

REMS Multi-Push SL REMS Multi-Push SLW INSTRUCTION MANUAL

Powerful, compact, electronic flushing and pressure testing unit with oil-free compressor. For flushing with water or a water/air mixture, disinfection, cleaning, preservation of pipe systems, for pressure and leak testing of pipe systems and vessels with compressed air or water, as a pneumatic pump for controlled filling of all types of vessels with compressed air and for operation of pneumatic tools.



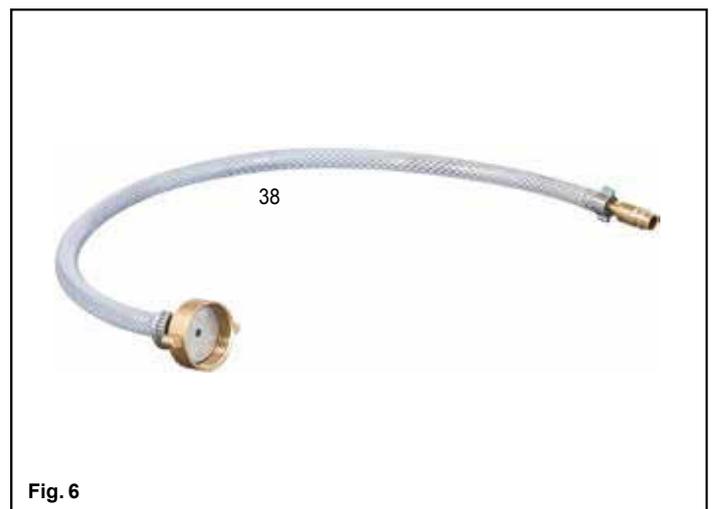
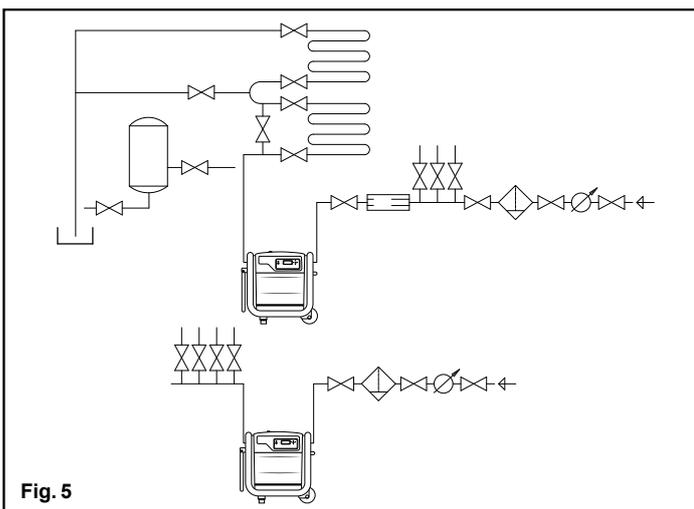
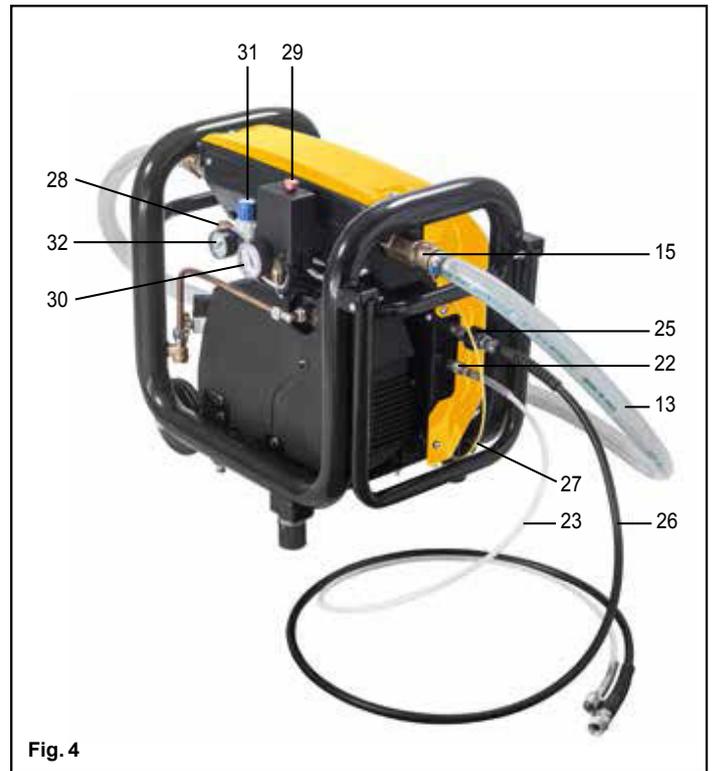
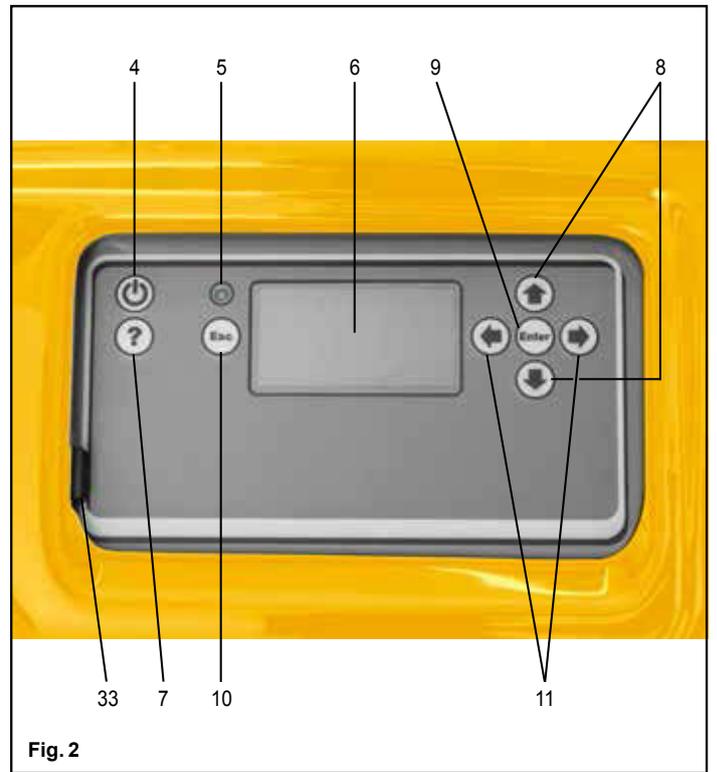
REMS

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MULTI-PUSH



Translation of the Original Instruction Manual

Fig. 1–6:

Fig. 1: View of inputs with operating panel and PRCD

Fig. 2: Operating panel of the input and control unit

Fig. 3: Connection to the water supply/installation

Fig. 4: View of outputs

Fig. 5: Flushing heating system/heating circuits

Fig. 6: Connecting hose compressor/water connections

- 1 Fault current circuit breaker PRCD
- 2 RESET button
- 3 TEST button
- 4 On/Off button
- 5 Control lamp
- 6 Screen (LCD)
- 7 "?" button
- 8 Arrow buttons ↑ ↓
- 9 Enter button
- 10 Esc button
- 11 Arrow buttons ← →
- 12 Fine filter
- 13 Suction/pressure hose
- 14 Flush supply
- 15 Flush drain
- 22 Output pressure test with compressed air, disinfection, cleaning, preservation, compressed air pump
- 23 Compressed air hose
- 24 Supply pressure test with water
- 25 Drain pressure test with water
- 26 High-pressure hose
- 27 Water drain pressure relief
- 28 Compressed air tools connection
- 29 Emergency stop button compressor
- 30 Pressure gauge compressed air tank
- 31 Compressed air tools pressure setting
- 32 Compressed air tools pressure gauge
- 33 USB connection
- 34 Condensation screw plug
- 35 Compressed air tank
- 36 Operating panel
- 37 Protective hood
- 38 Connection hose compressor/water connections
- 39 Control lamp PRCD

- c) Prevent unintentional starting. Ensure the switch is in the off-position before connecting to power source, picking up or carrying the tool. Carrying power tools with your finger on the switch or energising power tools that have the switch on invites accidents.
 - d) Remove any adjusting key or wrench before turning the power tool on. A wrench or a key left attached to a rotating part of the power tool may result in personal injury.
 - e) Do not overreach. Keep proper footing and balance at all times. This enables better control of the power tool in unexpected situations.
 - f) Dress properly. Do not wear loose clothing or jewellery. Keep your hair, clothing and gloves away from moving parts. Loose clothes, jewellery or long hair can be caught in moving parts.
- 4) Power tool use and care
- a) Do not force the power tool. Use the correct power tool for your application. The correct power tool will do the job better and safer at the rate for which it was designed.
 - b) Do not use the power tool if the switch does not turn it on and off. Any power tool that cannot be controlled with the switch is dangerous and must be repaired.
 - c) Disconnect the plug from the power source before making any adjustments, changing accessories, or storing power tools. Such preventive safety measures reduce the risk of starting the power tool accidentally.
 - d) Store idle power tools out of the reach of children and do not allow persons unfamiliar with the power tool or these instructions to operate the power tool. Power tools are dangerous in the hands of untrained users.
 - e) Maintain power tools. Check for misalignment or binding of moving parts, breakage of parts and any other condition that may affect the power tool's operation. If damaged, have the power tool repaired before use. Many accidents are caused by poorly maintained power tools.
 - f) Use power tools, accessories and insert tools etc. according to these instructions. Take the working conditions and activity being performed into consideration. The use of power tools for purposes for which they are not intended can lead to dangerous situations.
 - g) Keep handles dry, clean and free from oil and grease. Slippery handles prevent safe handling and control of the power tool in unexpected situations.
- 5) Service
- a) Have your power tool serviced by a qualified repair person using only identical replacement parts. This will ensure that the safety of the power tool is maintained.

