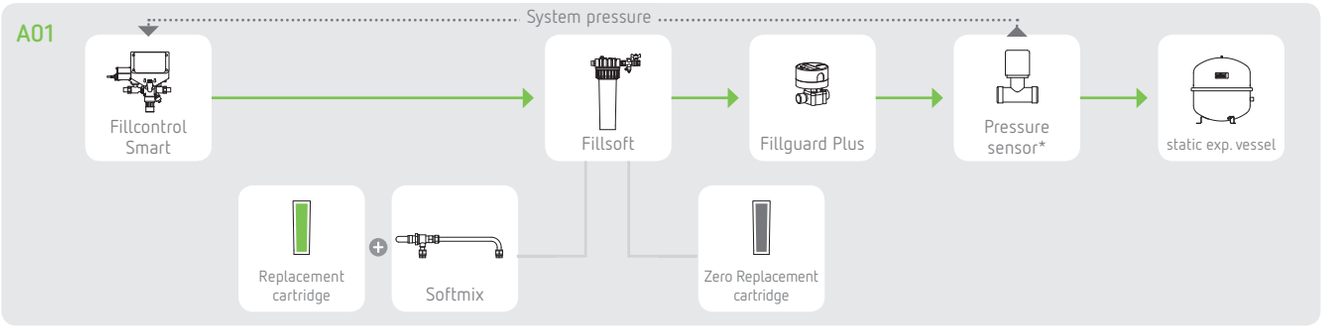
Type	Art. No.	DG	Weight [kg]
Busmodule			
Busmodule BACnet MS/TP Touch	8860600	0086	0,10
Busmodule BACnet-IP Touch	8860500	0086	0,40
Busmodule Ethernet	8860300	0086	1,90
Busmodule Modbus RTU Touch	9125592	0086	0,20
Busmodule Profibus DP	8860200	0086	3,00
Busmodule Profibus DP Touch	9118042	0086	0,10
I/O module			
I/O module GS	8997700	0039	1,00
Commissioning			
Commissioning Variomat Giga	7945724	0095	–
Master-Slave			
Master-Slave	7859100	0039	0,10
Bladder rupture detector			
Bladder rupture detector MBM II	7857700	0086	0,62
Safety valve			
Safety valve SV 1	6942100	0081	0,55
Valve			
Valve Safecontrol	9119352	0086	0,97

