



**reflex 'servitec 35-95'**  
**Vacuum spray-tube degassing unit**

**Assembly, operating and maintenance manual**  
Status 11/10



# reflex 'servitec'

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# reflex 'servitec'

## General information

### Overview

### 'servitec' control unit

- 1 Ball valve
- 2 Pressure gauge transformer
- 3 2-way motorized ball valve with overflow function
- 4 3-way motorized ball valve
- 5 Ball valve with integrated dirt traps
- 6 Ball valve
- 7 Bleed screw - pump
- 8 Bleed screw - pump
- 9 Pump
- 10 Control box IP 54
- 11 Pressure connection with nozzle
- 12 Connecting hose
- 13 Water shortage switch
- 14 Suction connection

### For 'servitec 35' only:

- 15 Wall mount
- 16 Distance piece

### 'servitec' spray-tube

- 17 Vacuum gauge
- 18 Vacuum spray-tube
- 19 Filling and draining valve
- 20 Dipstick-tube degassing unit

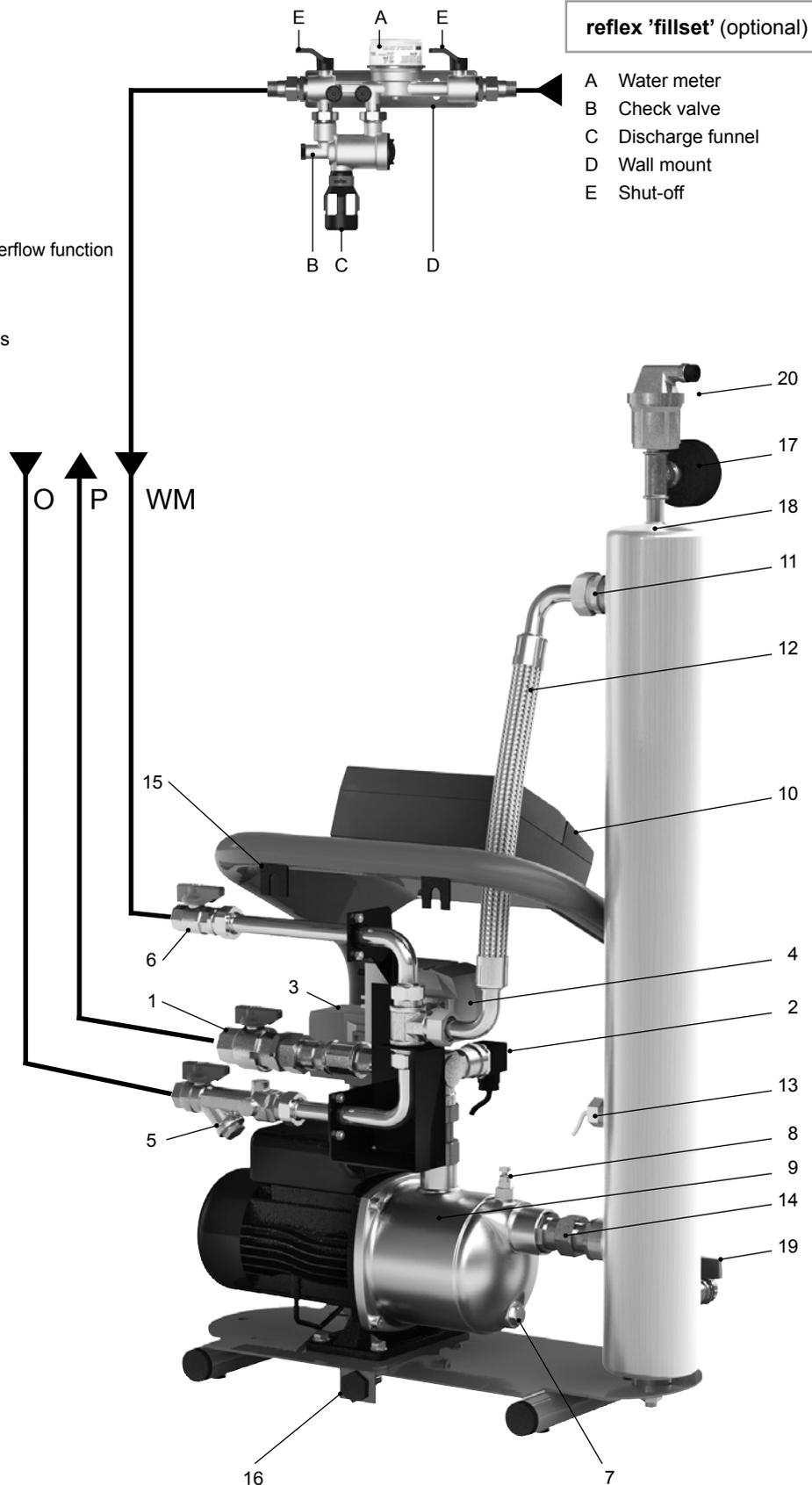
### Type code

'servitec' 60 / gl

gl - design for mixtures of water and glycol  
up to a 50 percent glycol content (for 'servitec ...'/gl only)  
Pump size

### reflex 'fillset' (optional)

- A Water meter
- B Check valve
- C Discharge funnel
- D Wall mount
- E Shut-off



reflex 'servitec 35'

# reflex 'servitec'

## General information

Operating field

LCD

### Message line

Display of the active degassing program and display of messages

### Pressure display

(in 'magcontrol' operating mode only)  
Display of the current system pressure (can only be read-out in non-operative state), flashes when a pressure failure occurs

### Operating mode buttons

Manual mode  
(→ p. 15)

hand

Stop mode (→ p. 15)  
System out of order

stop

Automatic mode  
(→ p. 15)

auto

Calling up customer menu (→ p. 15)

menu

1.5 bar  
continuous degassing

error

auto

quit

ok

reflex

### Control keys

#### In customer menu

Cancel parameter input, quit customer menu

#### In automatic, manual or stop mode

Acknowledge messages (for example "ER06 make-up time exceeded")

Scroll through start routine, scroll through customer menu, modify parameter(s)

Select parameter(s), confirm input

Note:



During the assembly  
this symbol stands for  
"Press button"

### General notes on safety

'servitec' is a degassing and make-up station that mainly consists of a control unit and a vacuum spray-tube.

Conformity in the appendix certifies the compliance to EU directive 97/23/EC on pressure devices and 89/336/EC on electromagnetic compatibility.

#### **Assembly operation, test prior to start-up, recurring tests**

According to national specifications; in Germany the Ordinance on Industrial Health and Safety (Betriebssicherheitsverordnung). In keeping with this, assembly and operation must be performed according to the state of the art by qualified personnel and specially trained staff. The operator is obliged to notify an authorized inspection agency of the required inspections prior to start-up (only for 'servitec' special systems, PS x V > 50 bar x liter), inspections after substantial modifications to the system and periodic inspections. Refer to section "Inspection intervals" for recommended inspection intervals. Only vacuum spray-tubes without visible external damage to the pressure vessel may be installed.

**Proper assembly and start-up must be certified in the assembly, start-up and maintenance certificates (see p. 25). This is the requirement for warranty claims. We recommend having the initial start-up and the annual maintenance performed by your Reflex Service (see p. 21).**

**Important:** 'servitec' is designed for stationary, not for mobile system operation. The set warranty periods are only valid if a maximum of 16,000 degassing intervals per year are observed (see Maintenance Instructions, p. 20).

#### **Modifications to 'servitec',**

such as welding work on the spray-tube or adjustments to the circuitry are not permitted.

#### **Adherence to parameters**

Details concerning the manufacturer, year of manufacture and serial number as well as technical data are provided on the name plate. Suitable temperature and pressure protection measures must be implemented in the supply system to ensure adherence to the specified permissible maximum and minimum operating parameters. This system may only be used in systems with nontoxic waters.

#### **Thermal protection**

In heating water systems, the operator must affix a warning notice near the vacuum spray-tube or provide suitable thermal insulation if there is a risk of personal injury from excessive surface temperatures. Care must be exercised when working on a hot system. There is a risk of scalding from water escaping at the screw connections, the bleed screw for the pump and the dipstick-tube degassing unit in particular. A risk of injury due to high temperatures arises especially from touching the vacuum spray-tube.

#### **Electrical connection**

Electrical wiring and connection must be performed by a qualified electrician according to the applicable local regulations (electricity board, VDE and EN). The system must be de-energized before any work is carried out on electrical components.

Failure to keep to these instructions, in particular the safety instructions, may result in the destruction of and defects in the 'servitec', personal injury and impaired operation. Any and all warranty or liability claims are excluded if these regulations are violated.