Safety notes for the electronic flushing and pressure testing unit with compressor

WARNING

Read all safety warnings and all instructions. Failure to follow the warnings and instructions may result in electric shock, fire and/or serious injury.

Save all warnings and instructions for future reference.

- Never use the power tool without the PRCD fault current circuit breaker included. The use of a fault current circuit breaker reduces the risk of electric shock.
- The power tool develops very high pressures, in applications with compressed air of up to 1 MPa/10 bar/145 psi and in applications with water of up to 4 MPa/40 bar/580 psi. So be very careful. Keep third parties away from the work area when working with the electrical device.
- Do not use the power tool if it is damaged. There is a danger of accident.
- Examine the high-pressure hoses for damage every time before using. Damaged high-pressure hoses can burst and cause injury.
- Only use original high-pressure hoses, fittings and couplings for the power tool. This ensures that the safety of the device is maintained.
- Apply the power tool horizontally and dry for operation. Penetration of water into the electrical device increases the risk of electric shock.
- Do not aim liquid jet at the power tool, not even for cleaning. Penetration of water into the electrical device increases the risk of electric shock.
- Do not suck up inflammable or explosive liquids, for example petrol, oil, alcohol, solvent, with the power tool. The fumes or liquids can ignite or explode.
- Do not operate the power tool in rooms where there is a risk of explosion. The fumes or liquids can ignite or explode.
- Protect the power tool against frost. The device could be damaged. Let the power tool run empty for about 1 minute, if necessary, to drain off remaining water.
- Never let the power tool operate unattended. Switch the power tool off at the On/Off switch (4) and pull out the mains plug for longer work breaks. Electrical devices can cause hazards which lead to material damage or injury when left unattended.
- Do not operate the power tool on a closed pipe system for a prolonged period of time. The power tool could be damaged by overheating.
- Children and persons who, due to their physical, sensory or mental abilities or lack of experience and knowledge are unable to operate the power tool safely may not use this power tool without supervision or instruction by a responsible person. Otherwise there is a risk of operating errors and injuries.
- Only allow trained persons to use the power tool. Apprentices may only use the power tool when they are over 16, when this is necessary for their training and when they are supervised by a trained operative.
- Check the power cable of the electric air device and extension leads regularly for damage. Have these renewed by qualified experts or an authorised REMS customer service workshop in case of damage.

General Power Tool Safety Warnings

WARNING

Read all safety warnings and all instructions. Failure to follow the warnings and instructions may result in electric shock, fire and/or serious injury.

Save all warnings and instructions for future reference.

1) Work area safety

- a) Keep work area clean and well lit. Cluttered or dark areas invite accidents.
- b) Do not operate power tools in explosive atmospheres, such as in the presence of flammable liquids, gases or dust. Power tools create sparks which may ignite the dust or fumes.
- c) Keep children and bystanders away while operating a power tool. Distractions can cause you to lose control.

2) Electrical safety

- a) Power tool plugs must match the outlet. Never modify the plug in any way. Do not use any adapter plugs with earthed (grounded) power tools. Unmodified plugs and matching outlets will reduce risk of electric shock.
- b) Avoid body contact with earthed or grounded surfaces, such as pipes, radiators, ranges and refrigerators. There is an increased risk of electric shock if your body is earthed or grounded.
- c) Do not expose power tools to rain or wet conditions. Water entering a power tool will increase the risk of electric shock.
- d) Do not misuse the connecting cable to carry or hang up the power tool or to pull the plug out of the socket. Keep the connecting cable away from heat, oil, sharp edges or moving tool parts. Damaged or knotted cables increase the risk of electric shock.
- e) When operating a power tool outdoors, use an extension cord suitable for outdoor use. Use of a cord suitable for outdoor use reduces the risk of electric shock.
- f) If operating a power tool in a damp location is unavoidable, use a residual current device (RCD) protected supply. Use of an RCD reduces the risk of electric shock.

3) Personal safety

- a) Stay alert, watch what you are doing and use common sense when operating a power tool. Do not use a power tool while you are tired or under the influence of drugs, alcohol or medication. A moment of inattention while operating power tools may result in serious personal injury.
- b) Use personal protective equipment. Always wear eye protection. Protective equipment such as dust mask, non-skid safety shoes, hard hat, or hearing protection used for appropriate conditions will reduce personal injuries.

- Only use approved and appropriate marked extension leads with a sufficient cable cross-section at least with the protection class approved in 1.4. **Electrical data.** Use extension leads up to a length of 10 m with cable cross-section 1.5 mm², from 10–30 m with cable cross-section 2.5 mm².

Explanation of symbols

	Danger with a medium degree of risk which could result in death or severe injury (irreversible) if not heeded.
	Danger with a low degree of risk which could result in minor injury (reversible) if not heeded.
	Material damage, no safety note! No danger of injury.
	Read the operating manual before starting
	Use eye protection
	Use hand protection
	Power tool complies with protection class I
	Environmentally friendly disposal
	CE conformity mark

1. Technical data

Use for the intended purpose

WARNING

Only use the power tool for the purpose intended. Failure to do so can result in death or severe injury.

REMS Multi-Push is intended for

- **flushing drinking water installations with water** in accordance with EN 806-4:2010 and information leaflet T 84-2004 "Flushing, Disinfection and Commissioning of Drinking Water Installations" of the German Central Association for Sanitary, Heating and Air Conditioning and for flushing radiators and area heating systems.
- **flushing drinking water installations with a water/air mixture with intermittent compressed air** in accordance with EN 806-4:2010 and information leaflet T 84-2004 "Flushing, Disinfection and Commissioning of Drinking Water Installations" of the German Central Association for Sanitary, Heating and Air Conditioning and for flushing radiators and area heating systems.
- **flushing pipe systems with a water/air mixture with constant compressed air**
- **disinfection, cleaning and preservation:** disinfection of drinking water installations in accordance with EN 806-4:2010 and information leaflet T 84-2004 "Flushing, Disinfection and Commissioning of Drinking Water Installations" of the German Central Association for Sanitary, Heating and Air Conditioning and other pipe systems. cleaning and preservation of radiators and area heating systems. Use of different additives for disinfection, cleaning and preservation for different applications with a feed unit for feeding in the additives.
- **leak testing of drinking water installations with compressed air** in accordance with information leaflet T 82-2011 "Leak Testing of Drinking Water Installations" of the German Central Association for Sanitary, Heating and Air Conditioning and pressure and leak testing of other pipe systems and vessels.
- **load testing of drinking water installations with compressed air** in accordance with information leaflet T 82-2011 "Leak Testing of Drinking Water Installations" of the German Central Association for Sanitary, Heating and Air Conditioning and pressure and load testing of other pipe systems and vessels.
- **hydrostatic pressure testing of drinking water installations with water in accordance with EN 806-4:2010, Test Method A** and for pressure and leak testing of other pipe systems and vessels.
- **hydrostatic pressure testing of drinking water installations with water in accordance with EN 806-4:2010, Test Method B** or modified in accordance with information leaflet T 82-2011 "Leak Testing of Drinking Water Installations" of the German Central Association for Sanitary, Heating and Air Conditioning and pressure and leak testing of other pipe systems and vessels.
- **hydrostatic pressure testing of drinking water installations with water in accordance with EN 806-4:2010, Test Method C** and for pressure and leak testing of other pipe systems and vessels.
- **compressed air pump** for controlled filling of all types of vessels with compressed air ≤ 0.8 MPa/8 bar/116 psi,
- **operation of compressed air tools** up to an air requirements of ≤ 230 Nl/min

All other uses are not for the intended purpose and are therefore prohibited.