Water make-up systems & water treatment

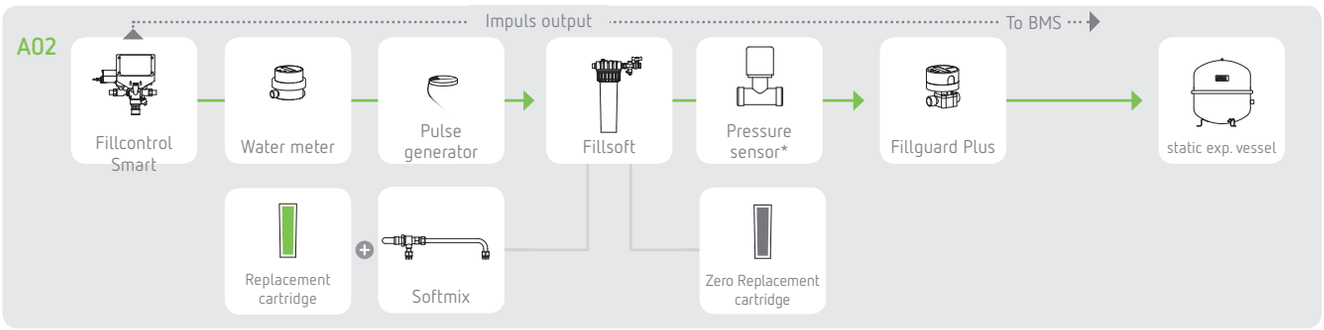
Manual water make-up

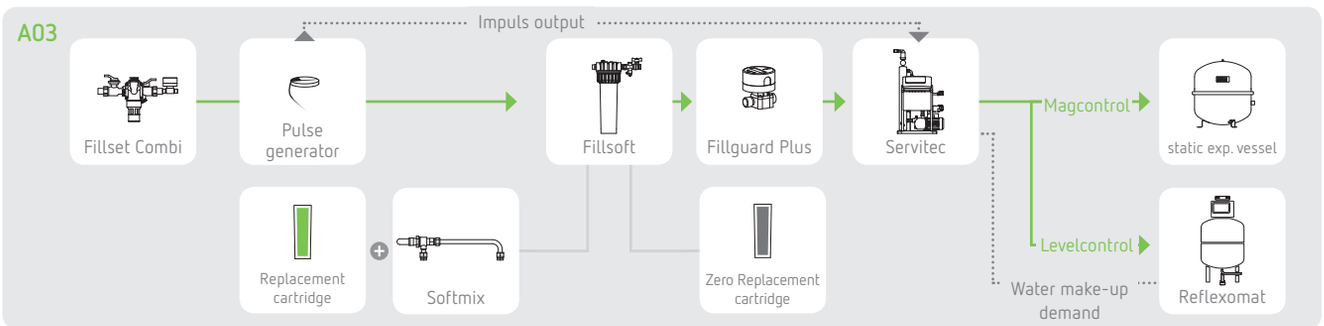


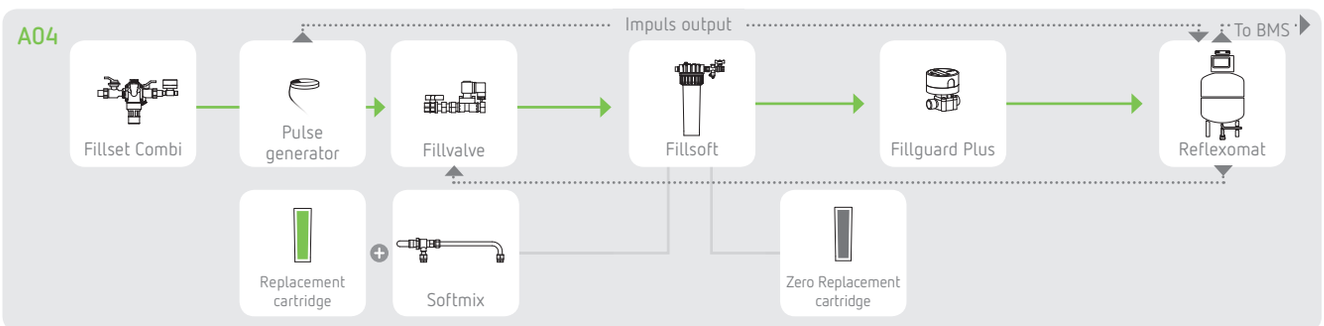
Automatic water make-up

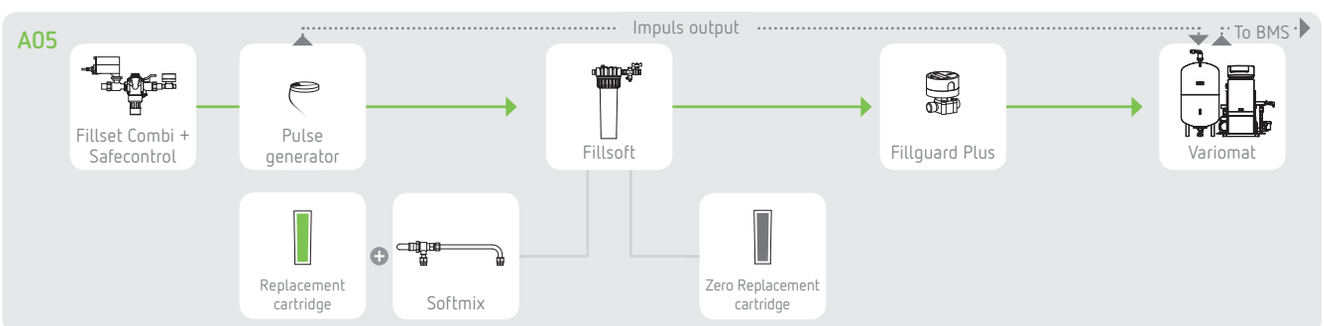


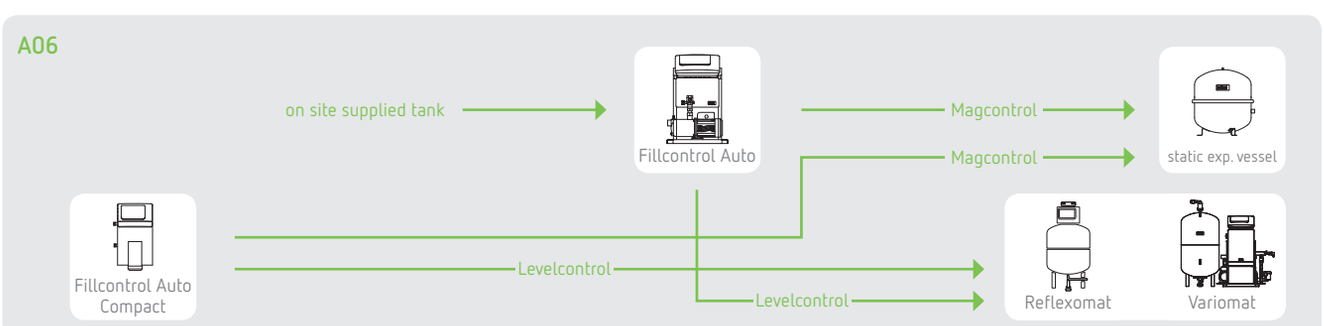
* Pressure sensor included in the scope of delivery of Fillcontrol Smart