# reflex 'servitec' Assembly

## Scope of delivery

### Note:

The scope of delivery is described on the delivery slip and the contents are indicated on the cardboard box.

### 1 Pallet

- with**
- 'servitec' (preassembled)
  - Vacuum spray-tube (preassembled)
  - Dipstick-tube degassing unit (enclosed in the cardboard box)

- with**
- Foil pocket (attached to 'servitec') with
  - Assembly, operating and maintenance manual
  - Electric circuit diagram

### Possible accessories:

#### 1 cardboard box

- 'fillset' with water meter (enclosed in cardboard box)
- 'fillset compact' without water meter (enclosed in cardboard box)



## Installation site

Requirements for the installation room:

- Frost-free, well-ventilated room; room temperature > 0 to max. 45°C
- No unauthorized access
- Level floor with adequate load-bearing capacity and drainage facility
- Filling connection DN 15, according to DIN 1988 P 4
- Electrical connection to 230 V~, 50 Hz, 16 A with upstream ground fault circuit interrupter: tripping current 0.03 A
- At a make-up pressure > 6 bar, a pressure reducer must be installed on site.

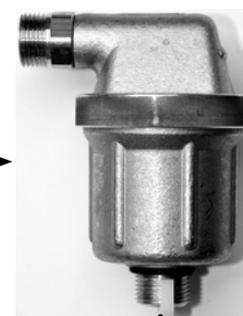
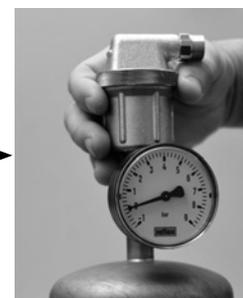
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## Make-up water quality

Values of water hardness according to the VDI 2035 directive are to be respected. We recommend the use of the reflex 'fillsoft'. A dirt trap (mesh size 250 µm) has to be installed into the make-up line (integrated in reflex 'fillset').

## Installation

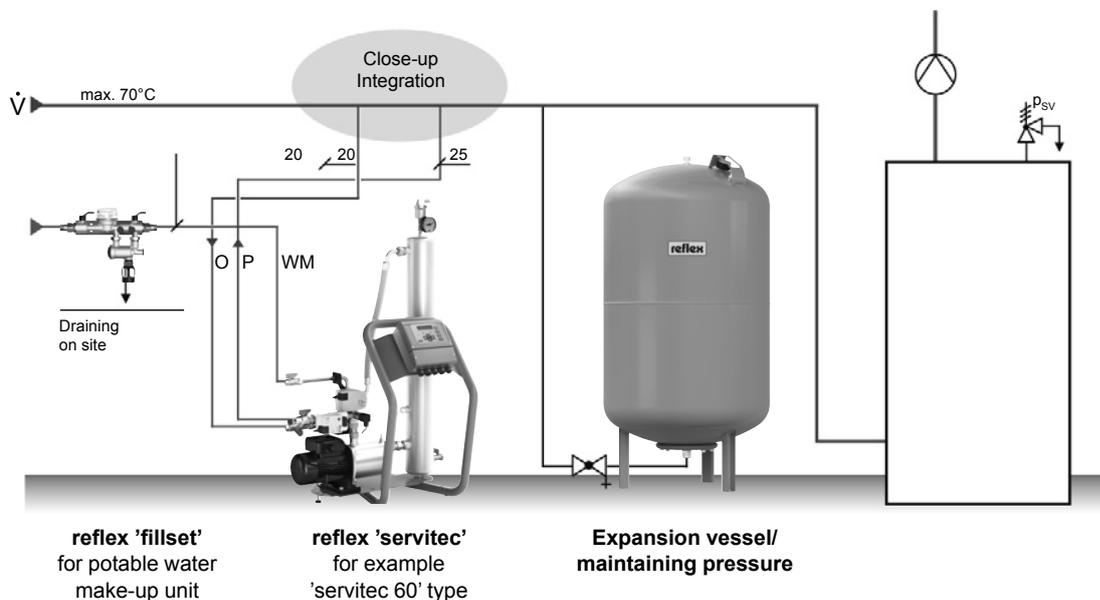
- Remove the 'servitec' unit from the pallet and transport to the installation site, ensuring that the 'servitec' unit is carried by the frame.
- When aligning the control unit, make sure that the valves and feed facilities of the connection lines can be operated.
- Remove the transport cover of the dipstick-tube degassing unit (20) and screw in the dipstick-tube degassing unit (20) by hand.
- Retighten all bolt connections.
- If the make-up water is to come from the potable water system, a 'fillset' unit (→ p. 3) or system separator must be installed upstream.
- If the parameter < 1.3 bar was selected when entering the desired make-up pressure in the customer menu (→ p.16), it must be ensured that water level, for example of the separation tank, is above the pump.
- If no 'fillset' is provided for connection to the potable water system, a dirt trap (mesh size < 0.25 mm) must be installed upstream on site.
- If the automatic make-up facility is not connected, the connection (WM) of the make-up line must be sealed with a G½" plug.
- 'servitec 35' must be decoupled for wall mounting on site to avoid the development of transmission noises.



Transport cover

## Assembly diagrams

- Connect 'servitec' with the system piping. The maximum permissible media temperature at the integration point is 70°C. In the case of heating systems, installation takes place in the system return.
- The point of integration should be in the immediate vicinity of the expansion line to take advantage of the protection offered by the system safety valve. Otherwise additional protection will be required.
- Maintain a minimum distance of 500 mm between the integration points.
- Note the direction of flow.
- Flush the pipelines.

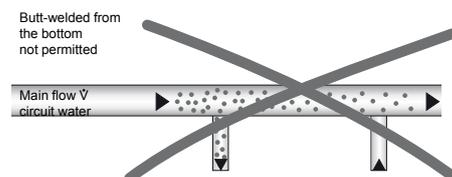
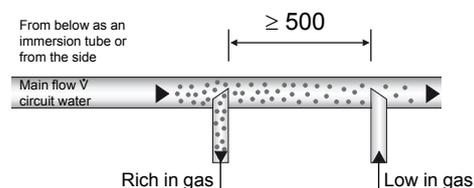
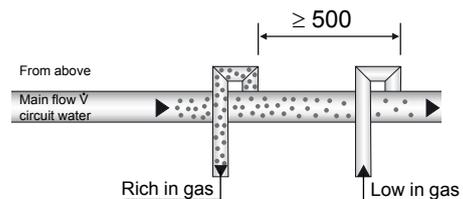


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- **Attention! Dirt!** Integrate connection lines as an immersion tube from the top, side or below. Never integrate flush from below (danger of soiling).
- Operation of the 'servitec' degassing unit is ensured only if the 'servitec' unit is integrated in a representative main flow of the system. The following minimum flow rates  $\dot{V}$  must be maintained during operation:

$\dot{V}$	'servitec' ... / 35'	'servitec' ... / 60-95
	0.7 m <sup>3</sup> /h	1.1 m <sup>3</sup> /h

## Close-up of integration



P Pump line

DN 25

O Overflow line

DN 20

WM Make-up line

DN 20

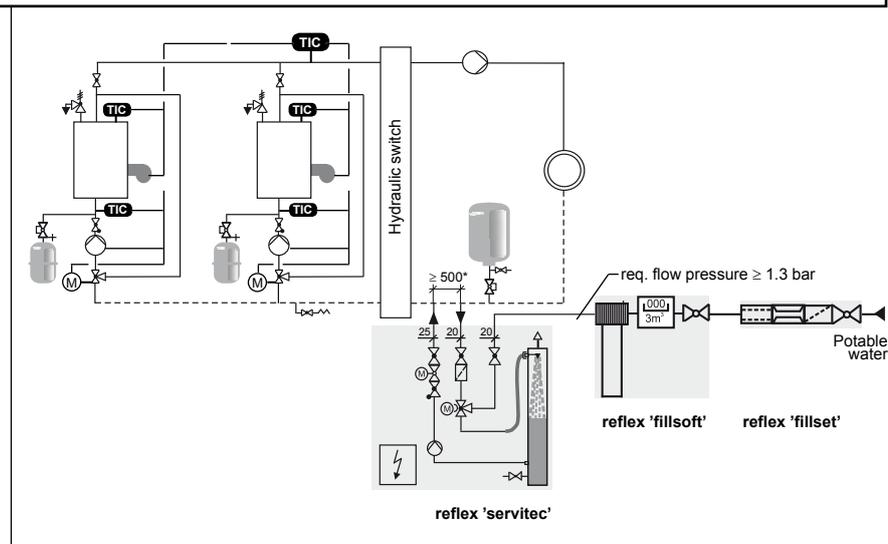
# reflex 'servitec' Assembly

## Installation

reflex 'servitec' degassing stations solve "gas problems" in three ways:

- ▶ No direct drawing in of air, thanks to monitored pressure maintenance
- ▶ No circulation problems from bubbles in the circuit water
- ▶ Reduction of corrosion risk thanks to the removal of oxygen from the filling and make-up water

## reflex 'servitec' in 'magcontrol' mode in a multiple boiler system with a hydraulic switch and expansion/pressure maintaining vessel



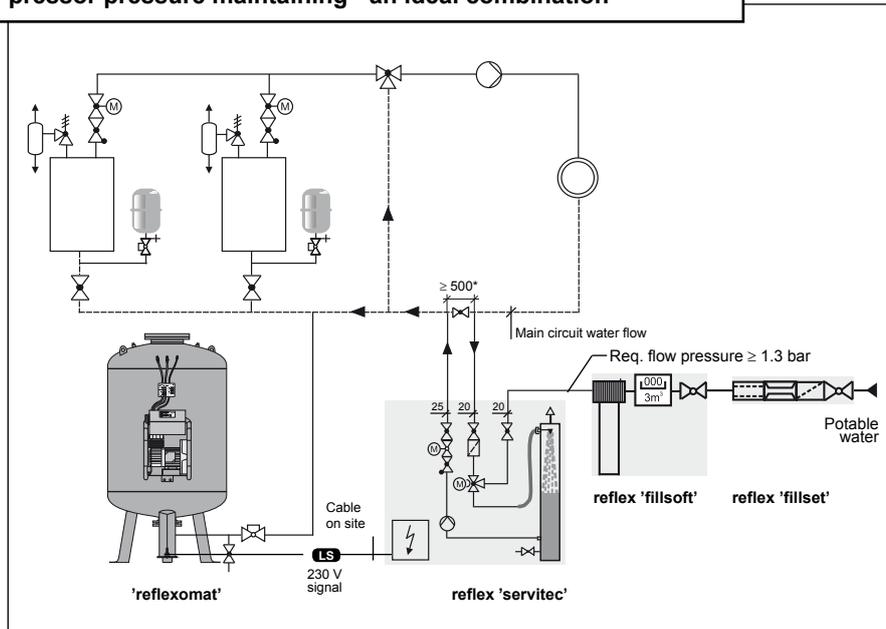
## Notes for the installer

- ▶ Preferably install the 'servitec' unit in the return on the system side so that the temperature load remains  $\leq 70^{\circ}\text{C}$ .
- ▶ When using softening systems (for example reflex 'fillsoft'), they should be installed between the 'fillset' and 'servitec' units.

\* Close-up of integration point → page 7

The circuits must be adjusted to suit local conditions.

## reflex 'servitec' in 'levelcontrol' mode and compressor pressure maintaining - an ideal combination



### Notes for the installer

- ▶ The combination of 'servitec' with compressor-controlled pressure-maintaining stations (for example 'reflexomat') is especially recommended. The system uncompromisingly degassed by the 'servitec' is softly cushioned by the 'reflexomat'.
- ▶ The water level in the expansion vessel is monitored by the control unit of the pressure-maintaining station. The 230 V make-up signal **LS** supplied by the pressure-maintaining station triggers the make-up process with degassing.
- ▶ Optimum degassing is ensured by integrating 'servitec' in the main circuit water flow.
- ▶ When combining pump-controlled pressure-maintaining stations with a 'servitec' unit, we always recommend individual boiler protection using a diaphragm pressure expansion vessel (for example 'reflex').

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### Electrical connection



Electrical wiring and connection must be performed by a qualified electrician according to the applicable local regulations (electricity board) and VDE guidelines. **The power supply plug must be disconnected or the system de-energized before any work is carried out on electrical components.** Comprehensive electrical connection diagrams are enclosed with these instructions and must be adhered to.

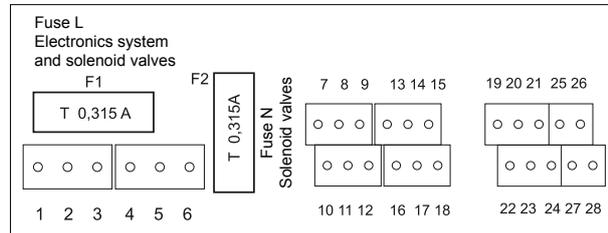
The following information applies only to standard systems and is largely restricted to the connections required on site.

- Loosen the recessed head screws on the control box (2).
- Open the cover.
- Pass all cables to be installed through the PG fitting.
- **Important!** Use only PG fittings suitable for the respective cable.
- Connect all cables (refer to the following electrical circuit diagram).
- Note the connected loads on p. 23 for on-site fuse protection.

# reflex 'servitec'

## Assembly - Initial start-up

Overview of the wiring diagram on the circuit board 'servitec 35 - 95'



Designation	Terminal	Signal	Remarks
Supply (230 V)	1	PE	'servitec' is fully wired including a plug with earthing contact
	2	N	
	3	L	
Pump 1 (9) (230 V)	4	PE	is connected
	5	N	
	6	M1	
Make-up unit (4) (230 V)	10	Y1 (cable no.2)	is connected
	11	N (cable no.1)	
Group message (floating)	13	COM	to be wired on-site (optional)
	14	NC	
	15	NO	
External make-up control	17	Make-up (230 V)	Only for 'servitec levelcontrol' floating input for ext. make-up signal
	18	Make-up (230 V)	
Low-water switch (13) Protection against dry running	20	- Level	Pass the cable of the low-water switch through the M20 2-way bolted connection and connect to termi- nals 20 and 21. Polarity need not be observed.
	21	+ Level	
Pressure gauge transformer (2)	22	PE	is connected
	23	- Pressure	
	24	+ Pressure	
Motorized ball valve (3) (overflow function)	25	0-10 V (cable no.3)	is connected
	26	0-10 V (cable no.5)	
	27	GND (cable no.1)	
	28	+24 V (cable no.2)	
Interface RS-485	The interface is provided for updating the interface program only on the 'servitec 35' to 'servitec 95' systems.		

### External make-up signal only for 'servitec levelcontrol'

Used in systems with pump- or compressor-controlled pressure maintenance. In the case of 'servitec levelcontrol', make-up is controlled using an external signal:

- Pass the control cable for the make-up unit through the corresponding bolted connection (M16 or M20).
- **Connect the cable (see above).**

**Once all the connections have been established, close the control box, retighten the bolts of the housing and connect to power supply. The system version appears in the display.**

**The 'servitec' control unit is now ready for initial start-up.**

## Requirements for start-up

- Installation of the 'servitec' including dipstick-tube degassing unit has been completed.
- The water connection to the system has been established.
- System pressure maintenance is in operation.
- The connection system is at least roughly bled.
- The system has been connected to the electrical mains system according to the applicable VDE and local electricity board regulations.
- At a make-up pressure > 6 bar, a pressure reducer must be installed on site.

**We recommend that you have the following steps and training of the operating personnel carried out by your Reflex Service (→ p. 21, chargeable service according to the applicable gross price list).**

## Start routine

The start routine commences when the controller is switched on for the first time. Its purpose is to set the parameters required for operation of the 'servitec' unit. If you enter an incorrect value, you can restart the start routine by pressing the "quit" button.

**Important!** The start routine can only be run through once; any subsequent parameter modifications and checks must be performed in the customer menu (→ p. 16).

### SERVITEC mag.../level...

The start routine of the 'servitec' is automatically called up when the controller is switched on for the first time. Subsequently, the 'servitec' model, for instance 'servitec magcontrol' or 'servitec levelcontrol', appears in the display (→ p. 8).

Choose the desired model using the arrow buttons:



Press "ok" to get to the language selection:



### Country: D D GB F NL PL CZ E DK

Select the language using the country code, for instance "GB" for English, and confirm with "ok".



### Please read the instructions!

A message asking you to read these operating instructions appears. Please confirm with "ok".



### Min. operating pressure P0 = 1.5 bar

This display appears only with 'servitec magcontrol'. Set the minimum operating pressure according to the static height of your system (refer also to the diagram below) and confirm with "ok".



$p_{sv}$  [bar] = Safety valve response pressure at the heat generator

$p_{max}$  [bar]

$p_e$  [bar] = Final pressure at pressure maintenance

The working pressure range of the 'servitec' must be within the working range  $p_a \dots p_e$  of the pressure maintenance.