Attention: Use for the intended purpose also includes consideration and observance of the national safety provisions, rules and regulations valid for the application site, especially the following standards and rules of technology:

European standard EN 806-4:2010

Based on the currently valid European directive 98/83/EC "on the quality of water for human consumption", the European standard EN 806-4:2010 "Specifications for installations inside buildings conveying water for human consumption – Part 4: Installation" was adopted by the European Committee for Standardisation (CEN) on the 23rd of February 2010 and had to receive the status of a national standard in all European countries by September 2010. This standard defines Europe-wide regulations for the commissioning of drinking water installations, e.g. for filling, pressure testing, flushing and disinfection for the first time.

Section 6 of EN 806-4:2010 describes the "filling and hydrostatic pressure testing of installations inside buildings for water for human consumption". "Installations inside buildings must be subjected to pressure testing. This can be done either with water or, if national regulations allow, oil-free, clean air with low pressure or inert gases may be used. The possible risk from high gas or air pressure in the system must be considered." However, apart from this note, the standard EN 806-4:2010 contains no test criteria whatsoever for testing with compressed air.

Section 6.1 of EN 806-4:2010 offers 3 test methods A, B, C for hydrostatic pressure testing depending on the material and size of the installed pipes. The test methods differ in different test sequences, pressures and times.

Section 6.2 of EN 806-4:2010 refers to this: "The drinking water installation must be flushed with drinking water after installation and pressure testing as well as immediately before commissioning." "If a system is not put into operation immediately after commissioning, it must be flushed at regular intervals (up to 7 days)." Pressure testing with compressed air is recommended if this demand cannot be fulfilled.

Section 6.2.2. of EN 806-4:2010 describes flushing with water.

Section 6.2.3. of EN 806-4:2010 describes flushing with a water/air mixture.

Information leaflet T 82-2011 of the German Central Association for Sanitary, Heating and Air Conditioning

For Germany the information leaflet T 82-2011 "Leak Tests of Drinking Water Installations with Compressed Air, Inert Gas or Water" of the German Central Association for Sanitary, Heating and Air Conditioning defines the following for the national regulations under "3.1 General": "Due to the compressibility of gases, the rules for the prevention of accidents "Working on Gas Systems" and the "Technical Rules for Gas Installations DVGW-TRGI" must be observed for physical and safety reasons when conducting pressure tests with air. Therefore, the test pressures have been defined as maximum 0.3 MPa (3 bar), the same as for load and leak tests for gas pipes, in agreement with the responsible industrial liability insurance association and based on these rules. The national regulations are thereby fulfilled."

With regard to the test methods A, B and C offered in section 6.1 of EN 806-4:2010 for pressure testing with water, information leaflet T 82-2011 of the German Central Association for Sanitary, Heating and Air Conditioning defines the following for Germany: "For reasons of practicability on the building site, a modified method based on practical tests which can be used for all materials and combinations of materials was chosen. The test time has been extended in relation to the time specified in the standard to allow even the slightest leaks to be detected. Test method B in accordance with DIN EN 806-4 is the basis for conducting the leak test with water for all materials." The following is defined:

Leak testing with compressed air is to be conducted when

- a longer standstill time between the leak test and commissioning, especially at average ambient temperatures $> 25^{\circ}\text{C}$, is to be expected to rule out possible bacterial growth,
- the pipe system cannot remain completely full from the leak test to commissioning, e.g. during a frost period,
- the corrosion resistance of a material in a partially drained line is endangered

Leak testing with water can be conducted when

- changing of the water can be ensured at regular intervals, after seven days at the latest, from the time of the leak test to commissioning of the drinking water installation. Additionally when
- it is ensured that the house or building water connection is flushed and therefore released for connection and operation,
- the pipe system is filled using totally hygienic components,
- the system remains full from the leak test to commissioning and partial filling can be avoided.

Information leaflet T 84-2004 of the German Central Association for Sanitary, Heating and Air Conditioning

For Germany information leaflet T 84-2004 "Flushing, Disinfection and Commissioning of Drinking Water Installations" of the German Central Association for Sanitary, Heating and Air Conditioning confirms and extends the methods for flushing and disinfection of drinking water installations largely defined already in EN 806-4:2010. It deals in particular with chemical disinfectants and describes thermal disinfection.

Technical Rule – Worksheet DVGW W 557 (A) October 2012 of the German Association of the Gas and Water Trade

For Germany, further instructions for the "Cleaning and Disinfection of Drinking Water Installations" can be taken from the Technical Rule - Worksheet W 557 (A) October 2012 of the German Association of the Gas and Water Trade (DVGW).

1.1. Scope of Supply

REMS Multi-Push SL / SLW, electronic flushing and pressure testing unit with compressor,
2 suction/pressure hoses 1", 1.5 m long, with hose screw fittings 1",

1 compressed air hose 8 mm, 1.5 m long, with quick couplings DN 5, for pressure testing with compressed air,
 1 high-pressure hose ½", 1.5 m long, with hose screw fittings ½", for pressure testing with water (only REMS Multi-Push SLW)
 Operating instructions.

1.2. Article numbers

REMS Multi-Push SL, electronic flushing and pressure testing unit, pressure test with compressed air, without accessories	115600
REMS Multi-Push SLW, electronic flushing and pressure testing unit, pressure test with compressed air and water, without accessories	115601
Fine filter with filter cartridge 50 µm	115323
Fine filter cartridge 50 µm	043052
Connecting hose compressor/water connections	115618
Caps 1" with chain (REMS Multi-Push)	115619
Plugs 1" with chain (suction/pressure hoses)	115620
Plugs ½" with chain (REMS Multi-Push)	115624
Caps ½" with chain (high-pressure hose)	115623
Compressed air hose NW 7.2 for compressed air tools, with quick couplings NW 7.2	115621
Pressure gauge 6 MPa/60 bar /870 psi	115140
Fine scaled pressure gauge 1.6 MPa/16 bar/232 psi,	115045
Fine scaled pressure gauge 250 hPa/250 mbar/3.6 psi,	047069

1.3. Applications

Device storage temperature	≥ 5°C
Water temperature	5°C – 35°C
Ambient temperature	5°C – 40°C

Compressor

Operating pressure	≤ 0.8 MPa/8 bar/116 psi
Oil separation rate	oil-free
Extraction rate	≤ 230 Nl/min
Compressed air vessel volume (Fig. 1 (35))	4.9 l
Condensation and particle filter	5 µm

Flushing

Flushing water connections	DN 25, 1"
Water pressure pipe network	≤ 1 MPa/10 bar/145 psi
Water pressure when flushing with compressed air	≤ 0.7 MPa/7 bar/101 psi
Water flow rate	≤ 5 m³/h
Pipe diameter installation	≤ DN 50, 2"

Pressure test

Pressure test with compressed air	≤ 0.4 MPa/4 bar/58 psi
Reading accuracy < 200 mbar	1 hPa/1 mbar/0.015 psi
Reading accuracy ≥ 200 mbar	100 hPa/100 mbar/1.5 psi
Pressure test with water	≤ 1.8 MPa/18 bar/261 psi
Reading accuracy	0.02 MPa/0.2 bar/3 psi

1.4. Electrical/electronic data

	230 V~; 50 Hz; 1,500 W
	110 V~; 50 Hz; 1,500 W
Type of protection terminal box	IP 44
Type of protection device, motor	IP 20
Protection class	1
Operating mode (continuous operation)	S 1
Screen (LCD)	3.0"
Resolution	128 × 64 bits
Data transfer with USB stick	USB port

1.5. Dimensions L × W × H 570 × 370 × 530 mm (22.4" × 14.6" × 20.9")

1.6. Weight

REMS Multi-Push SL	36.7 kg (81 lb)
REMS Multi-Push SLW	39.0 kg (86 lb)

1.7. Noise information

Work place-related	
Emission value	L _{PA} = 84 dB(A); K = 3 dB

2. Start-up

2.1. Electrical connection

⚠ WARNING

Caution: Mains voltage present! Before connecting the electronic flushing and pressure testing unit, check whether the voltage given on the rating plate corresponds to the mains voltage. Only use sockets/extension leads with a functioning PE contact. The function of the PRCD fault current circuit breaker (Fig. 1 (1)) must be checked every time before start-up and before beginning work:

1. Plug the mains plug into the socket.
2. Press the RESET button (2), the PRCD control lamp (Fig. 1 (39)) lights red (operating state).
3. Pull out the mains plug, the PRCD control lamp (39) must go out.
4. Plug the mains plug back into the socket.
5. Press the RESET button (2), the PRCD control lamp (39) lights red (operating state).
6. Press the TEST button (3), the PRCD control lamp (39) must go out.
7. Press the RESET button (2) again, the PRCD control lamp (39) lights red. The control lamp (Fig. 2 (5)) lights green. REMS Multi-Push is ready for operation after about 10 s.