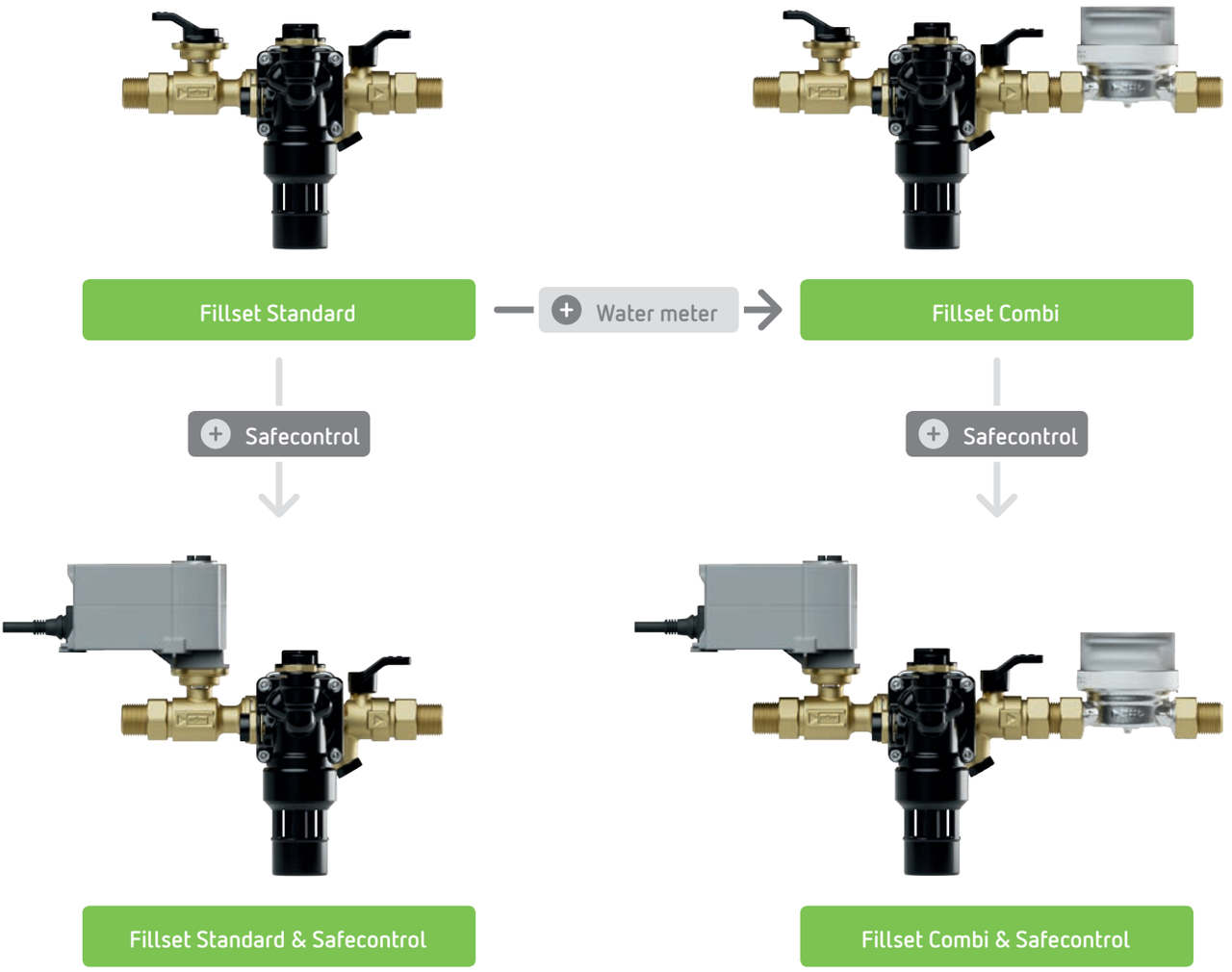




* Pressure sensor included in the scope of delivery of Fillcontrol Smart

Theoretical principles

Combination options for Fillsets



Fillset

Fillset Standard



Fillset Standard

Technical Features

- connection assembly for water make-up systems according to EN 806 and EN 1717
- for direct connection to potable water systems
- with multi-national certified system separator of Type BA
- isolating fixtures at inlet and outlet
- expandable using Fillset Safecontrol for automatic make-up
- water make-up capacity approx. 1,6 m^3/h at Δp = 1,2 bar
- minimal flow pressure p_0 + 1,5 bar (deviations possible in combination with Variomat and Servitec)
- max. permissible operating overpressure 10 bar
- max. permissible operating temperature 65 °C

	Type	Art. No.	DG	Connection inlet/outlet	Height h [mm]	Height including pressure reducer [mm]	Width w [mm]	Depth D [mm]	Weight [kg]
10 bar 65 °C	Standard	6813100	0070	R ½"/R ½"	170	204	236	128	1,70

Fillset Standard accessories

Pressure reducer



- reduces and stabilises the pressure of water flowing through the system
- ensures a constant pressure discharge, independent of any input pressure fluctuations
- protects the system against damage caused by overpressure and contributes to system efficiency and safety by preventing water hammer

Pulse generator



- the generated pulses are transmitted to an external reading device or a data acquisition system (e.g. BMS), thus enabling accurate monitoring and remote reading of water consumption without any need for direct access to the meter
- to increase the range of use of the water meter

Pressure gauge



- black casing