$p_a$  = Make-up if pressure falls below

$p_a$  [bar] = Initial pressure for pressure maintenance or filling pressure  $p_f$  at expansion vessel(s)

$p_0$  [bar] =  $p_{static} + p_{evaporation} + 0.2$  bar (recommendation)

$p_{st}$  [bar] = Static pressure (= static height [m] / 10)

0.3 bar  
≥ 0.5 bar \*

≥ 0.3 bar  
0...0.2 bar \*

### Example: Heating system

Advance temperature: 70°C  
(evaporation pressure  $p_D = 0$  bar)  
Static pressure  $p_{st}$ : 11 mWS  
(11 mWS ~ 1.1 bar)

### Setting values:

$p_0$ : = 1.3 bar  
 $p_{sv}$ : = 3.0 bar

### Resulting pressure values

for make-up:  
On: = 1.4 bar  
Off: = 1.6 bar



\* Error message if pressure is exceeded or falls below

# reflex 'servitec'

## Initial start-up

Safety valve  
pressure  
PS= 3.0 bar

**This display appears only with 'servitec magcontrol'.**  
Set the safety valve response pressure of the heat generator and confirm with "ok".



Time:  
18:46:29

Start by setting the current hour (here: 18) with the arrow buttons and confirm with "ok". Continue by setting the minutes (here: 46) and seconds (here: 29).



Date:  
29.11.01

Start by setting the current day (here: 29) with the arrow buttons and confirm with "ok". Continue by setting the month (here: 11) and year (here: 01).



End  
routine?      Yes

At the end of the start routine you will be asked whether you wish to exit the start routine. If you select **"Yes"** and confirm with "ok", the system automatically switches to stop mode. It should initially be left in stop mode in order to undertake additional start-up measures. If you select **"No"**, the start routine will be reinitiated.

1.7 bar  
STOP

You have completed the start routine and are in stop mode (here: 'servitec magcontrol' with pressure display).

**You are now in stop mode.  
Important! Do not change to automatic mode yet.**

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### Filling and bleeding pump



'servitec' unit is in stop mode.  
Pay attention at high temperatures! Note the general safety instructions (→ p. 5)!!

- Connect the filling hose to the filling and draining tap (19) of the vacuum spray-tube.
- Fill the vacuum spray-tube, air is expelled through the dipstick-tube degassing unit (20), the potable water pressure can then be read out on the vacuum gauge (17).
- **Bleed the pump (9) using the bleed screw (8)**, the pump must not be running.
- Close the bleed screw; close the filling and draining tap (19). Turn on the pump.



#### Note:

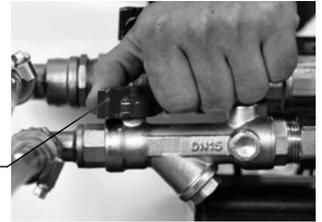
Do not fully unscrew the bleed screw. Wait until water runs out that is free from air. If required, repeat bleeding procedure until the pump indicates a vacuum on the vacuum gauge (17).

## Vacuum test



**Pay attention at high temperatures! Note the general safety instructions (→ p. 5)!**

The vacuum test must be performed carefully to guarantee operation of the 'servitec'!



- Close the ball valve (5), the ball valve (1) of the pump line is open



Switch to manual mode



Start system degassing (SE, ▲ flashes),  
pump (9) starts after 50 s



Switch off pump after approx. 10 s of pump operation!

- **Monitor the vacuum gauge (17); the pressure must not change over the course of approx. 10 min.**

If the pressure increases, carefully check the bolted connections at the vacuum spray-tube, the bleed screw (8) and the dipstick-tube degassing unit (20) and repeat the above mentioned procedure.

- Reopen the ball valve (5) if the vacuum test was successful
- If the error message "water low" appears, you must acknowledge it before being able to change to automatic mode.



**You may now change over to automatic mode.**

## Automatic mode

### Note:

For automatic mode of the 'servitec' unit, you must ensure that pressure maintenance of the system is in operation and that it is hydraulically connected to the 'servitec' unit. The system must have been roughly bled.



Start automatic mode, "Continuous degassing" appears in the display.

**1.7 bar  
continuous  
degassing**

Display (→ p. 4) after initial start-up of a 'servitec' unit in automatic mode

**The 'servitec' unit is now in operation.**

The initial start-up services of Reflex Service are now complete.

# reflex 'servitec'

## Initial start-up

After initial start-up, continuous degassing is activated for 24 hours as standard, which is automatically followed by interval degassing (→ p. 15). The dirt traps behind the ball valve (5) must be cleaned after continuous degassing.

### Cleaning the dirt traps



**Attention! Note the general safety instructions (→ p. 5)!**

#### Note:

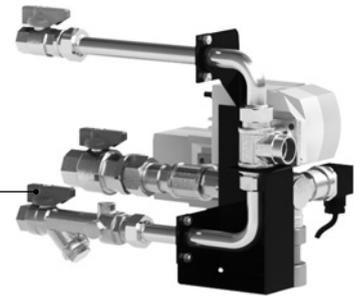
The dirt traps (5) must be cleaned following the set continuous degassing period (not part of the services provided by Reflex Service during initial start-up!). Please also observe to install dirt traps on-site (for example 'fillset' item F).

It is also required to check the dirt traps after the filling process or after extended periods of operation.

- Close ball valve (5).



switch to stop mode.



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- Loosen the sealing cap and remove.

- Remove dirt trap (filter insert) and clean under running water.

- Further seal the sealing cap and put on together with the dirt trap. Subsequently screw it in.

- Tighten sealing cap.

- Reopen ball valve (5).

- Bleed the pump (9) using the bleed screw (8), the pump must not be running.

- Close bleed screw (8).



Start automatic mode.



**Initial start-up is now completed!**

## Automatic mode

Automatic mode may only be activated after initial start-up has been successfully completed. If you are in automatic mode, you can select from three degassing programs, if required. System monitoring is active with all three degassing programs. Make-up takes place automatically. Select in the customer menu (→ p. 16)

### Continuous degassing – Intensive degassing following start-up and repairs

The degassing cycles are executed successively for the set continuous degassing time (basic setting: 24 h). The controller then automatically proceeds with interval degassing. In the case of water systems, at least half the system volume should flow through the 'servitec' unit once during start-up; in the case of water/glycol mixtures, the amount should be five times the system volume.

### Interval degassing – Economy mode in automatic mode

After eight intervals (default), a break (default 12 h) is observed before the next eight degassing intervals are started. This program is automatically started upon completion of continuous degassing or can be selected manually for systems already degassed. Interval degassing then starts at 08:00 each day.

### Make-up degassing – Degassing of the make-up water only

The system water is not degassed. This operating mode is practical during summer operation (→ p. 18) or if general degassing of the system water is not required. The make-up volume can be reduced with a pressure reducer by reducing the cold water input pressure.



Display (→ p. 4) automatic mode with continuous degassing



Display (→ p. 4) automatic mode with interval degassing



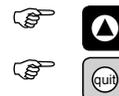
Display (→ p. 4) automatic mode with make-up degassing

## Manual mode

Manual mode can be used for the vacuum test and to fill the system. For this purpose, there are two types of operation in manual mode: NE (make-up degassing) and SE (system degassing)

### System degassing SE – system water is degassed

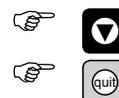
System degassing is active while ▲ flashes.  
Quit system degassing.



In this type of operation the degassing intervals (see above) are successively executed. System degassing is required for the vacuum test (→ p.13).

### Make-up degassing NE – make-up water is degassed

Make-up degassing in manual mode is active while ▼ flashes.  
Quit make-up degassing.



The system can be filled with 'servitec magcontrol'. The filling time is monitored. Once the filling pressure ( $p_F$ , → p. 11) or the filling time (10 h) has been reached, make-up degassing is terminated and the system switches to interval or continuous degassing operating mode. If the filling pressure  $p_F$  in the make-up degassing has not been reached, an error message is generated.

You will get to stop mode by pressing the  again.



Display (→ p. 4) 'servitec levelcontrol' indicator ▲ flashes during system degassing

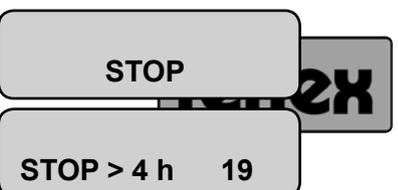


Display (→ p. 4) 'servitec levelcontrol' indicator ▼ flashes during make-up degassing. NSP appears at 230 V or floating make-up signal.