⚠ WARNING

If the described functions of the PRCD fault current circuit breaker (Fig. 1 (1)) are not fulfilled, the device may not be used. There is a danger of electric shock. The PRCD fault current circuit breaker tests the connected device, not the installation before the socket nor interconnected extension leads or cable reels.

On building sites, in a wet environment, indoors and outdoors or under similar installation conditions, only operate the electronic flushing and pressure testing unit on the mains with a fault current protection switch (FI switch) which interrupts the power supply as soon as the leakage current to earth exceeds 30 mA for 200 ms. A cable cross-section that corresponds to the power of the electronic flushing and pressure testing unit must be selected when using an extension lead. The extension lead must be approved for the protection class specified in 1.4 Electrical data.

Press the On/Off button on the input and control unit's operating panel (Fig. 2 (4)) for approx. 2 s, then release it. REMS Multi-Push is switched on and the compressor switches on. The screen (6) is illuminated and the REMS Multi-Push logo appears followed by the start menu:

Flushing
Disinfection
Testing
Compressed Air Pump
Memory Manager

2.2. Menu structure and on-screen displays

Five main programs of the REMS Multi-Push are displayed in the Start menu: Flushing, Disinfection, Testing, Compressed Air Pump, Memory Manager. The screen display contains a maximum 5 lines with 20 characters each. Lines with defaults or test values are displayed **language-independently** with physical formula symbols, a uniform verbal abbreviation and the value of the test criterion in the sub-routines. These have the following meanings:

p refer	bar xxx	reference test pressure	bar
p refer	mbar xxx	reference test pressure	mbar
p actual	bar xxx	actual test pressure	bar
p actual	mbar xxx	actual test pressure	mbar
p diff	bar xxx	differential test pressure	bar
p diff	mbar xxx	differential test pressure	mbar
t stabi	min xxx	stabilisation/wait time	min
t test	min xxx	test time	min
Δ > 10K		difference >10°C (10 Kelvin)	water/environment
PfS		press fitting system (ZVSHK)	
P+M		load test plastic + metal	
p H ₂ O	bar	water pressure	
v H ₂ O	m/s	minimum flow speed	
t H ₂ O	min	flushing time	
n H ₂ O	n-times	water change	
VA H ₂ O	l	volume of the flushing section	
VS H ₂ O	l/min	volume flow	
V H ₂ O	l	used water volume	
File no.		memory location no. for measuring log	
max. DN		largest rated diameter	
Enter		next screen display	
Esc		previous screen display or cancel	

2.3. Settings menu

NOTICE

The defaults for the different test criteria in the settings menu of the REMS Multi-Push are taken from EN 806-4:2010 or the information leaflet T 82-2011 of the German Central Association for Sanitary, Heating and Air Conditioning. All defaults for the test programs can be edited by the user in the Settings menu and in the Flushing, Test with compressed air, Test with water and Compressed Air Pump programs. Changes in the Settings menu are saved, i.e. they reappear the next time the REMS Multi-Push is switched on. If the defaults are only changed in one of the programs, the original defaults appear again the next time the REMS Multi-Push is switched on. Reset resets all defaults to factory settings and the language to German and the date, time, units formats to DD.MM.YYYY, 24 h, m / bar.

Attention: The user is solely responsible for transferred or newly entered test criteria (test sequences, pressures and times) or defaults in the individual programs and the conclusions from the tests.

The respective national safety provisions, rules and regulations valid for the application site must be considered and observed.

Before using the REMS Multi-Push, check whether the respective latest version software is installed on the input and control unit. Select the Settings menu and then Device data to display the version software. The latest version software (Ver. Software) for the input and control unit is available by USB stick as a download under www.rems.de → Downloads → Software. Compare the number of the version software with the latest version software number and install the latest version software on the input and control unit by means of a USB stick if necessary. REMS Multi-Push must be switched off for this, switch off with the On/Off button (Fig. 2 (4)) and pull out the mains plug if necessary. Insert the USB stick with the latest version software into the USB port (Fig. 2 (33)). Plug the mains plug into the socket. Press the Reset button (Fig. 1 (2)) of the PRCD fault current circuit breaker (1). The control lamp (5) lights green. The latest

version software is installed. When a USB stick with LED is used, the LED starts flashing. The installation is finished when the LED no longer flashes. If the USB stick has no LED, you should wait about 1 minute after switching on the PRCD. The latest version software is then installed on the input and control unit. Pull out the USB stick.

Before starting up for the first time, the language, date and time should be set in the Settings menu and the defaults for the individual programs checked and changed if necessary.

If the "?" button (Fig. 2 (7)) is pressed within 5 s after switching on the REMS Multi-Push, the Settings menu opens. The desired line is selected on the screen with the arrow buttons $\uparrow \downarrow$ (8). Displayed values can be changed with the arrow buttons $\leftarrow \rightarrow$ (11). The value is increased with the arrow pointing to the right and reduced with the arrow pointing to the left. The values change faster when the arrow buttons $\leftarrow \rightarrow$ (11) are kept pressed. If more than 5 lines in a subroutine are occupied, this is displayed by arrows $\blacktriangledown \blacktriangle$ in the top or bottom right hand corner of the screen respectively. The complete selection of the screen is confirmed with the Enter button (9) and the next screen appears.

The previous screen appears if the Esc button (10) is pressed during the setting. Already changed values are rejected.

If the Esc button (10) is pressed during the stabilisation/wait time (t stabi), the program aborts, the values (useless) are still saved, appear on the screen and "Cancel" appears additionally on the screen and possibly on the print strip.

If the Esc button (10) is pressed during the test time (t test), the values are still saved, appear on the screen and "Cancel" appears additionally on the screen and possibly on the print strip. In the test programs Enter provides a shortcut for the adaptation of p actual to p refer.

Select language, Enter:

Default German (deu) is preselected. Another language can be selected with the arrow buttons $\leftarrow \rightarrow$ (11), press Enter.

Select date, Enter:

Format "DD.MM.YYYY" is defaulted for the date. Another format for the date can be selected with the arrow buttons $\leftarrow \rightarrow$ (11). The next line on the screen is selected with the arrow buttons $\uparrow \downarrow$ (8) and the year or month or day can be selected with the arrow buttons $\leftarrow \rightarrow$ (11). Press Enter.

Select time, Enter:

Default "24 hours" is preselected. Another format for the time can be selected with the arrow buttons $\leftarrow \rightarrow$ (11). The next line on the screen is selected with the arrow buttons $\uparrow \downarrow$ (8) and hours or minutes can be selected with the arrow buttons $\leftarrow \rightarrow$ (11). Press Enter.

Select defaults \ units, Enter:

Default "m / bar" is preselected. Other units can be selected with the arrow buttons $\leftarrow \rightarrow$ (11).

Select Defaults \ Defaults \ Leak test with compressed air, Enter:

Check defaults, edit with arrow buttons $\uparrow \downarrow$ (8) or arrow buttons $\leftarrow \rightarrow$ (11) if necessary.

Select Defaults \ Defaults \ Load test with compressed air \ DN, Enter:

Check defaults, edit with arrow buttons $\uparrow \downarrow$ (8) or arrow buttons $\leftarrow \rightarrow$ (11) if necessary.

Select Defaults \ Defaults \ Test with water, method A or B or C, Enter:

Check defaults, edit with arrow buttons $\uparrow \downarrow$ (8) or arrow buttons $\leftarrow \rightarrow$ (11) if necessary.

Select device data, Enter:

Confirm last line "Reset" with Enter. Confirm the security prompt again with Enter. "Reset" resets all defaults to factory settings and the language to German (deu) and the date, time, units formats to "DD.MM.YYYY", "24 h", "m / bar".

2.4. Flushing programs

To flush pipe systems with water, with water/air mixture with intermittent compressed air and with water/air mixture with constant compressed air, REMS Multi-Push must be connected to the water supply or the manifold of the installation (Fig. 3) or to the heating system (Fig. 5) as follows:

To flush drinking water pipes after the house connection (water meter) (Fig. 3), fit the REMS fine filter (12) (Art. No. 115323) with filter cartridge 50 μm . Connect the suction/pressure hose (13) to the flushing supply (14) after the fine filter. Fit the second suction/pressure hose (13) to the flushing drain (Fig. 4 (15)) and connect to the installation to be flushed.