- not neccessary
- diameter: 63 mm
- connection: R ¼"

Safecontrol



- the actuator motor can be connected to the existing motor mount of the Fillset Standard, Combi or Fillcontrol Smart
- the dirt-resistant motor-controlled ball valve is closed by a spring without any need for an electrical supply
- hydraulic and electrical connections must be made on-site
- actuation can be performed via the Fillcontrol Smart or a separate Reflex control unit

Wall mounts



- suitable for wall-mounted installation of the Fillset Standard, Combi or the FillControl Smart
- depending on the site conditions, a wall-mounted installation can optionally ensure that the overall aesthetic of the entire system is ordered and tidy

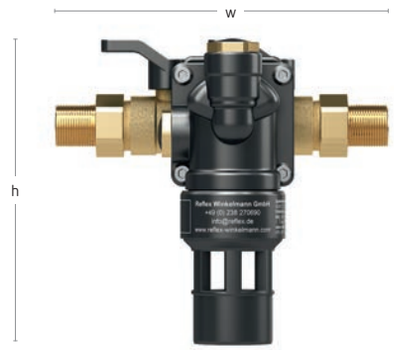
Water meter



- the water meter displays the measured water consumption on an analogue dial
- enables monitoring of the made up water volume

Type	Art. No.	DG	Weight [kg]
Pressure gauge	7111539	0086	0,09
Pressure reducer	9131440	0086	0,13
Pulse generator	9131441	0086	0,06
Safecontrol	7131422	0086	0,60
Wall mounts	9131442	0086	0,33
Water meter	7131225	0086	0,39

Fillset Compact Twist



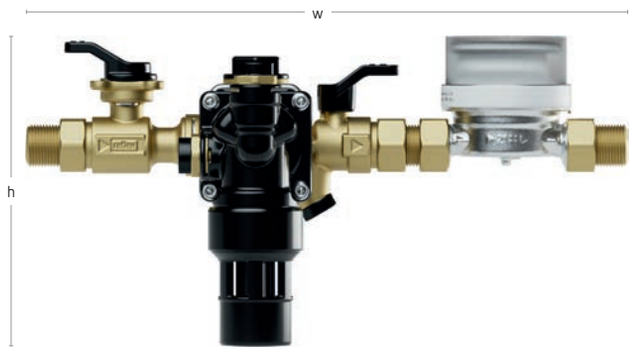
Fillset Compact Twist

Technical Features

- connection assembly for water make-up systems according to EN 806 and EN 1717
- for direct connection to potable water systems
- with multi-national certified system separator of Type BA
- isolating fixtures at inlet and outlet
- without water meter or with M-Bus water meter
- variable rotation (non-ratcheting) by hand
- minimal flow pressure p_0 + 1,5 bar
- max. permissible operating overpressure 10 bar
- max. permissible operating temperature 65 °C