## Stop mode

In stop mode, 'servitec' is without function except for indication in the LC display. Operation monitoring does not take place. All pumps or solenoid valves are switched off. The adjacent display appears when the "stop" button is pressed.

A message will be output if stop mode is active for more than 4 hours since there is no forced start-up of the pump (10) in this operating mode and consequently it can seize after long periods of operation.



# reflex 'servitec' Operation

## Customer menu

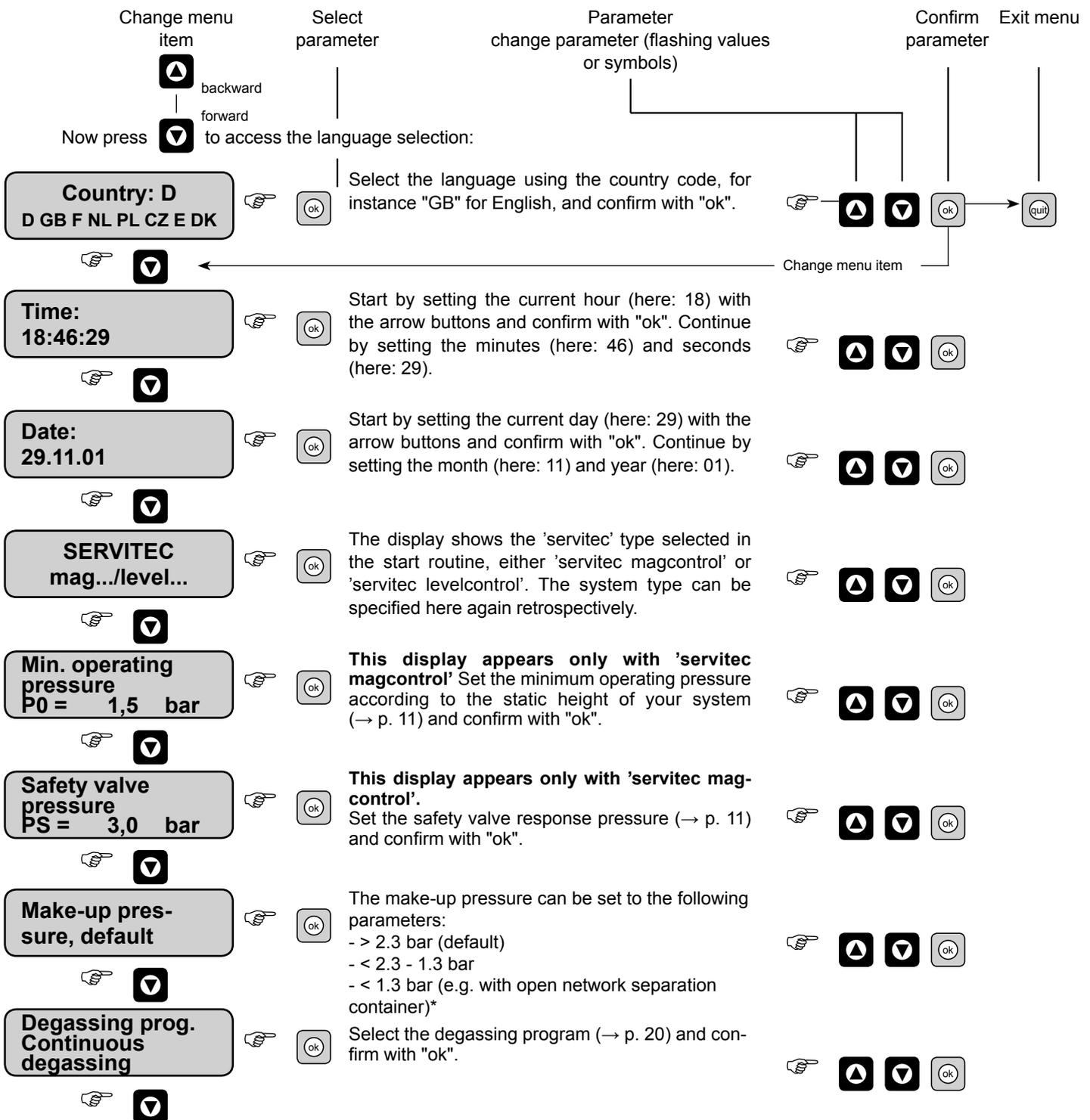


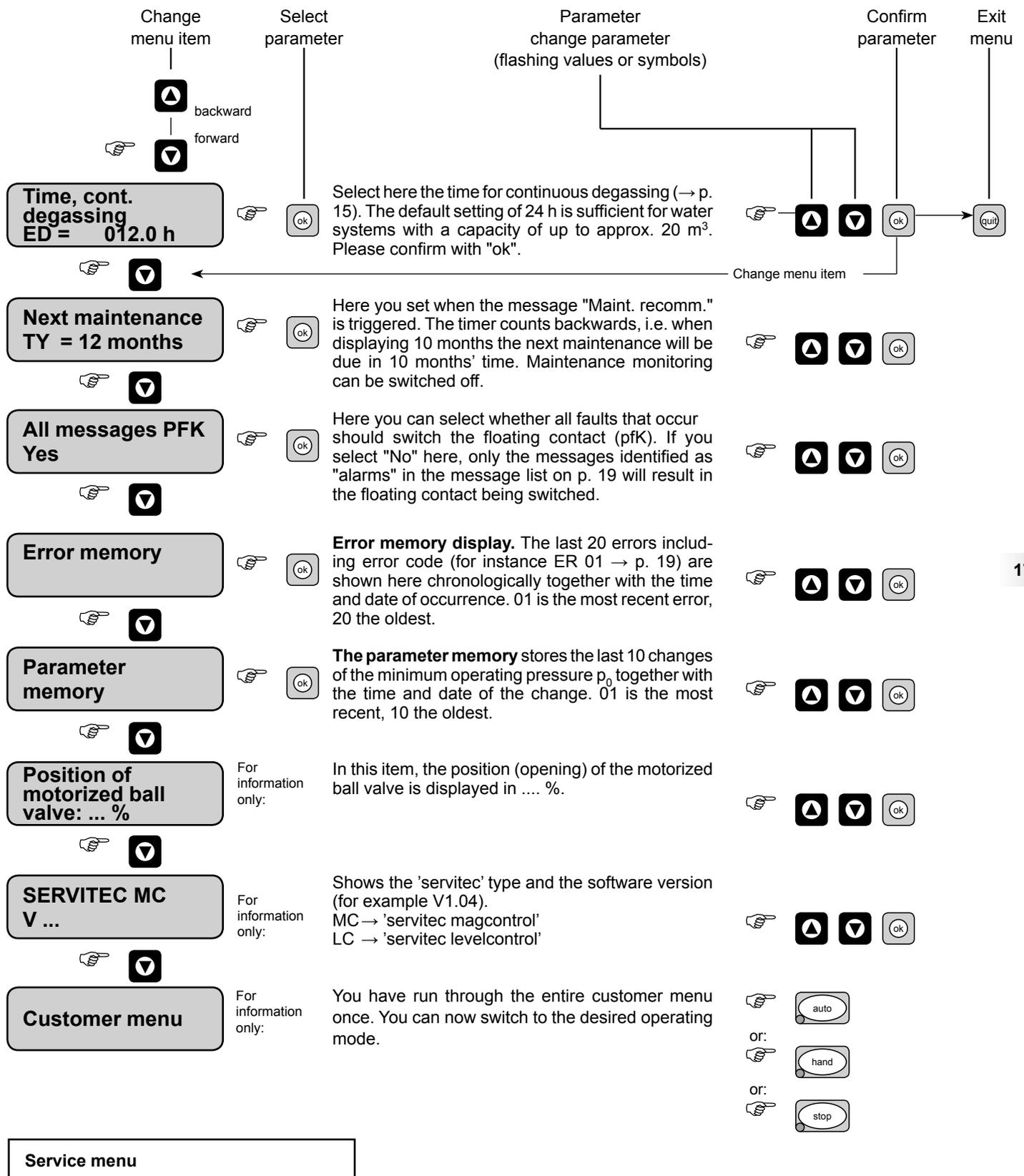
### General

The purpose of the customer menu is to enter and change the key 'servitec' operating parameters. Some of these will already have been processed within the start routine during initial start-up. Further parameter changes are possible here. Press the "menu" button to access the customer menu. Here you can change operating parameters or view current statuses. Press the "menu" button to access the customer menu. Press  to exit the customer menu.

## Customer menu

This display appears after the menu button is pressed. You are now in the customer menu.