Proceed accordingly to flush heating systems (Fig. 5).

2.6. Testing programs

2.6.1. Leak and load test with compressed air in accordance with information leaflet T 82-2011 of the German Central Association for Sanitary, Heating and Air Conditioning

⚠ WARNING

For Germany the information leaflet T 82-2011 "Leak Tests of Drinking Water Installations with Compressed Air, Inert Gas or Water" of the German Central Association for Sanitary, Heating and Air Conditioning defines the following for the national regulations under "3.1 General":

"Due to the compressibility of gases, the rules for the prevention of accidents "Working on Gas Systems" and the "Technical Rules for Gas Installations DVGW-TRGI" must be observed for physical and safety reasons when conducting pressure tests with air. Therefore, the test pressures have been defined as

maximum 0.3 MPa/3 bar/43.5 psi, the same as for load and leak tests for gas pipes, in agreement with the responsible industrial liability insurance association and based on these rules. The national regulations are thereby fulfilled."

The respective national safety provisions, rules and regulations valid for the application site must be considered and observed.

Before conducting a test with compressed air, it must be assessed whether the installation to be tested will withstand the preset / selected test pressure "p refer".

Connect the compressed air hose (Fig. 4 (23)) to the output Pressure test with compressed air, Disinfection, Cleaning, Preservation, Compressed air pump (22) and connect the compressed air hose (23) to the installation to be tested.

2.6.2. Pressure and leak test with water in accordance with EN 806-4:2010 (only REMS Multi-Push SLW)

⚠ WARNING

The hydro-pneumatic water pump installed additionally in the REMS Multi-Push SLW for this test is fed by the built-in compressor of the REMS Multi-Push. The hydro-pneumatic water pump generates a water pressure of max. 1.8 MPa/18 bar/261 psi. Before conducting one of the tests with water according to method A, B, C, it must be assessed whether the installation to be tested will withstand the preset/selected test pressure "p refer".

Fit the REMS fine filter (12) (Art. No. 115323) with filter cartridge 50 μm after the house connection (water meter). Connect the suction/pressure hose (13) to the pressure test with water supply (Fig. 1 (24)) after the fine filter. Connect the high-pressure hose (26) to the pressure test with water drain (Fig. 4 (25)) and connect to the installation to be tested. Feed the pressure relief water drain (27) into a vessel (bucket).

2.7. Compressed air pump program

Vessels of all types can be pumped up with this program. Connect the compressed air hose (23) to the output Pressure test with compressed air, Disinfection, Cleaning, Preservation, Compressed air pump (Fig. 4 (22)) and connect it to the vessel to be pumped up, e.g. expansion vessel, tyre. The default is displayed as 0.02 MPa/0, 2 bar/3 psi.

2.8. Memory Manager program (data transfer)

The results of the flushing and test programs are saved with date, time and log number in the selected language and can be transferred to a USB stick or printer (neither of which is included in the scope of supply) for documentation.

2.9. Compressed air tools connection

Unlike the described "Compressed Air Pump" program in which the values are controlled by the electronic control, compressed air tools up to a max. air requirement of 230 Nl/min can be operated directly from the compressed air vessel at the compressed air tools connection (Fig. 4 (28)). A compressed air hose with quick couplings NW 7.2 must be used (available as an accessory).

3. Operation

Before using the REMS Multi-Push, check whether the respective latest version software is installed on the input and control unit. Select the Settings menu and then Device data to display the version software. The latest version software (Ver. Software) for the input and control unit is available by USB stick as a download under www.rems.de \rightarrow Downloads \rightarrow Software. Compare the number of the version software with the latest version software number and install the latest version software on the input and control unit by means of a USB stick if necessary. See 2.3 for the further procedure.

NOTICE

The defaults for the different test criteria (test sequences, pressures and times) in the settings menu of the REMS Multi-Push are taken from EN 806-4:2010 or the information leaflet T 82-2011 of the German Central Association for Sanitary, Heating and Air Conditioning. All defaults for the test programs can be edited by the user in the Settings menu and in the Flushing, Test with compressed air, Test with water and Compressed Air Pump programs. Changes in the Settings menu are saved, i.e. they reappear the next time the REMS Multi-Push is switched on. If the defaults are only changed in one of the programs, the original defaults appear again the next time the REMS Multi-Push is switched on. Reset resets all defaults to factory settings and the language to German (deu) and the date, time, units formats to DD.MM.YYYY, 24 h, m / bar.

Attention: The user is solely responsible for transferred or newly entered test criteria (test sequences, pressures and times) or defaults in the individual programs and the conclusions from the tests. Especially, the user must decide whether a prescribed stabilisation/wit time is ended and must confirm this by \downarrow Enter.

The respective national safety provisions, rules and regulations valid for the application site must be considered and observed.

The electronic memory of REMS Multi-Push holds 40 files (logs). As soon as a program has been selected from the Start menu and the selected data have been confirmed with Enter, a new file no. is created automatically even if the program is then aborted.g. with Esc. If the 40th memory location is occupied, the message "Last file no. available". After completing this process, all files should be copied to a USB stick via the USB port (Fig. 2 (33)). The oldest file no. in the memory is then overwritten when further files are saved.

Screen display (must be released by Enter):

000425	Consecutive file no. 000425
19.08.2013 10:13	Date 19.08.2013 Time 10:13 (creation of a new file no.)
Files 40/40	Files 40/40 (a max. of 40 files are saved)
Last file no. available	Last file no. available

3.1. Flushing of drinking water installations programs

The flushing methods "flushing with water" and "flushing with water/air mixture with pressure pulses" are described in EN 806-4:2010 and for Germany additionally in information leaflet T 84-2004 "Flushing, Disinfection and Commissioning of Drinking Water Installations" of the German Central Association for Sanitary, Heating and Air Conditioning. REMS Multi-Push additionally offers the flushing program "flushing with water/air mixture with constant compressed air".

Excerpt from EN 806-4:2010, 6.2.1. "The drinking water installation must be flushed with drinking water after installation and pressure testing as well as immediately before commissioning." "If a system is not put into operation immediately after commissioning, it must be flushed at regular intervals (up to 7 days)."

3.1.1. Flushing with water program (without air supply)

In accordance with EN 806-4:2010 and information leaflet T 84-2004 of the German Central Association for Sanitary, Heating and Air Conditioning, the drinking water used for flushing must be filtered whereby particles $\geq 150 \mu\text{m}$ must be held back and the water must be perfectly fit for drinking (REMS fine filter with filter cartridge $50 \mu\text{m}$, Art. No. 115323). The system must be flushed section for section depending on the size of the installation and the arrangement and lay of the pipes. The minimum flow velocity when flushing the installation must be 2 m/s and the water in the system must be replaced at least 20 times during flushing.

For Germany the following is prescribed additionally among other things in the information leaflet T 84-2004 of the German Central Association for Sanitary, Heating and Air Conditioning: "Flushing will take place floor by floor from the end of the rise pipe. Within the floor and single lines, at least as many tapping points as listed in Table 1 as a recommended value for a flushing section will be fully opened for at least 5 minutes floor by floor.

Greatest rated width of the pipe in the flushed section, DN	25	32	40	50
<i>Greatest rated width of the pipe in the flushed section, in inches</i>	<i>1"</i>	<i>1¼"</i>	<i>1½"</i>	<i>2"</i>
Minimum number of tapping points to be opened DN 15 (½")	2	4	6	8

Table 1: Recommended value for the minimum number of tapping points to be opened related to the greatest rated width of the distribution line" (Information leaflet T 84-2004 of the German Central Association for Sanitary, Heating and Air Conditioning, lines in italics added, limiting to DN 50)

REMS Multi-Push displays the achieved flow velocity and the achieved water change on the screen among other things.