	Type	Art. No.	DG	Connection inlet/outlet	Height h [mm]	Width w [mm]	Depth D [mm]	Weight [kg]
10 bar 65 °C	Compact Twist	6811805	0070	R ½"/R ½"	157	175	117	2,42
	Compact Twist M-Bus	6811855	0070	R ½"/R ½"	157	175	117	2,42

Fillset Combi



Fillset Combi

Technical Features

- connection assembly for water make-up systems according to EN 806 and EN 1717
- for direct connection to potable water systems
- with multi-national certified system separator of Type BA
- isolating fixtures at inlet and outlet
- expandable using Fillset Safecontrol for automatic make-up
- including water meter
- water make-up capacity approx. 1,2 m^3/h at Δp = 1,35 bar
- minimal flow pressure p_0 + 1,5 bar (deviations possible in combination with Variomat and Servitec)
- max. permissible operating overpressure 10 bar
- max. permissible operating temperature 65 °C

	Type	Art. No.	DG	Connection inlet/outlet	Height h [mm]	Height including pressure reducer [mm]	Width w [mm]	Depth D [mm]	Weight [kg]
10 bar 65 °C	Combi	6813105	0070	R ½"/R ½"	170	204	314	150	2,26

Fillset Combi accessories

CE

Pressure reducer



- reduces and stabilises the pressure of water flowing through the system
- ensures a constant pressure discharge, independent of any input pressure fluctuations
- protects the system against damage caused by overpressure and contributes to system efficiency and safety by preventing water hammer

Pulse generator



- the generated pulses are transmitted to an external reading device or a data acquisition system (e.g. BMS), thus enabling accurate monitoring and remote reading of water consumption without any need for direct access to the meter
- to increase the range of use of the water meter

Pressure gauge



- black casing
- not neccessary
- diameter: 63 mm
- connection: R ¼"

Safecontrol



- the actuator motor can be connected to the existing motor mount of the Fillset Standard, Combi or Fillcontrol Smart
- the dirt-resistant motor-controlled ball valve is closed by a spring without any need for an electrical supply
- hydraulic and electrical connections must be made on-site
- actuation can be performed via the Fillcontrol Smart or a separate Reflex control unit

Wall mounts



- suitable for wall-mounted installation of the Fillset Standard, Combi or the FillControl Smart
- depending on the site conditions, a wall-mounted installation can optionally ensure that the overall aesthetic of the entire system is ordered and tidy

Type	Art. No.	DG	Weight [kg]
Pressure gauge	7111539	0086	0,09
Pressure reducer	9131440	0086	0,13
Pulse generator	9131441	0086	0,06
Safecontrol	7131422	0086	0,60
Wall mounts	9131442	0086	0,33

Theoretical principles

Fillcontrol Smart Construction

1. Fillset Safecontrol
   The motor for controlled actuation of the dirt-resistant water make-up valve for safe water make-up without pressure surges is closed without power by spring force.
2. Fillset Standard
   The connection set for water make-up systems when directly connected to potable water system ensures that the potable water system is protected from possible impurity by reliably preventing the backflow of system water.
3. Pressure Sensor
   The pressure sensor continuously measures the pressure in the system. If the pressure falls below a certain value, the sensor signals this to the control unit. This allows the sensor to provide information about the condition of the system, e.g., about possible leakages or faults, and to protect the system.
4. Controller
   The controlled, pressure-dependent water make-up is carried out with automatic interruption and fault message if the runtime is exceeded.

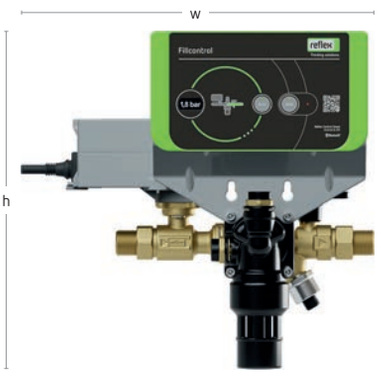
   The initial and subsequent filling of the system is

   facilitated by an adjustable operating mode. Function control and monitoring of the unit are carried out via a fully automatic, freely parametrisable microprocessor controller with LCD display for all relevant operating and fault messages and pressure display, RS-485 interface, as well as potential free output for group fault message.