A password-protected service level in which additional data can be changed is installed in 'servitec' controllers. This can only be done by Reflex Service, phone +49 23 82 / 70 69 - 550.

# reflex 'servitec'

## Operation

### Summer operation

If the circulating pumps of the system are taken out of service during the summer, degassing of the system water cannot be ensured since there is no gas-rich water reaching the 'servitec'. If this is the case, the degassing program can be set to make-up degassing using the customer menu (→ p. 16) (keyword: saving energy).

If the 'servitec' has been operated in make-up degassing mode during the summer, it should be reset to interval degassing or, if desired, to continuous degassing after the circulating pumps have been switched on again.

Seizing of the pump (9) is avoided by the forced start-up (24 h). Seizing of the pump cannot be ruled out following lengthy downtimes ('servitec' de-energized or in stop mode). For this reason the pump rotor should be turned using a screwdriver prior to restarting.

### Default settings

Parameters based on empirical values collected during research and operation have been preset in the data memory of the 'servitec'. The most important of these are described in the following table.

Parameter	Setting	Remark	'servitec magcontrol'	'servitec levelcontrol'
<b>Pressure</b> Make-up ON Make-up OFF Minimum pressure not attained Maximum pressure exceeded	$p_0 + 0.1$ bar $p_0 + 0.3$ bar = $p_0$ $p_{SV} - 0.2$ bar	– $p_0$ (min. operating pressure → p. 11) – $p_{SV}$ (safety valve response pressure (→ p. 11))	<b>x</b> <b>x</b> <b>x</b> <b>x</b>	
<b>Max. make-up volume</b> Time not attained (alarm)	0	– The alarm message is triggered when the make-up time or number of cycles is exceeded	<b>x</b> <b>x</b>	<b>x</b> <b>x</b>
<b>Filling</b> Maximum fill time	10 h	– Filling is terminated after 10 h or on reaching the fill pressure ( $p_0 + 0.3$ bar)	<b>x</b>	
<b>Degassing interval</b> Draw vacuum Injection time Expulsion time Idle time	Default* / gl* xx s / xx s xx s / xx s xx s / xx s xx s / xx s	– Pump running, no spraying – Pump running, spraying – Pump off, spraying – Pump off, no spraying	<b>x</b> <b>x</b> <b>x</b> <b>x</b>	<b>x</b> <b>x</b> <b>x</b> <b>x</b>
<b>Interval-continuous degassing-</b> Pause time Degassing cycles Start time for interval degassing  Continuous degassing time	12 h 8 08:00  24 h	– Eight degassing cycles are performed every 12 hours – Interval degassing starts at 08:00 each day (synchronization) – Adjust time to the consumer system	<b>x</b> <b>x</b> <b>x</b>  <b>x</b>	<b>x</b> <b>x</b> <b>x</b>  <b>x</b>

\* The values are permanently specified in the data memory and can only be modified in the Service menu.

## Messages

Active messages are displayed in the message line of the display. In addition to this, the error LED lights up (red). Dry-running protection is indicated directly by a separate LED (→ p. 4). If several messages are active simultaneously, they can be displayed directly with .

Most of the messages are automatically acknowledged once the cause has been remedied. Errors such as "Make-up time 06" or "Make-up cycle 07" must be acknowledged manually.

An error and parameter memory is available for subsequent analysis (→ p. 17). For remote transmission, it is possible to use the floating changeover switch for the group message and the floating contact for dry-running protection. In the customer menu (→ p. 16), you can select whether only those messages characterized as alarms or all messages should be output using the floating contact.

ER code	Type of error	Cause of error	Troubleshooting/remedy
01	<b>Min. pressure <math>p_0</math></b> not attained (alarm)	<ul style="list-style-type: none"> <li>– Water loss in the system</li> <li>– Pressure maintenance facility incorrectly set or defective</li> </ul>	<ul style="list-style-type: none"> <li>– Fix leak</li> <li>– Acknowledge error ("quit")</li> </ul>
02.1	<b>Protection against dry running</b> time exceeded (alarm)	<ul style="list-style-type: none"> <li>– Low-water switch (16) not wired up</li> <li>– No water entering the vacuum spray-tube                             <ul style="list-style-type: none"> <li>- Ball valve on inlet side closed</li> <li>- Dirt traps (5) dirty</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>– Wire up low-water switch</li> <li>– Open ball valve</li> <li>– Clean dirt traps</li> </ul>
02.2	<b>Protection against dry running</b> time not attained (alarm)	<ul style="list-style-type: none"> <li>– Insufficient water entering the vacuum spray-tube                             <ul style="list-style-type: none"> <li>- Dirt traps (5) dirty</li> </ul> </li> <li>– Dipstick-tube degassing unit (20) defective</li> </ul>	<ul style="list-style-type: none"> <li>– Clean dirt traps</li> <li>– Replace dipstick-tube degassing unit</li> </ul>
04.1	<b>Pump</b> fault (alarm)	<ul style="list-style-type: none"> <li>– Pump fuse defective</li> <li>– Pump blocked</li> <li>– Short circuit</li> </ul>	<ul style="list-style-type: none"> <li>– Check fuse and replace if necessary</li> <li>– Turn on pump</li> <li>– Determine cause and remedy</li> </ul>
06	<b>Make-up time</b> exceeded (default 20 min)	<ul style="list-style-type: none"> <li>– Major leaks in the system</li> <li>– Make-up time insufficient for downstream pressure maintenance</li> </ul>	<ul style="list-style-type: none"> <li>– Fix leaks and acknowledge error</li> <li>– Reduce make-up hystereses of pressure-maintenance facility</li> </ul>
07	<b>Make-up cycles</b> exceeded (default 3 in 2 h)	<ul style="list-style-type: none"> <li>– Minor leaks in the system</li> </ul>	<ul style="list-style-type: none"> <li>– Fix leaks and acknowledge error message</li> </ul>
08	<b>Pressure measurement</b> fault (alarm)	<ul style="list-style-type: none"> <li>– Pressure transducer not connected or defective</li> </ul>	<ul style="list-style-type: none"> <li>– Check wiring and replace if necessary</li> </ul>
10	<b>Max. pressure <math>p_{max}</math></b> exceeded	<ul style="list-style-type: none"> <li>– Excessive pressure losses between 'servitec' and system</li> <li>– Expansion vessel in the system has incorrect input pressure</li> <li>– PS set too low in the customer menu</li> </ul>	<ul style="list-style-type: none"> <li>– Integrate pressure transducer into the system or use greater nominal widths for piping to system</li> <li>– Check expansion vessel input pressure</li> <li>– Match PS setting to system's safety valve response pressure</li> </ul>
11*	<b>Make-up volume</b> within a make-up cycle exceeded	<ul style="list-style-type: none"> <li>– Major leaks in the system</li> <li>– Make-up volume insufficient for downstream pressure maintenance</li> </ul>	<ul style="list-style-type: none"> <li>– Fix leaks and acknowledge error</li> <li>– Reduce make-up hystereses of pressure-maintenance facility or increase maximum make-up volume</li> </ul>
12	<b>Fill time</b> exceeded (default 10 h)	<ul style="list-style-type: none"> <li>– Max. fill time exceeded</li> </ul>	<ul style="list-style-type: none"> <li>– Check fill status of the system, acknowledge error and refill if necessary</li> </ul>
16	<b>Voltage failure</b>		<ul style="list-style-type: none"> <li>– Check voltage supply</li> </ul>
19	Stop > 4 h	<ul style="list-style-type: none"> <li>– 'servitec' has been in stop mode for more than 4 h</li> </ul>	<ul style="list-style-type: none"> <li>– Activate automatic mode if necessary to prevent seizing of the pump</li> </ul>
<b>Maint. recomm.</b>	<b>Maintenance interval</b> expired	<ul style="list-style-type: none"> <li>– Reminder of at least annual maintenance</li> </ul>	<ul style="list-style-type: none"> <li>– Perform maintenance</li> <li>– Acknowledge message</li> </ul>

# reflex 'servitec'

## Maintenance, testing, disassembly

### Maintenance manual



#### Attention! Note the general safety instructions (see p. 5)!

The 'servitec' must be maintained annually or at least after 16,000 degassing cycles (this corresponds to a continuous degassing time of approx. 14 days or a continuous degassing time of 7 days + 1 year interval degassing with the default setting). Maintenance work should only be carried out by specialists. We recommend that you have this done by your Reflex Service.

As a reminder of the maintenance to be performed at least annually, the "Maint. recomm." message appears once the set operating time is up; this message can be acknowledged with the "quit" button.