Program sequence $\uparrow \downarrow$ (8):

1. Flush \ Enter
2. without compressed air \ Enter
3. Check default max. DN according to table 1 and change if necessary (11) \ \downarrow
4. Enter water volume of the flushing section VA H₂O (0-999 l) \ Enter
5. Open the water supply. The values flash as long as the minimum flow velocity $v \text{ H}_2\text{O} = 2 \text{ m/s}$ and the water change $n \text{ H}_2\text{O} = 20$ have not been reached. On reaching the values \ Enter (If the defaults $v \text{ H}_2\text{O}$ and $n \text{ H}_2\text{O}$ are not reached: \ Esc = cancel, clarify the cause, repeat the process)
6. Display screen: Water pressure (p H₂O), minimum flow velocity (v H₂O), flushing time (t H₂O), water change (n H₂O), volume of used water (V H₂O) \ Enter
7. Esc >> Start menu \ Memory Manager, data transfer >> 3.6

3.1.2. Flush with water/air mixture with intermittent compressed air program

The cleaning effect by flushing can be reinforced by adding compressed air. In accordance with EN 806-4:2010 and information leaflet T 84-2004 of the German Central Association for Sanitary, Heating and Air Conditioning, the drinking water used for flushing must be filtered whereby particles $\geq 150 \mu\text{m}$ must be held back and the water must be perfectly fit for drinking (REMS fine filter with filter cartridge $50 \mu\text{m}$, Art. No. 115323). "The pipe system can be flushed under pressure with a drinking water/air mixture intermittently with a minimum flow velocity in every pipe section of 0.5 m/s. A certain minimum number of tap fittings must be opened for this. If the minimum volume flow is not reached with full filling of the distribution pipe in a section of the pipe system to be flushed, a storage tank and a pump must be used for flushing." "The system must be flushed section by section depending on the size of the installation and the lay of the pipes. No flushing section may exceed a pipe section length of 100 m."

Greatest rated width of the pipe in the flushed section, DN	25	32	40	50
<i>Greatest rated width of the pipe in the flushed section, in inches</i>	<i>1"</i>	<i>1¼"</i>	<i>1½"</i>	<i>2"</i>
Minimum volume flow with fully filled pipe section, l/min	15	25	38	59
Minimum number of DN 15 (½") tapping points to be opened fully or a corresponding cross-sectional area	1	2	3	4

Table 2: Recommended minimum flow and minimum number of tapping points depending on the greatest rated diameter of the pipe in the flushed section which must be opened for the flushing process (for a minimum flow velocity of 0.5 m/s)"

(EN 806-4:2010, lines in italics added, limiting to DN 50).

The manual actuation of the setting fittings for the supply of intermittent compressed air described in EN 806-4:2010 and in the information leaflet T 84-2004 "Flushing, Disinfection and Commissioning of Drinking Water Installations" of the German Central Association for Sanitary, Heating and Air Conditioning takes place automatically in REMS Multi-Push. The compressed air is fed with an excess pressure of 0.5 bar above the measured water pressure. The compressed air supply lasts 5 s, the stagnation phase (without compressed air) lasts 2 s.

REMS Multi-Push displays the achieved flow velocity and the achieved volume flow on the screen among other things.

Program sequence $\uparrow \downarrow$ (8):

1. Flush \ Enter
2. Intermittent compressed air \ Enter
3. Check default max. DN according to table 2 and change if necessary (11) \ \downarrow
4. Enter water volume of the flushing section VA H₂O (0-999 l) (11) \ Enter
5. Open the water supply. If the minimum flow velocity $v \text{ H}_2\text{O} = 0,5 \text{ m/s}$, the minimum volume flow VS H₂O and the flushing time are reached \ Enter The flushing time (according to information leaflet T 84-2004 "Flushing, Disinfection and Commissioning of Drinking Water Installations" of the German Central Association for Sanitary, Heating and Air Conditioning) depends on the pipe length and should not drop below 15 s per metre. The flushing time must be at least 2 minutes per tapping point. (If the defaults $v \text{ H}_2\text{O}$ and VS H₂O are not reached: \ Esc = cancel, clarify the cause, repeat the process)
6. Display screen: Water pressure (p H₂O), minimum flow velocity (v H₂O), flushing time (t H₂O), volume of used water (V H₂O), volume flow (VS H₂O) \ Enter
7. Esc >> Start menu \ Memory Manager, data transfer >> 3.6

3.1.3. Flush with water/air mixture with constant compressed air program

The compressed air is fed continuously with an excess pressure of 0.5 bar above the measured water pressure in this program. The compressed air pulses in the program 3.1.2. flushing with water/air mixture with intermittent compressed air" are omitted here. Although these considerably improve the cleaning effect, they subject the pipes to greater stress. If there are any reservations about the strength of the pipes to be flushed, this program at least achieves an improvement of the cleaning effect in comparison with program 3.1.1. flushing with water (without air supply)" by a jolt-free turbulence due to the constantly fed compressed air.

REMS Multi-Push displays the used water volume on the screen among other things.

Program sequence $\uparrow \downarrow$ (8):

1. Flush \ Enter
2. Continuous air flow \ Enter
3. Check default max. DN according to table 2 and change if necessary (11) \ \downarrow
4. Enter water volume of the flushing section VA H₂O (0-999 l) (11) \ Enter
5. Open the water supply. To exit \ Enter, (\ Esc = cancel)
6. Display screen: Water pressure (p H₂O), flushing time (t H₂O), used water volume (V H₂O) \ Enter
7. Esc >> Start menu \ Memory Manager, data transfer >> 3.6

3.3. Testing drinking water installations with compressed air program

WARNING

For Germany the information leaflet T 82-2011 "Leak Tests of Drinking Water Installations with Compressed Air, Inert Gas or Water" of the German Central Association for Sanitary, Heating and Air Conditioning defines the following for the national regulations under "3.1 General":

"Due to the compressibility of gases, the rules for the prevention of accidents "Working on Gas Systems" and the "Technical Rules for Gas Installations DVGW-TRGI" must be observed for physical and safety reasons when conducting pressure tests with air. Therefore, the test pressures have been defined as maximum 0.3 MPa/3 bar/43.5 psi, the same as for load and leak tests for gas pipes, in agreement with the responsible industrial liability insurance association and based on these rules. The national regulations are thereby fulfilled."

The respective national safety provisions, rules and regulations valid for the application site must be considered and observed.

Before conducting a test with compressed air, it must be assessed whether the installation to be tested will withstand the preset / selected test pressure "p refer".

Section 6. of EN 806-4:2010 defines among other things that: "Installations inside buildings must be subjected to pressure testing. This can be done either with water or, if national regulations allow, oil-free, clean air with low pressure or inert gases may be used. The possible risk from high gas or air pressure in the system must be considered." However, apart from this note, the standard EN 806-4:2010 contains no test criteria whatsoever for testing with compressed air.

The tests described below and the defaults stored in the REMS Multi-Push correspond to the information leaflet T 82-2011 of the German Central Association for Sanitary, Heating and Air Conditioning. Future changes to this information leaflet or the respective valid provisions, rules and regulations for the application site must be considered and changed test criteria (test sequences, pressures and times) must be corrected in the defaults.

The programs can be aborted at any time with the Esc button (10). Then all the valves open and the pressure in the installation is released. The tests are saved but "Cancel" is shown in the file.

3.3.1. Leak test with compressed air (ZVSHK)

Test pressure 150 hPa (150 mbar)

Program sequence ↑ ↓ (8):

1. Test \ Enter
2. Test with compressed air \ Enter
3. Leak test \ Enter
4. Check reference test pressure default (p refer) and change if necessary (11) \ ↓
5. Check stabilisation default (t stabi) and change if necessary (11) \ ↓
6. Check test time default (t test) and change if necessary (11) \ ↓
7. Actual test pressure (p actual) is adjusted to reference test pressure (p refer) \ Enter
8. Stabilisation/wait time (t stabi) running, actual test pressure (p actual) is changed to reference test pressure (p refer) on expiring. The stabilisation/wait time can be ended prematurely with Enter, the test time (t test) then begins immediately (\ Esc = cancel).
9. Display screen: Reference test pressure (p refer), actual test pressure (p actual), differential test pressure (p diff), test time (t test) \ Enter
10. Esc >> Start menu \ Memory Manager, data transfer >> 3.6

3.3.2. Load test with compressed air ≤ DN 50 (ZVSHK)

Test pressure 0.3 MPa (3 bar)

Program sequence ↑ ↓ (8):

1. Test \ Enter
2. Test with compressed air \ Enter
3. Load test ≤ DN 50 \ Enter
See leak test 4. to 10. for further procedure

3.3.3. Load test with compressed air > DN 50 (ZVSHK)

Test pressure 0.1 MPa (1 bar)

Program sequence ↑ ↓ (8):

1. Test \ Enter
2. Test with compressed air \ Enter
3. Load test > DN 50 \ Enter
See leak test 4. to 10. for further procedure

3.4. Testing drinking water installations with water programs (only REMS Multi-Push SLW)

Section 6.1 of EN 806-4:2010 offers 3 test methods A, B, C for hydrostatic pressure testing depending on the material and size of the installed pipes. The test methods differ in different test sequences, pressures and times.