Fillcontrol

Fillcontrol Smart



Fillcontrol Smart

Technical Features

- compact automatic water make-up station, suitable for systems with a membrane expansion vessel according to EN 806 and EN 1717
- with multi-national certified system separator of Type BA
- Control Smart controller
- RS-485 interface, optional connection of bus and expansion modules
- capacity monitoring of a Fillsoft water treatment system possible
- controlled make-up using the Fillset Safecontrol motor ball valve
- connection voltage 230 V / 50 Hz
- water make-up capacity approx. 1,6 m^3 / h at Δp = 1,2 bar
- minimal flow pressure p_0 + 1,5 bar
- permissible maximum inlet pressure 10 bar

	Type	Art. No.	DG	Connection inlet / outlet	Height h [mm]	Width w [mm]	Depth D [mm]	Weight [kg]
10 bar 65 °C	Smart	6813500	0079	R ½" / R ½"	299	320	194	3,20

Fillcontrol Smart accessories

Pressure reducer



- reduces and stabilises the pressure of water flowing through the system
- ensures a constant pressure discharge, independent of any input pressure fluctuations
- protects the system against damage caused by overpressure and contributes to system efficiency and safety by preventing water hammer

Pulse generator



- the generated pulses are transmitted to an external reading device or a data acquisition system (e.g. BMS), thus enabling accurate monitoring and remote reading of water consumption without any need for direct access to the meter
- to increase the range of use of the water meter

Pressure gauge



- black casing
- not neccessary
- diameter: 63 mm
- connection: R ¼"

Wall mounts



- suitable for wall-mounted installation of the Fillset Standard, Combi or the FillControl Smart
- depending on the site conditions, a wall-mounted installation can optionally ensure that the overall aesthetic of the entire system is ordered and tidy

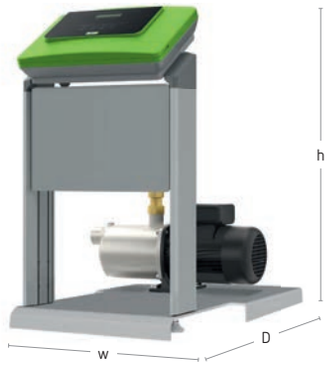
Water meter



- the water meter displays the measured water consumption on an analogue dial
- enables monitoring of the made up water volume

Type	Art. No.	DG	Weight [kg]
Pressure gauge	7111539	0086	0,09
Pressure reducer	9131440	0086	0,13
Pulse generator	9131441	0086	0,06
Wall mounts	9131442	0086	0,33
Water meter	7131225	0086	0,39

Fillcontrol Auto



Fillcontrol Auto

Technical Features

- automatic make-up system with integrated pump
- Fillcontrol Auto for water make-up, e.g. from containers or conditioning systems
- systems equipped with Control Basic for easy operation
- RS-485 interface, optional connection of bus and expansion modules
- Fillcontrol Auto suitable for applications with max. 50 % anti-freeze
- permissible maximum inlet pressure 10 bar
- max. permissible operating overpressure 10 bar
- maximum delivery pressure 5,5 bar
- minimal supply rate 360 l/h
- max. permissible operating temperature 70 °C

	Type	Art. No.	DG	Connection inlet/outlet	Delivery rate [m³/h]	Height h [mm]	Width w [mm]	Depth D [mm]	Weight [kg]
10 bar 70 °C	Auto 5,5	8812300	0070	G 1¼"/G1"	4,2	683	556	481	18,60
commissioning									
	Fillcontrol Auto/Auto Compact	7945723	0095	–	–	–	–	–	–

Fillcontrol Auto Compact



Fillcontrol Auto Compact

Technical Features

- automatic make-up system with integrated pump
- Fillcontrol Auto for water make-up, e.g. from containers or conditioning systems
- systems equipped with Control Basic for easy operation
- RS-485 interface, optional connection of bus and expansion modules
- including system separation to EN 806 and EN 1717
- permissible maximum inlet pressure 10 bar
- max. permissible operating overpressure 10 bar
- maximum delivery pressure 8,5 bar
- maximum inlet pressure 5,5 bar
- minimal supply rate 360 l/h
- max. permissible operating temperature 30 °C