The vacuum spray-tube should be depressurized by way of the filling and draining tap (19) before carrying out any maintenance work on it.

#### Leak test

- Check for external leaks, in particular the pump, screw connections and dipstick-tube degassing unit
- Seal, if required

#### Vacuum function test

- Procedure → p. 13, section "Vacuum test"

#### Cleaning the filter cartridge (5)

- Procedure → p. 14, section "Cleaning the dirt traps"

#### Checking the controller's setting values

- Procedure → p.16, "Customer menu"

#### Checking the degassing interval

#### System degassing

-   Switch to manual mode
-   Start system degassing (SE, ▲ flashes)
- The pump (9) starts once the expulsion time (50 s) has expired; the vacuum is drawn, and can be read off the vacuum gauge (17).
- Pump (9) switches off (after 30 s), the low-water LED must not light up
- Water is sprayed in via the pressure supply port with nozzle (11), the vacuum is broken, gas is expelled; gas must be expelled before the next interval starts.

1.7 bar  
NE ▼ SE ▲ 10 h

Display (→ p. 4) 'servitec magcontrol' ▲ flashes during system degassing

#### Make-up degassing

-   Start make-up degassing (NE, ▼ flashes)
- Motorized ball valve (4) of the make-up facility opens, and the pump starts and draws a vacuum.
- Pump switches off (30 s),
- Water is sprayed in via the nozzle (11), the vacuum is broken, gas is expelled; gas must be expelled before the next interval starts.
-   Deactivate make-up degassing (NE, ▼ stops flashing)

1.7 bar  
NE ▼ SE ▲ 10 h

Display (→ p. 4) 'servitec magcontrol' ▼ flashes during make-up degassing

#### Note:

Maintenance is complete once the gas has been completely expelled using the dipstick-tube degassing unit and the low-water LED (red) has not come on during the injection process.

-   Start automatic mode

# Maintenance, testing, disassembly / Reflex Service

## Disassembly

Before inspection or disassembly of the 'servitec' system or pressurized parts, these must be depressurized.

1. Close the ball valves (5), (6) of the control unit and (E) of the 'fillset'.
2. Open the filling and draining valve (19) until the spray tube (18) is depressurized.
3. Completely drain the spray tube (18) using the filling and draining valve (19); if necessary, ventilate by screwing off the dipstick-tube degassing unit (20).



## Inspections intervals

**Recommended maximum inspection intervals for Germany according to § 15 (5) of the Betriebssicherheitsverordnung (Ordinance on Industrial Safety and Health) and classification of the 'servitec' spray tube in Table 2 of directive 97/23/EC:**

Valid with strict adherence to the Reflex assembly, operating and maintenance instructions:

**External inspection:** No requirement

**Internal inspection:** Maximum interval according to § 15 (5)

**Strength test:** Maximum interval according to § 15 (5)

The actual intervals must be laid down by the operator on the basis of a safety evaluation, taking due account of the actual operating conditions and the applicable national regulations.

## Central factory service

**+49 23 82 / 70 69 -...**

**Extension:    Fax:    E-mail:**

Volker Lysk                      - 512                      - 523                      volker.lysk@reflex.de

## Regional Service

Please contact our central office in Ahlen to inquire about your regional service:

**Tel.: +49 23 82 / 70 69 - 0**

E-mail: info@reflex.de

## Certificate No. of EC type approval Zertifikat-Nr. der EG-Baumusterprüfung

Typ Type			Zertifikat-Nr. Certificate No.
'minimat'	200 - 500 Liter	6 bar - 120 °C	04 202 1 450 04 01952
'reflexomat'	200 - 800 Liter	6 bar - 120 °C	04 202 1 932 01 00077
	1000 - 5000 Liter	6 bar - 120 °C	04 202 1 450 02 00714
	350 - 5000 Liter	10 bar - 120 °C	04 202 1 450 02 00039
	1000 - 5000 Liter	10 bar - 120 °C	04 202 1 450 02 00715
'variomat'	200 - 1000 Liter	6 bar - 120 °C	04 202 1 932 01 00051
	1000 - 5000 Liter	6 bar - 120 °C	04 202 1 450 02 00712
'gigamat'	1000 - 5000 Liter	6 bar - 120 °C	04 202 1 450 02 00713
	10000 Liter	6 bar - 120 °C	04 202 1 450 02 00062



'servitec'                      DN 150 - DN 250                      10 bar / 16 bar - 120 °C                      04 202 1 450 03 00210

# reflex 'servitec'

## General information

### Mode of operation

#### General description

'servitec' is a degassing and make-up station. It can be used in a wide range of system conditions. The main field of application is heating and cooling circuits and wherever air problems in the form of dissolved or free gases cause problems in systems.

The 'servitec' vacuum spray-tube degassing system removes up to 90% of the dissolved gases from the system water. The 'servitec ../gl' was developed for glycol/water mixtures with up to 50% glycol. The '../gl' type ensures high degassing performance even with glycol/water mixtures.

Vacuum degassing of a part flow of the circuit water takes place according to an optimized schedule using selectable degassing programs (→ p. 15).

Part of the circuit water is atomized into the vacuum spray-tube (18) by drawing the vacuum through the pump (9). The large surface area of the sprayed water and the intense vacuum result in the extremely high degassing performance. The degassed water is returned to the system by the pump. There the water is again able to dissolve gases. The gases separated in the vacuum spray-tube are expelled using the dipstick-tube degassing unit (20). This degassing interval is repeated and both free as well as dissolved gases are removed from the circuit water.

#### Degassing interval

The water from the make-up or discharge line is made available at the nozzle (11) at an appropriate pressure by way of the motorized ball valve and the connecting hose (12). The degassing interval is a time-controlled, pre-programmed process. It can only be changed in the service menu by Reflex Service.

#### Injection time

The pump starts. A vacuum (dependent on temperature) can be read off the vacuum gauge (17) after a short time. This is possible because the pump draws more water from the vacuum spray-tube via the suction connection (11) than is able to flow in via the pressure supply port with nozzle. The motorized ball valve (3) constantly controls the volume flow of the pump. For this reason, the pump is set to a constant working point by the motorized ball valve. Spraying via the nozzle commences as soon as the vacuum begins to be established.

The water level in the vacuum spray-tube drops continuously while the pump is running. The timing program and pressure setting have been selected so that the low-water switch (13) will not be triggered.

#### Expulsion time

The pump switches off. The water continues to be sprayed into the vacuum spray-tube by the system pressure (at least 1.3 bar). During the expulsion time (50 s), the water column in the vacuum spray-tube rises gradually. The vacuum is still maintained during this phase of the interval. At the end of the expulsion phase, the rising water column compresses the removed gas within a few seconds, expelling it into the atmosphere via the dipstick-tube degassing unit.

#### Idle time

This is followed by the idle time during which redegassing takes place.



'servitec 60'

## 'servitec magcontrol' make-up

In the case of the 'servitec magcontrol', the pressure in the heating or cooling system is registered and monitored with the help of the pressure transducer (2). If the fill pressure drops below  $p_F = p_0 + 0.1$  bar, make-up degassing is activated until  $p_F = p_0 + 0.3$  bar has been reached. Time (20 min default setting) and cycle monitoring (3 in 2 hours) are active during this process.

## 'servitec levelcontrol' make-up

In the case of the 'servitec levelcontrol', make-up takes place directly into the system depending on the level in the vessel of the pressure- maintaining station.

The make-up function can be activated using a floating contact or an external 230 V~ signal.

Time, cycle and optional volume monitoring are active.