For Germany, the information leaflet T 82-2011 "Leak Tests of Drinking Water Installations with Compressed Air, Inert Gas or Water" of the German Central Association for Sanitary, Heating and Air Conditioning, the following is defined with regard to the test methods A, B, C for pressure testing with water offered in section 6.1 of EN 806-4:2010: ""For reasons of practicability on the building site, a modified method based on practical tests which can be used for all materials and combinations of materials was chosen. The test time has been extended in relation to the time specified in the standard to allow even the slightest leaks to be detected. Test method B in accordance with DIN EN 806-4 is the basis for conducting the leak test with water for all materials." The following is defined:

Leak testing with water can be conducted when

- changing of the water can be ensured at regular intervals, after seven days at the latest, from the time of the leak test to commissioning of the drinking water installation. Additionally when
- it is ensured that the house or building water connection is flushed and therefore released for connection and operation,
- the pipe system is filled using totally hygienic components,
- the system remains full from the leak test to commissioning and partial filling can be avoided.

WARNING

The hydro-pneumatic water pump installed additionally in the REMS Multi-Push

SLW for these tests is fed by the built-in compressor of the REMS Multi-Push. The hydro-pneumatic pump generates a water pressure of max. 1.8 MPa/18 bar/261 psi. Before conducting one of the tests with water A, B, C, it must be assessed whether the installation to be tested will withstand the preset/selected test pressure "p refer".

CAUTION

Before disconnecting the high-pressure hose (26) from the pressure test with water drain (25) or from the drinking water installation, make sure that the pressure has been totally relieved.

The programs can be aborted at any time with the Esc button (10). Then all the valves open and the pressure in the installation is released. The tests are saved but "Cancel" is shown in the file.

3.4.1. Pressure test with water, test method A (EN 806-4:2010, 6.1.3.2)

Program sequence ↑ ↓ (8):

1. Test \ Enter
2. Test with water \ Enter
3. Test with water A \ Enter
4. Check reference test pressure default (p refer) and change if necessary (11) \ ↓
5. Check stabilisation default (t stabi) and change if necessary (11) \ ↓
6. Check test time default (t test) and change if necessary (11) \ ↓
7. Actual test pressure (p actual) is adjusted to reference test pressure (p refer) \ Enter
8. Stabilisation/wait time (t stabi) running, actual test pressure (p actual) is changed to reference test pressure (p refer) on expiring. The stabilisation/wait time can be ended prematurely with Enter, the test time (t test) begins immediately (\ Esc = cancel).
9. Display screen: Reference test pressure (p refer), actual test pressure (p actual), differential test pressure (p diff), test time (t test) \ Enter
10. Esc >> Start menu \ Memory Manager, data transfer >> 3.6

3.4.2. Pressure test with water, test method Δ>10K (B/1): Temperature compensation (EN 806-4:2010, 6.1.3.3)

Program sequence ↑ ↓ (8):

1. Test \ Enter
2. Test with water \ Enter
3. Test with water B \ Enter
4. Test Δ>10K (B/1) \ Enter
5. Check reference test pressure default (p refer) and change if necessary (11) \ ↓
6. Check stabilisation default (t stabi) and change if necessary (11) \ ↓
7. Check test time default (t test) and change if necessary (11) \ ↓
8. Actual test pressure (p actual) is adjusted to reference test pressure (p refer) \ Enter
9. Stabilisation/wait time (t stabi) running, actual test pressure (p actual) is changed to reference test pressure (p refer) on expiring. The stabilisation/wait time can be ended prematurely with Enter, test time (t test) \ Enter (\ Esc = cancel).
10. Display screen: Reference test pressure (p refer), actual test pressure (p actual), differential test pressure (p diff), test time (t test) \ Enter
11. Esc >> Start menu \ Memory Manager, data transfer >> 3.6

3.4.3. Pressure test with water, test method Pfs (B/2): Press connections unpressed leaking (information leaflet T 82-2011 of the German Central Association for Sanitary, Heating and Air Conditioning, supplement to EN 806-4:2010, 6.1.3.2.)

Program sequence ↑ ↓ (8):

1. Test \ Enter
2. Test with water \ Enter
3. Test with water B \ Enter
4. Test Pfs (B/2) \ Enter
5. Check reference test pressure default (p refer) and change if necessary (11) \ ↓
6. Check test time default (t test) and change if necessary (11) \ ↓
7. Actual test pressure (p actual) is adjusted to reference test pressure (p refer) \ Enter, test time (t test) begins immediately (\ Esc = cancel)
8. Display screen: Reference test pressure (p refer), actual test pressure (p actual), differential test pressure (p diff), test time (t test) \ Enter
9. Esc >> Start menu \ Memory Manager, data transfer >> 3.6

3.4.4. Pressure test with water, test method P+M (B/3): Plastic and metal pipe systems (EN 806-4:2010, 6.1.3.3 and information leaflet T 82-2011 of the German Central Association for Sanitary, Heating and Air Conditioning)

Program sequence ↑ ↓ (8):

1. Test \ Enter
2. Test with water \ Enter
3. Test with water B \ Enter
4. Test P+M (B/3) \ Enter
5. Check reference test pressure default (p1 refer) and change if necessary (11) \ ↓
6. Check reference test pressure default (p2 refer) and change if necessary (11) \ ↓
7. Check test time default (t1 test) and change if necessary (11) \ ↓
8. Check test time default (t2 test) and change if necessary (11) \ ↓

9. Actual test pressure (p1 actual) is adjusted to reference test pressure (p1 refer) \ Enter, test time (t1 test) begins immediately (\ Esc = cancel)
10. Actual test pressure (p2 actual) is adjusted to reference test pressure (p2 refer) \ Enter, test time (t2 test) begins immediately (\ Esc = cancel)
11. Display screen: Reference test pressure (p1 refer), actual test pressure (p1 actual), differential test pressure (p1 diff), test time (t1 test)
Reference test pressure (p2 refer), actual test pressure (p2 actual), differential test pressure (p2 diff), test time (t2 test) \ Enter
12. Esc >> Start menu \ Memory Manager, data transfer >> 3.6

3.4.5. Pressure test with water, test method C (EN 806-4:2010, 6.1.3.4)

Program sequence ↑ ↓ (8):

1. Test \ Enter
2. Test with water \ Enter
3. Test with water C \ Enter
4. Check reference test pressure default (p refer) and change if necessary (11) \ ↓
5. Check stabilisation default (t0 stabi) and change if necessary (11) \ ↓
6. Check test time default (t1 test) and change if necessary (11) \ ↓
7. Check test time default (t2 test) and change if necessary (11) \ Enter
8. Actual test pressure (p0 actual) is adjusted to reference test pressure (p refer) \ Enter
9. Stabilisation/wait time (t stabi) running, actual test pressure (p actual) is changed to reference test pressure (p refer) on expiring. The stabilisation/wait time can be ended prematurely with Enter, the test time (t1 test) begins immediately followed by test time (t2 test) (\ Esc = cancel).
10. Display screen: Reference test pressure (p refer), actual test pressure (p0 actual), differential test pressure (p0 diff), test time (t0 test)
Actual test pressure (p1 actual), differential test pressure (p1 diff), test time (t1 test) actual test pressure (p2 actual), differential test pressure (p2 diff), test time (t2 test) \ Enter
11. Esc >> Start menu \ Memory Manager, data transfer >> 3.6

3.5. Compressed air pump program

The pressure is displayed and controlled to the reference test pressure (p refer) selected on the screen in the range from 200 to 0 descending in hPa (mbar, psi) and in the range from 0.2 to 8.0 ascending in MPa (bar, psi).

Program sequence ↑ ↓ (8):

1. Compressed air pump \ Enter
2. Check reference test pressure default (p refer) and change if necessary (11) \ Enter
3. The vessel is pumped up to the reference test pressure (p refer).
4. Esc >> Start menu \ Memory Manager, data transfer >> 3.6

The pressure of a vessel that is already under pressure is specified as p actual after connecting the vessel.

The program can be aborted at any time with the Esc button (10). Then all the valves open and the pressure is released. The pump-up is saved but "Cancel" is shown in the file.

3.6. Memory Manager, data transfer, logging

Four functions are provided for memory management:

- Display saved results of the flushing and testing programs
- Print saved results of the flushing and test programs on a printer. Plug in the printer at the USB port (Fig. 2 (33)).
- Delete saved results of the flushing and testing programs
- Save results of the flushing and test programs on a USB stick. Plug in the USB stick at the USB port (Fig. 2 (33)).

Display / Pressure
Delete file no.
Delete all files
Save USB

The results of the flushing and test programs are saved with date, time and log number in the selected language and can be transferred to a USB stick or printer (neither of which is included in the scope of supply) for documentation. Necessary additions to saved data, e.g. customer name, project number, tester, are possible on external devices (e.g. PC, laptop, tablet PC, smartphone).