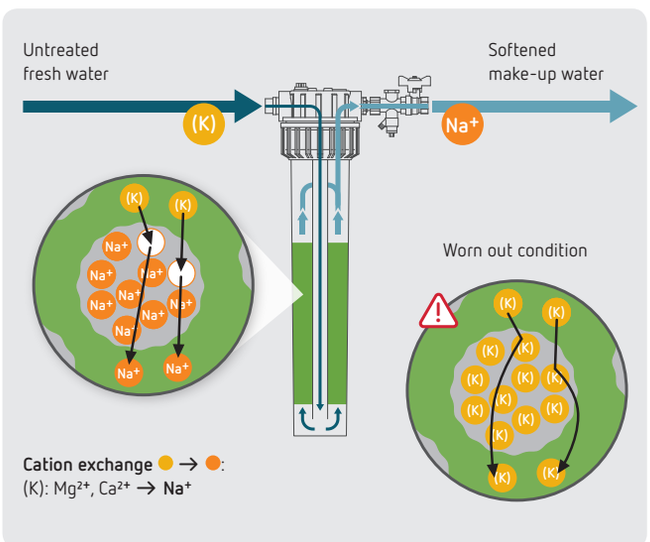
	Type	Art. No.	DG	Connection inlet/outlet	Overflow connection	Delivery rate [m³/h]	Height h [mm]	Width w [mm]	Depth D [mm]	Weight [kg]
10 bar 30 °C	Auto Compact 8,5	8688500	0070	G ⅜"/G ⅜"	DN 32/PN 16	0,12–0,18	619	579	287	19,10
commissioning										
	Fillcontrol Auto/Auto Compact	7945723	0095	–	–	–	–	–	–	–

Theoretical principles

Fillsoft — construction

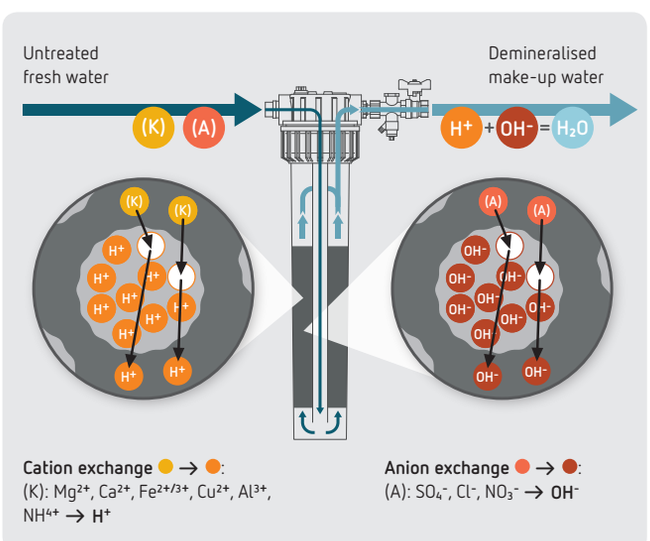


1. Fillsoft I casing
2. Fillsoft II casing
3. Softening with Fillsoft cartridge
   Prevents scale formation up to a total hardness of ≈ 0 °dH
4. Deionisation with Fillsoft Zero cartridge
   Prevents scale formation and corrosion up to an electrical conductivity of 10 µS/cm



Softening

Softening is based on the principle of cation replacement. Hard fresh water is fed over an exchanger pillar. Hardness-forming magnesium and calcium ions are replaced by sodium ions from resin beads and the water becomes soft. When the sodium ions are depleted, the cartridge requires replacement.



Demineralising

Demineralising is based on the principle of ion exchange (of the cations and anions). Fillsoft Zero enables the demineralisation of filling and top-up water. The cartridge absorbs all minerals. If conductivity, and thus the number of ions, increases, then the cartridge's capacity decreases and the cartridge requires replacement.

Fillsoft — application

When is **softening** necessary?

Problem

- scale formation

Objective

- prevention of scale formation in heat generation systems (boilers and heat exchangers) to protect against limescale deposits

Area of application

- in small and medium-sized heating and cooling water systems

Basis for assessment

- overall regional water hardness
- thresholds based on system size and according to VDI 2035 norm
- information from heat generator manufacturers and system operators who may have their own requirements for filling and top-up water

VDI 2035 guidelines

Overall water hardness (according to table)

- recommended thresholds for overall water hardness according to VDI 2035 (Part 1)

Group	Total heating capacity in kW	Sum of alkaline earth metals in mol/m³ (Total hardness in °dH) Specif. system volume (in l/kW heating capacity)		
		≤ 20	> 20 – ≤ 40	> 40
1	≤ 50	–	≤ 3,0 (16,8)	≤ 0,05 (0,3)
2	≤ 50*	≤ 3,0 (16,8)	≤ 1,5 (8,4)	
3	> 50 – ≤ 200	≤ 2,0 (11,2)	≤ 1,0 (5,6)	
4	> 200 – ≤ 600	≤ 1,5 (8,4)	< 0,05 (0,3)	
5	> 600	< 0,05 (0,3)		

* spec. system volume V_A [l/kW] = system vol./smallest individual heating capacity
** for circulating water heaters and systems with electric heating elements

Determining water status

- The water hardness can be obtained from the local supply companies or can be determined precisely with the Reflex hardness test kit (prod. no.: 6811900).