### Operating parameters

- ▶ Perm. excess operating pressure 'servitec' size 35, 60 : 8 bar  
'servitec' size 75, 95 : 10 bar
- ▶ Perm. operating temperature : > 0 ... 70°C
- ▶ Perm. advance temperature of the supply system : 120°C
- ▶ Perm. ambient temperature : > 0 ... 45°C
- ▶ Degree of separation for dissolved gases : Up to 90%  
Free gases : 100%
- ▶ Minimum flow pressure for make-up for heating and cooling water : 1.3 bar
- ▶ Noise level : 55 dB
- ▶ Nominal spray-tube volume  
'servitec' standard systems : 5 liters  
(without name plate on spray-tube)  
'servitec' special systems : acc. to name plate

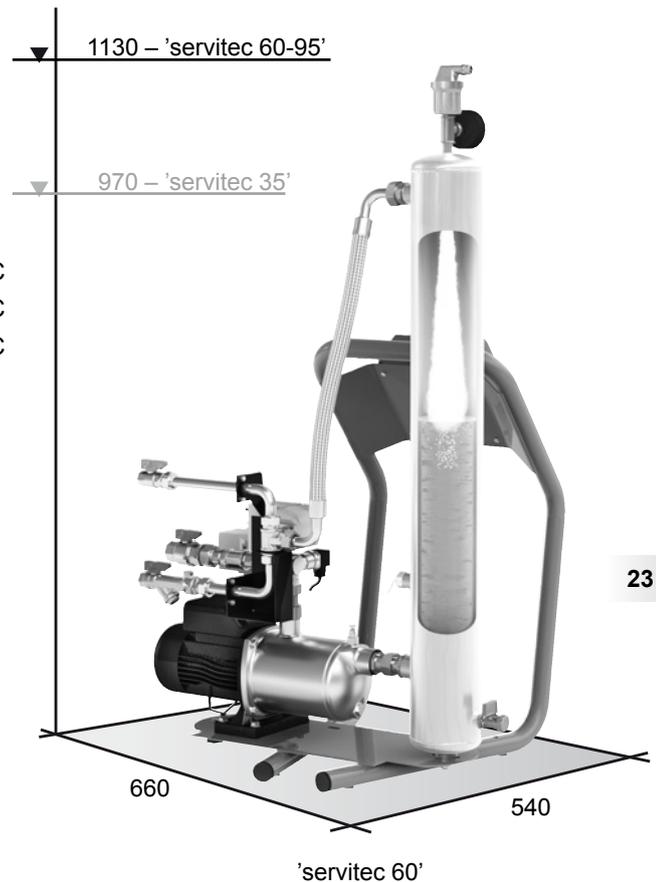
### Dimensions and weights

- |                                 |               |                  |
|---------------------------------|---------------|------------------|
| ▶ Dimensions                    | 'servitec 35' | 'servitec 60-95' |
| Total height:                   | 970 mm        | 1130 mm          |
| Width:                          | 530 mm        | 660 mm           |
| Depth:                          | 300 mm        | 540 mm           |
| ▶ Recommended installation area |               |                  |
| Width:                          |               | 1000 mm          |
| Depth:                          |               | 1000 mm          |
| ▶ Weight:                       |               | 28 - 45 kg       |

### Application areas

- ▶ Heating and cooling systems
- ▶ 'gl' version for water mixtures up to 50% glycol\*
- ▶ Degassing of the system water with system volumes:  
'servitec ../35' < 60 m<sup>3</sup>  
'servitec ../60 - 95' < 100 m<sup>3</sup>
- ▶ Degassing of make-up water, in particular potable water up to 0.55 m<sup>3</sup>/h\*

\* Larger stations or model for glycol available on request



### Electrical specifications

- ▶ Output
  - 'servitec 35':  
0.7 kW, fuse 10 A, 230 V, 50 Hz
  - 'servitec 60, 75, 95':  
1.1 kW, fuse 10 A, 230 V, 50 Hz
- ▶ Degree of protection IP 54
- ▶ Separate protection of the controller with a micro fuse (500 mA) and of the pump with a fuse (10 A)  
On-site connection
- ▶ - Ground fault circuit interrupter 0.03 A  
- < 1.5 kW 230 V  
Plug-ready 'servitec' with 5 m connection cable to on-site outlet

# reflex 'servitec'

## Declaration of conformity

### Konformitätserklärung für die elektrischen Einrichtungen an den Druckhalte-, Nachspeise- bzw. Entgasungsanlagen 'reflexomat', 'minimat', 'variomat', 'gigamat' und 'servitec'

1. Hiermit wird bestätigt, dass die Produkte den wesentlichen Schutzanforderungen entsprechen, die in den Richtlinien des Rates zur Angleichung der Rechtsvorschriften der Mitgliedsstaaten über die elektromagnetische Verträglichkeit (2004/108/EG) festgelegt sind.

Zur Beurteilung der Produkte wurden folgende Normen herangezogen: DIN EN 61326-1:2006-10

2. Hiermit wird bestätigt, dass die Schaltschränke den wesentlichen Anforderungen der Niederspannungsrichtlinie (2006/95/EG) entsprechen.

Zur Beurteilung der Produkte wurden folgende Normen herangezogen: DIN EN 61010-1:2002-08  
BGV A2

### Konformitätserklärung für eine Baugruppe Declaration of conformity of an assembly

Konstruktion, Fertigung, Prüfung von Druckgeräten  
Design – Manufacturing – Product Verification

Angewandtes Konformitätsbewertungsverfahren nach Richtlinie für Druckgeräte  
97/23/EG des Europäischen Parlaments und des Rates vom 29. Mai 1997

Operative Conformity Assessment according to Pressure Equipment Directive  
97/23/EC of the European Parliament and the Council of 29 May 1997

**Druckgefäße: 'reflexomat', 'minimat', 'variomat', 'gigamat' und 'servitec'**  
universell einsetzbar für Heizungs-, Solar- und Kühlwasseranlagen  
**Pressure vessels: 'reflexomat', 'minimat', 'variomat', 'gigamat' and 'servitec'**  
in operation for heating-, solar- and cooling plants

Angaben zu Behälter, Seriennummer, Typ und Betriebsgrenzen  
Data about vessel, serial no., type and working limits

gemäß Typenschild  
according to the name plate

Beschickungsgut  
Operating medium

Wasser / Inertgas oder Luft gemäß Typenschild  
Water / Inertgas or air according to the name plate

Normen, Regelwerk

Standards

Druckgeräterichtlinie, prEN 13831:2000  
oder AD 2000 gemäß Typenschild  
Pressure Equipment Directive, prEN 13831:2000  
or AD 2000 according to the name plate

Druckgerät

Pressure equipment

**Baugruppe** Artikel 3 Abs. 2.2  
**Behälter** Artikel 3 Abs. 1.1a) 2. Gedankenstrich (Anhang II Diagr. 2)  
**Ausrüstung** Artikel 3 Abs. 1.4:  
Membrane, 'reflexomat' und 'minimat' mit VS Steuereinheit und SV Sicherheitsventil, 'variomat' mit Steuereinheit, 'gigamat' mit Steuereinheit  
**assembly** article 3 paragraph 2.2  
**vessel** article 3 paragraph 1.1a) 2. bar (annex II Diagraph 2)  
**equipment** article 3 paragraph 1.4:  
diaphragm, 'reflexomat' and 'minimat' with VS control unit and SV safety valve, 'variomat' with control unit, 'gigamat' with control unit

Fluidgruppe  
Fluid group

2

Konformitätsbewertungen nach Modul  
Conformity assesment acc. to module

B + D 'reflexomat', 'minimat', 'variomat',  
'gigamat', 'servitec'

Kennzeichnung gem. Richtlinie 97/23/EG  
Label acc. to Directive 97/23/EC

CE 0045

Zertifikat-Nr. der EG-Baumusterprüfung  
Certificate-No. of EC Type Approval

→ S. 23  
→ p. 23

Sicherheitsventil (IV) 'reflexomat' Pos. 12  
siehe Bedienungsanleitung S. 3 'minimat' Pos. 7  
Safety valve (IV) 'variomat' Pos. 10  
see operating instructions p. 3 'gigamat' Pos. 13

Vom Hersteller des Sicherheitsventiles entsprechend den Anforderungen der Richtlinie 97/23/EG gekennzeichnet und bescheinigt.  
Confirmed and signed by the manufacturer of the safety valve according to the requirements of guideline 97/23/EC.

Zertifikat-Nr. der Bewertung des QS-Systems (Modul D)  
Certificate-No. of certification of QS System (module D)

07 202 1403 Z 0836/9/D0045

Benannte Stelle für Bewertung des QS-Systems  
Notified Body for certification of QS System

TÜV Nord Systems GmbH & Co. KG  
Große Bahnstraße 31, 22525 Hamburg

Registrier-Nr. der Benannten Stelle  
Registration-No. of the Notified Body

0045

Hersteller:  
Manufacturer:



**Reflex Winkelmann  
GmbH + Co. KG**

Gersteinstraße 19  
59227 Ahlen - Germany  
Telefon: +49 23 82 / 70 69 - 0  
Telefax: +49 23 82 / 70 69 - 588  
E-Mail: info@reflex.de

Der Hersteller erklärt, daß die Baugruppe die Anforderungen der Richtlinie 97/23/EG erfüllt.  
The manufacturer herewith certifies this assembly is in conformity with directive 97/23/EC.

Manfred Nussbaumer

Volker Mauel

Mitglieder der Geschäftsführung / Members of the Management





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