3.7. Operation of compressed air tools

Compressed air tools can be operated up to a max. air requirement of 230 Nl/min can be operated directly from the compressed air vessel. The air pressure supplied by the compressed air vessel can be checked on the compressed air vessel pressure gauge (Fig. 4 (30)). The compressor can be switched off at any time with the compressor emergency stop button (Fig. 4 (29)). The adjusting wheel must be raised to set the pressure of compressed air tools (Fig. 4 (31)). The set pressure can be read at the compressed air tools pressure gauge (Fig. 4 (32)).

3.8. Transport and storage

Completely drain the electronic flushing and pressure testing unit and the hoses to avoid damage; store at ≥ 5°C and dry. Water residue from flushing or from the pressure test with water can be removed with the compressor/water connections connecting hose (Fig. 5 (38) (accessories)). This connected to the compressed air tools connection on one side (Fig. 4 (28)) and respectively to the flushing supply (Fig. 1 (14)) or the pressure test with water supply on the other side (Fig. 1 (24)). See 3.7 for the further procedure.

The water connections on the tool and the hoses should be sealed by caps or plugs to prevent contamination.

4. Maintenance

4.1. Inspection

WARNING

Pull out the mains plug before inspection! Check hoses and seals for damage before every use. Do not use damaged hoses and seals.

4.2. Maintenance

WARNING

Pull out the mains plug before maintenance work! The tank of the condensation and particle filter in the electronic flushing and pressure testing unit with compressor must be checked regularly and emptied if necessary. The filter cartridge must be cleaned and replaced if necessary. Loosen the 6 screws of the protective hood (Fig. 1 (37)) to do this, remove the protective hood. Keep all the hose connections clean. Open both condensation screw plugs (Fig. 1 (34)) from time to time to drain condensation from the compressed air tank (Fig. 1 (35)).

In order to ensure that the date and time remain saved at all times, the button cell (Lithium CR1220, 3 V) on the back of the operating panel (Fig. 1 (36)) should be changed about every two years. Loosen the 6 screws of the protective hood (Fig. 1 (37)) to do this, remove the protective hood. Then loosen the 4 screws of the operating panel and change the button cell on the back of the operating panel.

Clean plastic parts (e.g. housing) only with REMS CleanM machine cleaner (Art. No. 140119) or a mild soap and a damp cloth. Do not use household cleaners. These often contain chemicals which can damage the plastic parts. Never use petrol, turpentine, thinner or similar products for cleaning.

Make sure that liquids cannot get inside the electronic flushing and pressure testing unit with compressor.

4.3. Repair

WARNING

Pull out the mains plug before doing maintenance work! This work may only be performed by qualified personnel.

5. Fault

NOTICE

If faults occur, first check whether the respective latest version software (Ver. Software) is installed on the input and control unit. Select the Settings menu and then Device data to display the version software. The latest version software (Ver. Software) for the input and control unit is available by USB stick as a download under www.rems.de → Downloads → Software. Compare the number of the version software with the latest version software number and install the latest version software on the input and control unit by means of a USB stick if necessary. See 2.3 for the further procedure.

5.1. Fault: Electronic flushing and pressure testing unit with compressor does not switch on after pressing the On/Off button (4).

Cause:

- On/Off button (Fig. 2 (4)) pressed too briefly.
- PRCD fault current circuit breaker (Fig. 1 (1)) is not switched on.
- Mains lead/PRCD defective.
- Electronic flushing and pressure testing unit with compressor defective.

Remedy:

- Press On/Off button for about 2 s, then release.
- Switch on PRCD fault current circuit breaker as described in 2.1..
- Have the mains lead/PRCD changed by qualified personnel or an authorised REMS customer service workshop.
- Have the electronic flushing and pressure testing unit with compressor checked/repaired by an authorised REMS customer service workshop.

5.2. Fault: Compressor will not start although there is low or no pressure in the compressed air tank (see the display on the compressed air tank pressure gauge (Fig.4 (30)).

Cause:

- Compressor emergency stop button (Fig.4 (29)) is switched off.
- Electronic flushing and pressure testing unit with compressor defective.

Remedy:

- Switch on compressor by pulling out the emergency stop button.
- Have the electronic flushing and pressure testing unit with compressor checked/repaired by an authorised REMS customer service workshop.

5.3. Fault: The necessary minimum flow velocity is not achieved in the flushing program.

Cause:

- Stop tap of the house connection is only partly open.
- Fine filter (Fig. 3 (12)) is contaminated.
- Not enough tapping points opened.
- Hoses connected incorrectly.
- Wrong defaults entered.
- Valves blocked, considerable, irremovable encrustations in the pipes.

Remedy:

- Fully open the stop tap.
- Clean or change the fine filter and filter cartridge.
- Open the appropriate number of tapping points.
- Connect hoses as shown in Fig. 3.
- Check defaults, correct if necessary. Restart the program.
- Clean/change valve(s). Clear encrustations.

5.5. Fault: The set pressure (p refer) is not reached in the test with compressed air or compressed air pump programs.

Cause:

- Installation or compressed air hose (Fig. 4 (23)) leaking.
- No or too little pressure in the compressed air tank.
- Electronic flushing and pressure testing unit with compressor defective.

Remedy:

- Check installation for leaks. Change the compressed air hose.
- See 5.2. Fault:
- Have the electronic flushing and pressure testing unit with compressor checked/repaired by an authorised REMS customer service workshop.

5.6. Fault: The set pressure (p refer) is not established in the test with water program (only Multi-Push SLW).

Cause:

- Suction/pressure hose (Fig. 1 (13)) or high-pressure hose (Fig. 4 (26)) leaking.
- Hydro-pneumatic pump does not build up pressure.
- Stop tap of the water supply is closed or only partly open.
- No or too little air pressure in the compressed air tank.
- Electronic flushing and pressure testing unit with compressor defective.

Remedy:

- Change suction/pressure hose or high-pressure hose.
- Connect suction/pressure hose between the house connection and the pressure test with water supply, see 2.6.2.
- Fully open the stop tap.
- Hydro-pneumatic pump requires compressed air, see 5.2. Fault:
- Have the electronic flushing and pressure testing unit with compressor checked/repaired by an authorised REMS customer service workshop.

5.7. Fault: The pressure in the pipe to be tested is not relieved after running the test with water programs or during the test with water B, P+M.

Cause:

- Pressure relief water drain (Fig. 4 (27)) is soiled or defective.
- Electronic flushing and pressure testing unit with compressor defective.

Remedy:

- Clean the pressure relief water drain or have it replaced by qualified personnel or an authorised REMS customer service workshop.
- Have the electronic flushing and pressure testing unit with compressor checked/repaired by an authorised REMS customer service workshop.

5.8. Fault: The date and time must be reset every time the electronic flushing and pressure testing unit with compressor is switched on.

Cause:

- Battery depleted.

Remedy:

- Change battery. See 4.2.

5.9. Fault: The new version software was not installed.

Cause:

- USB stick not recognised.
- New version software is not on the USB stick.
- The USB stick was pulled out of the USB port (Fig. 2 (33)) during the installation.
- A folder was created on the USB stick and the new version software was copied into this folder.

Remedy:

- Use another USB stick.
- Copy new version software to the USB stick.
- Repeat the procedure described in 2.3.. Use a USB stick with a LED if possible.
- Move the new version software into the main directory of the USB stick.

6. Disposal

The electronic flushing and testing unit with compressor may not be thrown in the domestic waste at the end of its useful life. It must be disposed of properly by law.

7. Manufacturer's Warranty

The warranty period shall be 12 months from delivery of the new product to the first user. The date of delivery shall be documented by the submission of the original purchase documents, which must include the date of purchase and the designation of the product. All functional defects occurring within the warranty period, which are clearly the consequence of defects in production or materials, will be remedied free of charge. The remedy of defects shall not extend or renew the warranty period for the product. Damage attributable to natural wear and tear, incorrect treatment or misuse, failure to observe the operational instructions, unsuitable operating materials, excessive demand, use for unau-

thorized purposes, interventions by the customer or a third party or other reasons, for which REMS is not responsible, shall be excluded from the warranty. Services under the warranty may only be provided by customer service stations authorized for this purpose by REMS. Complaints will only be accepted if the product is returned to a customer service station authorized by REMS without prior interference in an unassembled condition. Replaced products and parts shall become the property of REMS.

The user shall be responsible for the cost of shipping and returning the product.

The legal rights of the user, in particular the right to make claims against the seller under the warranty terms, shall not be affected. This manufacturer's warranty only applies for new products which are purchased in the European Union, in Norway or in Switzerland.

This warranty is subject to German law with the exclusion of the United Nations Convention on Contracts for the International Sales of Goods (CISG).