When is it necessary to **demineralise**?

Problem

- scale formation and water-side corrosion

Objective

- prevention of scale formation and corrosion to reduce the interaction of different materials, such as limescale deposits and siltation of tubelines, pumps and fittings

Area of application

- in small and medium-sized heating and cooling water systems
- when aluminium materials are used in heat generators or in systems with special water requirements softened water is usually insufficient and low-salt operation is required, instead

Basis for assessment

- water conductivity (through correlation iteratively also water hardness; exact values only via conductivity measurement)
- low- or high-salt operation according to VDI 2035 norm
- information from heat generator manufacturers and system operators who may have their own requirements for filling and top-up water

VDI 2035 guidelines

Conductivity

- conductivity of < 100 µS/cm is required
- some manufacturers require that make-up water be demineralised to < 10 µS/cm

Conductivity values for heating water

	low salinity	saline
Electrical conductivity in µS/cm	> 10 – ≤ 100	> 100 – ≤ 1.500
Appearance	clear, free of sedimenting substances	
	non-aluminium alloyed	aluminium alloyed
pH value	8,2 – 10,0	8,2 – 9,0

Determining water status

- Conductivity defines the total salt content (or the total amount of minerals in the water) and is easy to measure using a conductivity sensor or Reflex Fillguard.

Fillsoft

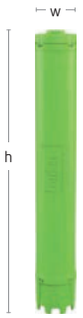
Fillsoft



Fillsoft I housing



Fillsoft II Housing



Fillsoft cartridge



Fillsoft Zero cartridge

Technical Features

- water treatment fitting for heating water make-up according to VDI 2035
- Fillsoft softening (green) cartridge capacity 6.000 l × °dH
- Fillsoft desalination (grey) cartridge capacity 3.000 l × °dH
- including mounting materials
- max. permissible operating overpressure 8 bar
- max. permissible operating temperature 40 °C

	Type	Art. No.	DG	PQ [pce]	Colour	Capacity* [l × °dH]	Cartridge slots [pce]	Max. continuous flow rate [l/h]	Connection inlet/outlet	Height h [mm]	Width w [mm]	Weight [kg]
Fillsoft housing												
8 bar 40 °C	FG I	9125660	0178	80	–	–	1	360	Rp ½"/Rp ½"	600	260	1,90
	FG II	9125661	0178	32	–	–	2	360	Rp ½"/Rp ½"	600	380	3,60
Fillsoft cartridges												
8 bar 40 °C	FSP 6000	6811800	0078	100	green	6.000	–	–	–	513	–	1,50
	FZP 3000	9125662	0078	100	grey	3.000	–	–	–	513	–	1,50

* Use of two cartridges doubles the capacity

Fillsoft accessories

Commissioning

- **7945722**: Reflex commissioning for Fillsoft in combination with Fillguard and Fillcontrol Plus Compact

Softmix

- mixing mechanism for Fillsoft softening



Fillguard Mini



- is delivered as a fully functional device and is immediately ready for use
- continuously measures the conductivity of the make-up water
- a display with three LEDs indicates the conductivity range and, depending on the required conductivity, the threshold value can be read off
- according to VDI 2035, any conductivity less than 100 µS/cm is considered as low-salt operation
- cartridges should be replaced once the conductivity has reached 100 µS/cm but in any event, no later than after 18 months
- the battery is designed for 10 years' operation

Fillguard Plus



- all in one combination of water meter and electrical conductivity measurement for monitoring softening or desalination via Fillsoft or Fillsoft Zero
- continuous capacitance and/or conductivity measurement
- programmable potential-free fault contact and switchable beeper
- simple and flexible installation
- rotatable display
- simple connection option with Servitec S and Servitec Touch control unit using Fillguard Connect cable

Fillsoft Tool

- assembly key for safe opening and closing of Fillsoft filter head



Fillsoft accessories

CE

Type	Art. No.	DG	Weight [kg]
Fillsoft Accessories (Softening)			
Fillsoft °dH-Set	6811900	0086	0,10
Fillsoft Softmix	9119219	0178	0,20
Fillsoft accessories (Desalination)			
Fillsoft Fillguard Mini	9125762	0178	0,06
accessories for Fillsoft (softening) and Fillsoft Zero (desalination)			
Fillsoft Fillguard Connect	9131033	0178	0,37
Fillsoft Fillguard Plus	9131058	0178	0,40
Fillsoft Tool	9200276	0086	0,40
commissioning			
Commissioning Cat. 4	7945722	0095	–